ACOPOSmulti

User's Manual

Version: **1.10 (April 2018)**
Model no.: **MAACPM-ENG**

Translation of the original manual

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Chapter 1: General information

Chapter 2: Technical data

Chapter 3: Installation

Chapter 4: Dimensioning

Chapter 5: Wiring

Chapter 6: Safety technology

Chapter 7: Standards and certifications

Appendix A: ACOPOSmulti overload characteristics

Appendix B: Accessories included in delivery

Appendix C: UL markings

Chapter 1 General information 21

1 Manual history 21
2 ACOPOSmulti 24
2.1 The drive system for maximum customer benefits 24
2.2 Trend-setting power supply 24
2.3 Handling power failures safely 24
2.4 Outstanding usability 25
2.5 Compact, scalable performance 25
2.6 Modular cooling system 26
2.7 Wiring made easy 27
2.8 Intelligent power supply modules 28
2.9 Integrated 24V auxiliary supply modules 29
2.10 Scalable inverter modules 30
2.11 Accurate encoder plug-in modules 31
2.12 100% software compatibility with the well-established ACOPOS drive generation 31
3 ACOPOSmulti configurations 32
3.1 ACOPOSmulti drive systems in a POWERLINK network 32
3.1.1 Recommended topology for POWERLINK networks 32
3.2 Compact, modular motion control applications 33
3.3 Extensive, modular motion control applications with up to 253 axes 33
3.4 Modular motion control applications with up to 253 axes and a visualization system 34
4 Safety guidelines 35
4.1 Organization of notices 35
4.2 General information 35
4.3 Intended use 35
4.4 Protection against electrostatic discharge 36
4.4.1 Packaging 36
4.4.2 Guidelines for proper ESD handling 36
4.5 Transport and storage 36
4.6 Handling and installation 37
4.7 Operation 37
4.7.1 Protection against touching electrical parts 37
4.7.2 Protection against hazardous movements 38
4.8 Characteristic values for functional safety 39
4.9 Environmentally friendly disposal 39
4.9.1 Separation of materials 39

Chapter 2 Technical data 41

1 Configuration of an ACOPOSmulti drive system 41
2 Status indicators 42
2.1 8B0P power supply modules 42
2.1.1 LED status indicators 42
2.1.2 LED status ERROR 42
2.2 8BVP power supply modules 43
2.2.1 LED status indicators 43
2.3 8B0C auxiliary supply modules 44
2.3.1 Auxiliary supply modules 44
2.3.2 Auxiliary supply modules with 24 V Out 45
2.3.3 Auxiliary supply modules with 42 V Out 46
2.3.4 Auxiliary supply modules with 24 V Out and 24 V In 47
2.4 8BVI inverter modules 48
2.4.1 Single-axis modules 48
2.4.2 2-axis modules 49
2.5 8BVE expansion modules 50
2.5.1 LED status 50
2.6 8B0K capacitor modules 51
2.6.1 Without integrated charging circuit 51

2.6.2 With integrated charging circuit..... 51
2.7 RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators..... 52
2.8 POWERLINK - LED status indicators..... 52
2.9 Backup battery - LED status indicators..... 52
2.10 Status changes when starting up the operating system loader..... 53
2.11 LED status indicator of fan module 8BXF002.0000-00..... 53
3 Module overview..... 54
4 8B0F passive line filters..... 57
4.1 Order data..... 57
4.2 Technical data..... 57
4.3 Wiring..... 59
4.3.1 8B0F line filters - Pinout overview..... 59
5 8BVF line filters..... 63
5.1 Order data..... 63
5.2 Technical data..... 63
5.3 Wiring..... 65
5.3.1 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Pinout overview..... 65
5.3.2 8BVF0880H000.000-1 - Pinout overview..... 68
6 8BVR regeneration chokes..... 70
6.1 Order data..... 70
6.2 Technical data..... 70
6.3 Wiring..... 72
6.3.1 8BVR0220H000.100-1 - Pinout overview..... 72
6.3.2 8BVR0440H000.100-2 - Pinout overview..... 73
6.3.3 8BVR0880H000.100-1 - Pinout overview..... 74
6.3.4 8BVR1650H000.100-1 - Pinout overview..... 75
7 8B0M mounting plates..... 77
7.1 Wall mounting..... 77
7.1.1 Order data..... 77
7.1.2 Technical data..... 78
7.1.3 Status LED..... 79
7.2 Cold plate mounting..... 80
7.2.1 Order data..... 80
7.2.2 Technical data..... 81
7.3 Feed-through mounting..... 83
7.3.1 Order data..... 83
7.3.2 Technical data..... 84
8 8B0P passive power supply modules..... 85
8.1 8B0P0110Hx00.000-1..... 85
8.1.1 General information..... 85
8.1.2 Order data..... 86
8.1.3 Technical data..... 87
8.1.4 Wiring..... 90
8.2 8B0P0220Hx00.000-1, 8B0P0440Hx00.000-1..... 94
8.2.1 Order data..... 94
8.2.2 Technical data..... 95
8.3 8B0P0220Hx00.001-1, 8B0P0440Hx00.001-1..... 98
8.3.1 Order data..... 98
8.3.2 Technical data..... 99
8.4 POWERLINK node number setting..... 101
8.5 8B0P0220Hx00.00x-1, 8B0P0440Hx00.00x-1 - Wiring..... 102
8.5.1 Pinout overview..... 102
8.5.2 Connector X1 - Pinout..... 103
8.5.3 Connectors X3A, X3B - Pinout..... 103
8.5.4 Connector X5A - Pinout..... 103
8.5.5 Connector X5B - Pinout..... 103
8.5.6 Additional protective ground connection (PE)..... 104

8.5.7 Input/Output circuit diagram....105
9 8BVP power supply modules....107
9.1 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1....107
9.1.1 Order data....107
9.1.2 Technical data....108
9.1.3 Wiring....111
9.2 8BVP0880Hx00.004-1....116
9.2.1 Order data....116
9.2.2 Technical data....117
9.2.3 Wiring....120
9.3 8BVP1650Hx00.000-1....125
9.3.1 Order data....125
9.3.2 Technical data....126
9.3.3 Wiring....129
9.4 POWERLINK node number setting....134
10 8B0C auxiliary supply modules....135
10.1 8B0C0160Hx00.000-1, 8B0C0320Hx00.000-1....135
10.1.1 8B0C0160Hx00.000-1....135
10.1.2 8B0C0320Hx00.000-1....137
10.1.3 Wiring....139
10.2 8B0C0160Hx00.001-1, 8B0C0320Hx00.002-1....141
10.2.1 8B0C0160Hx00.001-1....141
10.2.2 8B0C0320Hx00.002-1....144
10.2.3 Wiring....147
10.3 8B0C0160Hx00.A01-1....149
10.3.1 Order data....149
10.3.2 Technical data....149
10.3.3 Wiring....152
10.4 8B0C0320Hx00.00A-1....154
10.4.1 General information....154
10.4.2 Order data....155
10.4.3 Technical data....155
10.4.4 Wiring....158
11 8BVI inverter modules....160
11.1 Single-axis modules (single- and double-width)....160
11.1.1 8BVI0014HxS0.000-1, 8BVI0028HxS0.000-1....160
11.1.2 8BVI0055HxS0.000-1, 8BVI0110HxS0.000-1....165
11.1.3 8BVI0220HxS0.000-1....170
11.1.4 8BVI0330HxS0.000-1, 8BVI0440HxS0.000-1....174
11.1.5 Wiring....179
11.2 Single-axis modules (4x- and 8x-width)....187
11.2.1 8BVI0660HxS0.000-1, 8BVI0880HxS0.004-1....187
11.2.2 8BVI1650HxS0.000-1....192
11.2.3 Wiring....196
11.3 Dual-axis modules (single-width)....206
11.3.1 8BVI0014HxD0.000-1, 8BVI0028HxD0.000-1....206
11.3.2 8BVI0055HxD0.000-1....211
11.3.3 Wiring....215
11.4 Dual-axis modules (double-width)....226
11.4.1 8BVI0110HxD0.000-1, 8BVI0220HxD0.000-1....226
11.4.2 Wiring....231
11.5 POWERLINK node number settings Inverter modules....242
12 8BVE expansion modules....243
12.1 General information....243
12.2 Order data....244
12.3 Technical data....245
12.4 Wiring....248

12.4.1 Pinout overview - 8BVE0500Hx00.000-1 ... 248
13 8B0K capacitor modules ... 253
13.1 8B0K1650Hx00.000-1 ... 253
13.1.1 Order data ... 253
13.1.2 Technical data ... 253
13.2 8B0K3630Hx00.001-1 ... 255
13.2.1 Order data ... 255
13.2.2 Technical data ... 255
13.2.3 8B0K3630Hx00.001-1 - Wiring ... 257
14 8BAC plug-in modules ... 259
14.1 8BAC0120.000-1 EnDat 2.1 plug-in module ... 259
14.1.1 General information ... 259
14.1.2 Order data ... 259
14.1.3 Technical data ... 259
14.1.4 Wiring ... 261
14.1.5 Status indicators ... 262
14.1.6 Firmware ... 262
14.2 8BAC0120.001-2 EnDat 2.2 plug-in module ... 263
14.2.1 General information ... 263
14.2.2 Order data ... 264
14.2.3 Technical data ... 264
14.2.4 Wiring ... 265
14.2.5 Status indicators ... 266
14.2.6 Firmware ... 266
14.3 8BAC0121.000-1 HIPERFACE plug-in module ... 267
14.3.1 General information ... 267
14.3.2 Order data ... 267
14.3.3 Technical data ... 267
14.3.4 Wiring ... 268
14.3.5 Status indicators ... 269
14.3.6 Firmware ... 270
14.4 8BAC0122.000-1 resolver plug-in module ... 271
14.4.1 General information ... 271
14.4.2 Order data ... 271
14.4.3 Technical data ... 271
14.4.4 Wiring ... 272
14.4.5 Status indicators ... 274
14.4.6 Firmware ... 274
14.5 8BAC0123.000-1 incremental/SSI encoder plug-in module ... 275
14.5.1 General information ... 275
14.5.2 Order data ... 277
14.5.3 Technical data ... 277
14.5.4 Wiring ... 279
14.5.5 Status indicators ... 281
14.5.6 Firmware ... 281
14.6 8BAC0123.001-1 incremental encoder plug-in module ... 282
14.6.1 General information ... 282
14.6.2 Order data ... 283
14.6.3 Technical data ... 284
14.6.4 Wiring ... 285
14.6.5 Status indicators ... 287
14.6.6 Firmware ... 287
14.7 8BAC0123.002-1 incremental encoder plug-in module ... 288
14.7.1 General information ... 288
14.7.2 Order data ... 290
14.7.3 Technical data ... 290
14.7.4 Wiring ... 291

14.7.5 Status indicators....294
14.7.6 Firmware....294
14.8 8BAC0124.000-1 SinCos plug-in module....295
14.8.1 General information....295
14.8.2 Order data....295
14.8.3 Technical data....295
14.8.4 Wiring....296
14.8.5 Status indicators....298
14.8.6 Firmware....298
14.9 8BAC0125.000-1 plug-in module....299
14.9.1 General information....299
14.9.2 Order data....300
14.9.3 Technical data....300
14.9.4 Wiring....301
14.10 8BAC0130.000-1 digital I/O plug-in module....303
14.10.1 General information....303
14.10.2 Order data....303
14.10.3 Technical data....303
14.10.4 Wiring....304
14.10.5 Status indicators....305
14.10.6 Firmware....305
14.11 8BAC0130.001-1 digital Out plug-in module....306
14.11.1 General information....306
14.11.2 Order data....306
14.11.3 Technical data....306
14.11.4 Wiring....307
14.11.5 Status indicators....308
14.11.6 Firmware....308
14.12 8BAC0132.000-1 analog In plug-in module....309
14.12.1 General information....309
14.12.2 Order data....309
14.12.3 Technical data....309
14.12.4 Wiring....310
14.12.5 Status indicators....312
14.12.6 Firmware....312
14.13 8BAC0133.000-1 encoder emulation module....313
14.13.1 General information....313
14.13.2 Order data....313
14.13.3 Technical data....313
14.13.4 Wiring....314
14.13.5 Status indicators....315
14.13.6 Firmware....315
15 8B0W external braking resistors....316
15.1 Order data....316
15.2 Technical data....316
15.3 Wiring....317
15.3.1 8B0W braking resistors - Pinout....317
16 Fan modules....318
16.1 8B0M0040HFF0.000-1....318
16.1.1 General information....318
16.1.2 Order data....318
16.1.3 Technical data....319
16.1.4 Wiring....319
16.2 8BXF001.0000-00....321
16.2.1 Order data....321
16.2.2 Technical data....321
16.3 8BXF002.0000-00....322

16.3.1 Order data....322
16.3.2 Technical data....322
17 Cables....324
17.1 General information....324
17.1.1 Pre-assembled cables....324
17.2 8BCM motor cables....324
17.2.1 0.75 mm² motor cables....324
17.2.2 1.5 mm² motor cables....328
17.2.3 4 mm² motor cables....332
17.2.4 4 mm² motor cables with motor plug, size 1.5....335
17.2.5 10 mm² motor cables....337
17.2.6 Wiring....339
17.3 8BCH hybrid motor cables....343
17.3.1 1.5 mm² hybrid motor cable....343
17.3.2 4 mm² hybrid motor cable....345
17.3.3 Wiring....347
17.4 8BCE EnDat 2.1 cables....349
17.4.1 For use in cable drag chains....349
17.4.2 Not for use in cable drag chains....351
17.4.3 Wiring....352
17.5 8BCF EnDat 2.2 cable....354
17.5.1 Order data....354
17.5.2 Technical data....354
17.5.3 Wiring....355
17.6 EnDat 2.2 8BCFxxxx.1231B-0....357
17.6.1 Order data....357
17.6.2 Technical data....357
17.6.3 Wiring....358
17.7 Resolver cable - 8BCR....360
17.7.1 For use in cable drag chains....360
17.7.2 Not for use in cable drag chains....361
17.7.3 Wiring....363
17.8 8BCS SinCos cables....364
17.8.1 Order data....364
17.8.2 Technical data....364
17.8.3 Wiring....365
17.9 8BCA expansion cables....367
17.9.1 Expansion cables 1.5 mm²....367
17.9.2 Expansion cables 4 mm²....369
17.9.3 Expansion cables 10 mm²....371
17.9.4 Wiring....372
18 Cable extensions....373
18.1 1.5 mm² motor cables....373
18.1.1 Order data....373
18.1.2 Technical data....373
18.2 4 mm² motor cables....375
18.2.1 Order data....375
18.2.2 Technical data....375
18.3 10 mm² motor cables....377
18.3.1 Order data....377
18.3.2 Technical data....377
18.4 EnDat 2.1 cables....379
18.4.1 Order data....379
18.4.2 Technical data....379
18.5 EnDat 2.2 cables....381
18.5.1 Order data....381
18.5.2 Technical data....381

18.6 Resolver cables....383
18.6.1 Order data....383
18.6.2 Technical data....383
18.7 Resolver cables with springtec connector....385
18.7.1 Order data....385
18.7.2 Technical data....385
19 Terminal blocks....387
19.1 PC5....387
19.1.1 Order data....387
19.1.2 Technical data....387
19.2 PC6....388
19.2.1 Order data....388
19.2.2 Technical data....388
19.3 PC16....389
19.3.1 Order data....389
19.3.2 Technical data....389
19.4 MSTB....390
19.4.1 Order data....390
19.4.2 Technical data....390
20 Connectors....391
20.1 General information....391
20.2 8BPM motor connectors....391
20.2.1 Order data....391
20.2.2 Technical data....391
20.3 8BPE EnDat connectors....392
20.3.1 Order data....392
20.3.2 Technical data....392
20.4 8BPR resolver connectors....393
20.4.1 Order data....393
20.4.2 Technical data....393
20.5 springtec encoder connector....394
20.5.1 Order data....394
20.5.2 Technical data....394
20.6 springtec motor connector....395
20.6.1 Order data....395
20.6.2 Technical data....395
21 Signal connectors....396
21.1 Order data....396
21.2 Technical data....396
22 Shield component sets....397
22.1 8SCS000.0000-00....397
22.1.1 Order data....397
22.1.2 Technical data....397
22.2 8SCS001.0000-00....397
22.2.1 Order data....397
22.2.2 Technical data....397
22.3 8SCS002.0000-00....398
22.3.1 Order data....398
22.3.2 Technical data....398
22.4 8SCS003.0000-00....398
22.4.1 Order data....398
22.4.2 Technical data....398
22.5 8SCS004.0000-00....399
22.5.1 Order data....399
22.5.2 Technical data....399
22.6 8SCS005.0000-00....399
22.6.1 Order data....399

22.6.2 Technical data....399
22.7 8SCS007.0000-00....400
22.7.1 Order data....400
22.7.2 Technical data....400
22.8 8SCS008.0000-00....400
22.8.1 Order data....400
22.8.2 Technical data....400
22.9 8SCS009.0000-00....401
22.9.1 Order data....401
22.9.2 Technical data....401
22.10 8SCS010.0000-00....401
22.10.1 Order data....401
22.10.2 Technical data....401
23 Screw clamp terminal block sets....402
23.1 8BZ0C....402
23.1.1 Order data....402
23.1.2 Technical data....402
23.2 8BZ0P, 8BZVE and 8BZVF....403
23.2.1 Order data....403
23.2.2 Technical data....403
23.3 8BZVI....404
23.3.1 Order data....404
23.3.2 Technical data....404
23.3.3 Order data....405
23.3.4 Technical data....405
23.3.5 Order data....406
23.3.6 Technical data....406
23.3.7 Order data....407
23.3.8 Technical data....407
23.3.9 Order data....408
23.3.10 Technical data....408
24 Fuse sets....409
24.1 8BXS000.0000-00....409
24.1.1 Order data....409
24.1.2 Technical data....409
24.2 8BXS001.0000-00....410
24.2.1 Order data....410
24.2.2 Technical data....410
24.3 8BXS002.0000-00....411
24.3.1 Order data....411
24.3.2 Technical data....411
24.4 8BXS003.0000-00....412
24.4.1 Order data....412
24.4.2 Technical data....412
24.5 8BXS004.0000-00....413
24.5.1 Order data....413
24.5.2 Technical data....413
24.6 8BXS005.0000-00....414
24.6.1 Order data....414
24.6.2 Technical data....414
24.7 8BXS006.0000-00....414
24.7.1 Order data....414
24.7.2 Technical data....414
25 Accessory sets....415
25.1 8BXB000.0000-00....415
25.1.1 Order data....415
25.1.2 Technical data....415

25.2 8BXW000.0000-00....416
25.2.1 Technical data....416
25.2.2 Dimensions....416
25.3 8BXW001.0000-00....417
25.3.1 Technical data....417
25.3.2 Dimensions....417

Chapter 3 Installation....418
1 General information....418
1.1 8B0M mounting plates....418
1.1.1 8B0MxxxxHW00.000-1 (wall mounting)....418
1.1.2 8B0MxxxxHF00.000-1 (feed-through mounting)....418
1.1.3 8B0MxxxxHC00.000-1 (cold plate mounting)....419
1.2 Mounting ACOPOSmulti modules....420
1.3 8BVI inverter modules....421
1.3.1 Changing the backup battery....421
1.3.2 Installing 8BCH hybrid motor cables....422
1.4 8BVE0500Hx00.000-1 expansion modules....425
1.4.1 Installing device fuses....425
1.4.2 Replacing device fuses....426
1.5 Replacing the 8BXF001.0000-00 fan module....429
1.6 Replacing the 8BXF002.0000-00 fan module....430
1.7 Fan module 8B0M0040HFF0.000-00....431
1.7.1 Installing the 8B0M0040HFF0.000-00 fan module....431
1.7.2 Replacing the 8B0M0040HFF0.000-00 fan module....432
1.8 8BVR regeneration chokes....433
1.9 8B0W external braking resistors....433
1.9.1 Mounting orientation....434
2 Motor cables....435
2.1 Assembly example of a 1.5 mm² motor cable (module-side)....435
3 Shield component sets....439
3.1 Overview of possible shield component sets....439
3.1.1 Shield component sets for single-width modules....439
3.1.2 Shield component sets for double-width modules....440
3.1.3 Shield component sets for 4x-width modules....441
3.1.4 Shield component sets for 8x-width modules....442
3.2 8SCS002.0000-00 shield component set....443
3.2.1 Preparation....443
3.2.2 Installation....444
4 Dimension diagrams and installation dimensions....445
4.1 General information....445
4.1.1 Swivel range of the connector cover....445
4.2 8B0F passive line filters....446
4.2.1 8B0F0160H000.A00-1....446
4.2.2 8B0F0300H000.000-1....446
4.2.3 8B0F0550H000.000-1....447
4.3 8BVF line filters....448
4.3.1 8BVF0220H000.000-1 - Dimension diagram and installation dimensions....448
4.3.2 8BVF0440H000.001-2 - Dimension diagram and installation dimensions....449
4.3.3 8BVF0880H000.000-1 - Dimension diagram and installation dimensions....450
4.4 8BVR regeneration chokes....452
4.4.1 8BVR0220H000.100-1....452
4.4.2 8BVR0440H000.100-2....453
4.4.3 8BVR0880H000.100-1....454
4.4.4 8BVR1650H000.100-1....455
4.5 Wall mounting....456
4.5.1 8B0MnnnnHW00.000-1 mounting plates....456

4.5.2 8BxP0220HW00.00x-1, 8BxP0440HW00.00x-1 power supply modules..... 457
4.5.3 8BVP0880HW00.000-1 power supply module..... 458
4.5.4 Auxiliary supply modules..... 459
4.5.5 Single-width inverter modules (single-axis modules)..... 461
4.5.6 Single-width inverter modules (dual-axis modules)..... 462
4.5.7 8BVI0220HWSx.000-1, 8BVI0330HWSx.000-1, 8BVI0440HWSx.000-1 inverter modules..... 463
4.5.8 8BVI0110HWDx.000-1, 8BVI0220HWDx.000-1 inverter modules..... 464
4.5.9 Inverter modules 8BVI0660HWS0.000-1, 8BVI0880HWS0.004-1, 8BVI1650HWS0.000-1..... 465
4.5.10 8BVE0500HW00.000-1 expansion module..... 466
4.5.11 8B0K1650HW00.000-1, 8B0K3630HW00.001-1 capacitor modules..... 467
4.6 Cold plate mounting..... 468
4.6.1 8B0MnnnnHC00.000-1 mounting plates..... 468
4.6.2 8BxP0220HC00.00x-1, 8BxP0440HC00.00x-1 power supply modules..... 469
4.6.3 8BVP0880HC00.004-1 power supply module..... 470
4.6.4 8BVP1650HC00.000-1 power supply module..... 471
4.6.5 Auxiliary supply modules..... 472
4.6.6 Single-width inverter modules (single-axis modules)..... 474
4.6.7 Single-width inverter modules (dual-axis modules)..... 475
4.6.8 8BVI0220HCSx.000-1, 8BVI0440HCSx.000-1 inverter modules..... 476
4.6.9 8BVI0110HCDx.000-1, 8BVI0220HCDx.000-1 inverter modules..... 477
4.6.10 8BVI0880HCSx.004-1 inverter module..... 478
4.6.11 8BVI1650HCS0.000-1 inverter module..... 479
4.6.12 8BVE0500HC00.000-1 expansion module..... 480
4.6.13 8B0K1650HC00.000-1, 8B0K3630HC00.001-1 capacitor modules..... 481
4.7 Feed-through mounting..... 482
4.7.1 8B0MnnnnHF00.000-1 mounting plates..... 482
4.7.2 8BxP0220HC00.00x-1, 8BxP0440HC00.00x-1 power supply modules..... 483
4.7.3 8BVP0880HC00.004-1 power supply module..... 484
4.7.4 8BVP1650HC00.000-1 power supply module..... 485
4.7.5 Auxiliary supply modules..... 486
4.7.6 Single-width inverter modules (single-axis modules)..... 488
4.7.7 Single-width inverter modules (dual-axis modules)..... 489
4.7.8 8BVI0220HCSx.000-1, 8BVI0440HCSx.000-1 inverter modules..... 490
4.7.9 8BVI0110HCDx.000-1, 8BVI0220HCDx.000-1 inverter modules..... 491
4.7.10 8BVI0880HCSx.004-1 inverter module..... 492
4.7.11 8BVI1650HCS0.000-1 inverter module..... 493
4.7.12 8BVE0500HC00.000-1 expansion module..... 494
4.7.13 8B0K1650HC00.000-1, 8B0K3630HC00.001-1 capacitor modules..... 495
4.8 External braking resistors..... 496
4.8.1 8B0W0045H000.000-1, 8B0W0079H000.000-1, 8B0W0096H000.000-1..... 496
4.8.2 8B0W0045H000.001-1, 8B0W0079H000.001-1, 8B0W0096H000.001-1..... 497
4.9 8B0M0040HFF0.000-1 fan module..... 499
5 Installation and removal of plug-in modules..... 500
5.1 General information..... 500
5.2 Installation..... 501
5.3 Removal..... 501
6 Using cooling systems in control cabinets..... 502
6.1 Natural convection..... 502
6.2 Using filter fans..... 502
6.3 Using air/air heat exchangers..... 503
6.4 Using air/water heat exchangers..... 503
6.5 Using cooling units..... 504
6.5.1 General information..... 504
6.5.2 Placing a cooling unit on top of the control cabinet..... 505
6.5.3 Placing a cooling unit on the front of the control cabinet..... 505

Chapter 4 Dimensioning 507

1 Power mains connection 507
1.1 General information 507
1.1.1 Network configurations 507
1.1.2 Supply voltage range 508
1.1.3 Protective ground connection (PE) 508
1.2 Dimensioning 510
1.2.1 Design of the ACOPOSmulti power mains connections 510
1.3 Fault current protective device (FI protection) 513
1.3.1 Rated fault current 513
1.3.2 Estimating possible ACOPOSmulti drive system configurations 513
1.3.3 Manufacturers of fault current protection devices that can be used 514
1.3.4 Examples 515
2 Motor connection 516
2.1 Motor overload protection 517
3 Braking resistors 518
3.1 General information 518
3.2 External braking resistor connections 518
3.2.1 Fuse protection 519
3.2.2 Replacing the fuse for the external braking resistor 519
3.3 Dimensioning braking resistors 522
3.3.1 Basis of the calculation 522
3.3.2 Example 525
3.4 Configuring brake resistor parameters 532
4 Check the max. chargeable DC bus capacitance 533
4.1 Procedure 533
4.2 Max. chargeable DC bus capacitance values of 8BxP power supply modules 534
4.3 Overview of DC bus capacitance values 534
4.4 Example 1 536
4.5 Example 2 537
4.6 Example 3 538
5 Selecting the right auxiliary supply module 539
5.1 Procedure 540
5.2 Examples 540
5.2.1 Example 1 540
5.2.2 Example 2 542
6 Cooling water circuit 544
6.1 Cooling system 544
6.1.1 Piping 544
6.1.2 Gaskets 544
6.1.3 Diagram of the cooling water circuit 545
6.2 Coolant 549
6.2.1 Preparation and maintenance 549
6.2.2 Hydrologic data 550
6.2.3 Corrosion protection 550
6.2.4 Biocide additive 551
6.2.5 Condensation 551
7 Dimensioning cooling systems for cooling control cabinets 553
7.1 General dimensioning criteria 553
7.1.1 Basic selection of the cooling system 553
7.2 Natural convection 554
7.2.1 Dimensioning 554
7.2.2 Example 555
7.3 Filter fans 556
7.3.1 Dimensioning 556
7.3.2 Example 557
7.4 Air/air heat exchanger 558

7.4.1 Dimensioning....558
7.4.2 Example....558
7.5 Air-to-water heat exchangers, cooling units....560
7.5.1 Dimensioning....560
7.5.2 Example....560

Chapter 5 Wiring....563
1 General information....563
1.1 Electromagnetic compatibility of the installation....563
1.1.1 General information....563
1.1.2 Installation notes....563
1.1.3 Overview....564
1.1.4 Connection diagrams for ground connections and shield connections....574
1.2 Insulation and high voltage testing....584
1.2.1 Insulation resistance testing in accordance with EN 60204....584
1.2.2 High voltage testing....585
1.2.3 Typical procedure....586
1.3 Overview of terminal cross sections....587
1.3.1 8BVF line filters....587
1.3.2 8BVR regeneration chokes....587
1.3.3 8B0P power supply modules....588
1.3.4 8BVP power supply modules....588
1.3.5 8B0C auxiliary supply modules....589
1.3.6 8BVI inverter modules....589
1.3.7 8BVE expansion modules....590
1.3.8 8B0K3630Hx00.001-1 capacitor modules....590

Chapter 6 Safety technology....591
1 Standard safety technology ("hardwired safety technology")....591
1.1 General information....591
1.2 Principle - Implementing the safety function....592
1.2.1 Additional function....593
1.3 Wiring the enable inputs to the required Safety Category / SIL / PL....594
1.3.1 STO, Category 4 / SIL 3 / PL e (Variant A)....595
1.3.2 STO, Category 4 / SIL 3 / PL e (Variant B)....596
1.3.3 STO, Category 3 / SIL 2 / PL d....597
1.4 Wiring the enable inputs to the required Safety Category / SIL / PL and functionality (STO, SS1, SS2, SLS, SOS)....598
1.4.1 STO, SLS, SOS - Safety Category 4 / SIL 3 / PL e....598
1.4.2 SS1, SLS, SS2 - Safety Category 4 / SIL 3 / PL e (Variant A)....600
1.4.3 SS1, SLS, SS2 - Safety Category 4 / SIL 3 / PL e (Variant B)....602
1.4.4 STO, SLS, SOS - Safety Category 3 / SIL 2 / PL d....605
1.4.5 SS1, SLS, SS2 - Safety Category 3 / SIL 2 / PL d (Variant A)....607
1.4.6 SS1, SLS, SS2 - Safety Category 3 / SIL 2 / PL d (Variant B)....609

Chapter 7 Standards and certifications....613
1 Applicable European directives....613
2 Applicable standards....613
3 Environmental limit values....614
3.1 Mechanical conditions per EN 61800-2....614
3.1.1 Operation....614
3.1.2 Transport....614
3.2 Climate conditions per EN 61800-2....614
3.2.1 Operation....614
3.2.2 Storage....614
3.2.3 Transport....614
4 Requirements for immunity to disturbances (EMC)....615

4.1 Evaluation criteria (performance criteria)..... 615
4.2 Low-frequency disturbances in accordance with EN 61800-3..... 615
4.3 High-frequency disturbances in accordance with EN 61800-3..... 616
5 Requirements for emissions (EMC)..... 617
5.1 High-frequency emissions per EN 61800-3..... 617
5.1.1 Disturbance voltages on the power mains connection..... 617
5.1.2 Radiated emissions..... 617
6 Additional environmental limit values..... 617
7 International certifications..... 618
8 Standards and definitions for safety technology..... 619

Appendix A ACOPOSmulti overload characteristics..... 621
1 Inverter module 8BVI0014HCSx.000-1_8BVI0014HCDx.000-1..... 621
2 Inverter module 8BVI0014HWSx.000-1_8BVI0014HWDx.000-1..... 623
3 Inverter module 8BVI0028HCSx.000-1_8BVI0028HCDx.000-1..... 626
4 Inverter module 8BVI0028HWSx.000-1_8BVI0028HWDx.000-1..... 629
5 Inverter module 8BVI0055HCSx.000-1_8BVI0055HCDx.000-1..... 631
6 Inverter module 8BVI0055HWSx.000-1_8BVI0055HWDx.000-1..... 633
7 Inverter module 8BVI0110HCSx.000-1_8BVI0110HCDx.000-1..... 635
8 Inverter module 8BVI0110HWSx.000-1_8BVI0110HWDx.000-1..... 638
9 Inverter module 8BVI0220HCSx.000-1_8BVI0220HCDx.000-1..... 640
10 Inverter module 8BVI0220HWSx.000-1_8BVI0220HWDx.000-1..... 642
11 Inverter module 8BVI0330HCSx.000-1..... 644
12 8BVI0330HWSx.000-1 inverter modules..... 646
13 Inverter module 8BVI0440HCSx.000-1..... 648
14 Inverter module 8BVI0440HWSx.000-1..... 650
15 Inverter module 8BVI0660HCSx.000-1..... 653
16 Inverter module 8BVI0660HWSx.000-1..... 655
17 Inverter module 8BVI0880HCSx.004-1..... 657
18 Inverter module 8BVI0880HWSx.004-1..... 659
19 Inverter module 8BVI1650HCSx.000-1..... 661
20 Inverter module 8BVI1650HWSx.000-1..... 663
21 Power supply module 8BVP0220HC00.000-1..... 665
22 Power supply module 8BVP0880HC00.004-1..... 667
23 Power supply module 8BVP1650HC00.000-1..... 669

Appendix B Accessories included in delivery..... 672
1 ACOPOSmulti modules..... 672

Appendix C UL markings..... 674

Chapter 1 • General information

1 Manual history

Information:

B&R makes every effort to keep user's manuals as current as possible.
From a safety standpoint, however, the current version must be downloaded from the B&R website (www.br-automation.com).

Version	Date	Comment
1.10	2018-05-09	Changes / New features • Chapter "General information" - Safety guidelines: Modified "Intended use". • Chapter "Technical data" - Adapted ACOPOSmulti drive system configuration to Product Catalog 2016, added more detailed description. - Revised LED status indicator tables. - 8B0F passive line filters: Revised order data. - Wiring overview of pinouts for 8B0F passive line filters: Added 8B0F0160H000.A00-1. - Regeneration choke 8BVR0880H000.100-2: Revised "Technical data". - 8B0M "cold" mounting plates: Revised material assignment. - 8B0P passive power supply modules: Added "General information", revised "Technical data". - 8BAC plug-in modules: Updated note regarding other cable lengths, updated certification. - 8BXF fan modules: Updated technical data, updated certification. - 1.5 mm² hybrid motor cables: Added section "General information". - 4 mm² hybrid motor cables: Revised "Technical data" - Added resolver cable extension 8BCRxxxx.11230-0. - Added springtec encoder connector and springtec motor connector. - Added feed-through receptacles 8BXC004, 8BXC005 and 8BXC009, updated weights and measurements. • Chapter "Installation" - 8B0F passive line filters: Updated dimension diagram and installation dimensions for 8B0F0160H000.A00-1. - Updated dimension diagram and installation dimensions for single-width power inverter (2-axis modules) 8BVI1650HWS0.000-1. • Chapter "Dimensioning" Mains connection: Removed table "Tripping characteristics of the fuse for the mains connection". - External braking resistor: Added section for replacing the fuse in passive PSM 8B0P0110. - Coolant: Updated list of usable antifreezes. • Chapter "Safety technology" "Wiring the enable inputs to the required safety category / SIL / PL": Added link to safety user's manual. "STO, category 4 / SIL 3 / PL e (variant A)": Replaced term for emergency switching-off device in German edition. "SS1, SLS, SS2 - Safety category 4 / SIL 3 / PL e (variant B)": Revised example code. • Appendix B - Accessories included in delivery - Added UL markings for ACOPOSmulti modules.
1.02	2014-08-01	Changes / New features • Chapter "Technical data": - Removed 0.75 mm² motor cables with springtec connector from manual. - Added 1.5 mm² and 4 mm² hybrid motor cables. - Added 8B0P0110Hx00.000-1 passive power supply modules. - Updated wall mounting and cold plate mounting information for modules with 2 and 3 slots. • Installation chapter - Shield component sets: Added detailed version. - Added installation of hybrid motor cables. • Appendix: - Added load characteristics. - Added content of delivery for individual devices.
1.01	13-Mar-13	Changes / New features • Minor adjustments to images for translation • Technical data for the mounting plates added • Technical data and order data for 8TB terminal blocks added • Additional information on installing ACOPOSmulti mounting plates 8B0MnnnnHC00.000-1 added • POWERLINK cable added as an optional accessory • Pinout for 8BAC0133.000-1 corrected • Pinout for 8B0C0320Hx00.00A-1 X3 connector corrected • Technical data for connectors corrected
1.00	12/12/2012	Changes / New features

Table 1: Manual history

Version	Date	Comment
		• "ACOPOSmulti" and "ACOPOSmulti configuration" added to the "General information" chapter • Technical data / Status indicators / Auxiliary supply modules: More detailed version added • "Technical data" chapter: Wiring the connections for the motor holding brake added • Order data / Technical data / Wiring: ° Passive power supply modules: 8B0P0220Hx00.001-1 and 8B0P0440Hx00.001-1 added ° Power supply unit: 8BVP1650HW00.000-1 added ° Inverter modules: 8BVI0660HxS0.000-1 and 8BVI1650HWS0.000-1 added ° Capacitor modules: 8B0K3630Hx00.001-1 added ° Cables: 0.75 mm² motor cables added Cable is not suitable for use in cable drag chains added ° Fan module: 8B0M0040HFF0.000-1 added • 8BVP0880Hx00.000-1 power supply module replaced by 8BVP0880Hx00.004-1 follow-up module • 8BVI0880Hx00.000-1 inverter module replaced by 8BVI0880Hx00.004-1 follow-up module • Wiring the 8BVE expansion module updated to include "Additional PE connection on 8BVE expansion modules" • "Installation" chapter updated to include "Replacing the 8BXF000.0000-00 fan module" • "Dimensioning" chapter: - Section "Checking the max. chargeable DC bus capacitance" added - Selecting auxiliary supply modules added - Dimensioning cooling systems revised

Table 1: Manual history

2 ACOPOSmulti

2.1 The drive system for maximum customer benefits



In today's market, customers demand more than simply meeting technical requirements. Above all, customers require cost-effective solutions, investment security and a high degree of availability. ACOPOSmulti, the new drive generation from B&R, possesses these characteristics. It is the universal solution for all automation tasks in machine manufacturing. A new milestone on the path to "Perfection in Automation", the ACOPOSmulti generation offers the highest degree of efficiency for multi-axis machines that are commonly used in the plastics, packaging, print and textile industries.

2.2 Trend-setting power supply

Conventional drive systems convert only half of the applied power from the mains into actual mechanical power. The ACOPOSmulti drive system treads a new path.

Power factor correction

This means that only effective power is taken from the power supply. This reduces the connected load and current consumption of the machine by approximately a factor of 2. This results in smaller fuses and wire cross sections.

Stable voltage conditions

The DC bus voltage remains constant regardless of the mains supply voltage, which means maximum utilization by the inverter modules and motors no matter what country they are operating in.

Integrated power regeneration unit

All 8BVP active power supply modules are able to regenerate power. Instead of being converted to heat as is usually the case, kinetic energy generated during braking is converted to electrical energy that is regenerated back into the power supply system.

Sophisticated diagnostics

The intelligent power supply modules with network connection via POWERLINK offer completely new options for machine and system diagnostics.

2.3 Handling power failures safely

Today's production machines rely on flexibility. Mechanical cams are being replaced by electronic cam profiles. The well-known advantages of flexibility and wear-free electronics also have a disadvantage: loss of the cam profile link when a power failure occurs. This is not the case with the ACOPOSmulti drive system – the integrated 24V auxiliary supply module makes it possible to maintain a coordinated movement until the system reaches a standstill.

2.4 Outstanding usability

The ACOPOSmulti drive system is designed to provide the highest degree of usability throughout its entire life cycle.

Designed for simple management of machine variants

An ACOPOSmulti mounting plate is the basis for different variants of a machine. The design of the machine determines which devices are used. The software recognizes the design automatically and provides the necessary functions.

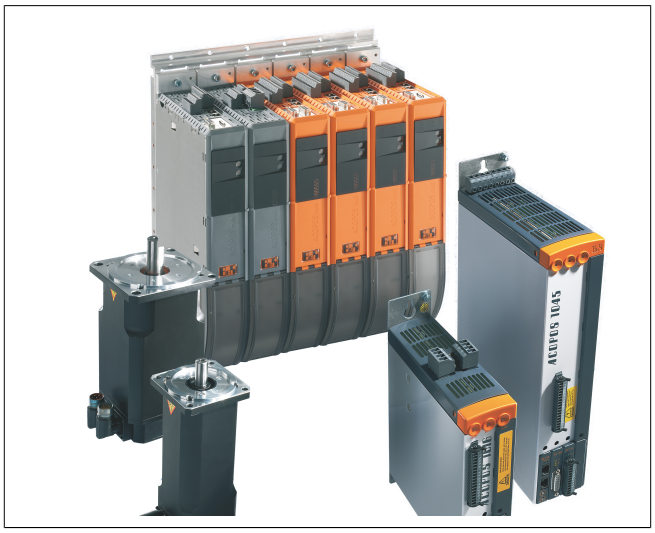
Ideally suited for industrial control cabinets

The ACOPOSmulti is designed with connection technology that allows pre-wiring of complete control cabinets – ideal when manufacturing series-produced machines.

Easy maintenance

ACOPOSmulti makes it possible to replace drive components quickly – considerably reducing downtimes for production machines.

2.5 Compact, scalable performance



Compact, high-performance drive technology is the latest trend. The goal behind this trend is to achieve the best possible use of production halls, which in turn requires the smallest machine dimensions. Based on this principle, ACOPOSmulti offers maximum performance with minimum space requirements. The range of applications includes sensor-free induction motors, permanent magnet servo motors in standard torque or linear motor versions and ultra-dynamic iron-free linear motors.

Return on investment

Return on investment was a major topic considered when developing the ACOPOSmulti drive system. As a result, it is just as easy to add the ACOPOSmulti drive system to an existing system as it is to use it in new machines. Thanks to software compatibility with the ACOPOS drive generation already established on the market, efforts can be concentrated on the most important factor – the application. That's all there is to it.

Safety as an integral system component

Trend-setting safety technology communicates via the openSAFETY network. By integrating this open standard, the ACOPOSmulti drive system, together with the B&R safety-related components, has raised the bar in the area of safe automation solutions.

Integrated technology

Modern marketing demands highly individualized end products, making machine flexibility one of the most decisive factors in gaining a competitive edge. Sophisticated mechatronic solutions continue to replace mechanical process technologies in modern machine concepts. As they do, the role played by software increases in importance. B&R offers a wide range of industry-specific technology functions that simplify automation even in complex applications. These well-structured and easy-to-operate software components guarantee a cost-effective solution every time.

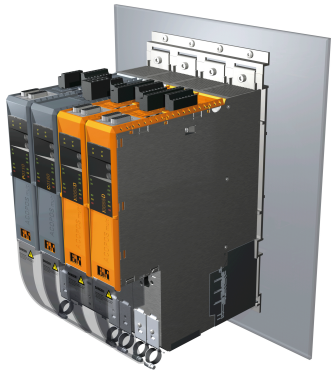
Easy wiring

Industrial control cabinet designs streamline production cycles. Pre-assembled cable harnesses used directly on the machine or system make assembly easier and faster. The ACOPOSmulti drive system supports pre-wiring of the entire control cabinet using its sophisticated wiring and mounting technology. All that's left is mounting the ACOPOSmulti drive components in the control cabinet and connecting them to the pre-wired cable harnesses. In this way, ACOPOSmulti drastically reduces the amount of manual wiring.

2.6 Modular cooling system

The use of fans and cooling units in the control cabinet means considerably higher costs as well as additional maintenance expenses. ACOPOSmulti gives the designer the necessary space for conventional heat dissipation in the control cabinet, a feed-through cooler with IP65 protection for releasing heat outside the control cabinet and a cold plate variant for connecting to a cooling circulation system (water, oil).

Devices are connected consecutively without splicing, and all have the same height. Only the width differs and depends on the continuous power of the respective module. The ACOPOSmulti drive system is designed so that the ideal cooling concept can be implemented on the machine.



Wall mounting

This is the conventional mounting method. Heat is dissipated directly through the air in the control cabinet. This type of mounting is suitable for a small number of axes with low power ratings. This limitation can be circumvented by using additional fans or cooling units in the control cabinet.



Feed-through mounting

Based on a feed-through heat sink, excessive heat is output directly to the ambient air outside of the control cabinet. This type of mounting is suitable for a large number of axes with any range of power rating.



Cold plate mounting

Excessive heat generated by the devices is output directly to the coolant via a plate cooled with oil or water. This type of mounting is suitable for a large number of axes with any range of power rating and a machine's own cooling circulation system.

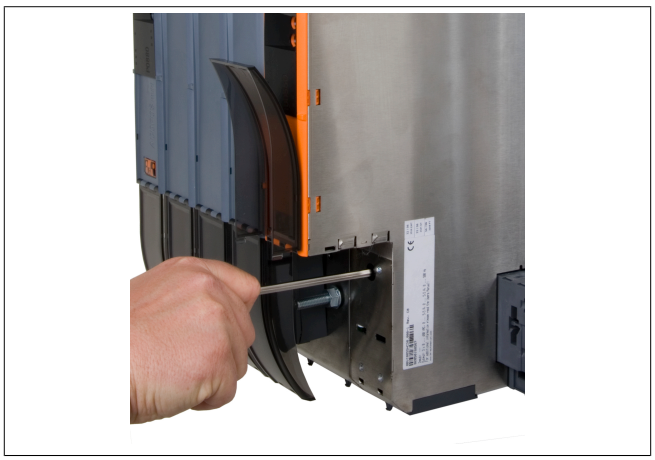
2.7 Wiring made easy



The wiring of electrical switching equipment in the control cabinet has been made considerably easier in previous years with plug-in rail mounting systems from various manufacturers. The trend-setting connection technology used by the ACOPOSmulti allows it to use these systems as well.

Simply attach and fasten the device to the mounting plate to establish the connections to the power supply module. In addition to the connection of the DC bus and the 24 V auxiliary supply, the ground connection is established via the rail system. Additional grounding measures from module to module are not necessary.

The rails integrated in the mounting plate are amply dimensioned. This makes it possible to arrange the sequence of modules as needed without limitations.



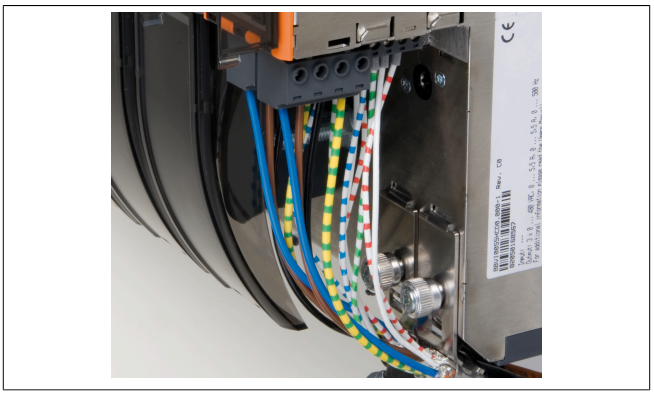
The rail system integrated in the backplane module is designed to be protected from accidental contact. The 24 V auxiliary supply voltage and the DC voltage from the DC bus are distributed as required.

The rail contacts are used for the power supply modules and the auxiliary supply modules to feed power to the rail system or take power from the inverter modules. A protective ground conductor is integrated in the rail system, eliminating the need to connect modules using external wiring.



Motor and encoder lines are connected in the easiest way imaginable using connectors and pre-assembled cables. The network connection is made in the same way. For large power ratings of 64kW and up, threaded bolts and sufficient free space make it much easier to connect to the power supply module and inverter module.

ACOPOSmulti motor and encoder cables are assembled with speedtec connectors from Intercontec, making them extremely easy for customers to use. speedtec connectors are designed so that the system can only be locked if it is connected correctly. Because of the "ratchet effect", the user is sure that the connector is completely closed and that it cannot be opened again by vibration.



All plug-in connections (signal, motor connections, etc.) can be wired using screw terminals or cage clamps according to the user's needs. This principle – simply attach and tighten the screws – was also skillfully applied to the shield connections.

ACOPOSmulti motor cables are equipped with a shield plate that only needs to be connected to the ACOPOSmulti inverter module and fastened. Optimal shielding effect and quick, easy installation do not have to be a contradiction.

2.8 Intelligent power supply modules



Constant DC bus voltage regardless of the mains supply – that means maximum utilization by the inverter modules and motors no matter the country where they are operated. The result is identical machine behavior anywhere in the world, without the need for additional upstream transformers. Valuable device resources are not wasted since the smallest mains voltage can be taken advantage of by today's systems. In addition, it is also possible to operate ACOPOSmulti drive systems on 3x 220 V voltage networks without upstream transformers, though this also requires the use of the next larger power supply module.

Integrated power regeneration unit

8BVP active power supply modules are able to regenerate power. Instead of being converted to heat as is usually the case, kinetic energy generated during braking is converted to electrical energy that is regenerated back into the power supply system. The advantage? This prevents additional heat from being generated by the braking resistors used inside control cabinets for conventional devices. An integrated power regeneration system provides an efficient and environmentally friendly solution for avoiding heat build-up in the control cabinet that would otherwise be generated by braking energy. This is especially important when arranging several small axes in a tight space.

Power factor correction

Another advantage: Only effective power is taken from the power mains. The power factor corrector (PFC) considerably reduces the connected load and current consumption of the machine (by approximately a factor of 2). This results in smaller fuses and wire cross sections. In general, the power supply module is designed so that all of the challenges for machine designers arising from the world's different power supply networks can be met optimally. ACOPOSmulti drives are already prepared for future standards.

Intelligent maintenance

Like all other modules in the ACOPOSmulti series, the power supply modules also have a network connection. This allows all data about current consumption, machine efficiency, etc. to be recorded and analyzed. Together with the information from the individual axes, this represents a big step in the direction of "intelligent maintenance".

2.9 Integrated 24V auxiliary supply modules



The ACOPOSmulti drive system provides the 24V supply for drives as well as for the PLC, PC or peripherals (optional). This doesn't just minimize space requirements; it also ensures predictable machine behavior when power is lost.

Supply for the PLC, drives and peripherals

Why was an effort made to include peripheral devices as well as drives in the 24V supply design of the ACOPOSmulti drive units? The answer is easy when taking a closer look at modern production machines, particularly what happens when power failures or power dips occur. While earlier production machines were positively driven with the help of mechanical cams, modern systems are equipped with electronic cam profiles. The well-known advantages of flexibility and wear-free electronics also have a disadvantage: loss of the cam profile link when a power failure occurs.

Power failures not a problem

ACOPOSmulti addresses this issue with its integrated 24 V auxiliary supply module. The kinetic energy created in the motors when braking is returned to the DC bus, where it is available as electrical energy. This electrical energy is distributed to the drives and even the PLC, PC or peripherals if necessary. To ideally distribute this limited energy during a power failure, the auxiliary supply modules have a fixed output as well as a 24 V output that can be switched off in order to cut off the supply for non-essential peripheral components. Devices can be connected directly to the common DC bus on the drive and have open line, short circuit, and overload protection. This is the ideal solution for electronically linked systems to utilize the advantage of mechanical cams – the defined reference for the angle of the axes is maintained during a loss of or dip in the power supply.

2.10 Scalable inverter modules



Control cabinet space is precious, with minimum volume a decisive factor for survival or failure on the market. Because of this, the ACOPOSmulti drive system offers maximum performance with minimum volume. To further optimize the compact design, inverter modules up to 22 A are also available as 2-axis modules. It is thus possible to create the best possible configuration consisting of 1- or 2-axis inverter modules for each individual task. Above 22 A, the devices are only available as 1-axis modules, so the customer does not have to make any compromises in compactness.

Scalable dynamic features

The paradigm shift for designers of production machines is in full swing. As a result, the number of hybrid drive systems is increasing. ACOPOSmulti is the perfect solution for this mix of conventional motor / gearbox combinations and direct drive technology. The scalability of drive computing power allows the best possible utilization of devices in the vast field of motion control. The range of applications includes sensor-free induction motors, permanent magnet servo motors in the standard design or torque/linear motor versions and ultra-dynamic ironless linear motors. Of course, all inverter modules are equipped with protection against short circuit and ground faults.

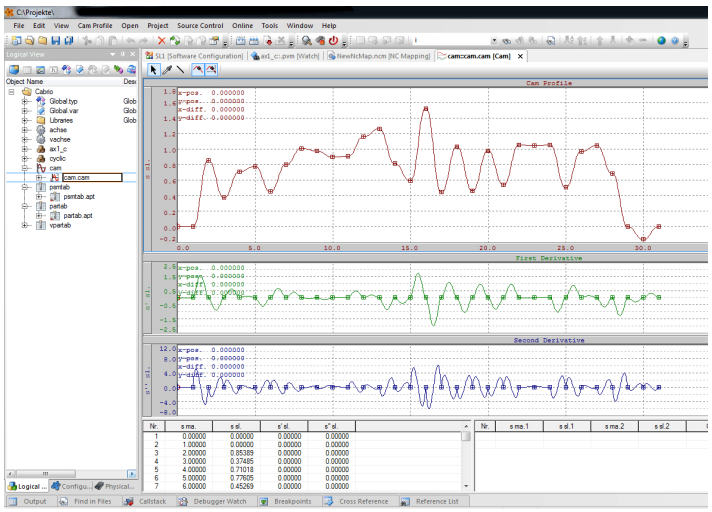


Figure 1: Scalable dynamic features

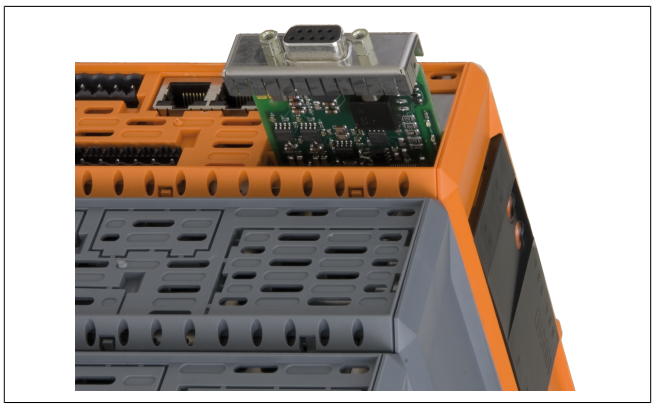
Safely taking it to the physical limits

Insulated gate bipolar transistors (IGBTs) are key components of the power inverter. They are mainly responsible for the power output of the respective inverter module. With the help of pulse width modulated signals, they generate an output voltage regulated in amplitude, frequency and phase. One of the main factors influencing the service life of these IGBTs is the temperature or temperature rise in the component itself. Strict compliance of limit values, even under the most difficult conditions, is a measure of the quality of a power inverter. With the help of a sophisticated mathematics model of the IGBT structure, B&R guarantees compliance with the limit values at maximum output power.

Finding a solution to this apparent contradiction provides a number of benefits for the user:

- Safe inverter operation regardless of the operating mode and environmental conditions.
- The connected motor does not coast down when the temperature limit is exceeded. Instead, the brakes are applied until reaching standstill, without overloading the IGBTs.
- Internal computer-aided models (IGBTs, motor) make it possible to predict the load on a power transmission system after all of its components have completely warmed up (after one cycle). This function considerably reduces the typically long settling times during thermal processes and allows the machine operator to optimize the production process extremely efficiently.

2.11 Accurate encoder plug-in modules



The highly accurate encoder interfaces for resolvers, EnDat 2.1 and 2.2 as well as encoders with sinusoidal output signals play a significant role in the excellent results of the entire control network.

The parameter memory in EnDat encoders is used by B&R to store information such as motor data. In this way, the ACOPOSmulti inverters are always automatically provided with the correct motor parameters and limit values. This is referred to as the "embedded parameter chip".

Nonvolatile application memory, which is also integrated in the embedded parameter chip, allows the machine manufacturer to store initialization and calibration parameters such as zero points and torque linearization. In addition, modules or additional units which have been finished, tested and aligned can then be integrated into the production process or installed at the end customer's plant without extensive calibration testing.

2.12 100% software compatibility with the well-established ACOPOS drive generation

Return on investment is extremely important at B&R. This is illustrated by making the software used with the ACOPOSmulti system compatible with the ACOPOS drive generation already established on the market.

In this case, compatibility does not mean remaining stagnant. It means that the ACOPOSmulti drive generation has inherited all of the functions from the ACOPOS generation and further advanced both generations.

The user can build upon this and implement the additional functions that can be used to improve performance and take advantage of the intelligent maintenance features.

3 ACOPOSmulti configurations

ACOPOSmulti drive systems include multiple technology-specific functions. The ACOPOSmulti functions listed below are basic functions that the user can switch between as needed within 400 µs. Furthermore, manipulations such as changes in product length, print mark control, overlying torque control, brief process adaptations and quality checks can be carried out at any time.

- Point-to-point movements
- Electronic gears
- Electronic compensation gears
- Cutting units
- Electronic cam profiles
- Flying saws
- Line shafts
- CNC

ACOPOSmulti servo drives can be used in various configurations depending on the requirements of the application. The functions listed above are available to the user in each of the topology examples shown.

Reaction speeds are not influenced by the network and control system being used if technology functions are processed directly on the ACOPOSmulti drive system. Additional sensors and actuators must be integrated in the control system for more complex processes. In these cases, the level of performance depends mostly on the control system being used.

The topology examples shown on the following pages provide an overview of the bandwidths that are possible with B&R automation components.

3.1 ACOPOSmulti drive systems in a POWERLINK network

High-performance machine architectures require flexible networks and fieldbuses. With POWERLINK, a network is available to the user that fully meets the high demands of dynamic motion systems. POWERLINK adapts to the requirements of the machine and the system. The rigid coupling of many axes with controllers, industrial PCs, I/O systems and operator panels allows machines and systems to be created with the highest level of precision. Compatibility to standard Ethernet also reduces the number of networks and fieldbuses at the machine level.

Successful areas of use for these topologies

- Packaging industry
- Handling technology
- Plastics processing
- Paper and printing
- Textile industry
- Wood industry
- Metalworking industry
- Semiconductor industry

3.1.1 Recommended topology for POWERLINK networks

In the POWERLINK network (seen from the manager), the tree structure should always come first followed by the line structure. Otherwise, the line structure delay affects the entire tree beneath it.

Information:

A maximum of 10 hubs extending outward from the manager are possible.

3.2 Compact, modular motion control applications

- Modular machine architectures with up to 100 m between individual axes
- Minimal wiring required due to line structure (no ring)
- No additional infrastructure components needed
- Synchronization from the PLC program to the drive control loop

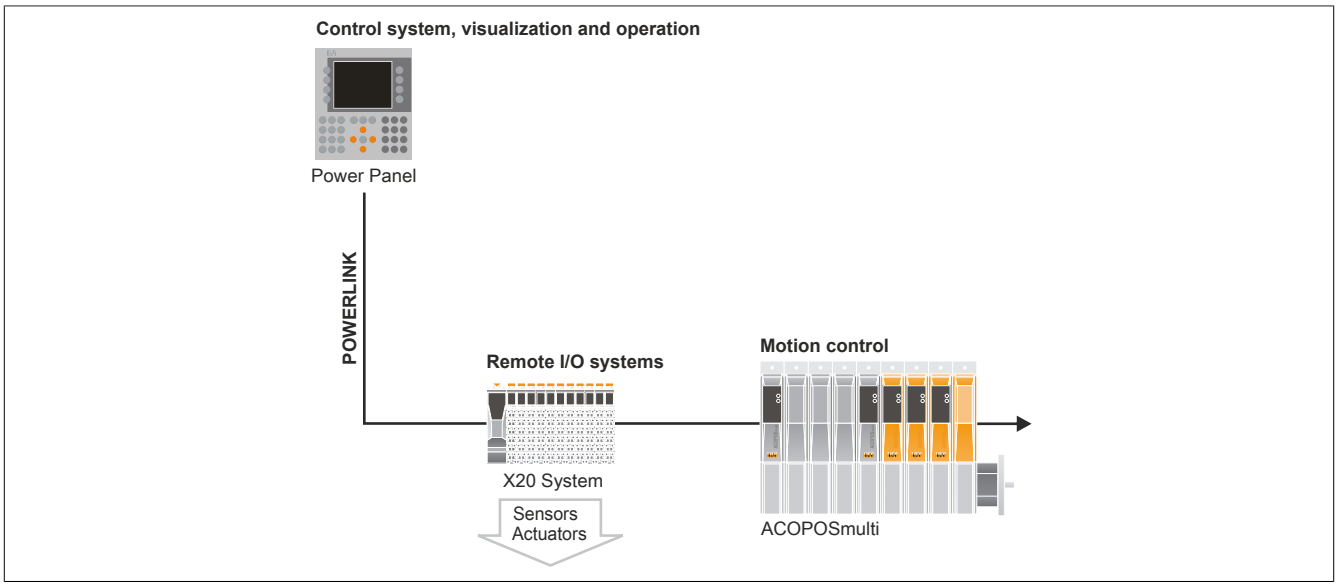


Figure 2: Compact, modular motion control applications

3.3 Extensive, modular motion control applications with up to 253 axes

- Modular machine architectures with up to 100 m between individual axes
- Optimized wiring using a mixed star/line structure (not a ring)
- Nodes with fast and slow sampling rates operable within a single network, eliminating the need to divide the network into fast and slow segments
- Synchronization from the PLC program to the drive control loop

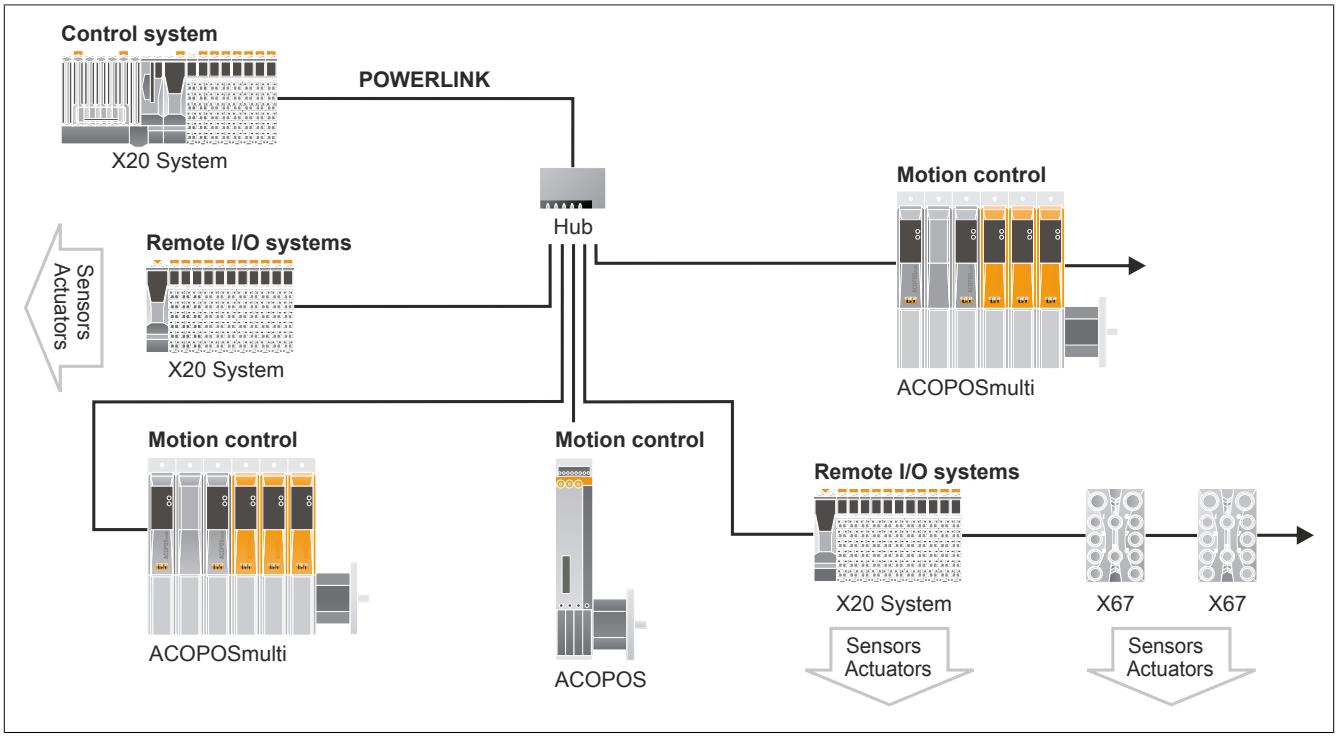


Figure 3: Extensive, modular motion control applications with up to 253 axes

3.4 Modular motion control applications with up to 253 axes and a visualization system

- Modular machine architectures with up to 100 m between individual axes
- Optimized wiring using a mixed star/line structure (not a ring)
- Nodes with fast and slow sampling rates operable within a single network, eliminating the need to divide the network into fast and slow segments
- Synchronization from the PLC program to the drive control loop
- Control and visualization using a powerful IPC system

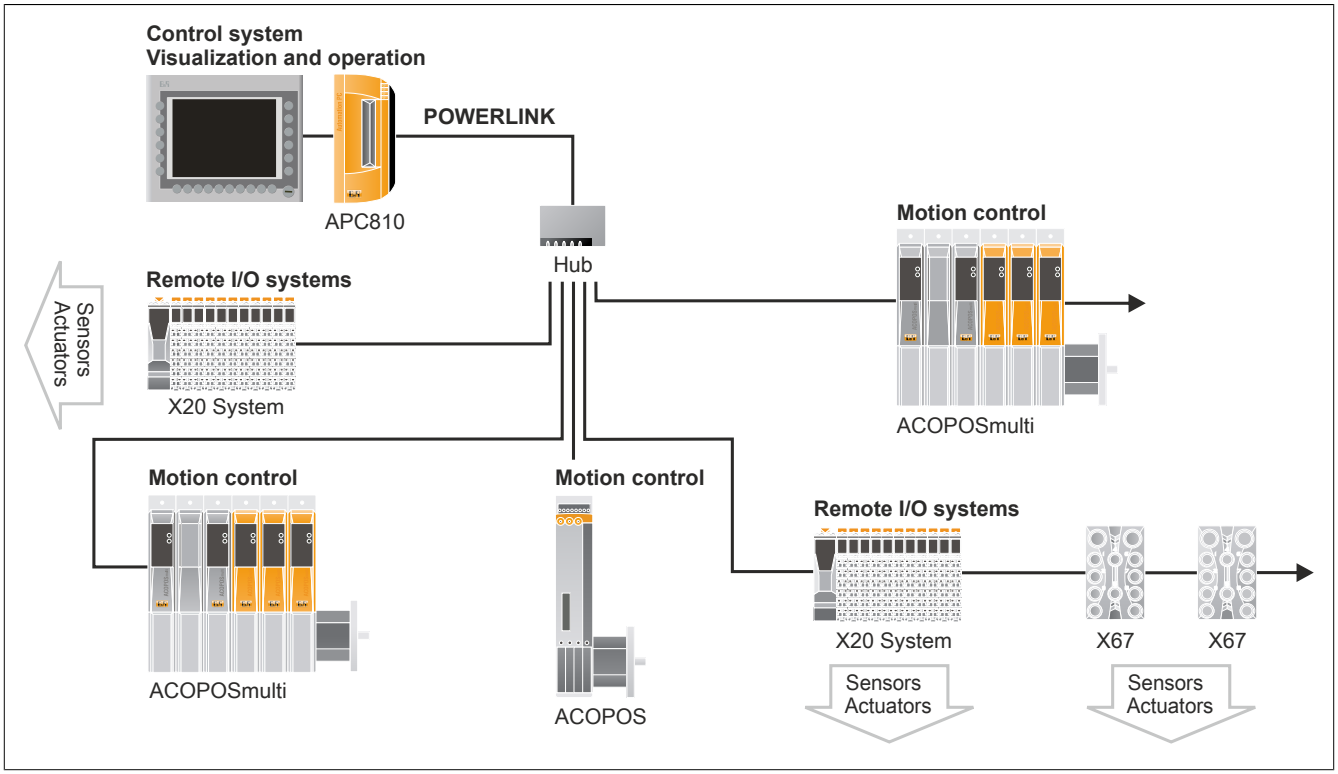


Figure 4: Modular motion control applications with up to 253 axes and HMI

4 Safety guidelines

4.1 Organization of notices

Safety notices

Contain **only** information that warns of dangerous functions or situations.

Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!	Failure to observe these safety guidelines and notices can result in minor injury or damage to property.
Notice!	Failure to observe these safety guidelines and notices can result in damage to property.

Table 2: Organization of safety notices

General notices

Contain **useful** information for users and instructions for avoiding malfunctions.

Signal word	Description
Information:	Useful information, application tips and instructions for avoiding malfunctions.

Table 3: Organization of general notices

4.2 General information

B&R drive systems and servo motors have been designed, developed and manufactured for conventional use in industrial environments.

They were not designed, developed and manufactured for any use involving serious risks or hazards that could lead to death, injury, serious physical impairment or loss of any kind without the implementation of exceptionally stringent safety precautions.

In particular, these risks include the use of these devices to monitor nuclear reactions in nuclear power plants, in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

Servo drives, inverter modules and frequency inverters from B&R are not dual-use goods per Annex I of Council Regulation (EC) No. 428/2009 | 3A225 as amended by Commission Delegated Regulation (EU) No. 2015/2420.
The electrical output frequency of these modules is monitored; if the limit frequency is exceeded, the current movement is aborted and an error is reported.

Servo drives, inverter modules and frequency inverters with the dual-use option are dual-use goods per Annex I of Council Regulation (EC) No. 428/2009 | 3A225 as amended by Commission Delegated Regulation (EU) No. 2015/2420.
The electrical output frequency of these modules is not monitored.

Modules with the dual-use option are subject to various export restrictions.

Danger!

Drive systems and servo motors can have exposed parts with voltages applied (e.g. terminals) or hot surfaces. Additional hazards include moving machine parts. The removal of required covers, inappropriate use of the devices or their improper installation or operation can result in severe personal injury or damage to property.

All tasks such as the transport, installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are those familiar with the transport, mounting, installation, commissioning and operation of devices who also have the appropriate qualifications to perform these tasks. National accident prevention regulations must be observed.

The safety notices, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and are to be observed in all cases.

4.3 Intended use

Servo drives are components designed to be installed in electrical systems or machines. They are not permitted to be used unless the machine meets directive 2006/42/EC (machinery directive) as well as directive 2004/108/EC (EMC directive).

B&R drive systems are only permitted to be directly operated on grounded industrial power systems (TT, TN, TN-C-S). When used in residential areas, commercial areas or small businesses, additional protective and filtering measures must be implemented by the user.

Danger!

Drive systems are not permitted to be operated directly on IT and corner-grounded TN-S systems!

For technical data as well as connection and environmental conditions, see the nameplate or this user's manual. Specifications regarding connection and environmental conditions must be observed!

Danger!

Electronic devices are never completely failsafe. If the drive systems fails, the user is responsible for making sure that the motor is brought to a secure state.

4.4 Protection against electrostatic discharge

Electrical components that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

4.4.1 Packaging

Electrical components with a housing do not require special ESD packaging but must be handled properly (see section 4.4.2 "Guidelines for proper ESD handling" on page 36).

Electrical components without a housing are protected by ESD-suitable packaging.

4.4.2 Guidelines for proper ESD handling

Electrical components with a housing

- Do not touch the connector contacts on connected cables.
- Do not touch the contact tips on circuit boards.

Electrical components without a housing

The following points apply in addition to the points listed under "Electrical components with a housing":

- Any persons handling electrical components or devices with installed electrical components must be grounded.
- Components are only permitted to be touched on their narrow sides or front plate.
- Components must always be placed on or stored in a suitable medium (ESD packaging, conductive foam, etc.).
  Metallic surfaces are not suitable storage surfaces!
- Components must not be subjected to electrostatic discharge (e.g. caused by charged plastics).
- Observe a minimum distance of 10 cm from monitors and television sets.
- Measuring instruments and equipment must be grounded.
- Probe tips of galvanically isolated measuring instruments must be temporarily discharged on suitably grounded surfaces before taking measurements.

Individual components

- ESD protective measures for individual components are thoroughly implemented at B&R (conductive floors, footwear, arm bands, etc.).
- These special ESD protection measures for individual components are not necessary for customers handling B&R products.

4.5 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical loads, temperature, moisture, corrosive atmospheres, etc.).

Drive systems contain components sensitive to electrostatic charges that can be damaged by inappropriate handling. It is therefore necessary to provide the required protective measures against electrostatic discharge when installing or removing these drive systems.

4.6 Handling and installation

Warning!

B&R drive systems and servo motors can be heavy.

During handling and installation of heavy B&R drive systems or servo motors, there is therefore the danger of personal injury or damage to property (through shearing, impacts, cutting or crushing). Suitable protective equipment (e.g. safety glasses, protective gloves, safety shoes, etc.) must be used whenever necessary!

Installation must be performed according to this documentation using suitable equipment and tools.

Devices are only permitted to be installed by qualified personnel without voltage applied. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.

General safety guidelines and national accident prevention regulations (e.g. VBG 4) for working with high voltage systems must be observed.

Electrical installation must be carried out according to applicable guidelines (e.g. line cross-section, fuses, protective ground connections, see also chapter 4 "Dimensioning").

4.7 Operation

4.7.1 Protection against touching electrical parts

Danger!

To operate drive systems, it is necessary for certain parts to carry dangerous voltage levels over 60 VDC or 42 VAC. Touching one of these components can result in a life-threatening electric shock. This could lead to death, severe injury or damage to property.

Before switching on a drive system, it is important to ensure that it is properly connected to ground potential (PE rail). Ground connections must be established even when testing or operating the drive system for a short time!

Before switching on the device, all parts that carry voltage must be securely covered. During operation, all covers and control cabinet doors must remain closed.

Danger!

If the safety functions integrated in the drive system are used in an application, then they must be fully validated before the drive system is switched on for the first time. This could lead to death, severe injury or damage to property.

Control and power connections can still carry voltage even if the motor is not turning. Touching these connections while the device is switched on is prohibited.

Before performing any work on drive systems, they must first be disconnected from the power system and prevented from being switched on again.

Danger!

Dangerously high voltage!

Before performing service work, disconnect the power supply and wait 5 minutes to ensure that the capacitors have discharged. Observe regulations!
This delay time of 5 minutes begins as soon as all of the synchronous motors connected to the drive system that has been disconnected from the power supply have come to a standstill. If the synchronous motors are not stationary when the drive system is disconnected from the power supply, then the delay time must be extended accordingly.

The following warning label is attached to the modules:



Figure 5: Warning label on ACOPOSmulti modules

The connections on the drive system for signal voltages in the voltage range 5 to 30 V are safely isolated circuits. The signal voltage connections and interfaces are therefore only permitted to be connected to devices or electrical components that have sufficient isolation per EN 61800-5-1 and protective extra-low voltage that corresponds to voltage class DVC A (SELV, PELV).

Never remove the electrical connections of drive systems while voltage is applied. In the worst case, arcs may occur that can subsequently cause personal injury and/or damage to contacts.

4.7.2 Protection against hazardous movements

Danger!

Improper control of motors can result in unintended hazardous movements! Such incorrect behavior can have various causes:

- **Incorrect installation or faults when handling components**
- **Improper or incomplete wiring**
- **Defective devices (drive system, motor, position encoder, cables, brake)**
- **Incorrect control (e.g. caused by software error)**

Some of the errors listed above can be detected and prevented by the drive system's internal monitoring. Nevertheless, it is still possible for the motor shaft to move any time after the device is switched on! For this reason, higher-level safety precautions need to be put in place to ensure that personnel and machines are protected.

The moving parts on machines must be shielded in such a way as to prevent unintentional access by personnel. This type of protection can be achieved by using stable mechanical protective equipment such as protective covers, protective fences, protective gates or photoelectric sensors.

Removing, bypassing or circumventing these protective measures and entering the area where movement takes place is prohibited.

A sufficient number of emergency stop buttons must be installed in direct proximity to the machine and be easily accessible at all times. This emergency stop equipment must be checked before the machine is put into operation.

On free running motors, the key (if present) must be removed or measures taken to prevent its ejection. The holding brake built into motors cannot prevent hoisting equipment from dropping hanging loads.

4.8 Characteristic values for functional safety

Characteristic values for functional safety are listed in chapter "Safety technology".

Characteristic values are calculated based on a proof test interval of maximum 20 years. Since a proof test cannot be carried out for B&R drive systems, the proof test interval is the same as the system's mission time.

Per the EN ISO 13849, EN 62061 and IEC 61508 standards, the safety functions described in section "Safety technology" cannot be used beyond the specified mission time.

Danger!

The user must ensure that all B&R drive systems that execute a safety function are replaced by new B&R drive systems or removed from operation before their mission time expires.

Information:

The end date of the mission time (MTE) is stored on all modules of B&R drive systems that perform a safety function and can be read out by the user as follows (for details, see Automation Help):

- **Parameter ID 10312 - EPROM_MISSION_TIME_END**
- **Library ACP10_MC - Function block MC_BR_GetHardwareInfo**

The end date of the mission time (MTE) can also be read directly from the housing of modules:

- **MTE: YYYYMMDD (YYYY ... Year, MM ... Month, DD ... Day)**

4.9 Environmentally friendly disposal

All B&R drive systems and servo motors are designed to inflict as little harm as possible on the environment.

4.9.1 Separation of materials

It is necessary to separate out the different materials so that devices can undergo an environmentally friendly recycling process.

Component	Disposal
Drive systems, servo motors, cables	Electronic recycling
Cardboard/Paper packaging	Paper/Cardboard recycling

Table 4: Environmentally friendly separation of materials

Disposal must take place per applicable legal regulations.

Chapter 2 • Technical data

1 Configuration of an ACOPOSmulti drive system

The ACOPOSmulti drive system consists of a mounting plate, various modules (power supply, auxiliary supply, inverter, expansion and capacitor modules), plug-in modules as well as a line filter and – only in combination with 8BVP active power supply modules – a regeneration choke.

The configuration of an ACOPOSmulti drive system is carried out in 10 steps:

1. Determine the cooling method.
    - Standard cooling (wall mounting)
    - Feed-through cooling (feed-through mounting)
    - Oil/Water cooling (cold plate mounting)
2. Define or verify the supply voltage range and network configuration.
3. Select the ACOPOSmulti inverter modules according to the application requirements.
    - 1-axis modules
    - 2-axis modules
4. Select the ACOPOSmulti plug-in modules for the motor encoder and external axis encoder according to the application requirements.
5. If the ACOPOSmulti drive system should be expandable:
   Define the number of optional slots for additional ACOPOSmulti modules on the mounting plate.
6. Select the ACOPOSmulti power supply module based on the application requirements (active/passive power supply module) and based on the total power of the required ACOPOSmulti inverter modules (with a mains voltage <3x 400 VAC or DC bus voltage <750 VDC, derating information must be taken into account).
    - Passive power supply modules[1)]
    - Active power supply modules
7. Check the maximum chargeable DC bus capacitance.
8. Select the ACOPOSmulti auxiliary supply module based on the total power required for the 24 VDC power supply of the selected ACOPOSmulti module, ACOPOSmulti plug-in modules as well as the peripheral supply (e.g. PLC, actuators, motor holding brakes, sensors)
    - 24 V internal
    - 24 V internal, 24 V external
    - 24 V internal, 24 V external, 24 V external supply
    - 42 V external

> **Danger!**
>
> **ACOPOSmulti auxiliary supply modules (8B0C0320Hx00.00A-1) must not be used in combination with ACOPOSmulti SafeMOTION inverter modules!**

9. Determine the total number of slots by adding the widths of all selected ACOPOSmulti modules (including optional slots).
10. Select the ACOPOSmulti mounting plate according to the total number of slots required and specified cooling method.

[1)] Step 8 can be skipped if the 24 VDC power supply is supplied to the selected ACOPOSmulti 8BVI inverter modules by passive power supply module 8B0P0110Hx00.000-1 (max. 90 W).

2 Status indicators

Status indicators are located on the black cover of each module.

2.1 8B0P power supply modules

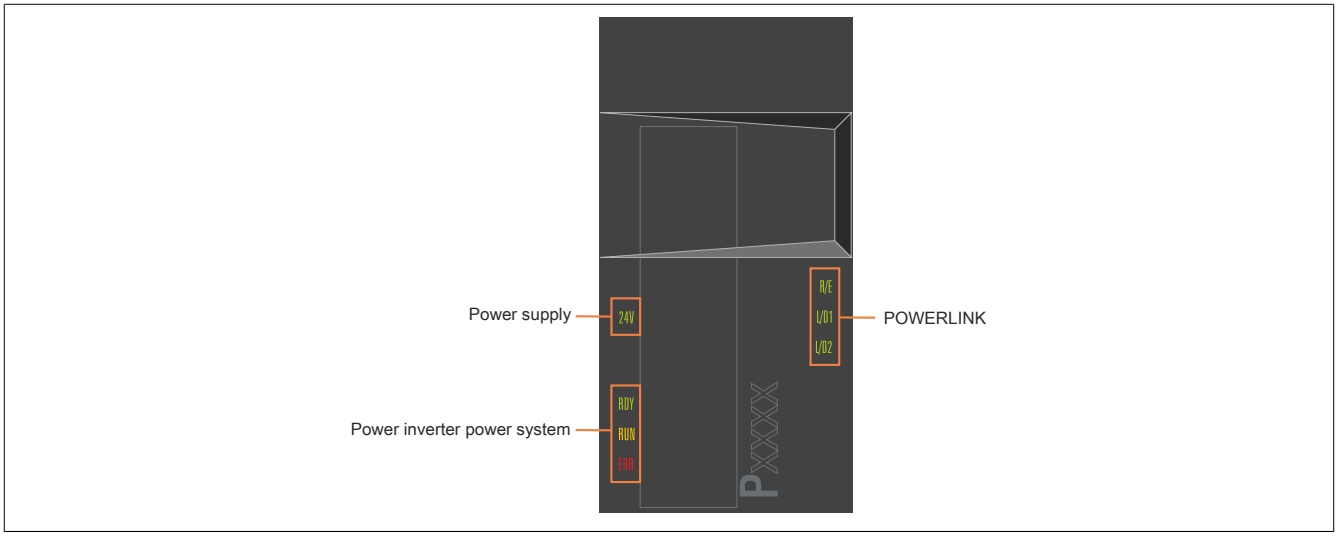


Figure 6: 8B0P power supply modules - Status indicator groups

2.1.1 LED status indicators

Status indicator group	Label	Color	Function	Description
POWERLINK	R/E	Green/Red	Ready/Error	see "POWERLINK - LED status indicators" on page 52
	L/D1	Green	Link/Data activity on port 1	
	L/D2	Green	Link/Data activity on port 2	
Power inverter power system	RDY	Green	Ready	see "RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators" on page 52
	RUN	Orange	Run	
	ERR	Red	Error	
Power supply	24 V	Green	24 V OK	The 24 V internal system voltage supply is higher than the minimum permissible value and/or the 24 V internal module-internal power supply is within the tolerance range. 1)

Table 5: 8B0P power supply modules - LED status indicators

1) 8B0P power supply modules have an internal power supply that generates 24 VDC directly from the mains input voltage for module-internal purposes. If the 24 VDC generated in the module is properly applied, LED "24 V" is lit.
It is therefore possible that LED "24 V" is lit although the 24 VDC internal system voltage generated by 24 VDC auxiliary supply module 8B0C is not present via the mounting plate on power supply module 8BxP. This is the case, for example, if the 24 VDC 8B0C auxiliary supply module of the ACOPOSmulti drive system is defective or has no electrical contact to the mounting plate.

2.1.2 LED status ERROR

The following intervals are used for the LED status indicators:

Block size: 500 ms
Repeats after: 3,000 ms

Status	LED	Display
Charging resistor overtemperature	RDY	
	RUN	
	ERR	

Module not configured in Automation Studio

The following intervals are used for the LED status indicators:

Block size: 50 ms
Repeats after: 3,000 ms

Status	LED	Display
Module not configured in Automation Studio	RDY	
	RUN	
	ERR	

2.2 8BVP power supply modules

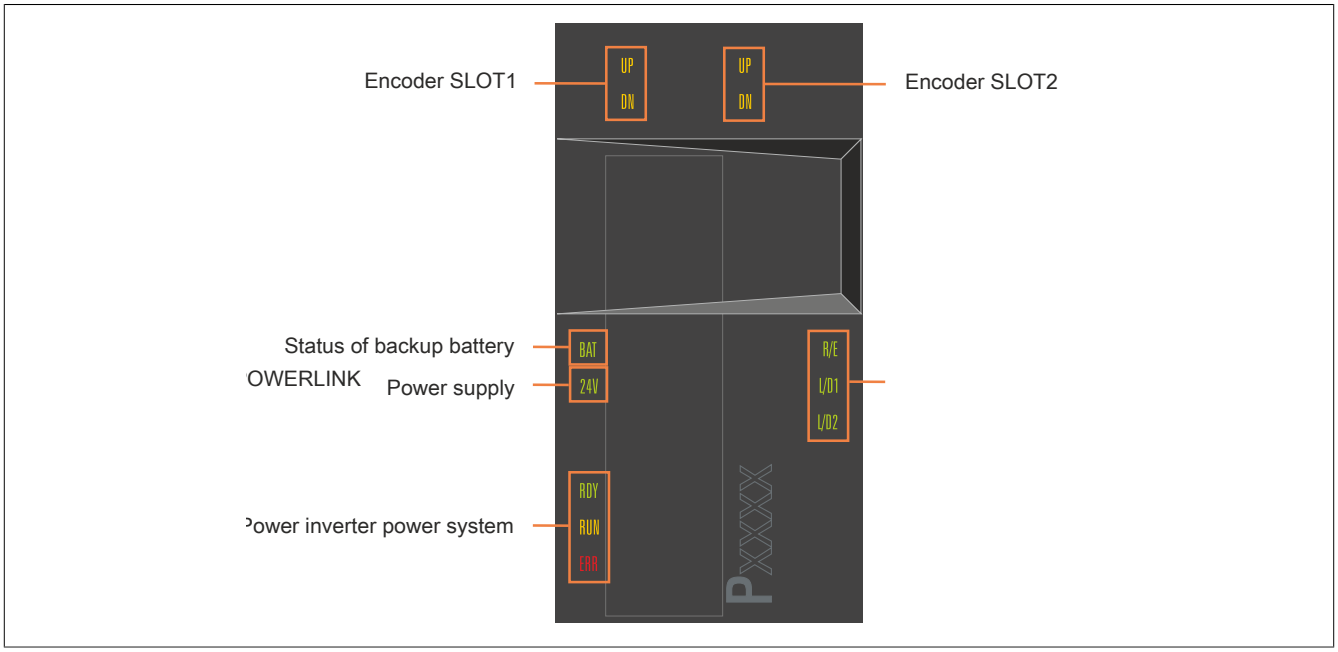


Figure 7: 8BVP power supply modules - Status indicator groups

2.2.1 LED status indicators

Status indicator group	Label	Color	Function	Description
POWERLINK	R/E	Green/Red	Ready/Error	see "POWERLINK - LED status indicators" on page 52
	L/D1	Green	Link/Data activity on port 1	
	L/D2	Green	Link/Data activity on port 2	
Power inverter power system	RDY	Green	Ready	see "RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators" on page 52
	RUN	Orange	Run	
	ERR	Red	Error	
Status of backup battery	BAT	Green/Red	Ready/Error	see "Backup battery - LED status indicators" on page 52
Power supply	24 V	Green	24 V OK	24 V internal system voltage supply is within the tolerance range
Encoder SLOT1	UP	Orange	Encoder direction of rotation +	The encoder position of the connected encoder is changing in the positive direction. The faster the encoder position changes, the brighter the LED is lit.
	DN	Orange	Encoder direction of rotation -	The encoder position of the connected encoder is changing in the negative direction. The faster the encoder position changes, the brighter the LED is lit.
Encoder SLOT2	UP	Orange	Encoder direction of rotation +	See encoder SLOT1.
	DN	Orange	Encoder direction of rotation -	

Table 6: 8BVP power supply modules - LED status indicators

2.3 8B0C auxiliary supply modules

2.3.1 Auxiliary supply modules

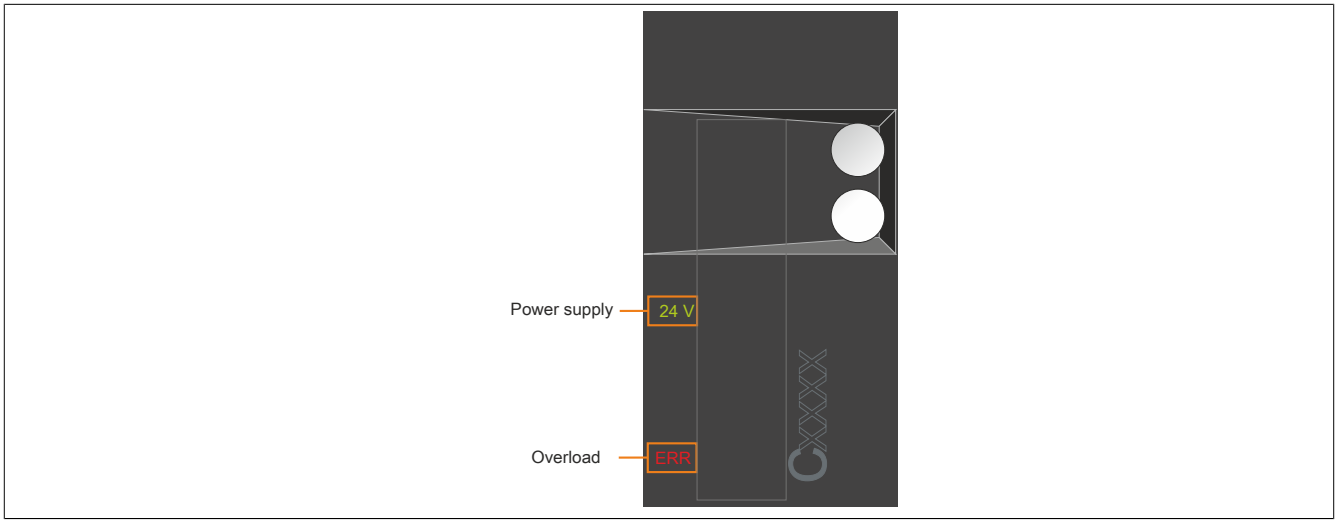


Figure 8: Indicator groups for auxiliary supply modules (8B0C0xx0Hx00.000-1)

2.3.1.1 LED status - Auxiliary supply modules

Status indicator group	Labeling	Color	Function	Description
Power supply	24 V	Green	24 V OK	The 24 VDC internal system supply voltage is within the permissible tolerance
Overload	ERR	Red	Overload	The module is not supplied via the DC bus voltage. [1)] The 24 VDC internal system supply voltage is outside of the permissible tolerance (overload, overtemperature, short circuit, etc)

Table 7: LED status - 8B0C auxiliary supply modules

1) The module is enabled via the input CR_OK, no electrical contact to the backplane module - check bottom mounting screws.

2.3.2 Auxiliary supply modules with 24 V Out

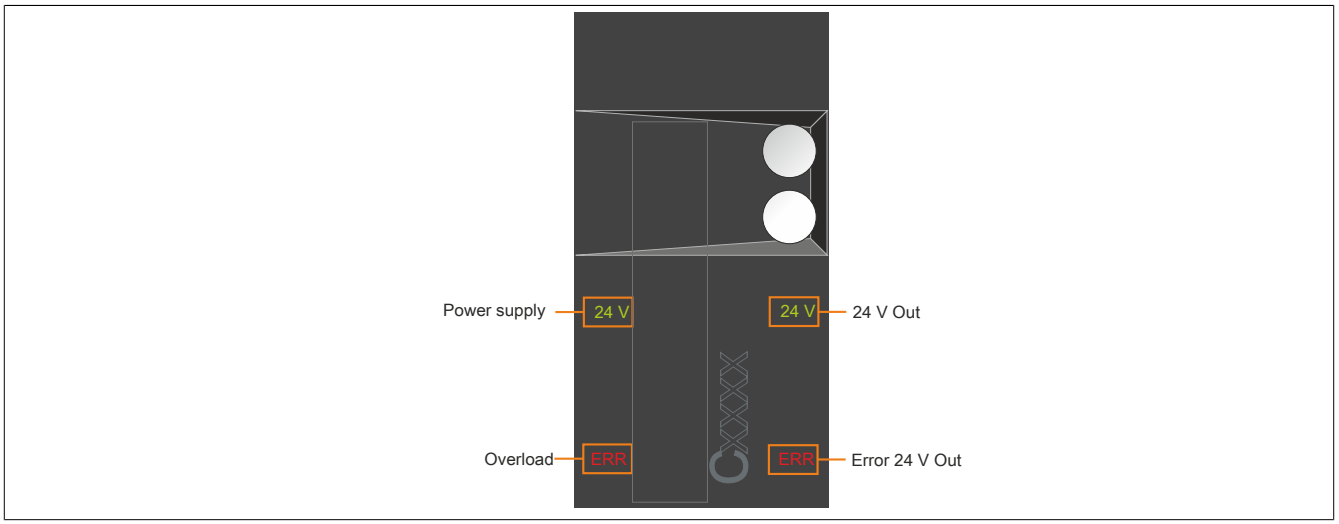


Figure 9: Indicator groups for auxiliary supply modules with 24 V Out (8B0C0xx0Hx00.00x-1)

2.3.2.1 LED status - Auxiliary supply modules with 24 V Out

Status indicator group	Labeling	Color	Function	Description
Power supply	24 V	Green	24 V OK	The 24 VDC internal system supply voltage is within the permissible tolerance
Overload	ERR	Red	Overload	The module is not supplied via the DC bus voltage. 1) The 24 VDC internal system supply voltage is outside of the permissible tolerance (overload, overtemperature, short circuit, etc)
24 V Out	24 V	Green	24 V Out OK	One of the switchable 24 VDC outputs is active and the output voltage is within the permissible tolerance The 24 VDC internal system supply voltage is within the permissible tolerance
	ERR	Red	24 V Out error	The 24 VDC internal system supply voltage is outside of the permissible tolerance (overload, overtemperature, short circuit, etc) At least one of the switchable outputs is active **and** the resettable fuse has been tripped for one or more switchable outputs.

Table 8: LED status - 8B0C auxiliary supply modules with 24 V Out

1) The module is enabled via the input CR_OK, no electrical contact to the backplane module - check bottom mounting screws.

2.3.3 Auxiliary supply modules with 42 V Out

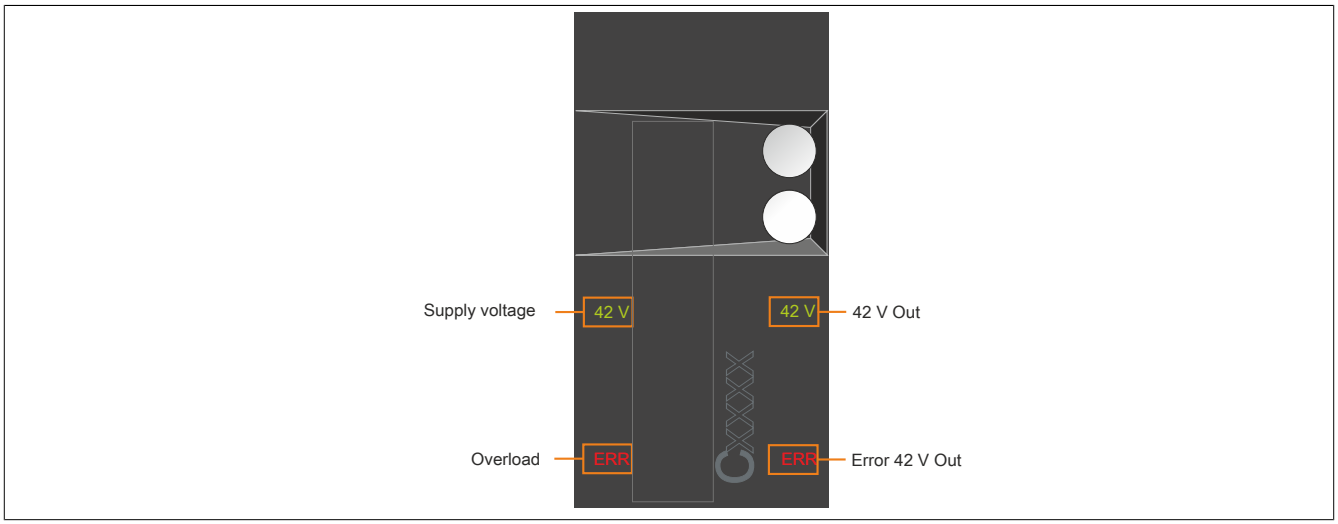


Figure 10: 8B0C0160Hx00.A01-1 auxiliary supply modules with 42 V Out - Status indicator groups

2.3.3.1 Auxiliary supply modules with 42 V Out - LED status indicators

Status indicator group	Labeling	Color	Function	Description
Supply voltage	42 V	Green	42 V OK	The 42 VDC supply is within the permissible tolerance.
Overload	ERR	Red	Overload	The module is not supplied via the DC bus voltage. [1)] The 42 VDC supply is outside of the permissible tolerance (overload, overtemperature, short circuit, etc.).
42 V Out	42 V	Green	42 V Out OK	One of the switchable 42 VDC Out outputs is active, and the output voltage is within the permissible tolerance.
	ERR	Red	42 V Out error	The 42 VDC supply is outside of the permissible tolerance (overload, overtemperature, short circuit, etc.). At least one of the switchable outputs is active **and** the resettable fuse has been tripped for one or more switchable outputs.

Table 9: 8B0C auxiliary supply modules with 42 V Out - LED status indicators

1) The module is enabled via the CR_OK input. No electrical contact to the backplane module - check the bottom mounting screw.

2.3.4 Auxiliary supply modules with 24 V Out and 24 V In

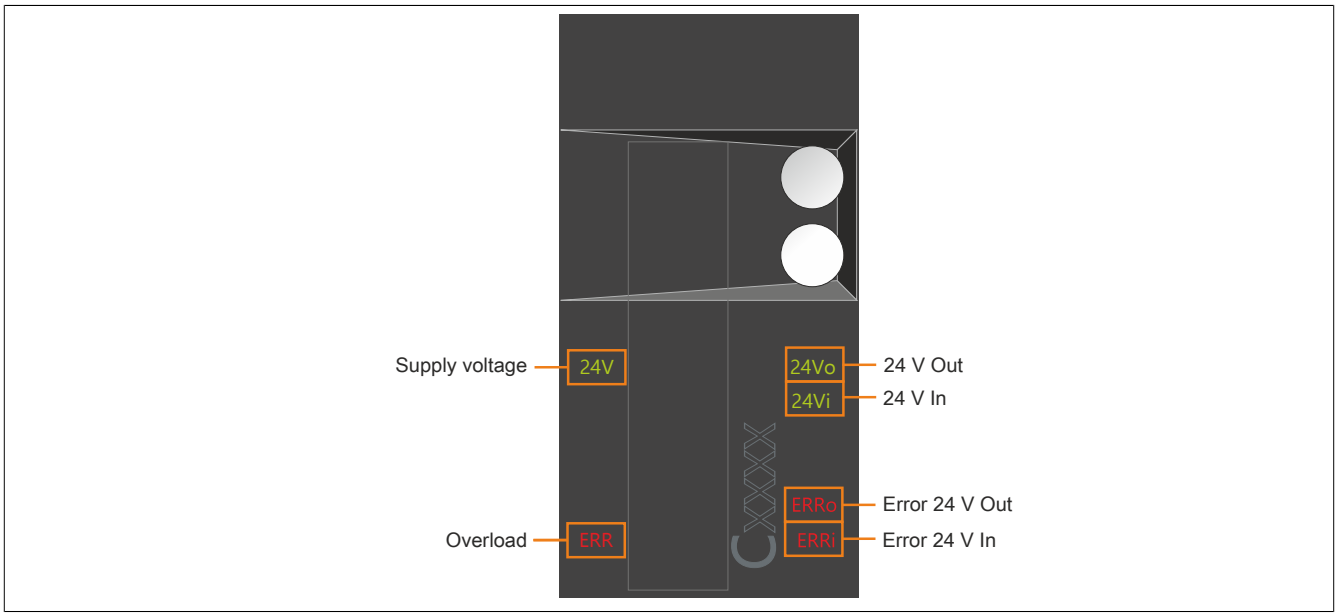


Figure 11: 8B0C0320Hx00.00A-1 auxiliary supply modules with 24 V Out and 24 V In - Status indicator groups

2.3.4.1 Auxiliary supply modules with 24 V Out and 24 V In - LED status indicators

Status indicator group	Labeling	Color	Function	Description
Supply voltage	24 V	Green	24 V OK	The 24 VDC internal system supply voltage is within the permissible tolerance.
Overload	ERR	Red	Overload	The module is not supplied via the DC bus voltage. [1)] The 24 VDC internal system supply voltage or 42 VDC supply is outside of the permissible tolerance (overload, overtemperature, short circuit, etc.).
24 V Out	24Vo	Green	24 V Out OK	One of the switchable 24 VDC outputs is active, and the output voltage exceeds the minimum permissible value. The 24 VDC internal system supply voltage exceeds the minimum permissible value.
24V In	24 Vi	Green	24 V In OK	The 24 VDC external system supply voltage is within the permissible tolerance.
Error 24 V Out	ERRo	Red	24 V Out error	The 24 VDC internal system supply voltage exceeds the minimum permissible value (overload, overtemperature, short circuit, etc.). At least one of the switchable outputs is active **and** the resettable fuse has been tripped for one or more switchable outputs.
Error 24 V In	ERRi	Red	24 V In error	The 24 VDC external system supply voltage is outside the permissible tolerance The 24 VDC external system supply voltage is within the permissible tolerance **and** the resettable fuse has been tripped (overload, short circuit, etc.). The 24 VDC external system supply voltage is within the permissible tolerance **and** temperature monitoring has been triggered.

Table 10: 8B0C auxiliary supply modules with 24 V Out and 24 V In - LED status indicators

1) The module is enabled via the CR_OK input. No electrical contact to the backplane module - check the bottom mounting screw.

2.4 8BVI inverter modules

2.4.1 Single-axis modules

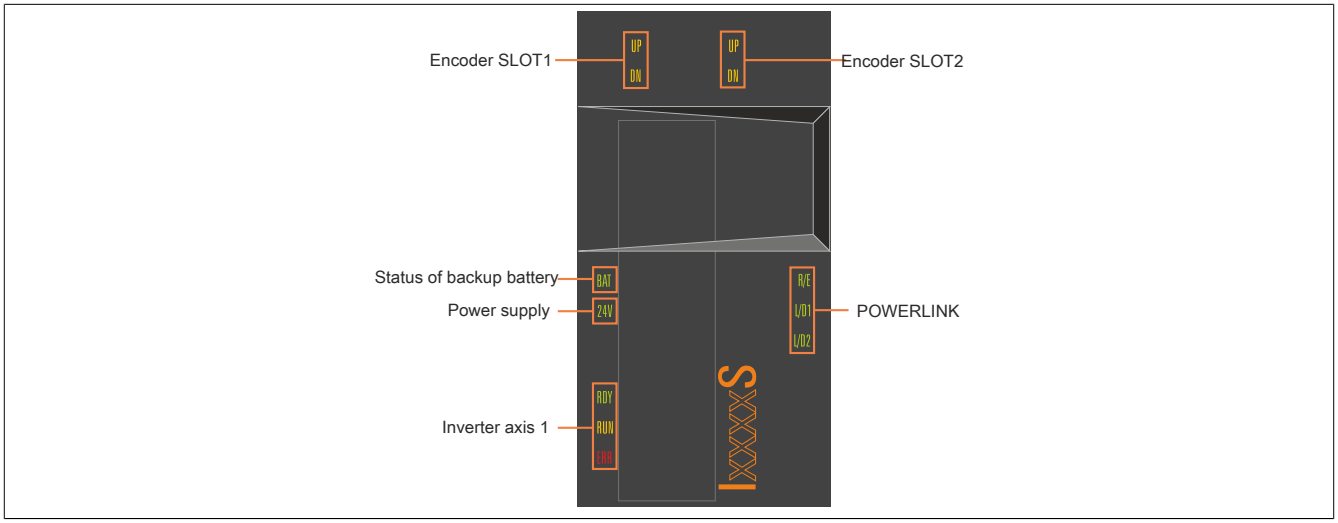


Figure 12: 8BVI inverter modules (1-axis modules) - Status indicator groups

LED status indicators

Status indicator group	Label	Color	Function	Description
POWERLINK	R/E	Green/Red	Ready/Error	see "POWERLINK - LED status indicators" on page 52
	L/D1	Green	Link/Data activity on port 1	
	L/D2	Green	Link/Data activity on port 2	
Inverter axis 1	RDY	Green	Ready	see "RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators" on page 52
	RUN	Orange	Run	
	ERR	Red	Error	
Status of backup battery	BAT	Green/Red	Ready/Error	see "Backup battery - LED status indicators" on page 52
Power supply	24 V	Green	24 V OK	The 24 V module supply voltage is within the tolerance range.
Encoder SLOT1	UP	Orange	Encoder direction of rotation +	Indicates that the position of the connected encoder is changing in the positive direction. The faster the encoder position changes, the brighter the LED is lit.
	DN	Orange	Encoder direction of rotation -	Indicates that the position of the connected encoder is changing in the negative direction. The faster the encoder position changes, the brighter the LED is lit.
Encoder SLOT2	UP	Orange	Encoder direction of rotation +	see Encoder SLOT1
	DN	Orange	Encoder direction of rotation -	

Table 11: 8BVI inverter modules (1-axis modules) - LED status indicators

2.4.2 2-axis modules

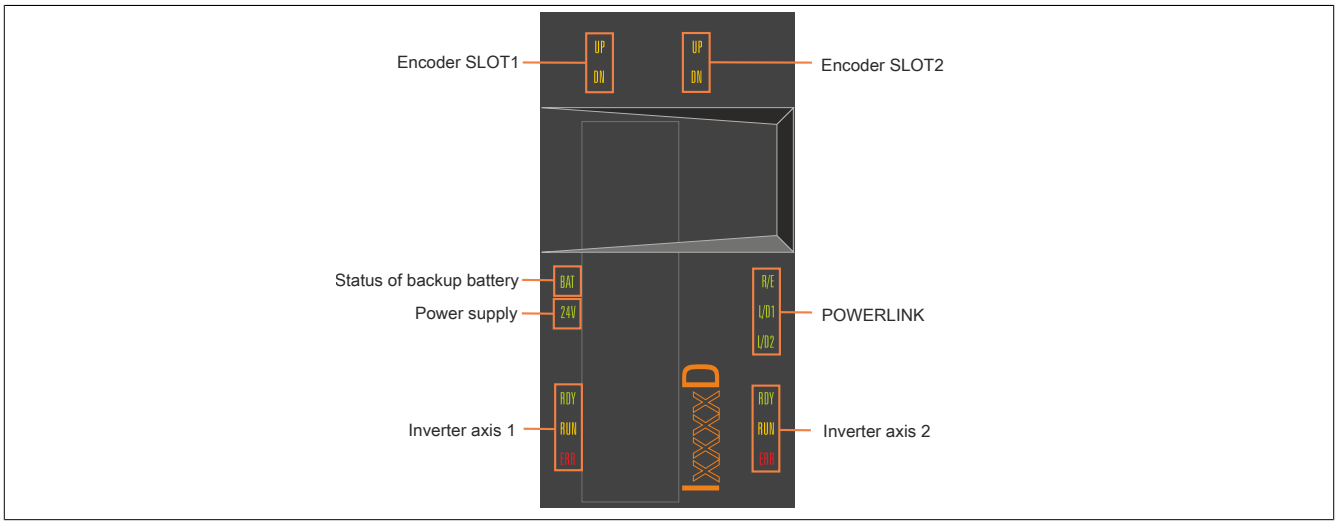


Figure 13: Indicator groups for 8BVI inverter modules (2-axis modules)

LED status indicators

Status indicator group	Label	Color	Function	Description
POWERLINK	R/E	Green/Red	Ready/Error	see "POWERLINK - LED status indicators" on page 52
	L/D1	Green	Link/Data activity on port 1	
	L/D2	Green	Link/Data activity on port 2	
Inverter axis 1	RDY	Green	Ready	see "RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators" on page 52
	RUN	Orange	Run	
	ERR	Red	Error	
Inverter axis 2	RDY	Green	Ready	See inverter axis 1
	RUN	Orange	Run	
	ERR	Red	Error	
Status of backup battery	BAT	Green/Red	Ready/Error	see "Backup battery - LED status indicators" on page 52
Power supply	24 V	Green	24 V OK	The 24 V module power supply voltage is within the tolerance range.
Encoder SLOT1	UP	Orange	Encoder direction of rotation +	Indicates that the position of the connected encoder is changing in the positive direction. The faster the encoder position changes, the brighter the LED is lit.
	DN	Orange	Encoder direction of rotation -	Indicates that the position of the connected encoder is changing in the negative direction. The faster the encoder position changes, the brighter the LED is lit.
Encoder SLOT2	UP	Orange	Encoder direction of rotation +	See encoder SLOT1.
	DN	Orange	Encoder direction of rotation -	

Table 12: LED status indicators - 8BVI inverter modules (2-axis modules)

2.5 8BVE expansion modules

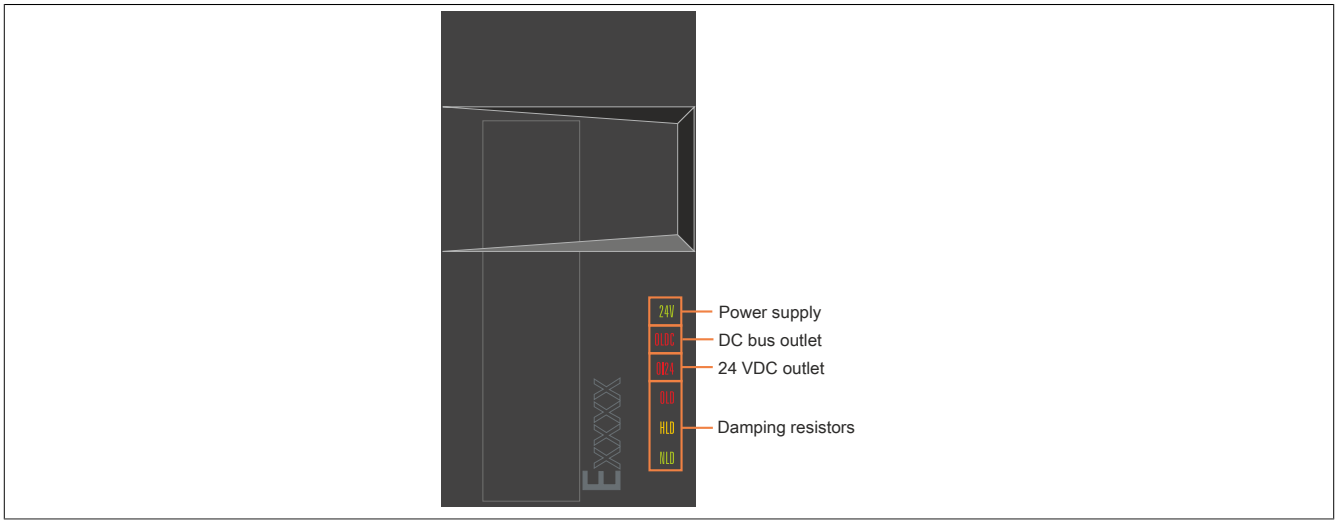


Figure 14: 8BVE expansion modules - Status indicator groups

2.5.1 LED status

Status indicator group	Labeling	Color	Function	Description
Power supply	24 V	Green	24 V OK	The 24 V module supply voltage is within the tolerance range.
DC bus outlet [1]	OLDC	Red	Overload	DC bus outlet is overloaded • The alarm contacts are activated. [2] **Caution!** **There is the danger of both DC fuses being damaged after the OLDC LED is lit (overload of DC bus outlet). For this reason, they should be replaced as a precaution after the OLDC LED is lit.**
24 VDC outlet [1]	OL24	Red	Overload	The 24 VDC outlet is overloaded. • The alarm contacts are activated. [2]
Damping resistors	OLD [1]	Red	Load >100%	The damping resistors are overloaded. • The alarm contacts are activated.
	HLD	Orange	75% < Load < 100%	The load on the damping resistors is high. • The alarm contacts are not activated. [2]
	NLD	Green	Load <75%	The load on the damping resistors is in the normal range. • The alarm contacts are not activated.

Table 13: Status LEDs - 8BVE expansion modules

1) The LED lights after overload occurs until power is disconnected from the module.
2) The alarm contact remains enabled until the cause of the overload has been eliminated and power has been disconnected from the module.

2.6 8B0K capacitor modules

2.6.1 Without integrated charging circuit

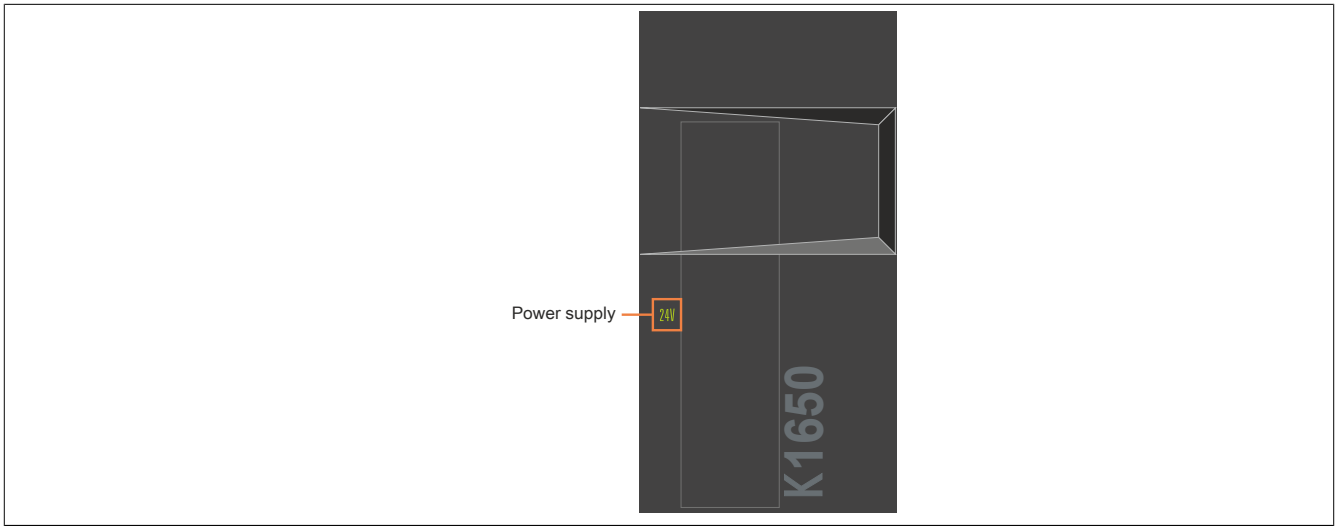


Figure 15: Indicator groups for 8B0K capacitor modules without integrated charging circuit

2.6.1.1 LED status

Status indicator group	Labeling	Color	Function	Description
Power supply	24 V	Green	24 V OK	The 24 V module supply voltage is within the tolerance range

Table 14: LED status for 8B0K capacitor modules

2.6.2 With integrated charging circuit

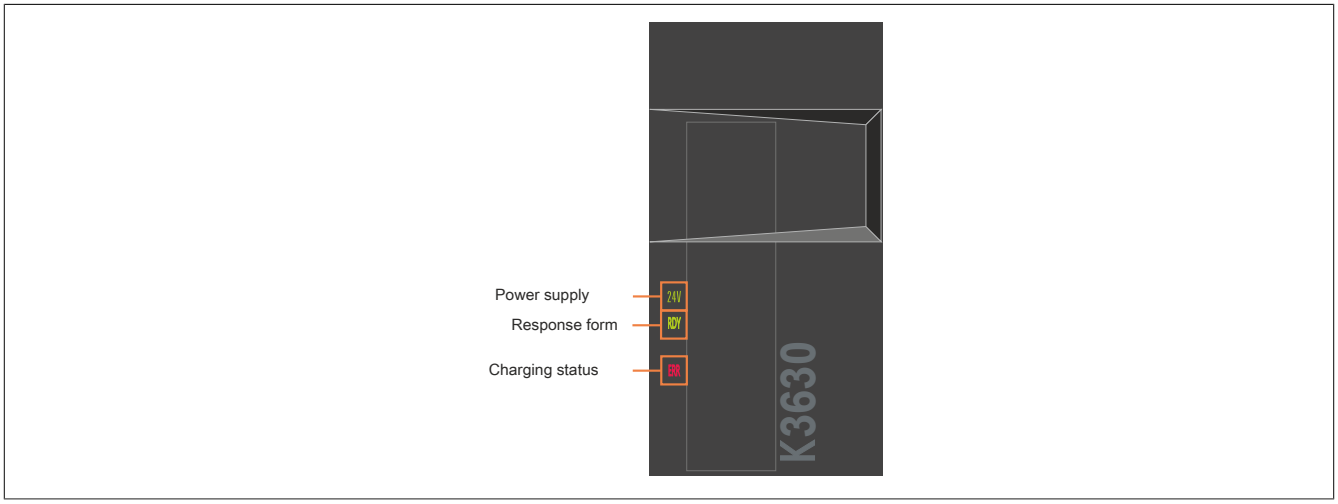


Figure 16: Indicator groups for 8B0K capacitor modules with integrated charging circuit

2.6.2.1 LED status indicators

Status indicator group	Labeling	Color	Function	Description
Power supply	24 V	Green	24 V OK	The 24 V module voltage supply is within the tolerance range
Response form	RDY	Green	Ready	The integrated main relay is closed and the alarm contacts are active.
Charging status	ERR	Red	Error	The DC bus is not charged because of an error. and/or The module is in the charging phase

Table 15: 8B0K capacitor modules with integrated charging circuit - LED status indicators

2.7 RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators

Label	Color	Function	Description	
RDY	Green	Ready	Solid green	The module is operational and the power stage can be enabled (operating system present and booted, no permanent or temporary errors).
			Blinking green [1]	The module is not ready for operation. **Examples:** • No signal on one or both enable inputs • DC bus voltage outside the tolerance range • Overtemperature on the motor (temperature sensor) • Motor feedback not connected or defective • Motor temperature sensor not connected or defective • Overtemperature on the module (IGBT junction, heat sink, etc.) • Disturbance on network
RUN	Orange	Run	Solid orange	The module's power stage is enabled.
ERR	Red	Error	Solid red [1]	There is a permanent error on the module. **Examples:** • Permanent overcurrent • Invalid data in EPROM
			Blinking red	• LED status "Status changes when starting up the operating system loader" on page 53

Table 16: RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators

1) Firmware V2.130 and later.

Information:

The ACOPOSmulti drive system has no way of detecting whether the fans in the fan modules of the mounting plate or the module-internal fans are actually rotating.

2.8 POWERLINK - LED status indicators

Label	Color	Function	Description	
R/E	Green/Red	Ready/Error	LED off	The module is not supplied with power or network interface initialization has failed.
			Solid red	The POWERLINK node number of the module is 0.
			Blinking red/green	The client is in an error state (drops out of cyclic operation).
			Blinking green (1x)	The client detects a valid POWERLINK frame on the network.
			Blinking green (2x)	Cyclic operation on the network is taking place, but the client itself is not yet a participant.
			Blinking green (3x)	Cyclic operation of the client is in preparation.
			Solid green	The client is participating in cyclic operation.
			Flickering green	The client is not participating in cyclic operation and also does not detect any other stations on the network participating in cyclic operation.
L/D1	Green	Link/Data activity Port 1	Solid green	A physical connection has been established to another station on the network.
			Blinking green	Activity on port 1
L/D2	Green	Link/Data activity Port 2	Solid green	A physical connection has been established to another station on the network.
			Blinking green	Activity on port 2

Table 17: POWERLINK - LED status indicators

2.9 Backup battery - LED status indicators

Label	Color	Function	Description	
BAT	Green/Red	Ready/Error	LED off	**Possible causes:** • The voltage of the installed backup battery is within the tolerance range, but an EnDat encoder with backup battery is not connected. • An EnDat encoder with backup battery is connected and registering "Battery OK", but the module's firmware version does not support EnDat encoders with battery backup.
			Solid green	An EnDat encoder with battery backup is connected and registering "Battery OK" (voltage of the installed backup battery is within the tolerance range).
			Solid red	An EnDat encoder with battery backup is connected and registering "Battery not OK". **Possible causes:** • Voltage of the installed backup battery outside of tolerance range • No backup battery installed in module

Table 18: Backup battery - LED status indicators

2.10 Status changes when starting up the operating system loader

The following intervals are used for the LED status indicators:

Block size: 50 ms
Repeats after: 3,000 ms

Status	LED	Display
1. Boot procedure for base hardware active	RDY	
	RUN	
	ERR	
2. Network configuration active	RDY	
	RUN	
	ERR	
3. Waiting for network telegram	RDY	
	RUN	
	ERR	
4. Network communication active	RDY	
	RUN	
	ERR	
5. ACOPOS operating system being transferred/burned [1]	RDY	
	RUN	
	ERR	

Table 19: Status changes when starting up the operating system loader

1) Firmware V2.140 and later.

2.11 LED status indicator of fan module 8BXF002.0000-00

Information:

8BXF002.0000-00 fan modules are equipped with a status LED.



Figure 17: Fan module 8BXF002.0000-00

Label	Color	Function	Description	
Fan module	Green/Red	Ready/Error	LED off	Fan module not supplied with 24 VDC
			LED lit red	Fan module supplied with 24 VDC, fan in fan module not rotating
			LED lit green	Fan module supplied with 24 VDC, fan in fan module rotating

Table 20: LED status indicator 8BXF002.0000-00

3 Module overview

8B0F passive line filters

Model number	Short description	Page
8B0F0160H000.A00-1	Passive line filter, 16 A, 3x 480 VAC, 50/60 Hz, IP20	57
8B0F0300H000.000-1	Passive line filter, 30 A, 3x 520 VAC, 50/60 Hz, IP20	57
8B0F0550H000.000-1	Passive line filter, 55 A, 3x 520 VAC, 50/60 Hz, IP20	57

8BVF line filters

Model number	Short description	Page
8BVF0220H000.000-1	ACOPOSmulti line filter, 22.5 A, 480 V	63
8BVF0440H000.001-2	ACOPOSmulti line filter 45 A, 480 V, increased peak current-carrying capacity	63
8BVF0880H000.000-1	ACOPOSmulti line filter, 90 A, 480 V	63

8BVR regeneration chokes

Model number	Short description	Page
8BVR0220H000.100-1	ACOPOSmulti regeneration choke, 22.5 A, 480 V, connection terminals	70
8BVR0440H000.100-2	ACOPOSmulti regeneration choke, 45 A, 480 V, connection terminals	70
8BVR0880H000.100-1	ACOPOSmulti regeneration choke, 90 A, 480 V, terminal blocks	70
8BVR1650H000.100-1	ACOPOSmulti regeneration choke, 180 A, 480 V, connected using M10 threaded bolts	70

8B0M mounting plates

Wall mounting

Model number	Short description	Page
8B0M0020HW00.000-1	ACOPOSmulti mounting plate with backplane, 2 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0030HW00.000-1	ACOPOSmulti mounting plate with backplane, 3 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0040HW00.000-1	ACOPOSmulti mounting plate with backplane, 4 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0050HW00.000-1	ACOPOSmulti mounting plate with backplane, 5 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0060HW00.000-1	ACOPOSmulti mounting plate with backplane, 6 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0070HW00.000-1	ACOPOSmulti mounting plate with backplane, 7 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0080HW00.000-1	ACOPOSmulti mounting plate with backplane, 8 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0090HW00.000-1	ACOPOSmulti mounting plate with backplane, 9 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0100HW00.000-1	ACOPOSmulti mounting plate with backplane, 10 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0110HW00.000-1	ACOPOSmulti mounting plate with backplane, 11 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0120HW00.000-1	ACOPOSmulti mounting plate with backplane, 12 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0130HW00.000-1	ACOPOSmulti mounting plate with backplane, 13 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0140HW00.000-1	ACOPOSmulti mounting plate with backplane, 14 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0150HW00.000-1	ACOPOSmulti mounting plate with backplane, 15 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0160HW00.000-1	ACOPOSmulti mounting plate with backplane, 16 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0170HW00.000-1	ACOPOSmulti mounting plate with backplane, 17 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0180HW00.000-1	ACOPOSmulti mounting plate with backplane, 18 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0190HW00.000-1	ACOPOSmulti mounting plate with backplane, 19 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0200HW00.000-1	ACOPOSmulti mounting plate with backplane, 20 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0210HW00.000-1	ACOPOSmulti mounting plate with backplane, 21 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0220HW00.000-1	ACOPOSmulti mounting plate with backplane, 22 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0230HW00.000-1	ACOPOSmulti mounting plate with backplane, 23 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0240HW00.000-1	ACOPOSmulti mounting plate with backplane, 24 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0250HW00.000-1	ACOPOSmulti mounting plate with backplane, 25 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0260HW00.000-1	ACOPOSmulti mounting plate with backplane, 26 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77
8B0M0270HW00.000-1	ACOPOSmulti mounting plate with backplane, 27 slots, HV, wall mounting, 75 mm² and 22 mm², complete	77

Cold plate

Model number	Short description	Page
8B0M0020HC00.000-1	ACOPOSmulti mounting plate with backplane, 2 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0030HC00.000-1	ACOPOSmulti mounting plate with backplane, 3 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0040HC00.000-1	ACOPOSmulti mounting plate with backplane, 4 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0050HC00.000-1	ACOPOSmulti mounting plate with backplane, 5 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0060HC00.000-1	ACOPOSmulti mounting plate with backplane, 6 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0070HC00.000-1	ACOPOSmulti mounting plate with backplane, 7 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0080HC00.000-1	ACOPOSmulti mounting plate with backplane, 8 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0090HC00.000-1	ACOPOSmulti mounting plate with backplane, 9 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0100HC00.000-1	ACOPOSmulti mounting plate with backplane, 10 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0110HC00.000-1	ACOPOSmulti mounting plate with backplane, 11 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0120HC00.000-1	ACOPOSmulti mounting plate with backplane, 12 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0130HC00.000-1	ACOPOSmulti mounting plate with backplane, 13 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0140HC00.000-1	ACOPOSmulti mounting plate with backplane, 14 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0150HC00.000-1	ACOPOSmulti mounting plate with backplane, 15 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0160HC00.000-1	ACOPOSmulti mounting plate with backplane, 16 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0170HC00.000-1	ACOPOSmulti mounting plate with backplane, 17 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0180HC00.000-1	ACOPOSmulti mounting plate with backplane, 18 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0190HC00.000-1	ACOPOSmulti mounting plate with backplane, 19 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80

Model number	Short description	Page
8B0M0200HC00.000-1	ACOPOSmulti mounting plate with backplane, 20 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0210HC00.000-1	ACOPOSmulti mounting plate with backplane, 21 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0220HC00.000-1	ACOPOSmulti mounting plate with backplane, 22 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0230HC00.000-1	ACOPOSmulti mounting plate with backplane, 23 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0240HC00.000-1	ACOPOSmulti mounting plate with backplane, 24 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0250HC00.000-1	ACOPOSmulti mounting plate with backplane, 25 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0260HC00.000-1	ACOPOSmulti mounting plate with backplane, 26 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80
8B0M0270HC00.000-1	ACOPOSmulti mounting plate with backplane, 27 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	80

Feed-through mounting

Model number	Short description	Page
8B0M0040HF00.000-1	ACOPOSmulti mounting plate with backplane 4 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	83
8B0M0080HF00.000-1	ACOPOSmulti mounting plate with backplane 8 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	83
8B0M0120HF00.000-1	ACOPOSmulti mounting plate with backplane 12 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	83
8B0M0160HF00.000-1	ACOPOSmulti mounting plate with backplane 16 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	83
8B0M0200HF00.000-1	ACOPOSmulti mounting plate with backplane 20 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	83

8B0P passive power supply modules

Model number	Short description	Page
8B0P0110HC00.000-1	ACOPOSmulti power supply module, passive, 11 A, HV, cold plate or feed-through mounting, 24 V In 1x, integrated line filter	86
8B0P0110HW00.000-1	ACOPOSmulti power supply module, passive, 11 A, HV, wall mounting, 24 V In 1x, integrated line filter	86
8B0P0220HC00.000-1	ACOPOSmulti power supply module, passive, 22 A, HV, cold plate or feed-through mounting	94
8B0P0220HC00.001-1	ACOPOSmulti power supply module, passive, 22 A, HV, cold plate or feed-through mounting, passive motor short circuit brake	98
8B0P0220HW00.000-1	ACOPOSmulti power supply module, passive, 22 A, HV, wall mounting	94
8B0P0220HW00.001-1	ACOPOSmulti power supply module, passive, 22 A, HV, wall mounting, passive motor short circuit brake	98
8B0P0440HC00.000-1	ACOPOSmulti power supply module, passive, 44 A, HV, cold plate or feed-through mounting	94
8B0P0440HC00.001-1	ACOPOSmulti power supply module, passive, 44 A, HV, cold plate or feed-through mounting, passive motor short circuit brake	98
8B0P0440HW00.000-1	ACOPOSmulti power supply module passive, 44 A, HV, wall mounting	94
8B0P0440HW00.001-1	ACOPOSmulti power supply module, passive, 44 A, HV, wall mounting, passive motor short circuit brake	98

8BVP power supply modules

Model number	Short description	Page
8BVP0220HC00.000-1	ACOPOSmulti power supply module, 22 A, HV, cold plate or feed-through mounting	107
8BVP0220HW00.000-1	ACOPOSmulti power supply module 22 A, HV, wall mounting	107
8BVP0440HC00.000-1	ACOPOSmulti power supply module, 44 A, HV, cold plate or feed-through mounting	107
8BVP0440HW00.000-1	ACOPOSmulti power supply module 44 A, HV, wall mounting	107
8BVP0880HC00.004-1	ACOPOSmulti power supply module, 88 A, HV, cold plate or feed-through mounting	116
8BVP0880HW00.004-1	ACOPOSmulti power supply module 88 A, HV, wall mounting	116
8BVP1650HC00.000-1	ACOPOSmulti power supply module, 165 A, HV, cold plate or feed-through mounting	125
8BVP1650HW00.000-1	ACOPOSmulti power supply module, 165 A, HV, wall mounting	125

8B0C auxiliary supply modules

Model number	Short description	Page
8B0C0160HC00.000-1	ACOPOSmulti auxiliary supply module 16 A, HV, cold plate or feed-through mounting	135
8B0C0160HC00.001-1	ACOPOSmulti auxiliary supply module, 16 A, HV, cold plate or feed-through mounting, 24 V Out 1x 16 A, 1x 5 A	141
8B0C0160HC00.A01-1	ACOPOSmulti auxiliary supply module, 16 A, HV, cold plate or feed-through mounting, 42 V Out 1x 16 A, 1x 3 A	149
8B0C0160HW00.000-1	ACOPOSmulti auxiliary supply module 16 A, HV, wall mounting	135
8B0C0160HW00.001-1	ACOPOSmulti auxiliary supply module, 16 A, HV, wall mounting, 24VOut 1x 16 A, 1x 5 A	141
8B0C0160HW00.A01-1	ACOPOSmulti auxiliary supply module, 16 A, HV, wall mounting, 42VOut 1x 16A, 1x 3A	149
8B0C0320HC00.000-1	ACOPOSmulti auxiliary supply module 32 A, HV, cold plate or feed-through mounting	137
8B0C0320HC00.002-1	ACOPOSmulti auxiliary supply module, 32 A, HV, cold plate or feed-through mounting, 24 V Out 1x 32 A, 1x 5 A	144
8B0C0320HC00.00A-1	ACOPOSmulti auxiliary supply module, 32 A, HV, cold plate or feed-through mounting, 24 V In 1x 30 A, 24 V Out 1x 30 A, 1x5 A	155
8B0C0320HW00.000-1	ACOPOSmulti auxiliary supply module 32 A, HV, wall mounting	137
8B0C0320HW00.002-1	ACOPOSmulti auxiliary supply module, 32 A, HV, wall mounting, 24VOut 1x 32 A, 1x 5 A	144
8B0C0320HW00.00A-1	ACOPOSmulti auxiliary supply module, 32 A, HV, wall mounting, 24VIn 1x 30 A, 24VOut 1x 30 A, 1x 5 A	155

8BVI power inverter modules

Model number	Short description	Page
8BVI0014HCD0.000-1	ACOPOSmulti inverter module 1.9 A, HV, cold plate or feed-through mounting, 2 axes	206
8BVI0014HCS0.000-1	ACOPOSmulti inverter module, 1.9 A, HV, cold plate or feed-through mounting	160
8BVI0014HWD0.000-1	ACOPOSmulti inverter module 1.9 A, HV, wall mounting, 2 axes	206
8BVI0014HWS0.000-1	ACOPOSmulti inverter module, 1.9 A, HV, wall mounting	160
8BVI0028HCD0.000-1	ACOPOSmulti inverter module 3.8 A, HV, cold plate or feed-through mounting, 2 axes	206
8BVI0028HCS0.000-1	ACOPOSmulti inverter module, 3.8 A, HV, cold plate or feed-through mounting	160
8BVI0028HWD0.000-1	ACOPOSmulti inverter module 3.8 A, HV, wall mounting, 2 axes	206
8BVI0028HWS0.000-1	ACOPOSmulti inverter module, 3.8 A, HV, wall mounting	160

Model number	Short description	Page
8BVI0055HCD0.000-1	ACOPOSmulti inverter module 7.6 A, HV, cold plate or feed-through mounting, 2 axes	211
8BVI0055HCS0.000-1	ACOPOSmulti inverter module, 7.6 A, HV, cold plate or feed-through mounting	165
8BVI0055HWD0.000-1	ACOPOSmulti inverter module 7.6 A, HV, wall mounting, 2 axes	211
8BVI0055HWS0.000-1	ACOPOSmulti inverter module, 7.6 A, HV, wall mounting	165
8BVI0110HCD0.000-1	ACOPOSmulti inverter module, 15.1 A, HV, cold plate or feed-through mounting, 2 axes	226
8BVI0110HCS0.000-1	ACOPOSmulti inverter module, 15.1 A, HV, cold plate or feed-through mounting	165
8BVI0110HWD0.000-1	ACOPOSmulti inverter module, 15.1 A, HV, wall mounting, 2 axes	226
8BVI0110HWS0.000-1	ACOPOSmulti inverter module, 15.1 A, HV, wall mounting	165
8BVI0220HCD0.000-1	ACOPOSmulti inverter module, 22 A, HV, cold plate or feed-through mounting, 2 axes	226
8BVI0220HCS0.000-1	ACOPOSmulti inverter module, 22 A, HV, cold plate or feed-through mounting	170
8BVI0220HWD0.000-1	ACOPOSmulti inverter module, 22 A, HV, wall mounting, 2 axes	226
8BVI0220HWS0.000-1	ACOPOSmulti inverter module, 22 A, HV, wall mounting	170
8BVI0330HCS0.000-1	ACOPOSmulti inverter module, 33 A, HV, cold plate or feed-through mounting	174
8BVI0330HWS0.000-1	ACOPOSmulti inverter module, 33 A, HV, wall mounting	174
8BVI0440HCS0.000-1	ACOPOSmulti inverter module, 44 A, HV, cold plate or feed-through mounting	174
8BVI0440HWS0.000-1	ACOPOSmulti inverter module, 44 A, HV, wall mounting	174
8BVI0660HCS0.000-1	ACOPOSmulti inverter module, 66 A, HV, cold plate or feed-through mounting	187
8BVI0660HWS0.000-1	ACOPOSmulti inverter module, 66 A, HV, wall mounting	187
8BVI0880HCS0.004-1	ACOPOSmulti inverter module, 88 A, HV, cold plate or feed-through mounting	187
8BVI0880HWS0.004-1	ACOPOSmulti inverter module, 88 A, HV, wall mounting	187
8BVI1650HCS0.000-1	ACOPOSmulti inverter module, 165 A, HV, cold plate or feed-through mounting	192
8BVI1650HWS0.000-1	ACOPOSmulti inverter module, 165 A, HV, wall mounting	192

8BVE expansion modules

Model number	Short description	Page
8BVE0500HC00.000-1	ACOPOSmulti expansion module 50 A, HV, cold plate or feed-through mounting	244
8BVE0500HW00.000-1	ACOPOSmulti expansion module 50 A, HV, wall mounting	244

8B0K capacitor modules

Model number	Short description	Page
8B0K1650HC00.000-1	ACOPOSmulti capacitor module 1650 µF, HV, cold plate or feed-through mounting	253
8B0K1650HW00.000-1	ACOPOSmulti capacitor module 1650 µF, HV, wall mounting	253
8B0K3630HC00.001-1	ACOPOSmulti capacitor module 3630 µF, HV, cold plate or feed-through mounting, charging circuit	255
8B0K3630HW00.001-1	ACOPOSmulti capacitor module 3630 µF, HV, wall mounting, charging circuit	255

8BAC plug-in modules

Model number	Short description	Page
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	259
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	264
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	267
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	271
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	277
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	283
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	290
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	295
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	300
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	303
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	306
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	309
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	313

4 8B0F passive line filters

4.1 Order data

Model number	Short description	Figure
	Line filters passive	
8B0F0160H000.A00-1	Passive line filter, 16 A, 3x 480 VAC, 50/60 Hz, IP20	
8B0F0300H000.000-1	Passive line filter, 30 A, 3x 520 VAC, 50/60 Hz, IP20	
8B0F0550H000.000-1	Passive line filter, 55 A, 3x 520 VAC, 50/60 Hz, IP20	

Table 21: 8B0F0160H000.A00-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Order data

Allocation to power supply module

	8B0F0160H000.A00-1	8B0F0300H000.000-1	8B0F0550H000.000-1
8B0P0220Hx00.00x-1	X	X	
8B0P0440Hx00.00x-1			X

Table 22: Allocation to power supply module

4.2 Technical data

Model number	8B0F0160H000.A00-1	8B0F0300H000.000-1	8B0F0550H000.000-1
General information			
Cooling and mounting method	Wall mounting		
Certifications			
CE	Yes		
KC	-	Yes	
UL	cULus E225616 Power conversion equipment		
Mains connection			
Permissible network configurations	TT, TN [1]		
Mains input voltage	Max. 3x 480 VAC ±10%	Max. 3x 520 VAC ±10%	
Frequency	0 to 60 Hz		
Continuous current	16 A_{eff} [2]	30 A_{eff} [2]	55 A_{eff} [2]
Peak current	24 A_{eff} (<1 min), 1x/h	45 A_{eff} (<1 min), 1x/h	82.5 A_{eff} (<1 min), 1x/h
Reduction of continuous current at ambient temperatures starting at 40°C	In preparation		
Reduction of continuous current depending on installation elevation			
Starting at 1000 m above sea level	0.8 A_{eff} per 1000 m	1.5 A_{eff} per 1000 m	2.75 A_{eff} per 1000 m
Power dissipation [3]	6.1 W	11.8 W	25.9 W
Line filter per EN 61800-3, category C3 [4]	Yes		
Design			
L1, L2, L3 and L1´, L2´, L3´	Terminals		
PE	M5 threaded bolt		M6 threaded bolt
Shield connection			
On mains	No		
On device	No		
Terminal connection cross section			
Flexible and fine wire lines			
With wire end sleeves	Max. 4 mm²	Max. 10 mm²	Max. 16 mm²
Approbation data			
UL/C-UL-US	AWG 12	AWG 8	AWG 4
CSA	AWG 12	AWG 8	AWG 4
Electrical characteristics			
Discharge capacitance	0.4 µF		
Discharge current [5]	33 mA		

Table 23: 8B0F0160H000.A00-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Technical data

Model number	8B0F0160H000.A00-1	8B0F0300H000.000-1	8B0F0550H000.000-1
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Lying horizontally		Yes	
Standing horizontally		No	
Installation at elevations above sea level			
Nominal		0 to 1000 m	
Maximum [6]		4000 m	
Pollution degree per EN 61800-5-1		In preparation	
Overvoltage category per IEC 60950		II	
Degree of protection per EN 60529		IP20	
Environmental conditions			
Temperature			
Operation			
Nominal		5 to 40°C	
Maximum [7]		55°C	
Storage		-25 to 55°C	
Transport		-25 to 70°C	
Relative humidity			
Operation		5 to 85%	
Storage		5 to 95%	
Transport		Max. 95% at 40°C	
Mechanical characteristics			
Dimensions			
Width	45 mm	50 mm	85 mm
Height	250 mm	270 mm	250 mm
Depth	70 mm	85 mm	90 mm
Weight	0.8 kg	1.2 kg	2 kg

Table 23: 8B0F0160H000.A00-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) Valid under the following conditions: 3x 480 VAC mains input voltage, 50°C ambient temperature, cos phi = 0.8.
The exact value depends on the respective application.
3) Valid under the following conditions: 25°C ambient temperature, 50 Hz frequency.
4) Limit values from EN 61800-3 C3 (second environment).
5) Valid under the following conditions: 400 VAC mains input voltage, 50 Hz frequency
Note: If two phases are interrupted, the discharge current can be up to 5.4 times higher in extreme cases.
6) Continuous operation at an installation elevation of 1000 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
7) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.

4.3 Wiring

4.3.1 8B0F line filters - Pinout overview

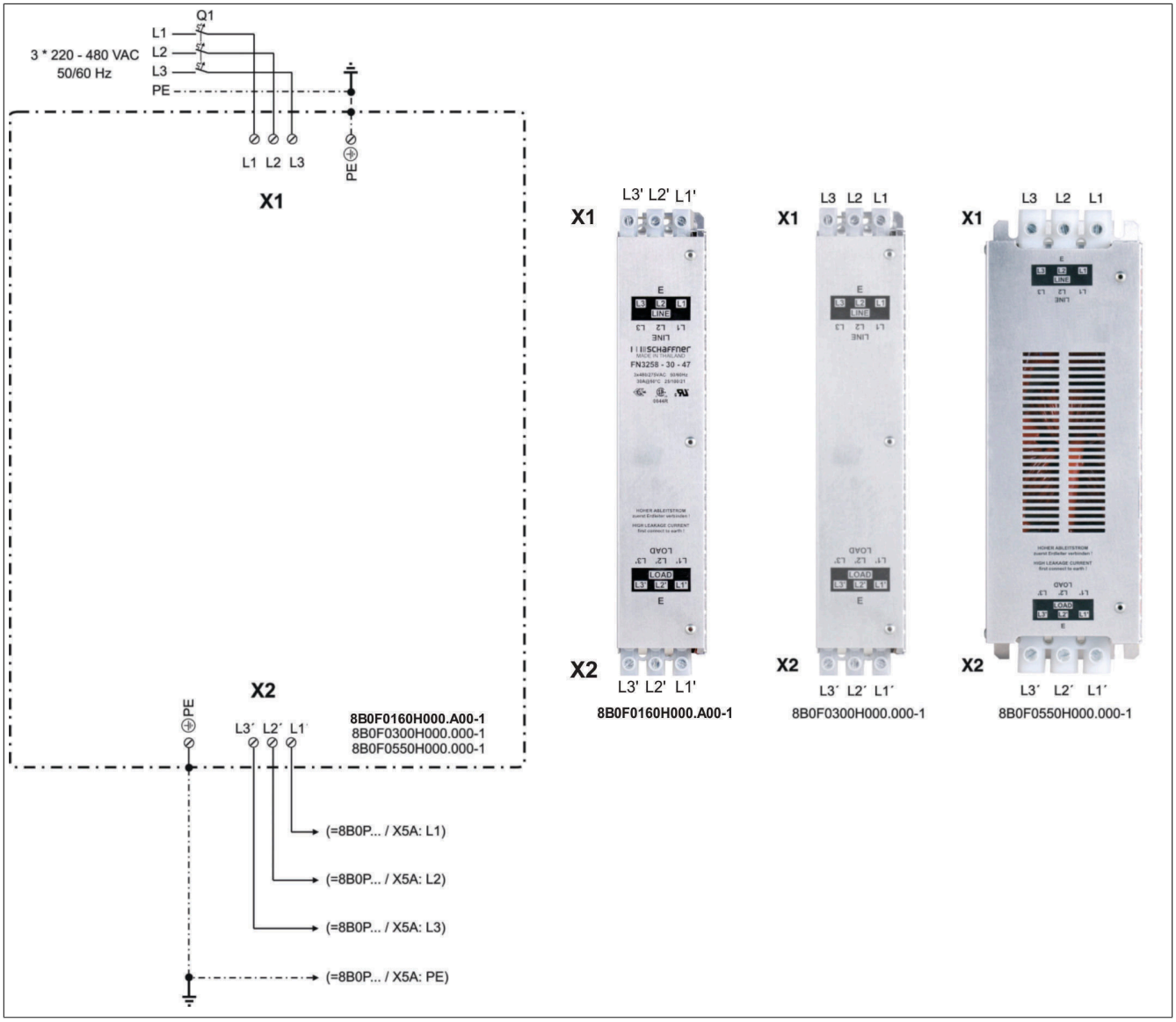


Figure 18: 8B0F0160H000.A00-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Pinout overview

4.3.1.1 8B0F0160H000.A00-1 - Pinout

4.3.1.1.1 X1 - Pinout

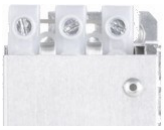
X1	Description	Function
L3 L2 L1 	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
Terminal connection cross section		
Flexible and fine wire lines with wire end sleeves UL/cULus CSA	Max. 4 mm² 12 12	
Tightening torque of the terminal screws	0.8 Nm	

Table 24: Connector X1 - Pinout

4.3.1.1.2 X2 - Pinout

X2	Description	Function
 L3' L2' L1'	L1'	Mains connection L1 (load side)
	L2'	Mains connection L2 (load side)
	L3'	Mains connection L3 (load side)
Terminal connection cross section		
Flexible and fine wire lines with wire end sleeves UL/cULus CSA	Max. 4 mm² 12 12	
Tightening torque of the terminal screws	0.8 Nm	

Table 25: Connector X2 - Pinout

4.3.1.2 8B0F0300H000.000-1 - Pinout

4.3.1.2.1 X1 - Pinout

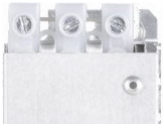
X1	Description	Function
L3 L2 L1 	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
Terminal connection cross section		
Flexible and fine wire lines with wire end sleeves UL/cULus CSA	Max. 10 mm² 8 8	
Tightening torque of the terminal screws	1.9 to 2.2 Nm	

Table 26: Connector X1 - Pinout

4.3.1.2.2 X2 - Pinout

X2	Description	Function
 L3' L2' L1'	L1'	Mains connection L1 (load side)
	L2'	Mains connection L2 (load side)
	L3'	Mains connection L3 (load side)
Terminal connection cross section		
Flexible and fine wire lines with wire end sleeves UL/cULus CSA	Max. 10 mm² 8 8	
Tightening torque of the terminal screws	1.9 to 2.2 Nm	

Table 27: Connector X2 - Pinout

4.3.1.3 8B0F0550H000.000-1 - Pinout

4.3.1.3.1 X1 - Pinout

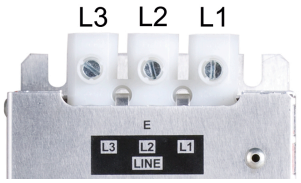
X1	Description	Function
	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
Terminal connection cross section		
Flexible and fine wire lines with wire end sleeves UL/cULus CSA	Max. 16 mm² 4 4	
Tightening torque of the terminal screws	1.9 to 2.2 Nm	

Table 28: Connector X1 - Pinout

4.3.1.3.2 X2 - Pinout

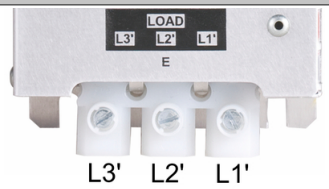
X2	Description	Function
	L1'	Mains connection L1 (load side)
	L2'	Mains connection L2 (load side)
	L3'	Mains connection L3 (load side)
Terminal connection cross section		
Flexible and fine wire lines with wire end sleeves UL/cULus CSA	Max. 16 mm² 4 4	
Tightening torque of the terminal screws	1.9 to 2.2 Nm	

Table 29: Connector X2 - Pinout

4.3.1.4 Protective ground connection (PE) (mains and load side)

The protective ground conductor is connected to the threaded bolt provided using a cable lug.

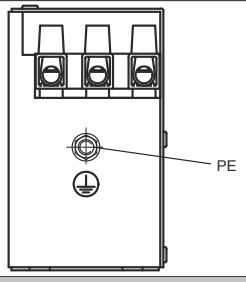
Figure	Pin	Description	Function
	---	PE	Protective ground conductor
Terminal cross sections	**[mm²]**		**AWG**
Cable lug for threaded bolt	0.25 - 16		23 - 5
Tightening torque of the terminal screws [Nm]:	2.2 Nm		

Table 30: Protective ground connection (PE) 8B0F

Danger!

Before switching on the power supply, it must be ensured that the housing of the line filter is properly connected to ground potential (PE rail). The ground connection must be established even when testing the line filter or operating it for a short time!

4.3.1.5 Input/Output circuit diagram

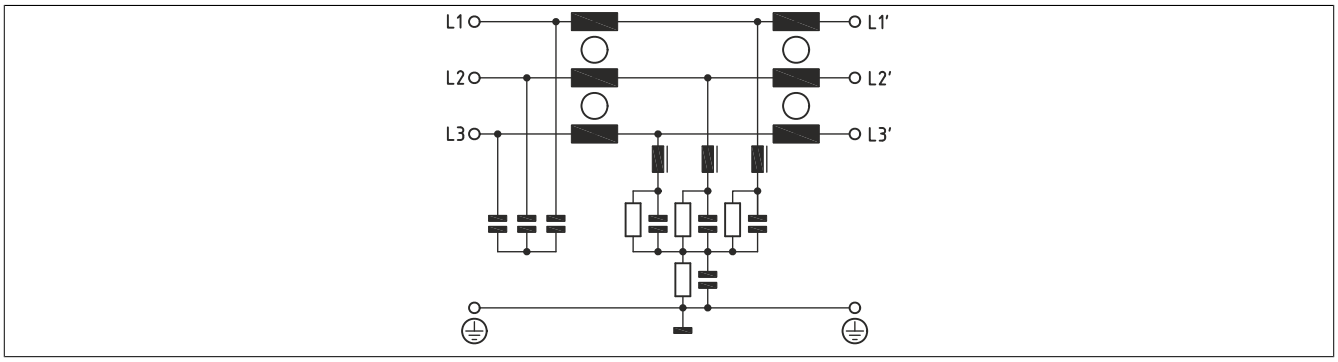


Figure 19: 8B0F - Input/Output circuit diagram

5 8BVF line filters

5.1 Order data

Model number	Short description	Figure
	Line filters	
8BVF0220H000.000-1	ACOPOSmulti line filter, 22.5 A, 480 V	
8BVF0440H000.001-2	ACOPOSmulti line filter 45 A, 480 V, increased peak current-carrying capacity	
8BVF0880H000.000-1	ACOPOSmulti line filter, 90 A, 480 V	
	Required accessories	
	Terminal block sets	
8BZVF044000.001-2A	Screw clamp set for ACOPOSmulti modules 8BVF0220H000.000-1 and 8BVF0440H000.001-2: 1x 8TB4104.202N-10, 1x 8TB4104.206D-10, 1x 8TB2104.204A-00	
8BZVF088000.000-1A	Screw clamp set for ACOPOSmulti 8BVF0880H000.000-1 modules: 1x 8TB2104.204A-00	
	Optional accessories	
	Terminal blocks	
8TB2104.204A-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 4: T- T + F- F+, A keying: 0000	
8TB4104.202N-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 2: L1 L2 L3 PE, N keying: 1100	
8TB4104.206D-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 6: L1´ L2´ L3´ PE, D keying: 0011	

Table 31: 8BVF0220H000.000-1, 8BVF0440H000.001-2, 8BVF0880H000.000-1 - Order data

5.2 Technical data

Model number	8BVF0220H000.000-1	8BVF0440H000.001-2	8BVF0880H000.000-1
General information			
Cooling and mounting method	Wall mounting		
Certifications			
CE	Yes		
KC	Yes		
UL	cULus E225616 Power conversion equipment		
Mains connection			
Permissible network configurations	TT, TN [1]		
Mains input voltage	3x 220 to 3x 480 VAC ±10%		
Frequency	50 / 60 Hz ±4%		
Allocation to power supply module	8BVP0220HC00.000-1 8BVP0220HW00.000-1	8BVP0440HC00.000-1 8BVP0440HW00.000-1	8BVP0880HC00.00x-1 8BVP0880HW00.00x-1
Continuous current [2]	22.5 A_{eff}	45 A_{eff}	90 A_{eff}
Peak current <10 s	56 A_{eff}	180 A_{eff}	
Reduction of continuous current at ambient temperatures starting at 40°C	No reduction	0.4 A_{eff} per °C	1 A_{eff} per °C
Reduction of continuous current depending on installation elevation			
Starting at 1000 m above sea level	1.8 A_{eff}	3.6 A_{eff}	7.2 A_{eff}
Power dissipation at nominal current	85 W	210 W	980 W
Integrated line filter per EN 61800-3, category C3 [3]	Yes		
Design			
L1, L2, L3, PE and L1´, L2´, L3´, PE	Male connector		Feed-through terminals
PE	M5 threaded bolt		No
Shield connection			
On mains	No		
On device	Yes [4]		
Terminal connection cross section			
Flexible and fine wire lines			
With wire end sleeves	0.5 to 16 mm²		10 to 50 mm²
Approbation data			
UL/C-UL-US	20 to 6 AWG		6 to 1/0 AWG
CSA	20 to 6 AWG		6 to 1/0 AWG
Terminal cable cross section dimension of shield connection	12 to 22 mm	23 to 35 mm	32 to 50 mm
Fan connection			
Max. power consumption during operation ($P_{Fan8BVF...}$)	8.25 W		
Design			
F+, F-	Male connector		

Table 32: 8BVF0220H000.000-1, 8BVF0440H000.001-2, 8BVF0880H000.000-1 - Technical data

Model number	8BVF0220H000.000-1	8BVF0440H000.001-2	8BVF0880H000.000-1
Terminal connection cross section			
Flexible and fine wire lines			
With wire end sleeves		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		30 to 12 AWG	
CSA		28 to 12 AWG	
Temperature sensor connection			
Design			
T+, T-		Male connector	
Terminal connection cross section			
Flexible and fine wire lines			
With wire end sleeves		0.25 to 2.5 mm²	
Approbation data			
UL/C-UL-US		30 to 12 AWG	
CSA		28 to 12 AWG	
Electrical characteristics			
Discharge capacitance		14.1 µF	
Operating conditions			
Permissible mounting orientations			
Hanging vertically		Yes	
Lying horizontally		Yes	
Standing horizontally		No	
Installation at elevations above sea level			
Nominal		0 to 500 m	
Maximum [5]		4000 m	
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1		III	
Degree of protection per EN 60529		IP20	
Environmental conditions			
Temperature			
Operation			
Nominal		5°C to 40°C	
Maximum [6]		55°C	
Storage		-25°C to 55°C	
Transport		-25°C to 70°C	
Relative humidity			
Operation		5 to 85%	
Storage		5 to 95%	
Transport		Max. 95% at 40°C	
Mechanical characteristics			
Dimensions			
Width	135 mm		175 mm
Height	378 mm		436 mm
Depth		212 mm	
Weight	11.6 kg	15 kg	23.5 kg

Table 32: 8BVF0220H000.000-1, 8BVF0440H000.001-2, 8BVF0880H000.000-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) Valid for the following conditions: 40°C ambient temperature, installation elevation <500 m above sea level.
3) Limit values from EN 61800-3 C3 (second environment). In order to conform to the EMC limit values, the 8BVP power supply module connected to the 8BVF line filter must be operated at the nominal switching frequency (5 kHz). The total length of all motor cables on each drive system (and for each 8BVF line filter) is not permitted to exceed 900 m. The cable length between the 8BVF line filter and the 8BVP power supply module is not permitted to exceed 5 m. The maximum permissible motor cable length per motor connection must also be taken into consideration (see 8BVI inverter modules).
4) Cables do not have to be shielded up to a total length of 3 m between the line filter, regeneration choke and power supply module. Please contact B&R when using cable lengths >3 m.
5) Continuous operation at an installation elevation of 500 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
6) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.

5.3 Wiring

Warning!

ACOPOSmulti drive systems are only permitted to be used with specially designed line filters. Line filters from third-party manufacturers are not permitted to be used under any circumstances; there is a risk of irreparable damage to these line filters or components of the ACOPOSmulti drive system.

5.3.1 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Pinout overview

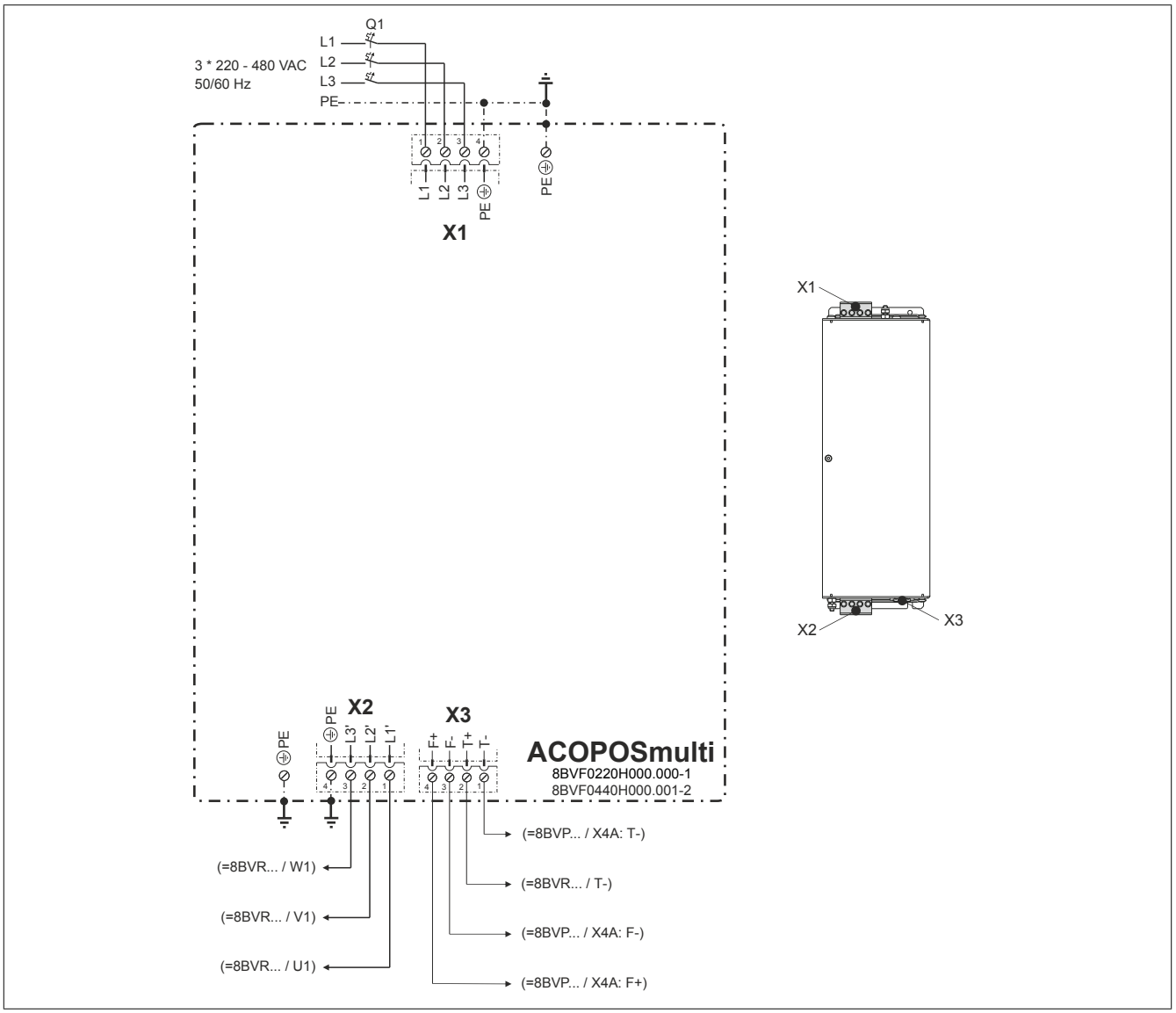


Figure 20: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Pinout overview

5.3.1.1 Connector X1 - Pinout

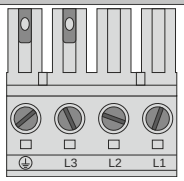
X1	Description	Function
	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
	PE	Protective ground conductor

Table 33: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Connector X1 - Pinout

5.3.1.2 Connector X2 - Pinout

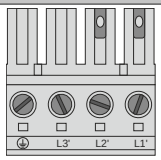
X2	Description	Function
	L1'	Mains connection L1 (load side)
	L2'	Mains connection L2 (load side)
	L3'	Mains connection L3 (load side)
	PE	Protective ground conductor

Table 34: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Connector X2 - Pinout

Warning!

The position of the protective ground connection (PE) on connectors X1 and X2 differs from the position of the protective ground connection on connector X5A of inverter modules 8BVI0220 / 8BVI0440 and power supply modules 8BVP0220 / 8BVP0440!

5.3.1.3 Connector X3 - Pinout

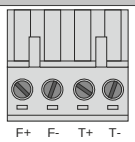
X3	Description	Function
	T-	Load: Temperature sensor -
	T+	Load: Temperature sensor +
	F-	Load: Fan -
	F+	Load: Fan +

Table 35: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Connector X3 - Pinout

5.3.1.4 Additional protective ground connection (PE) (mains and load side)

The protective ground conductor is connected to the M5 threaded bolt provided for this purpose (mains and load side) using a cable lug.

For information concerning dimensioning, see 1.1.3 "Protective ground connection (PE) " on page 508.

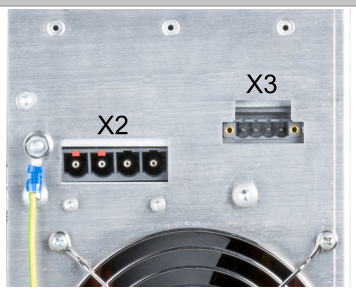
Figure		Pin	Description	Function
 View from above (mains side)	 View from below (load side)	---	PE	Protective ground conductor
Terminal cross sections			**[mm²]**	**AWG**
Cable lug for M5 threaded bolt			0.25 - 16	23 - 5

Table 36: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Additional protective ground connection (PE)

Danger!

Before switching on the power supply, it must be ensured that the housing of the line filter is properly connected to ground potential (PE rail). The ground connection must be established even when testing the line filter or operating it for a short time!

5.3.1.5 Input/Output circuit diagram

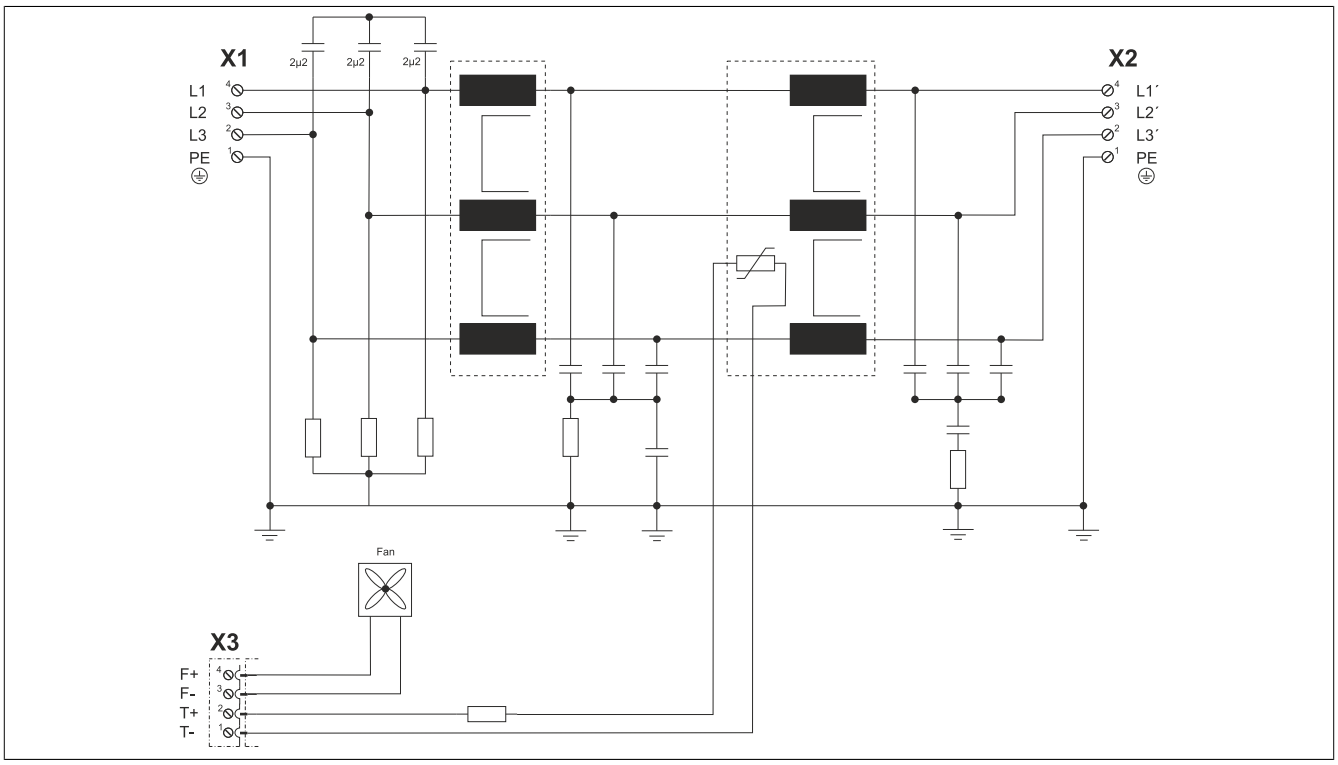


Figure 21: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Input/Output circuit diagram

5.3.2 8BVF0880H000.000-1 - Pinout overview

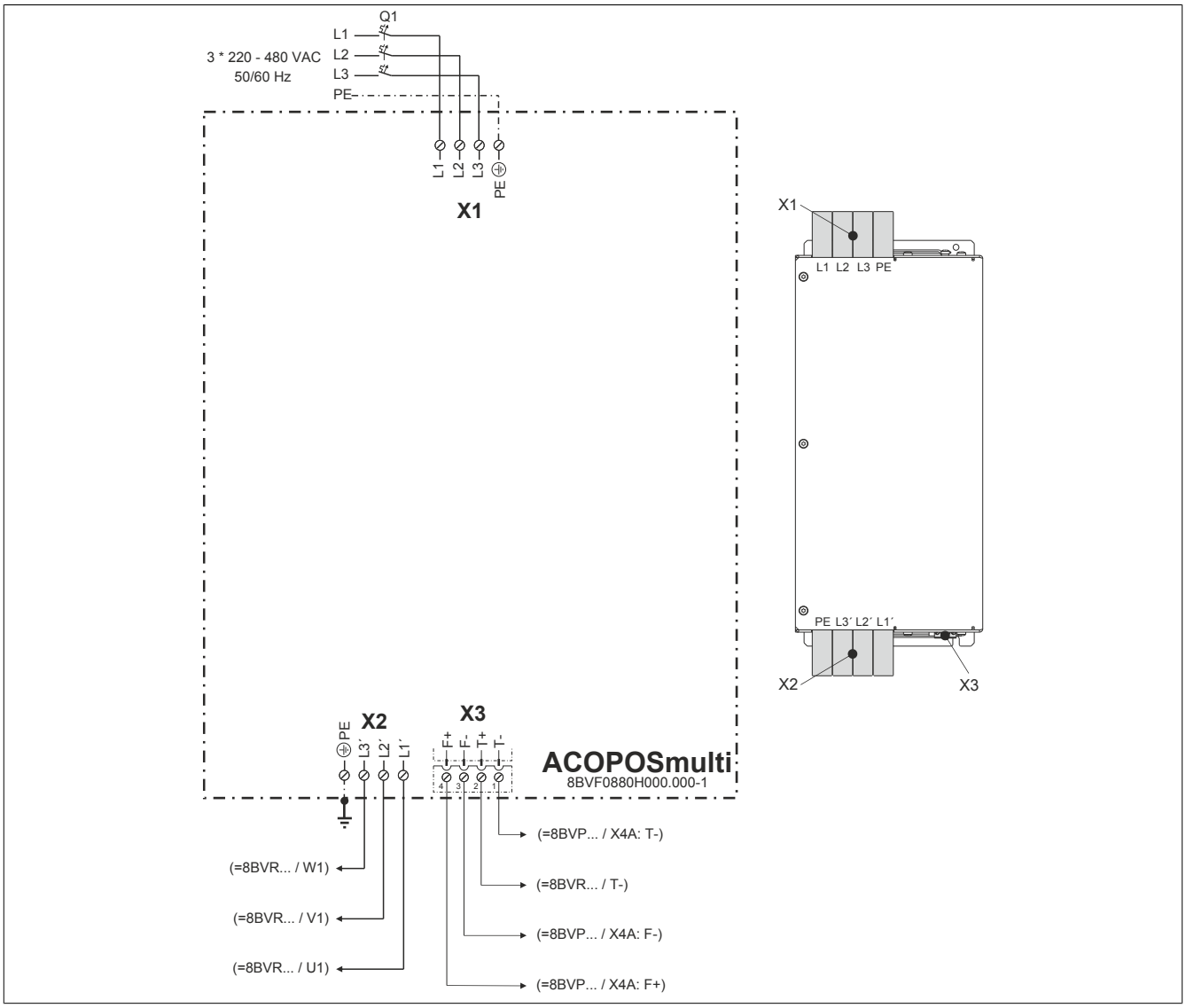


Figure 22: 8BVF0880H000.000-1 - Pinout overview

*** Only relevant for wiring variants in combination with 8BVP1650 power supply modules.
The mains connection for 8BVP1650 power supply modules can in have one of two different wiring variations (2x 8BVF0880 + 1x 8BVR1650 or 2x 8BVF0880 + 2x 8BVR0880) depending on the 8BVR regeneration choke used. See section "8BVP1650 mains connection" for more details.

5.3.2.1 X1 - Pinout

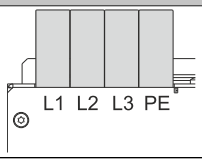
X1	Description	Function
	L1	Mains connection L1 (mains side)
	L2	Mains connection L2 (mains side)
	L3	Mains connection L3 (mains side)
	PE	Protective ground conductor

Table 37: 8BVF0880H000.000-1 - X1 - Pinout

5.3.2.2 X2 - Pinout

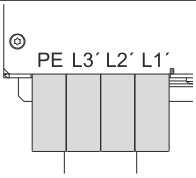
X2	Description	Function
	L1'	Mains connection L1 (mains side)
	L2'	Mains connection L2 (mains side)
	L3'	Mains connection L3 (mains side)
	PE	Protective ground conductor

Table 38: 8BVF0880H000.000-1 - X2 - Pinout

5.3.2.3 Connector X3 - Pinout

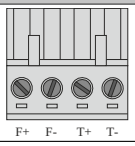
X3	Description	Function
	T-	Load: Temperature sensor -
	T+	Load: Temperature sensor +
	F-	Load: Fan -
	F+	Load: Fan +

Table 39: 8BVF0880H000.000-1 - X3 connector - Pinout

Danger!

Before switching on the power supply, it must be ensured that the housing of the line filter is properly connected to ground potential (PE rail). The ground connection must be established even when testing the line filter or operating it for a short time!

5.3.2.4 Input/Output circuit diagram

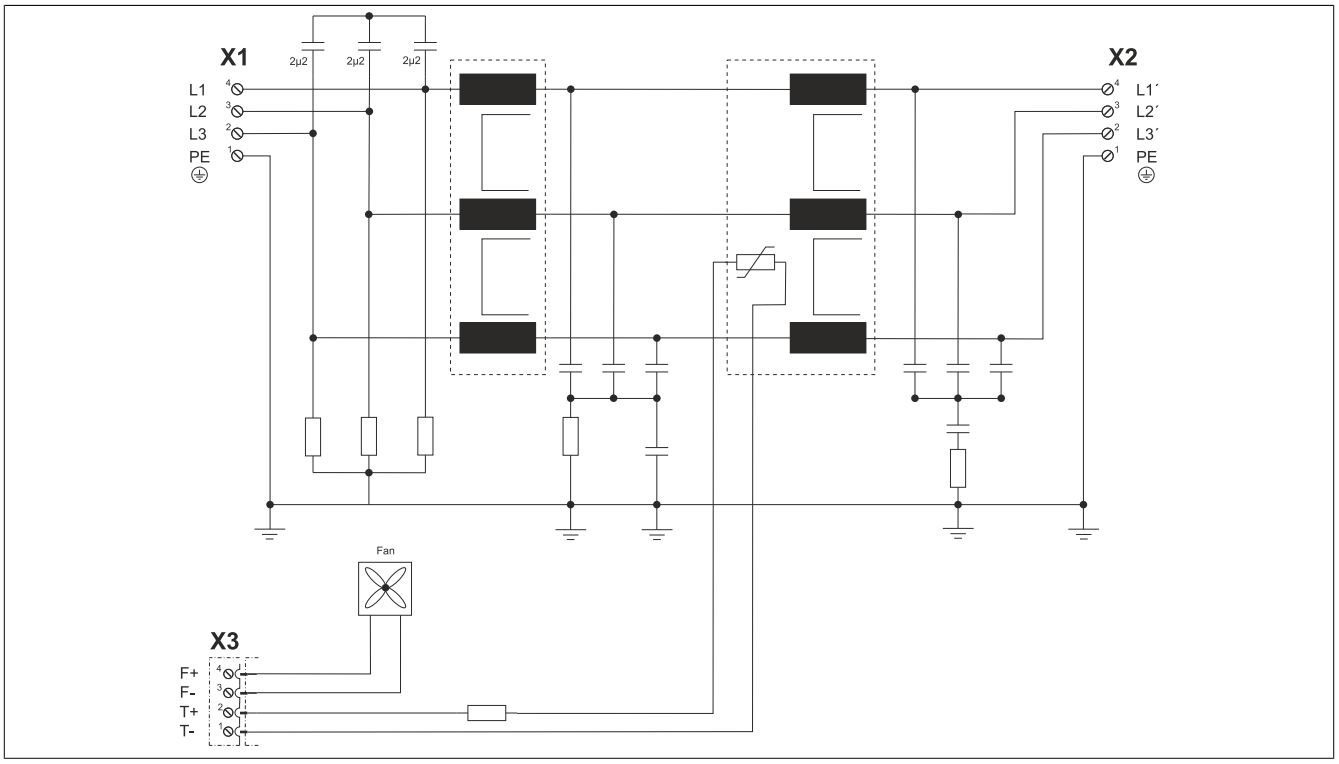


Figure 23: 8BVF0880H000.000-1 - Input/Output circuit diagram

6 8BVR regeneration chokes

6.1 Order data

Model number	Short description	Figure
	Regeneration chokes	
8BVR0220H000.100-1	ACOPOSmulti regeneration choke, 22.5 A, 480 V, connection terminals	
8BVR0440H000.100-2	ACOPOSmulti regeneration choke, 45 A, 480 V, connection terminals	
8BVR0880H000.100-1	ACOPOSmulti regeneration choke, 90 A, 480 V, terminal blocks	
8BVR1650H000.100-1	ACOPOSmulti regeneration choke, 180 A, 480 V, connected using M10 threaded bolts	

Table 40: 8BVR0220H000.100-1, 8BVR0440H000.100-2, 8BVR0880H000.100-1, 8BVR1650H000.100-1 - Order data

6.2 Technical data

Model number	8BVR0220H000.100-1	8BVR0440H000.100-2	8BVR0880H000.100-1	8BVR1650H000.100-1
General information				
Cooling and mounting method	Wall mounting			
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Mains connection				
Mains input voltage	3x 220 to 3x 480 VAC ±10%			
Frequency	50 / 60 Hz ±4%		50/60 Hz ±4%	
Allocation to power supply module	8BVP0220HC00.000-1 8BVP0220HW00.000-1	8BVP0440HC00.000-1 8BVP0440HW00.000-1	8BVP0880HC00.00x-1 8BVP0880HW00.00x-1	8BVP1650HC00.00x-1 8BVP1650HW00.00x-1
Continuous current [1]	22.5 A_{eff}	45 A_{eff}	90 A_{eff}	180 A_{eff}
Peak current <10 s	56 A_{eff}	90 A_{eff}	180 A_{eff}	360 A_{eff}
Reduction of continuous current depending on ambient temperature				
Horizontal mounting orientation	-		0.6 A_{eff} per °C (starting at 10°C)	-
Vertical mounting orientation	No reduction	In preparation	1 A_{eff} per °C (starting at 40°C)	In preparation
Reduction of continuous current depending on installation elevation				
Starting at 1000 m above sea level	1.8 A_{eff} per 1000 m	3.6 A_{eff} per 1000 m	7.2 A_{eff} per 1,000 m	14.4 A_{eff} per 1,000 m
Power dissipation at nominal current	130 W	260 W	420 W	750 W
Design				
U1, V1, W1	Terminals			M10 threaded bolts
U2, V2, W2	Terminals			M10 threaded bolts
Shield connection [2]				
On mains	No			
On device	No			
Terminal connection cross section				
Solid core / Multiple-conductor lines	1.5 to 25 mm²		2.5 to 50 mm²	-
Flexible and fine wire lines				
With wire end sleeves	1.5 to 16 mm²		2.5 to 35 mm²	6 to 120 mm² [3]
Approbation data				
UL/C-UL-US	18 to 4 AWG		12 to 1 AWG	10 AWG to 250 kcmil
CSA	18 to 4 AWG		12 to 2 AWG	10 AWG to 250 kcmil
Inductance	2 mH	1 mH	0.5 mH	
Temperature sensor connection				
Design				
T+, T-	Terminals			

Table 41: 8BVR0220H000.100-1, 8BVR0440H000.100-2, 8BVR0880H000.100-1, 8BVR1650H000.100-1 - Technical data

Model number	8BVR0220H000.100-1	8BVR0440H000.100-2	8BVR0880H000.100-1	8BVR1650H000.100-1
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.5 to 2.5 mm²			
Approbation data				
UL/C-UL-US	30 to 12 AWG			
CSA	26 to 12 AWG			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	No			
Lying horizontally	No		Yes	No
Standing horizontally	Yes			
Installation at elevations above sea level				
Nominal	0 to 500 m			
Maximum [4]	4000 m			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP00			
Environmental conditions				
Temperature				
Operation				
Nominal	5 to 40°C			
Maximum [5]	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%			
Storage	5 to 95%			
Transport	Max. 95% at 40°C			
Mechanical characteristics				
Dimensions				
Width	245 mm	270 mm	293 mm	475 mm
Height	270 mm	285 mm	412 mm	360 mm
Depth	103 mm	120 mm	165 mm	330 mm
Weight	10.5 kg	Approx. 17 kg	40.2 kg	Approx. 79 kg

Table 41: 8BVR0220H000.100-1, 8BVR0440H000.100-2, 8BVR0880H000.100-1, 8BVR1650H000.100-1 - Technical data

1) Valid in the following conditions: Mounting orientation "standing horizontally", 40°C ambient temperature, installation elevation <500 m above sea level.
2) The cable does not require shielding up to a total cable length of 3 m between the line filter, regeneration choke and power supply module. Please contact B&R when using cable lengths >3 m.
3) The connection is made with cable lugs.
4) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
5) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.

6.3 Wiring

Information:

ACOPOSmulti 8BVR regeneration chokes do not contain a protective ground connection because all exposed electrically conductive parts are isolated from the active parts using reinforced insulation.

Warning!

When installing ACOPOSmulti regeneration chokes make sure that the windings and connection wires are strongly insulated from the neighboring electrically conductive components (e.g. control cabinet wall).

If this reinforced insulation is implemented solely through the use of an air gap, a minimum distance to adjacent conductive parts of 8 mm (or 12.7 mm per cULus) is required.

6.3.1 8BVR0220H000.100-1 - Pinout overview

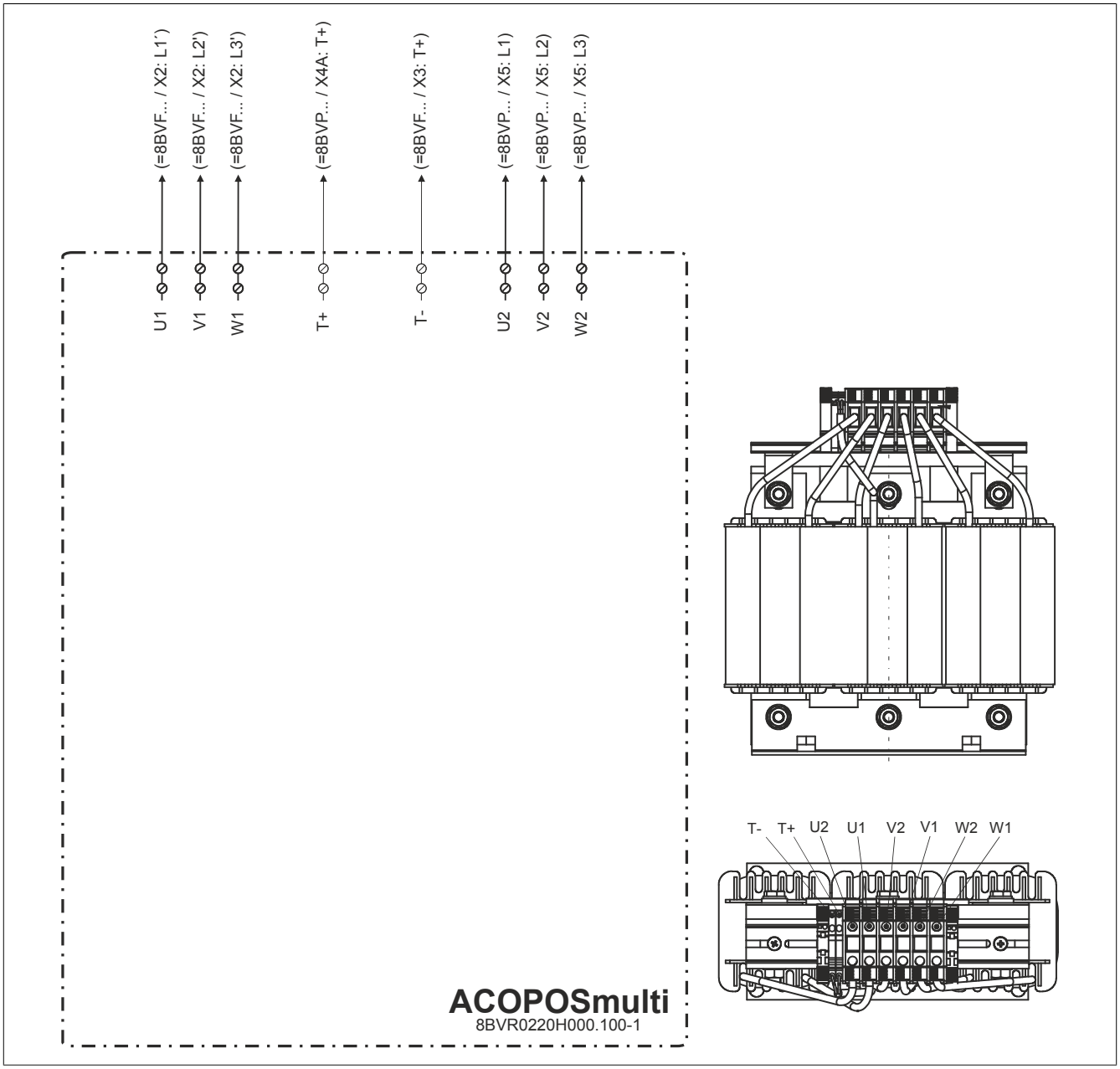


Figure 24: 8BVR0220H000.100-1 - Pinout overview

6.3.1.1 Input/Output circuit diagram

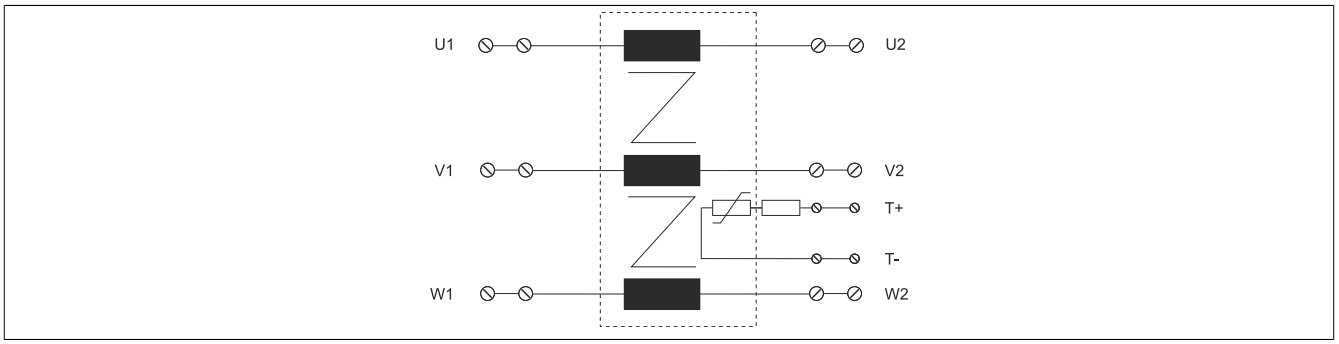


Figure 25: 8BVR0220H000.100-1 - Input/Output circuit diagram

6.3.2 8BVR0440H000.100-2 - Pinout overview

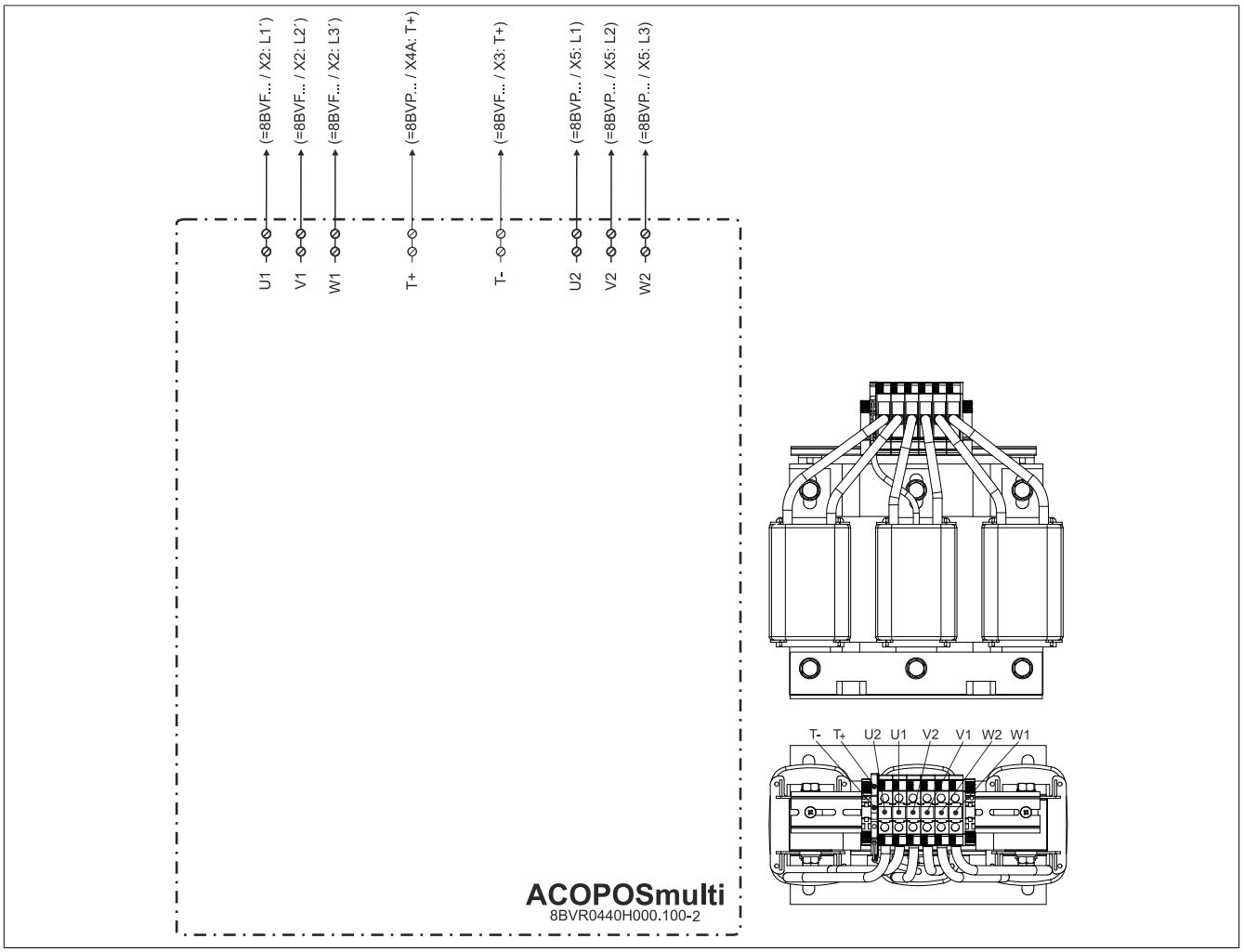


Figure 26: 8BVR0440H000.100-2 - Pinout overview

6.3.2.1 Input/Output circuit diagram

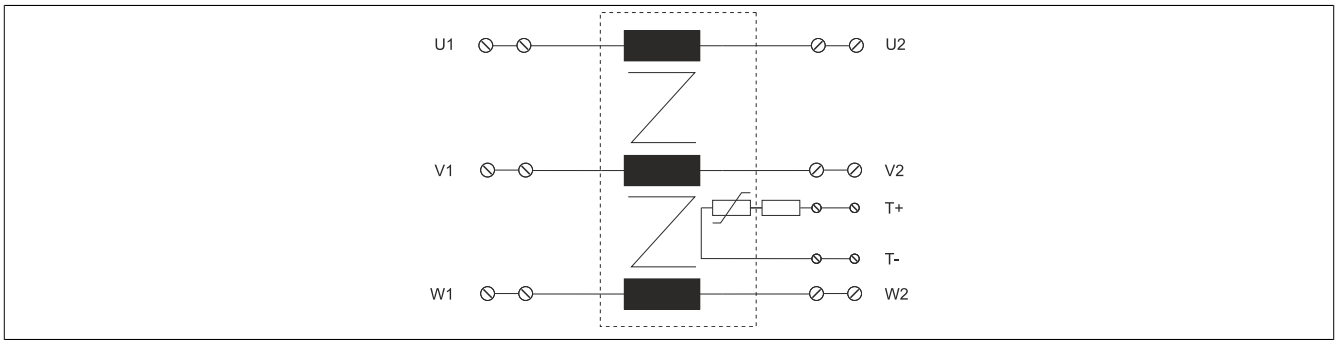


Figure 27: 8BVR0440H000.100-x - Input/Output circuit diagram

6.3.3 8BVR0880H000.100-1 - Pinout overview

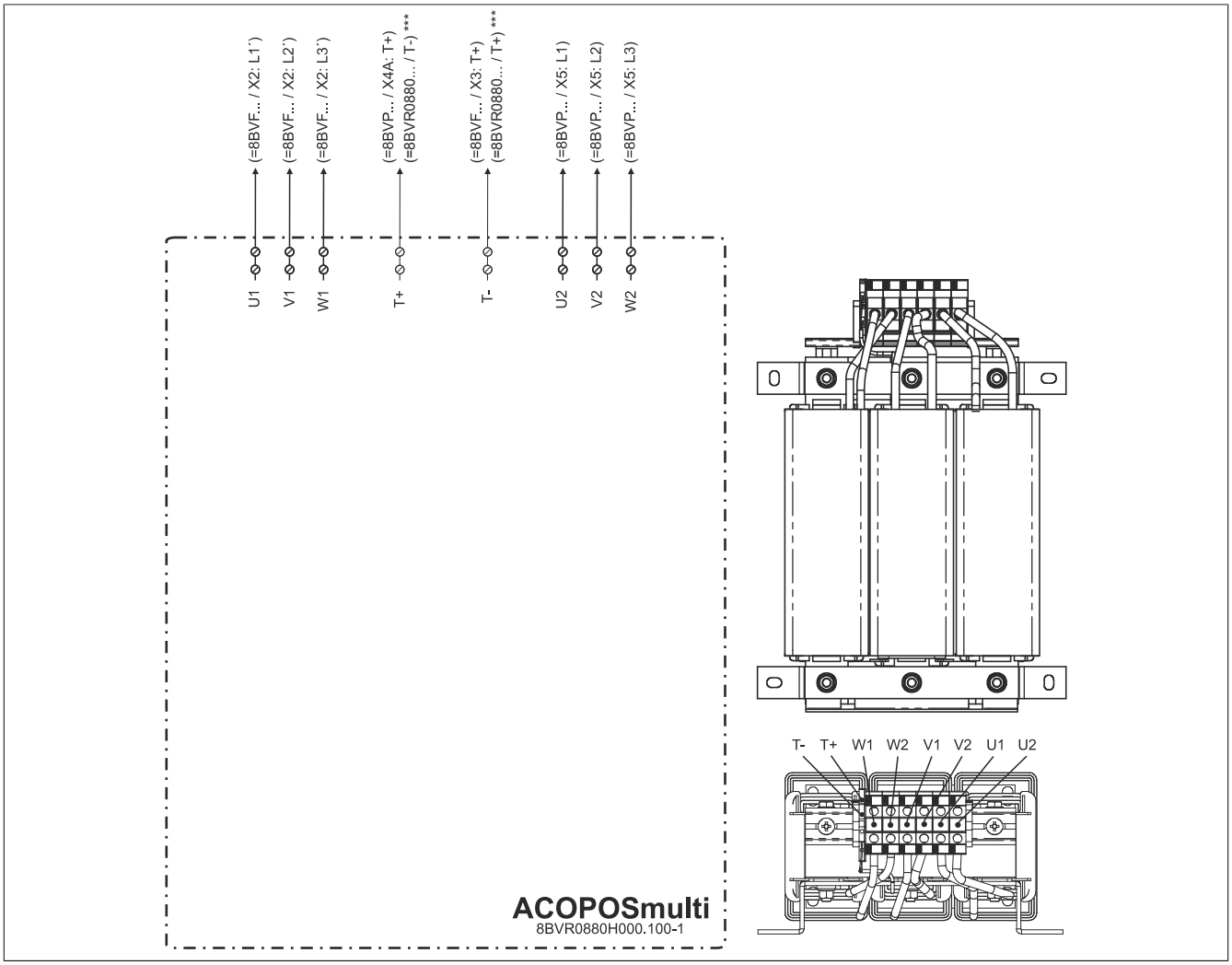


Figure 28: 8BVR0880H000.100-1 - Pinout overview

*** Only relevant for wiring variants in combination with 8BVP1650 power supply modules.
The mains connection for 8BVP1650 power supply modules can in have one of two different wiring variations (2x 8BVF0880 + 1x 8BVR1650 or 2x 8BVF0880 + 2x 8BVR0880) depending on the 8BVR regeneration choke used. See section "8BVP1650 mains connection" for more details.

6.3.3.1 Input/Output circuit diagram

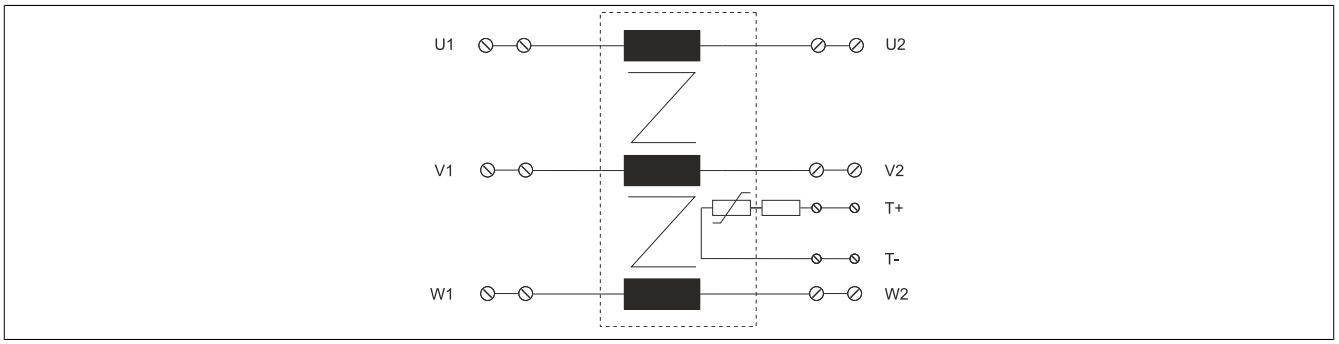


Figure 29: 8BVR0880H000.100-1 - Input/Output circuit diagram

6.3.4 8BVR1650H000.100-1 - Pinout overview

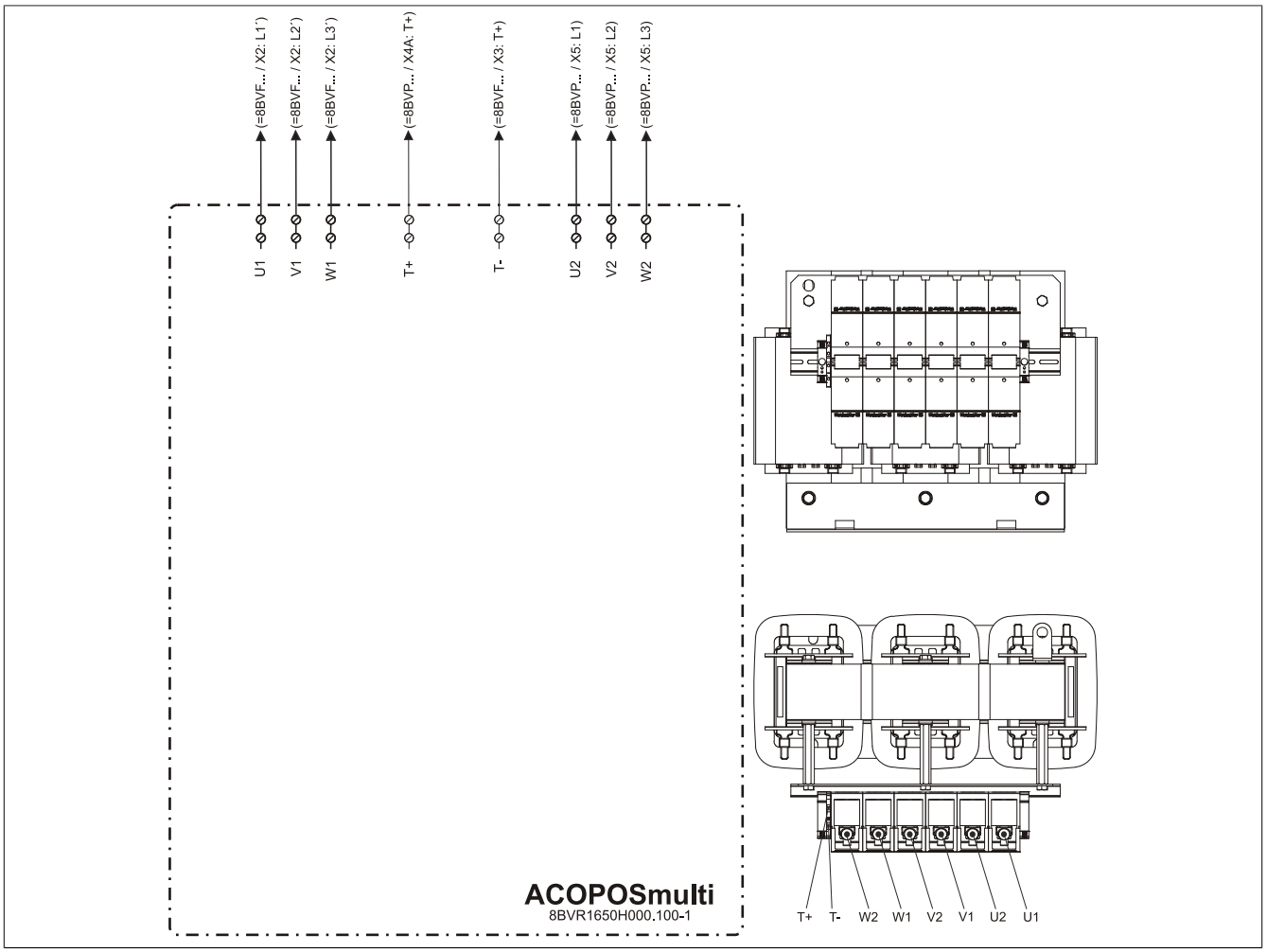


Figure 30: 8BVR1650H000.100-1 - Pinout overview

6.3.4.1 Input/Output circuit diagram

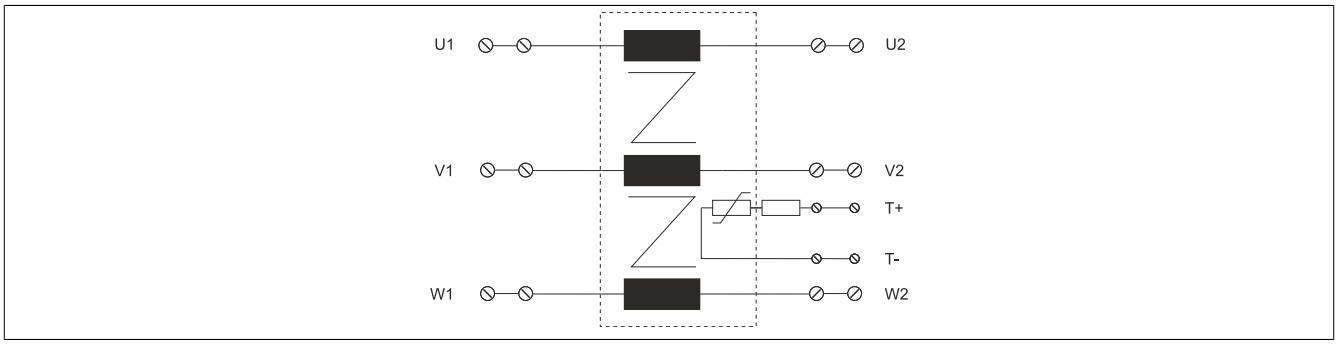


Figure 31: 8BVR1650H000.100-1 - Input/Output circuit diagram

7 8B0M mounting plates

7.1 Wall mounting

7.1.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0M0020HW00.000-1	ACOPOSmulti mounting plate with backplane, 2 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0030HW00.000-1	ACOPOSmulti mounting plate with backplane, 3 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0040HW00.000-1	ACOPOSmulti mounting plate with backplane, 4 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0050HW00.000-1	ACOPOSmulti mounting plate with backplane, 5 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0060HW00.000-1	ACOPOSmulti mounting plate with backplane, 6 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0070HW00.000-1	ACOPOSmulti mounting plate with backplane, 7 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0080HW00.000-1	ACOPOSmulti mounting plate with backplane, 8 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0090HW00.000-1	ACOPOSmulti mounting plate with backplane, 9 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0100HW00.000-1	ACOPOSmulti mounting plate with backplane, 10 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0110HW00.000-1	ACOPOSmulti mounting plate with backplane, 11 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0120HW00.000-1	ACOPOSmulti mounting plate with backplane, 12 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0130HW00.000-1	ACOPOSmulti mounting plate with backplane, 13 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0140HW00.000-1	ACOPOSmulti mounting plate with backplane, 14 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0150HW00.000-1	ACOPOSmulti mounting plate with backplane, 15 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0160HW00.000-1	ACOPOSmulti mounting plate with backplane, 16 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0170HW00.000-1	ACOPOSmulti mounting plate with backplane, 17 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0180HW00.000-1	ACOPOSmulti mounting plate with backplane, 18 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0190HW00.000-1	ACOPOSmulti mounting plate with backplane, 19 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0200HW00.000-1	ACOPOSmulti mounting plate with backplane, 20 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0210HW00.000-1	ACOPOSmulti mounting plate with backplane, 21 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0220HW00.000-1	ACOPOSmulti mounting plate with backplane, 22 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0230HW00.000-1	ACOPOSmulti mounting plate with backplane, 23 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0240HW00.000-1	ACOPOSmulti mounting plate with backplane, 24 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0250HW00.000-1	ACOPOSmulti mounting plate with backplane, 25 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0260HW00.000-1	ACOPOSmulti mounting plate with backplane, 26 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
8B0M0270HW00.000-1	ACOPOSmulti mounting plate with backplane, 27 slots, HV, wall mounting, 75 mm² and 22 mm², complete	
	Optional accessories	
	Fan modules	
8BXF002.0000-00	ACOPOSmulti fan module, replacement fan for mounting plate with backplane module, wall mounting (8B0MxxxxHWxx.xxx-x)	

Table 42: 8B0M0020HW00.000-1, 8B0M0030HW00.000-1, 8B0M0040HW00.000-1, 8B0M0050HW00.000-1, 8B0M0060HW00.000-1, 8B0M0070HW00.000-1, 8B0M0080HW00.000-1, 8B0M0090HW00.000-1, 8B0M0100HW00.000-1, 8B0M0110HW00.000-1, 8B0M0120HW00.000-1, 8B0M0130HW00.000-1, 8B0M0140HW00.000-1, 8B0M0150HW00.000-1, 8B0M0160HW00.000-1, 8B0M0170HW00.000-1, 8B0M0180HW00.000-1, 8B0M0190HW00.000-1, 8B0M0200HW00.000-1, 8B0M0210HW00.000-1, 8B0M0220HW00.000-1, 8B0M0230HW00.000-1, 8B0M0240HW00.000-1, 8B0M0250HW00.000-1, 8B0M0260HW00.000-1, 8B0M0270HW00.000-1 - Order data

Number of necessary 8BXF002.0000-00 fan modules depending on the number of slots on the mounting plate

Model number	Number of slots	Number of fan modules
8B0M0020HW00.000-1	2	1
8B0M0030HW00.000-1	3	2
8B0M0040HW00.000-1	4	3
8B0M0050HW00.000-1	5	3
8B0M0060HW00.000-1	6	4
8B0M0070HW00.000-1	7	5
8B0M0080HW00.000-1	8	6
8B0M0090HW00.000-1	9	6
8B0M0100HW00.000-1	10	7
8B0M0110HW00.000-1	11	8
8B0M0120HW00.000-1	12	9
8B0M0130HW00.000-1	13	9
8B0M0140HW00.000-1	14	10
8B0M0150HW00.000-1	15	11
8B0M0160HW00.000-1	16	12
8B0M0170HW00.000-1	17	12
8B0M0180HW00.000-1	18	13
8B0M0190HW00.000-1	19	14
8B0M0200HW00.000-1	20	15
8B0M0210HW00.000-1	21	15
8B0M0220HW00.000-1	22	16
8B0M0230HW00.000-1	23	17
8B0M0240HW00.000-1	24	18
8B0M0250HW00.000-1	25	18
8B0M0260HW00.000-1	26	19
8B0M0270HW00.000-1	27	20

Table 43: Number of 8BXF002.0000-00 fan modules depending on mounting plate 8B0M

7.1.2 Technical data

Information:

nnnn indicates the number of slots (0160 equals 16 slots).

Model number	8B0MnnnnHW00.000-1
General information	
Number of slots nnnn	
Minimum	2
Maximum	27
Cooling and mounting method	Wall mounting
DC bus connection	
Voltage	
Nominal	750 VDC
Continuous power [1]	200 kW
Reduction of continuous power depending on installation elevation	
Starting at 500 m above sea level	20 kW per 1000 m
Cross section	
DC+, DC-	72 mm²
PE	72 mm²
24 VDC auxiliary supply	
Voltage	25 VDC ±1.6%
Continuous power [1]	1500 W
Max. power consumption per slot ($P_{Fan8B0M...}$)	8.25 W [2]
Reduction of continuous power depending on installation elevation	
Starting at 500 m above sea level	150 W per 1000 m
Cross section	
24 VDC, COM	21.3 mm²
Operating conditions	
Permissible mounting orientations	
Hanging vertically	Yes
Lying horizontally	Yes
Standing horizontally	No
Installation at elevations above sea level	
Nominal	0 to 500 m
Maximum [3]	4000 m
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)

Table 44: 8B0MnnnnHW00.000-1 - Technical data

Model number	8B0MnnnnHW00.000-1
Overvoltage category per EN 61800-5-1	III
Evenness of mounting surface	Smoothness of 1 mm over the entire mounting surface
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum [4]	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at +40°C
Mechanical characteristics	
Dimensions [5]	
Width	(57 + (n - 1) * 53.5) mm
Height	385 mm
Depth	13.5 mm
Weight	(0.53 * number of slots) kg

Table 44: 8B0MnnnnHW00.000-1 - Technical data

1) Valid in the following conditions: 40°C ambient temperature, installation altitude <500 m above sea level.
2) Corresponds to the proportionate power consumption of the fan modules on the mounting plate.
3) Continuous operation of ACOPOSmulti mounting plates at altitudes ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous power reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
4) Continuous operation of ACOPOSmulti mounting plates at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous power reductions into consideration).
5) The dimensions define the size of the mounting plate. Make sure to leave additional space above and below the backplanes for mounting, connections and air circulation.

7.1.3 Status LED

Information:

The fan modules on the underside of 8B0M mounting plates are equipped with a status LED.

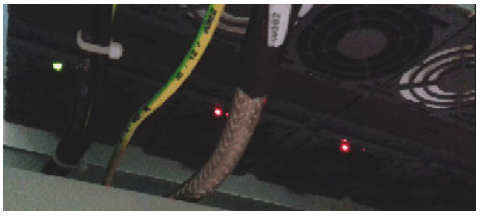


Figure 32: Fan LED 8BXF002.0000-00

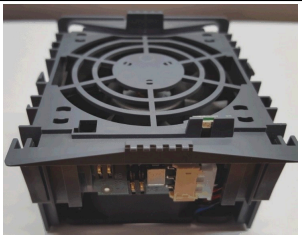


Figure 33: Fan module 8BVF002.0000-00

Label	Color	Function	Description	
Fan module	Green/Red	Ready/Error	LED off	Fan module not supplied with 24 VDC
			LED lit red	Fan module supplied with 24 VDC, fan in fan module not rotating
			LED lit green	Fan module supplied with 24 VDC, fan in fan module rotating

Table 45: LED status indicator 8BXF002.0000-00

Information:

The ACOPOSmulti drive system has no way of detecting whether the fans in the fan modules of the mounting plate or the module-internal fans are actually rotating.

7.2 Cold plate mounting

7.2.1 Order data

Model number	Short description	Figure
	Cold-plate mounting	
8B0M0020HC00.000-1	ACOPOSmulti mounting plate with backplane, 2 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0030HC00.000-1	ACOPOSmulti mounting plate with backplane, 3 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0040HC00.000-1	ACOPOSmulti mounting plate with backplane, 4 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0050HC00.000-1	ACOPOSmulti mounting plate with backplane, 5 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0060HC00.000-1	ACOPOSmulti mounting plate with backplane, 6 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0070HC00.000-1	ACOPOSmulti mounting plate with backplane, 7 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0080HC00.000-1	ACOPOSmulti mounting plate with backplane, 8 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0090HC00.000-1	ACOPOSmulti mounting plate with backplane, 9 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0100HC00.000-1	ACOPOSmulti mounting plate with backplane, 10 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0110HC00.000-1	ACOPOSmulti mounting plate with backplane, 11 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0120HC00.000-1	ACOPOSmulti mounting plate with backplane, 12 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0130HC00.000-1	ACOPOSmulti mounting plate with backplane, 13 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0140HC00.000-1	ACOPOSmulti mounting plate with backplane, 14 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0150HC00.000-1	ACOPOSmulti mounting plate with backplane, 15 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0160HC00.000-1	ACOPOSmulti mounting plate with backplane, 16 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0170HC00.000-1	ACOPOSmulti mounting plate with backplane, 17 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0180HC00.000-1	ACOPOSmulti mounting plate with backplane, 18 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0190HC00.000-1	ACOPOSmulti mounting plate with backplane, 19 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0200HC00.000-1	ACOPOSmulti mounting plate with backplane, 20 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0210HC00.000-1	ACOPOSmulti mounting plate with backplane, 21 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0220HC00.000-1	ACOPOSmulti mounting plate with backplane, 22 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0230HC00.000-1	ACOPOSmulti mounting plate with backplane, 23 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0240HC00.000-1	ACOPOSmulti mounting plate with backplane, 24 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0250HC00.000-1	ACOPOSmulti mounting plate with backplane, 25 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0260HC00.000-1	ACOPOSmulti mounting plate with backplane, 26 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
8B0M0270HC00.000-1	ACOPOSmulti mounting plate with backplane, 27 slots, HV, cold plate mounting, 75 mm² and 22 mm², complete	
	Optional accessories	
	Accessory sets	
8BXW000.0000-00	ACOPOSmulti accessory set: 2x fitting for mounting plate 8B0MxxxxHCxx.xxx-x and 8EMCxxxx000.0000-1, angled	
8BXW001.0000-00	ACOPOSmulti accessory set: 2x fitting for mounting plate 8B0MxxxxHCxx.xxx-x and 8EMCxxxx000.0000-1, straight	

Table 46: 8B0M0020HC00.000-1, 8B0M0030HC00.000-1, 8B0M0040HC00.000-1, 8B0M0050HC00.000-1, 8B0M0060HC00.000-1, 8B0M0070HC00.000-1, 8B0M0080HC00.000-1, 8B0M0090HC00.000-1, 8B0M0100HC00.000-1, 8B0M0110HC00.000-1, 8B0M0120HC00.000-1, 8B0M0130HC00.000-1, 8B0M0140HC00.000-1, 8B0M0150HC00.000-1, 8B0M0160HC00.000-1, 8B0M0170HC00.000-1, 8B0M0180HC00.000-1, 8B0M0190HC00.000-1, 8B0M0200HC00.000-1, 8B0M0210HC00.000-1, 8B0M0220HC00.000-1, 8B0M0230HC00.000-1, 8B0M0240HC00.000-1, 8B0M0250HC00.000-1, 8B0M0260HC00.000-1, 8B0M0270HC00.000-1 - Order data

7.2.2 Technical data

Information:

nnnn indicates the number of slots (0160 equals 16 slots).

Model number	8B0MnnnnHC00.000-1
General information	
Number of slots nnnn	
Minimum	2
Maximum	27
Cooling and mounting method	Cold-plate mounting
DC bus connection	
Voltage	
Nominal	750 VDC
Continuous power [1]	200 kW
Reduction of continuous power depending on installation elevation	
Starting at 500 m above sea level	20 kW per 1,000 m
Cross section	
DC+, DC-	72 mm²
PE	72 mm²
24 VDC auxiliary supply	
Voltage	25 VDC ±1.6%
Continuous power [1]	1500 W
Reduction of continuous power depending on installation elevation	
Starting at 500 m above sea level	150 W per 1,000 m
Cross section	
24 VDC, COM	21.3 mm²
Operating conditions	
Permissible mounting orientations	
Hanging vertically	Yes
Lying horizontally	Yes
Standing horizontally	No
Installation at elevations above sea level	
Nominal	0 to 500 m
Maximum [2]	4000 m
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Overvoltage category per EN 61800-5-1	III
Evenness of mounting surface	Smoothness of 1 mm over the entire mounting surface
Flow volume	
Minimum	3 l/min [3]
Maximum	6 l/min [3]
Pressure drop depending on flow volume	
3 l/min	typically 0.3 bar
6 l/min	typically 0.7 bar
Test pressure	10 bar for 1 minute, air inside, water outside
Max. continuous pressure [4]	5 bar
Max. permissible return temperature	60°C
Degree of protection per EN 60529	IP20
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum [5]	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical characteristics	
Dimensions [6]	
Width	(94 + (n - 1) * 53.5) mm
Height	378 mm
Depth	17 mm
Weight	(0.94 * number of slots) kg

Table 47: 8B0MnnnnHC00.000-1 - Technical data

1) Valid in the following conditions: 40°C ambient temperature, installation altitude <500 m above sea level.
2) Continuous operation of ACOPOSmulti mounting plates at altitudes ranging from 500 m to 4000 m above sea level is possible (taking the continuous power reductions listed into consideration). Requirements that go above and beyond this need to be arranged with B&R.
3) Valid in the following conditions: Mounting plate with max. 27 slots, cooling medium tap water. Values vary depending on the cooling medium and/or connection fitting being used!

4) The requirements for the entire system (tubing, heat exchangers, re-coiling systems, etc.) and possible application-specific requirements must be met.
5) Continuous operation of ACOPOSmulti mounting plates at an ambient temperature ranging from 40°C to max. 55°C is possible (taking the continuous power reductions listed into consideration).
6) The dimensions define the size of the mounting plate. Make sure to leave additional space above and below the backplanes for mounting, connections and air circulation.

7.3 Feed-through mounting

7.3.1 Order data

Model number	Short description	Figure
	Feed-through mounting	
8B0M0040HF00.000-1	ACOPOSmulti mounting plate with backplane 4 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	
8B0M0080HF00.000-1	ACOPOSmulti mounting plate with backplane 8 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	
8B0M0120HF00.000-1	ACOPOSmulti mounting plate with backplane 12 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	
8B0M0160HF00.000-1	ACOPOSmulti mounting plate with backplane 16 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	
8B0M0200HF00.000-1	ACOPOSmulti mounting plate with backplane 20 slots, HV, feed-through mounting, 75 mm² and 22 mm², complete	
	Required accessories	
	Fan modules	
8B0M0040HFF0.000-1	ACOPOSmulti fan module for mounting plate 8B0MxxxxH-F00.xxx-x and 8EMFxxxx000.0000-1	
8EXF400.0000-00	ACOPOS P3 fan module for mounting plate 8EM-Fxxx000.0000-1, 2 slots	
	Optional accessories	
	I/O supply cable	
X67CA0P00.0002	Power connection cable, 0.2 m	
X67CA0P20.0010	Power attachment cable, 1.0 m	
X67CA0P20.0020	Power attachment cable, 2.0 m	
X67CA0P20.0050	Power attachment cable, 5 m	
X67CA0P20.0150	Power attachment cable, 15 m	
X67CA0P20.0500	Power attachment cable, 50 m	

Table 48: 8B0M0040HF00.000-1, 8B0M0080HF00.000-1, 8B0M0120H-F00.000-1, 8B0M0160HF00.000-1, 8B0M0200HF00.000-1 - Order data

Model number	Number of slots	Number of fan modules
8B0M0040HF00.000-1	4	1
8B0M0080HF00.000-1	8	2
8B0M0120HF00.000-1	12	3
8B0M0160HF00.000-1	16	4
8B0M0200HF00.000-1	20	5

Table 49: Number of required 8B0M0040HFF0.000-1 fan modules depending on mounting plate 8B0M

Information:

ACOPOSmulti 8B0MxxxxHF00.xxx-x mounting plates can only be used together with 8B0M0040HF-F0.000-1 fan modules!

For optimal availability of the ACOPOSmulti drive system, the 8B0M0040HFF0.000-1 fan modules must be switched on at all times.

7.3.2 Technical data

Information:

nnnn indicates the number of slots (0160 equals 16 slots).

Model number	8B0MnnnnHF00.000-1
General information	
Number of slots nnnn	
Minimum	4 [1]
Maximum	20
Cooling and mounting method	Feed-through mounting
DC bus connection	
Voltage	
Nominal	750 VDC
Continuous power [2]	200 kW
Reduction of continuous power depending on installation elevation	
Starting at 500 m above sea level	20 kW per 1,000 m
Cross section	
DC+, DC-	72 mm²
PE	72 mm²
24 VDC auxiliary supply	
Voltage	25 VDC ±1.6%
Continuous power [2]	1500 W
Max. power consumption per slot ($P_{Fan8B0M...}$)	8.25 W [3]
Reduction of continuous power depending on installation elevation	
Starting at 500 m above sea level	150 W per 1,000 m
Cross section	
24 VDC, COM	21.3 mm²
Operating conditions	
Permissible mounting orientations	
Hanging vertically	Yes
Lying horizontally	Yes
Standing horizontally	No
Installation at elevations above sea level	
Nominal	0 to 500 m
Maximum [4]	4000 m
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)
Overvoltage category per EN 61800-5-1	III
Degree of protection per EN 60529	IP64 Fan module IP54 (8B0M0040HFF0.000-1)
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum [5]	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical characteristics	
Dimensions [6]	
Width	(64 + n * 53.5) mm
Height	378 mm
Depth	14 mm
Weight	(1.6 * number of slots) kg

Table 50: 8B0MnnnnHF00.000-1 - Technical data

1) The number of slots must be a multiple of 4.
2) Valid in the following conditions: 40°C ambient temperature, installation altitude <500 m above sea level.
3) Corresponds to the attributable power consumption of the fan module 8B0M0040HFF0.000-1.
4) Continuous operation of ACOPOSmulti mounting plates at altitudes ranging from 500 m to 4000 m above sea level is possible (taking the continuous power reductions listed into consideration). Requirements that go above and beyond this need to be arranged with B&R.
5) Continuous operation of ACOPOSmulti mounting plates at an ambient temperature ranging from 40°C to max. 55°C is possible (taking the continuous power reductions listed into consideration).
6) The dimensions define the size of the mounting plate. Make sure to leave additional space above and below the backplanes for mounting, connections and air circulation.

8 8B0P passive power supply modules

8.1 8B0P0110Hx00.000-1

8.1.1 General information

Passive power supply module 8B0P0110 has an integrated line filter and internal braking resistor. It is also possible to connect an optional external braking resistor.

The module has an external 24 VDC input that can be used to supply an ACOPOSmulti drive system with 24 VDC. This enables compact ACOPOSmulti drive systems to be implemented without auxiliary supply module 8B0C.

Requirements

- Voltage is applied to the external 24 VDC input of the module.
- There is no 8B0C auxiliary supply module in the ACOPOSmulti drive system or the 8B0C auxiliary supply module is not enabled (CR_OK signal is not wired).

Information:

The 24 VDC power consumption of the ACOPOSmulti drive system is not permitted to exceed 90 W in this case.

As soon as auxiliary supply module 8B0C is available in the ACOPOSmulti drive system, the 24 VDC supply is always carried out via this auxiliary supply module 8B0C, even if voltage is present at the external 24 VDC input of passive power supply module 8B0P0110. The CR_OK signal must be wired correctly within the ACOPOSmulti drive system for this.

Startup behavior

Passive power supply module 8B0P0110 starts up when at least one of the following conditions is met:

- Voltage is applied to the external 24 VDC input of the module.
- Voltage is applied to the mains input of the module.

As soon as the module has started up and the mains voltage is applied to the module, the DC bus capacitors are charged and output CR_OK is set.

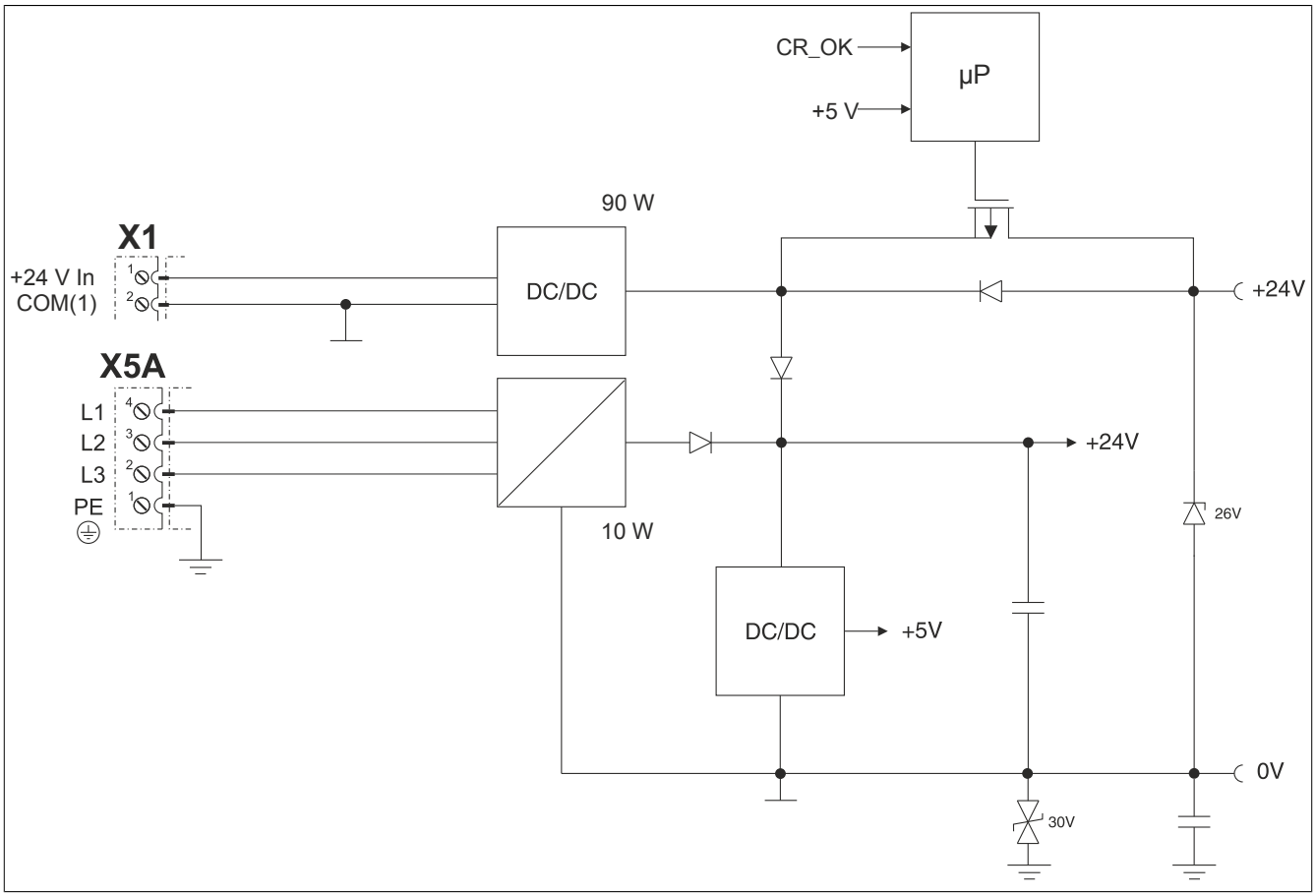


Figure 34: 8B0P0110Hx00.000-1 - 24 VDC power supply diagram

8.1.2 Order data

Model number	Short description	Figure
	Wall mounting	
8B0P0110HW00.000-1	ACOPOSmulti power supply module, passive, 11 A, HV, wall mounting, 24 V In 1x, integrated line filter	
	Cold plate or feed-through mounting	
8B0P0110HC00.000-1	ACOPOSmulti power supply module, passive, 11 A, HV, cold plate or feed-through mounting, 24 V In 1x, integrated line filter	
	Required accessories	
	Terminal block sets	
8BZ0P011000.000-1A	Screw clamp set for ACOPOSmulti 8B0P0110Hx00.00x-1 modules: 1x 8TB3104.206F-10, 1x 8TB3103.202A-10, 1x 8TB2106.2010-00	
	Optional accessories	
	Braking resistors	
8B0W0045H000.000-1	Braking resistor, 450 W, 50 R, IP20, terminals	
8B0W0045H000.001-1	Braking resistor, 450 W, 50 R, IP65, terminals	
8B0W0079H000.000-1	Braking resistor, 790 W, 33 R, IP20, terminals	
8B0W0079H000.001-1	Braking resistor, 790 W, 33 R, IP65, terminals	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Fuse sets	
8BXS006.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 15 A, fast-acting	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	

Table 51: 8B0P0110HW00.000-1, 8B0P0110HC00.000-1 - Order data

Model number	Short description	Figure
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB3103.202A-10	Screw clamp terminal block 3-pin, single-row, pitch: 7.62 mm, labeling 2: PE RB- RB+, coding A: 000	
8TB3104.206F-10	Screw clamp 4-pin, single-row, spacing: 7.62 mm, Label 6: PE L3 L2 L1, Keying: 0101	

Table 51: 8B0P0110HW00.000-1, 8B0P0110HC00.000-1 - Order data

8.1.3 Technical data

Model number	8B0P0110HW00.000-1	8B0P0110HC00.000-1
General information		
B&R ID code	0xDDAD	0xDD94
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
UL	cULus E225616 Power conversion equipment	
Mains connection		
Network configurations	TT, TN-S, TN-C-S [1)]	
Mains input voltage	3x 208 to 3x 480 VAC ±10%	
Frequency	50 / 60 Hz ±4%	
Installed load	Max. 7.3 kVA	
Power dissipation with continuous power	[2.8 * P² + 0.5 * P + 10] W [2)]	
Inrush current at 400 VAC	2 A	
Switch-on interval	>120 s	
Max. DC bus capacitance depending on mains voltage		
230 VAC	9 mF	
400 VAC	3 mF	
480 VAC	2 mF	
Integrated line filter per EN 61800-3, category C3 [3)]	Yes	
Integrated regeneration choke	No	
Capable of power regeneration	No	
Power factor correction (PFC)	No	
Design		
L1, L2, L3, PE	Male connector	
PE	M5 threaded bolt	
Shield connection [4)]	No	
Terminal connection cross section		
Flexible and fine wire lines		
With wire end sleeves	0.5 to 6 mm²	
Approbation data		
UL/C-UL-US	20 to 6 AWG	
CSA	20 to 6 AWG	
Terminal cable cross section dimension of shield connection	23 to 35 mm	
DC bus connection		
Voltage		
Nominal	294 to 679 VDC	
Continuous power [5)]	4 kW	
Reduction of continuous power depending on mains input voltage		
Mains input voltage <3x 400 VAC	10 W/V * (400 V - Mains input voltage)	
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	0.4 kW per 1000 m	
Reduction of continuous power depending on cooling method	No reduction	
Peak power output (supply)	12 kW	
Power dissipation with continuous power	In preparation	
DC bus capacitance	330 µF	
Protective measures		
Overload protection	Yes	
Short circuit and ground fault protection	No	
Design	ACOPOSmulti backplane	

Table 52: 8B0P0110HW00.000-1, 8B0P0110HC00.000-1 - Technical data

Model number	8B0P0110HW00.000-1	8B0P0110HC00.000-1
24 VDC supply		
Input voltage	25 VDC ±1.6%	
Input capacitance	23.5 µF	
Max. power consumption	12 W	
Design	ACOPOSmulti backplane	
24 VDC In		
Input voltage		
Minimum	18 VDC	
Nominal	24 VDC	
Maximum	30 VDC	
24 VDC internal system voltage supply	25 VDC ±1.6% (regulated)	
Switch-on threshold	16 V	
Max. continuous current	4.0 A	
Status indicators	24 V LED	
Undervoltage detection	Yes	
Overvoltage detection	Yes	
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Overtemperature protection	Yes	
Design		
24 VDC In, COM	Male connector	
Terminal connection cross section of input "24 VDC In"		
Flexible and fine wire lines		
With wire end sleeves	0.2 to 2.5 mm²	
Approbation data		
UL/C-UL-US	30 to 12 AWG	
CSA	22 to 12 AWG	
Braking resistor [6]		
Peak power int./ext.	2 kW / 24 kW (max. 1 s)	
Continuous power int./ext.	150 W / 8 kW [7]	
Min. braking resistance	25 Ω	
Rated current of built-in fuse [8]	15 A (fast-acting)	
Design		
RB+, RB-, PE	Male connector	
Shield connection	Yes	
Terminal connection cross section		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 6 mm²	0.5 to 6 mm²
Approbation data		
UL/C-UL-US	24 to 8 AWG	20 to 6 AWG
CSA	24 to 8 AWG	20 to 6 AWG
Terminal cable cross section dimension of shield connection	23 to 35 mm	
Protective measures		
Overload protection	Yes	
Short circuit and ground fault protection	Yes (with RB+ using external replaceable fuse)	
Electrical characteristics		
Discharge capacitance	0.4 µF	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [9]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [10]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	

Table 52: 8B0P0110HW00.000-1, 8B0P0110HC00.000-1 - Technical data

Model number	8B0P0110HW00.000-1	8B0P0110HC00.000-1
Mechanical characteristics		
Dimensions [11]		
Width	53.5 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	3.5 kg	
Module width	1	

Table 52: 8B0P0110HW00.000-1, 8B0P0110HC00.000-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) P ... Continuous power [kW]. Applies to drive systems where the 8BVI inverter modules are operated at the nominal switching frequency (5 kHz).
3) Limit values from EN 61800-3 C3 (second environment). The total length of all motor cables on each drive system (and for each 8B0P0110 power supply module) is not permitted to exceed 75 m. In order to conform to EMC limit values, the 8BVI inverter modules in the drive system are permitted to be operated at a maximum switching frequency of 10 kHz (at a switching frequency of 20 kHz, the total length of all motor cables on each drive system is reduced to a maximum length of 45 m). At a maximum switching frequency of 10 kHz, it is possible to conform to the limits specified in EN 61800-3 C2 when using an external line filter. The maximum permissible motor cable length per motor connection must also be taken into consideration (see 8BVI inverter modules).
4) Cables do not have to be shielded up to a total length of 3 m between the line filter and power supply module. Please contact B&R when using cable lengths >3 m.
5) Valid under the following conditions: 3x 400 VAC mains input voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
6) The power calculations are based on a DC bus voltage of 700 VDC.
   Danger!
   A component malfunction in the 8B0P passive power supply module can lead to continuous power output to the external braking resistor, causing it to overheat. This must be taken into account when selecting (e.g. intrinsic safety), organizing and operating the external braking resistor. Thermal monitoring and external cutoff devices should be implemented if necessary.
   If B&R 8B0W braking resistors are used and the 8B0P power supply module is operated with a mains voltage of 3x 360 to 3x 480 VAC ±10%, there is no need for thermal monitoring since B&R 8B0W braking resistors are intrinsically safe under these conditions.
7) Continuous power refers to the maximum braking power the ACOPOSmulti power supply module can exchange continuously. Depending on the application, the actual continuous power provided by the external braking resistor is limited by the rated current of fuse I_B (integrated in the ACOPOSmulti device) and the value of the external braking resistance R_{BR}.
8) A Littelfuse KLK D 015 fuse must be used.
9) Continuous operation at an installation elevation of 500 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
10) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.
11) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

8.1.4 Wiring

8.1.4.1 Pinout overview

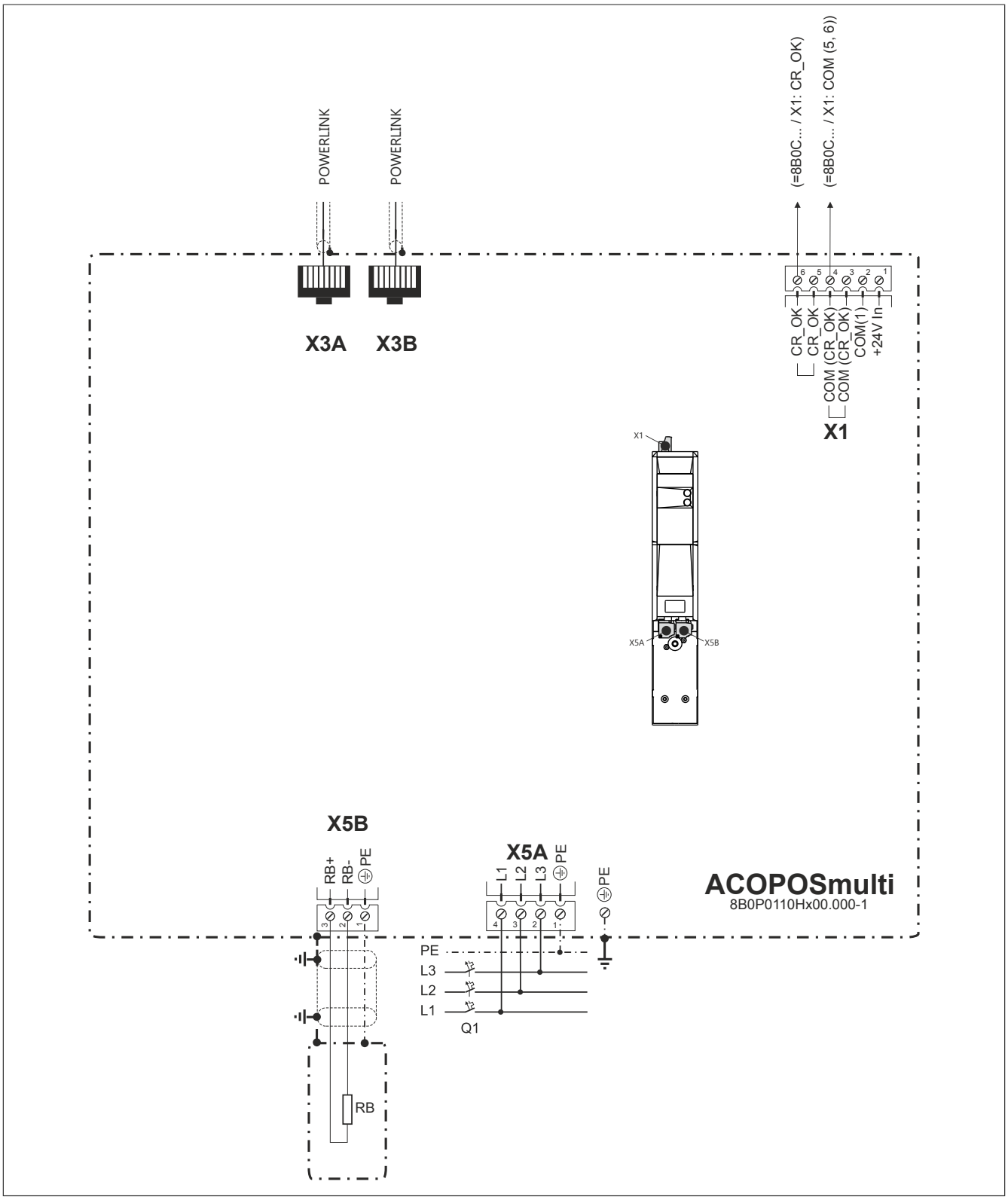


Figure 35: 8B0P0110Hx00.000-1 - Pinout overview

8.1.4.2 Connector X1 - Pinout

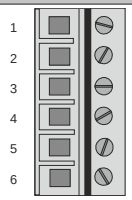
X1	Pin	Description	Function
	1	+24 V In	+24 V feed
	2	COM(1)	+24 V supply, 0 V
	3	COM CR_OK	DC bus ready 0 V
	4	COM CR_OK	DC bus ready 0 V
	5	CR_OK	DC bus ready
	6	CR_OK	DC bus ready

Table 53: Connector X1 - Pinout

Danger!

The connections for the 24 V supply are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

8.1.4.3 Connectors X3A, X3B - Pinout

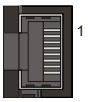
X3A, X3B	Pin	Description	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 54: X3A, X3B connectors - Pinout

8.1.4.4 Connector X5A - Pinout

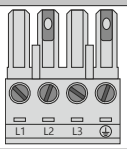
X5A	Description	Function
	PE	Power system: Protective ground conductor
	L3	Power system: Mains connection L3
	L2	Power system: Mains connection L2
	L1	Power system: Mains connection L1

Table 55: Connector X5A - Pinout

8.1.4.5 Connector X5B - Pinout

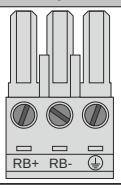
X5B	Description	Function
	PE	Protective ground conductor
	RB-	Braking resistor -
	RB+	Braking resistor +

Table 56: X5B - Pinout

Danger!

Before switching on the module, it is important to make sure that the housing is properly connected to ground (PE rail). Ground connections must also be established if the module is connected for test purposes or only being operated for a short period of time!

8.1.4.6 Additional protective ground connection (PE)

The protective ground conductor is secured to the M5 threaded bolt provided for this purpose using a cable lug.

For information concerning dimensioning, see "Protective ground connection (PE) " on page 508.

Figure	Pin	Description	Function
	---	PE	Protective ground conductor
Terminal cross sections	**[mm²]**		**AWG**
Cable lug for M5 threaded bolt	0.25 - 16		23 - 5

Table 57: Additional protective ground connection (PE)

8.1.4.7 Input/Output circuit diagram

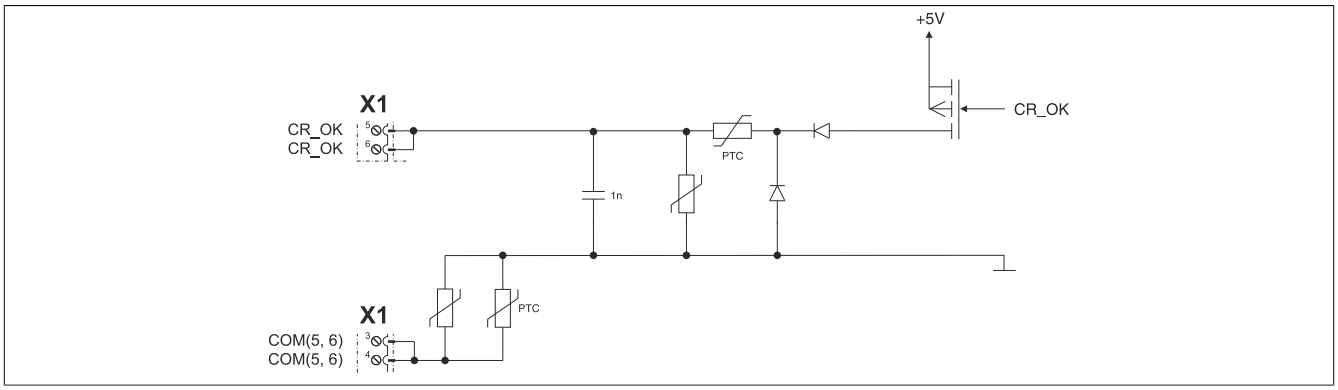


Figure 36: 8B0C - Enable

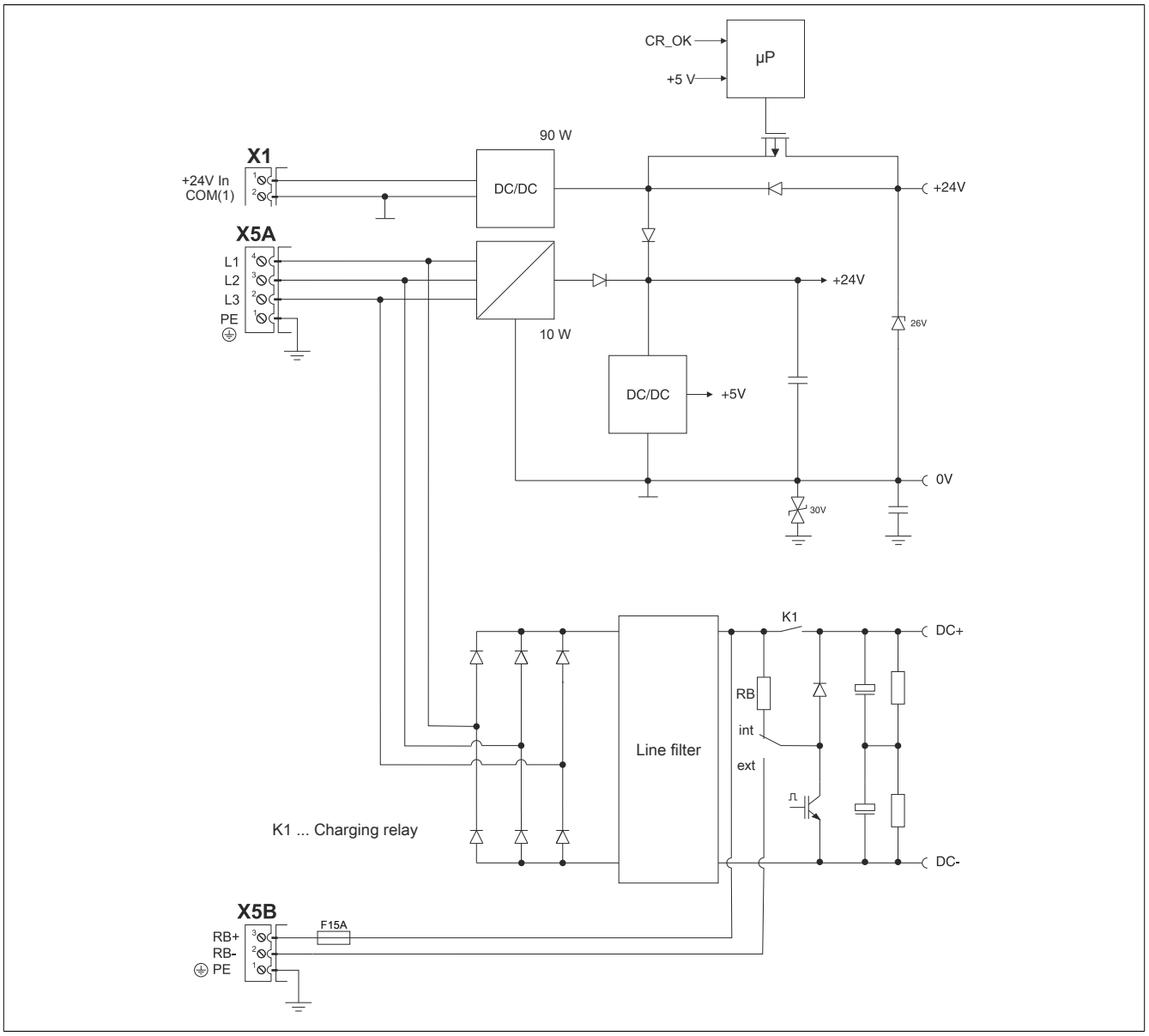


Figure 37: Power unit and external 24 VDC input

8.2 8B0P0220Hx00.000-1, 8B0P0440Hx00.000-1

- Wide input voltage range
- Connection for external braking resistor

8.2.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0P0220HW00.000-1	ACOPOSmulti power supply module, passive, 22 A, HV, wall mounting	
8B0P0440HW00.000-1	ACOPOSmulti power supply module passive, 44 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8B0P0220HC00.000-1	ACOPOSmulti power supply module, passive, 22 A, HV, cold plate or feed-through mounting	
8B0P0440HC00.000-1	ACOPOSmulti power supply module, passive, 44 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZ0P044000.000-1A	Screw clamp set for ACOPOSmulti modules 8B0P0220Hx00.00x-1 and 8B0P0440Hx00.00x-1: 1x 8TB4104.202L-10, 1x 8TB4103.202A-00, 1x 8TB2106.2010-00	
	Optional accessories	
	Braking resistors	
8B0W0045H000.000-1	Braking resistor, 450 W, 50 R, IP20, terminals	
8B0W0045H000.001-1	Braking resistor, 450 W, 50 R, IP65, terminals	
8B0W0079H000.000-1	Braking resistor, 790 W, 33 R, IP20, terminals	
8B0W0079H000.001-1	Braking resistor, 790 W, 33 R, IP65, terminals	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Fuse sets	
8BXS003.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 30 A, fast-acting	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB4103.202A-00	Screw clamp terminal block 3-pin, single-row, pitch: 10.16 mm, labeling 2: PE RB- RB+, coding A: 000	
8TB4104.202L-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 2: PE L3 L2 L1, keying L: 1010	

Table 58: 8B0P0220HW00.000-1, 8B0P0440HW00.000-1, 8B0P0220HC00.000-1, 8B0P0440HC00.000-1 - Order data

8.2.2 Technical data

Model number	8B0P0220HW00.000-1	8B0P0220HC00.000-1	8B0P0440HW00.000-1	8B0P0440HC00.000-1
General information				
B&R ID code	0xA8E9	0xA8E7	0xA8EA	0xA8E8
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Mains connection				
Network configurations	TT, TN-S, TN-C-S [1]	TT, TN-S, TN-C-S [2]		
Mains input voltage	3x 380 to 3x 500 VAC ±10%			
Frequency	50 / 60 Hz ±4%	50/60 Hz ±4%		
Installed load	Max. 15.6 kVA		Max. 30.4 kVA	
Power dissipation with continuous power	Approx. 130 W		Approx. 300 W	
Inrush current at 400 VAC	10 A			
Switch-on interval	>120 s			
Max. DC bus capacitance depending on mains voltage				
230 VAC	43.6 mF [3]		43.6 mF [4]	
400 VAC	14.4 mF [5]		14.4 mF [6]	
480 VAC	10 mF [7]		10 mF [8]	
Integrated line filter per EN 61800-3, category C3 [9]	No			
Integrated regeneration choke	No			
Capable of power regeneration	No			
Power factor correction (PFC)	No			
Design				
L1, L2, L3, PE	Male connector			
PE	M5 threaded bolt			
Shield connection [10]	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.5 to 16 mm²			
Approbation data				
UL/C-UL-US	20 to 6 AWG			
CSA	20 to 6 AWG			
Terminal cable cross section dimension of shield connection	23 to 35 mm			
DC bus connection				
Voltage				
Nominal	537 to 707 VDC			
Continuous power [11]	8 kW		16 kW	
Reduction of continuous power depending on mains input voltage				
Mains input voltage <3x 400 VAC	20 W/V * (400 V - Mains input voltage)		40 W/V * (400 V - Mains input voltage)	
Reduction of continuous power depending on installation elevation				
Starting at 500 m above sea level	0.8 kW per 1000 m		1.6 kW per 1000 m	
Reduction of continuous power depending on cooling method	In preparation			
Peak power output (supply)	24 kW		48 kW	
Power dissipation with continuous power	In preparation			
DC bus capacitance	660 µF		1320 µF	
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	No			
Design	ACOPOSmulti backplane			
24 VDC supply [12]				
Input voltage	25 VDC ±1.6%			
Input capacitance	23.5 µF			
Max. power consumption	12 W			
Design	ACOPOSmulti backplane			
Braking resistor [13]				
Peak power output	40 kW (max. 0.2 s)		65 kW (max. 1 s)	
Continuous power	3 kW [14]			
Min. braking resistance	12 Ω		7.5 Ω	
Rated current of built-in fuse [15]	30 A (fast-acting)			

Table 59: 8B0P0220HW00.000-1, 8B0P0220HC00.000-1, 8B0P0440HW00.000-1, 8B0P0440HC00.000-1 - Technical data

Model number	8B0P0220HW00.000-1	8B0P0220HC00.000-1	8B0P0440HW00.000-1	8B0P0440HC00.000-1
Design				
RB+, RB-, PE	Male connector			
Shield connection	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.5 to 6 mm²			
Approbation data				
UL/C-UL-US	20 to 8 AWG			
CSA	20 to 8 AWG			
Terminal cable cross section dimension of shield connection	23 to 35 mm			
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	Yes (with RB+ through externally replaceable blow-out fuse)	Yes (with RB+ using external replaceable fuse)		
Electrical characteristics				
Discharge capacitance	0.9 µF			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Lying horizontally	Yes			
Standing horizontally	No			
Installation at elevations above sea level				
Nominal	0 to 500 m			
Maximum [16]	4000 m			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP20			
Environmental conditions				
Temperature				
Operation				
Nominal	5 to 40°C			
Maximum [17]	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%			
Storage	5 to 95%			
Transport	Max. 95% at 40°C			
Mechanical characteristics				
Dimensions [18]				
Width	106.5 mm			
Height	317 mm			
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 5.9 kg	Approx. 4.7 kg	Approx. 6.1 kg	Approx. 4.9 kg
Module width	2			

Table 59: 8B0P0220HW00.000-1, 8B0P0220HC00.000-1, 8B0P0440HW00.000-1, 8B0P0440HC00.000-1 - Technical data

1) In the USA, TT and TN power mains are commonly referred to as "Delta/Wye with grounded Wye neutral".
2) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
3) Up to Revision H0: 17.5 mF
4) Up to Revision F0: 17.5 mF
5) Up to Revision H0: 5.8 mF
6) Up to Revision F0: 5.8 mF
7) Up to Revision H0: 4 mF
8) Up to Revision F0: 4 mF
9) Limit values from EN 61800-3 C3 (second environment).
10) The cable does not require shielding up to a total cable length of 3 m between the line filter and power supply module. Please contact B&R when using cable lengths >3 m.
11) Valid in the following conditions: 3x 400 VAC mains input voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
12) The power supply modules have an integrated DC bus power supply for the electronics. The 24 VDC supply from the ACOPOSmulti backplane only feeds the +24 VDC of the trigger inputs and the encoder power supplies on the encoder modules.
13) The power calculations are based on a DC bus voltage of 700 VDC.
Danger!
A component malfunction in the 8B0P passive power supply module can lead to continuous power output to the external braking resistor, causing it to overheat. This must be taken into account when selecting (e.g. intrinsic safety), organizing and operating the external braking resistor. Thermal monitoring and external cutoff devices should be implemented if necessary.
If B&R 8B0W braking resistors are used and the 8B0P power supply module is operated with a mains voltage of 3x 380 to 3x 500 VAC ±10%, there is no need for thermal monitoring since B&R 8B0W braking resistors are intrinsically safe under these conditions.

14) Value with minimum permissible braking resistance.
With higher braking resistance values, the continuous power is increased and peak power decreased.
15) A Littelfuse KLK D 030 fuse must be used.
16) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
17) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
18) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

8.3 8B0P0220Hx00.001-1, 8B0P0440Hx00.001-1

These modules are equipped with what a "passive motor short circuit brake".

Passive motor short circuit brake

A motor with a hanging load is connected to an ACOPOSmulti drive system with passive power supply module 8B0P with passive motor short circuit brake. If the power supply to the drive system is disconnected and this hanging load begins sinking (due to failure of the motor holding brake, for example), then the motor axis rotates and the DC bus voltage increases. If the DC bus voltage overshoots a value of 15 VDC, then the DC bus is shorted via a thyristor. This limits the speed at which the hanging load sinks.

The passive motor short circuit brake is designed for up to 25 kW of power. One fault event is permitted to occur maximum once every 15 minutes for this amount of power.

Information:

The passive motor short circuit brake is always active and cannot be influenced by the user!

Warning!

The passive motor short circuit brake works without current limiting. As a result, irreparable damage to drive system components (passive power supply module 8B0P, motor, etc.) is possible at excessively high power values.

The passive motor short circuit brake is not monitored. It therefore has no effect in the event of component failure!

8.3.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0P0220HW00.001-1	ACOPOSmulti power supply module, passive, 22 A, HV, wall mounting, passive motor short circuit brake	
8B0P0440HW00.001-1	ACOPOSmulti power supply module, passive, 44 A, HV, wall mounting, passive motor short circuit brake	
	Cold plate or feed-through mounting	
8B0P0220HC00.001-1	ACOPOSmulti power supply module, passive, 22 A, HV, cold plate or feed-through mounting, passive motor short circuit brake	
8B0P0440HC00.001-1	ACOPOSmulti power supply module, passive, 44 A, HV, cold plate or feed-through mounting, passive motor short circuit brake	
	Required accessories	
	Terminal block sets	
8BZ0P044000.000-1A	Screw clamp set for ACOPOSmulti modules 8B0P0220Hx00.00x-1 and 8B0P0440Hx00.00x-1: 1x 8TB4104.202L-10, 1x 8TB4103.202A-00, 1x 8TB2106.2010-00	
	Optional accessories	
	Braking resistors	
8B0W0045H000.000-1	Braking resistor, 450 W, 50 R, IP20, terminals	
8B0W0045H000.001-1	Braking resistor, 450 W, 50 R, IP65, terminals	
8B0W0079H000.000-1	Braking resistor, 790 W, 33 R, IP20, terminals	
8B0W0079H000.001-1	Braking resistor, 790 W, 33 R, IP65, terminals	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Fuse sets	
8BXS003.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 30 A, fast-acting	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	

Table 60: 8B0P0220HW00.001-1, 8B0P0440HW00.001-1, 8B0P0220HC00.001-1, 8B0P0440HC00.001-1 - Order data

Model number	Short description	Figure
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB4103.202A-00	Screw clamp terminal block 3-pin, single-row, pitch: 10.16 mm, labeling 2: PE RB- RB+, coding A: 000	
8TB4104.202L-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 2: PE L3 L2 L1, keying L: 1010	

Table 60: 8B0P0220HW00.001-1, 8B0P0440HW00.001-1, 8B0P0220HC00.001-1, 8B0P0440HC00.001-1 - Order data

8.3.2 Technical data

Model number	8B0P0220HW00.001-1	8B0P0220HC00.001-1	8B0P0440HW00.001-1	8B0P0440HC00.001-1
General information				
Note	Integrated passive motor short circuit brake			
B&R ID code	0xA988	0xA987	0xA989	0xA98A
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Mains connection				
Network configurations	TT, TN-S, TN-C-S [1]			
Mains input voltage	3x 380 to 3x 500 VAC ±10%			
Frequency	50/60 Hz ±4%			
Installed load	Max. 15.6 kVA		Max. 30.4 kVA	
Power dissipation with continuous power	In preparation			
Inrush current at 400 VAC	10 A			
Switch-on interval	>120 s			
Max. DC bus capacitance depending on mains voltage				
230 VAC	43.6 mF [2]		43.6 mF [3]	
400 VAC	14.4 mF [4]		14.4 mF [5]	
480 VAC	10 mF [6]		10 mF [7]	
Integrated line filter per EN 61800-3, category C3 [8]	No			
Integrated regeneration choke	No			
Capable of power regeneration	No			
Power factor correction (PFC)	No			
Design				
L1, L2, L3, PE	Male connector			
PE	M5 threaded bolt			
Shield connection [9]	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.5 to 16 mm²			
Approbation data				
UL/C-UL-US	20 to 6 AWG			
CSA	20 to 6 AWG			
Terminal cable cross section dimension of shield connection	23 to 35 mm			
DC bus connection				
Voltage				
Nominal	537 to 707 VDC			
Continuous power [10]	8 kW		16 kW	
Reduction of continuous power depending on mains input voltage				
Mains input voltage <3x 400 VAC	20 W/V * (400 V - Mains input voltage)		40 W/V * (400 V - Mains input voltage)	
Reduction of continuous power depending on installation elevation				
Starting at 500 m above sea level	0.8 kW per 1000 m		1.6 kW per 1000 m	
Reduction of continuous power depending on cooling method	In preparation			
Peak power output (supply)	24 kW		48 kW	
Power dissipation with continuous power	In preparation			

Table 61: 8B0P0220HW00.001-1, 8B0P0220HC00.001-1, 8B0P0440HW00.001-1, 8B0P0440HC00.001-1 - Technical data

Model number	8B0P0220HW00.001-1	8B0P0220HC00.001-1	8B0P0440HW00.001-1	8B0P0440HC00.001-1
DC bus capacitance	660 µF		1320 µF	
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	No			
Design	ACOPOSmulti backplane			
24 VDC supply [11]				
Input voltage	25 VDC ±1.6%			
Input capacitance	23.5 µF			
Max. power consumption	12 W			
Design	ACOPOSmulti backplane			
Braking resistor [12]				
Peak power output	40 kW (max. 1 s)		65 kW (max. 1 s)	
Continuous power	3 kW			
Min. braking resistance	12 Ω		7.5 Ω	
Rated current of built-in fuse [13]	30 A (fast-acting)			
Design				
RB+, RB-, PE	Male connector			
Shield connection	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.5 to 6 mm²			
Approbation data				
UL/C-UL-US	20 to 6 AWG			
CSA	20 to 6 AWG			
Terminal cable cross section dimension of shield connection	23 to 35 mm			
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	Yes (with RB+ using external replaceable fuse)	Yes (with RB+ through externally replaceable blow-out fuse)	Yes (with RB+ using external replaceable fuse)	Yes (with RB+ through externally replaceable blow-out fuse)
Electrical characteristics				
Discharge capacitance	0.9 µF			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Lying horizontally	Yes			
Standing horizontally	No			
Installation at elevations above sea level				
Nominal	0 to 500 m			
Maximum [14]	4000 m			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP20			
Environmental conditions				
Temperature				
Operation				
Nominal	5 to 40°C			
Maximum [15]	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%			
Storage	5 to 95%			
Transport	Max. 95% at 40°C			
Mechanical characteristics				
Dimensions [16]				
Width	106.5 mm			
Height	317 mm			
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 5.9 kg	Approx. 4.7 kg	Approx. 6.1 kg	Approx. 4.9 kg
Module width	2			

Table 61: 8B0P0220HW00.001-1, 8B0P0220HC00.001-1, 8B0P0440HW00.001-1, 8B0P0440HC00.001-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) Up to Revision H0: 17.5 mF
3) Up to Revision F0: 17.5 mF
4) Up to Revision H0: 5.8 mF
5) Up to Revision F0: 5.8 mF

6) Up to Revision H0: 4 mF
7) Up to Revision F0: 4 mF
8) Limit values from EN 61800-3 C3 (second environment).
9) Cables do not have to be shielded up to a total length of 3 m between the line filter and power supply module. Please contact B&R when using cable lengths >3 m.
10) Valid under the following conditions: 3x 400 VAC mains input voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
11) The power supply modules have an integrated DC bus power supply for the electronics. The 24 VDC power supply from the ACOPOSmulti backplane only feeds the +24 VDC of the trigger inputs and the encoder power supplies on the encoder modules.
12) The power calculations are based on a DC bus voltage of 700 VDC.
Danger!
A component malfunction in the 8B0P passive power supply module can lead to continuous power output to the external braking resistor, causing it to overheat. This must be considered when selecting (e.g. intrinsic safety), organizing and operating the external braking resistor. Thermal monitoring and external cutoff devices should be implemented if necessary.
If B&R 8B0W braking resistors are used and the 8B0P power supply module is operated with a mains voltage of 3x 380 to 3x 500 VAC ±10%, there is no need for thermal monitoring since B&R 8B0W braking resistors are intrinsically safe under these conditions.
13) A Littelfuse KLK D 030 fuse must be used.
14) Continuous operation at an installation elevation of 500 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
15) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.
16) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

8.4 POWERLINK node number setting

The POWERLINK node number can be set using the two hexadecimal coded rotary switches located behind the module's black cover.

<table>
<tr><th colspan="2">Figure</th><th>Coded rotary switches</th><th>POWERLINK node number</th></tr>
<tr><td rowspan="3">

Cover closed</td><td rowspan="3">

Cover open</td><td>1</td><td>16s position (high)</td></tr>
<tr><td>2</td><td>1s position (low)</td></tr>
<tr><td colspan="2">A change to the POWERLINK node number only takes effect the next time the ACOPOSmulti drive system is switched on.
Information:
In principle, node numbers between $01 and $FD are permitted.
However, node numbers between $F0 and $FD are intended for future system expansions. To ensure compatibility, these node numbers should be avoided.
Node numbers $00, $FE and $FF are reserved and are therefore not permitted to be set.</td></tr>
</table>

Table 62: Setting the POWERLINK node number

8.5 8B0P0220Hx00.00x-1, 8B0P0440Hx00.00x-1 - Wiring

8.5.1 Pinout overview

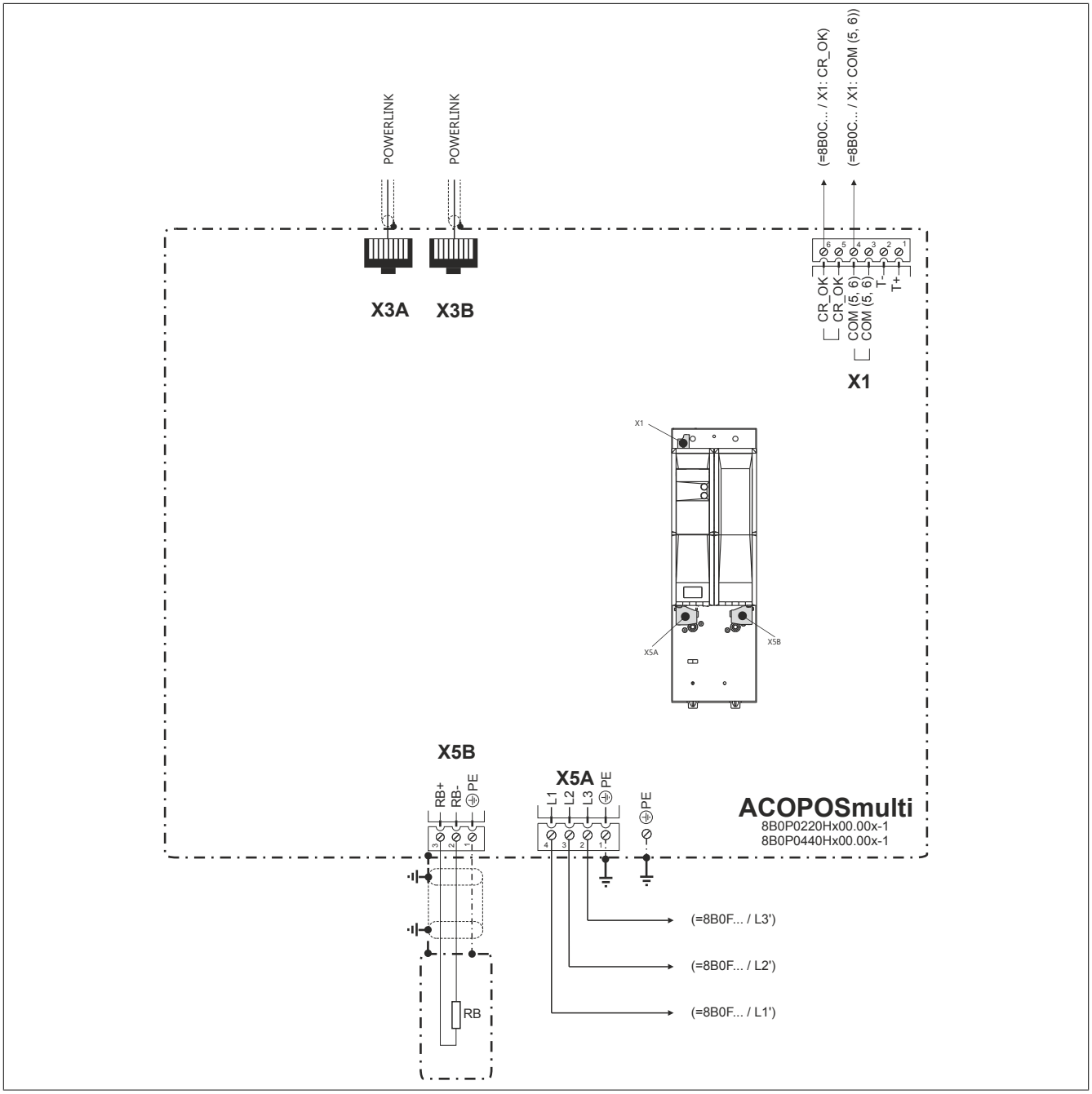


Figure 38: 8B0P0220Hx00.00x-1, 8B0P0440Hx00.00x-1 - Pinout overview

8.5.2 Connector X1 - Pinout

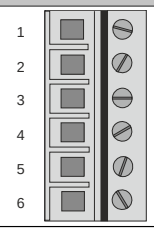
X1	Pin	Description	Function
	1	T+	Temperature sensor +
	2	T-	Temperature sensor -
	3	COM (5, 6)	DC bus ready 0 V
	4	COM (5, 6)	DC bus ready 0 V
	5	CR_OK	DC bus ready [1]
	6	CR_OK	DC bus ready [1]

Table 63: Connector X1 - Pinout

1) Output CR_OK is only set if the following condition is met:
The charging relay is closed and DC bus voltage U_{DC} >270 VDC.

Danger!

The connections for the temperature sensors are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

8.5.3 Connectors X3A, X3B - Pinout

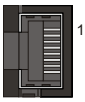
X3A, X3B	Pin	Description	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 64: X3A, X3B connectors - Pinout

8.5.4 Connector X5A - Pinout

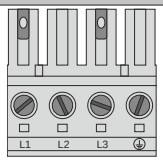
X5A	Description	Function
	PE	Power system: Protective ground conductor
	L3	Power system: Mains connection L3
	L2	Power system: Mains connection L2
	L1	Power system: Mains connection L1

Table 65: Connector X5A - Pinout

8.5.5 Connector X5B - Pinout

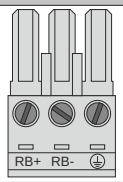
X5B	Description	Function
	PE	Protective ground conductor
	RB-	Braking resistor -
	RB+	Braking resistor +

Table 66: X5B - Pinout

Danger!

Before switching on the module, it is important to make sure that the housing is properly connected to ground (PE rail). Ground connections must also be established if the module is connected for test purposes or only being operated for a short period of time!

8.5.6 Additional protective ground connection (PE)

The protective ground conductor is secured to the M5 threaded bolt provided for this purpose using a cable lug.

For information concerning dimensioning, see "Protective ground connection (PE) " on page 508.

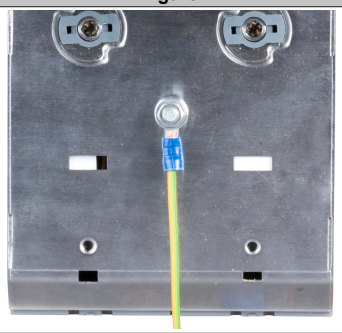
Figure	Pin	Description	Function
	---	PE	Protective ground conductor
Terminal cross sections	**[mm²]**		**AWG**
Cable lug for M5 threaded bolt	0.25 - 16		23 - 5

Table 67: Additional protective ground connection (PE)

8.5.7 Input/Output circuit diagram

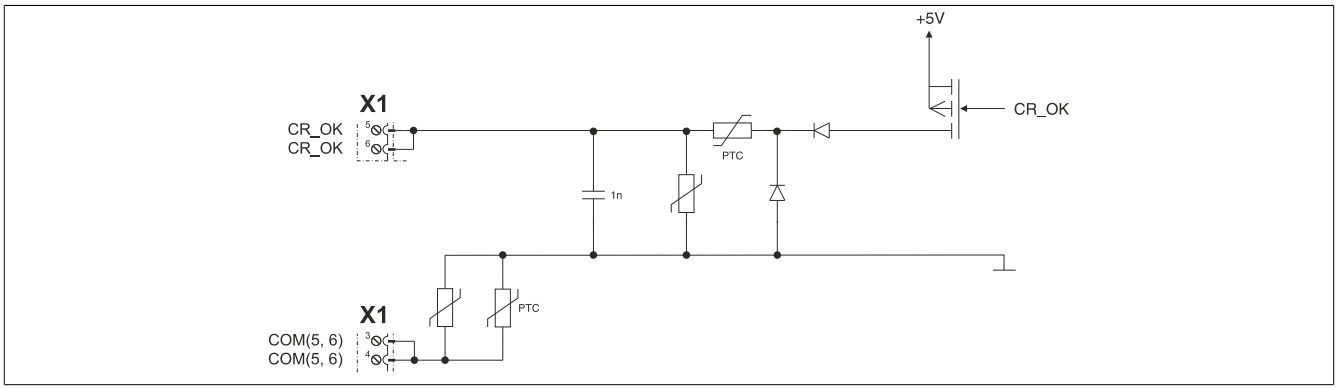


Figure 39: 8B0C - Enable

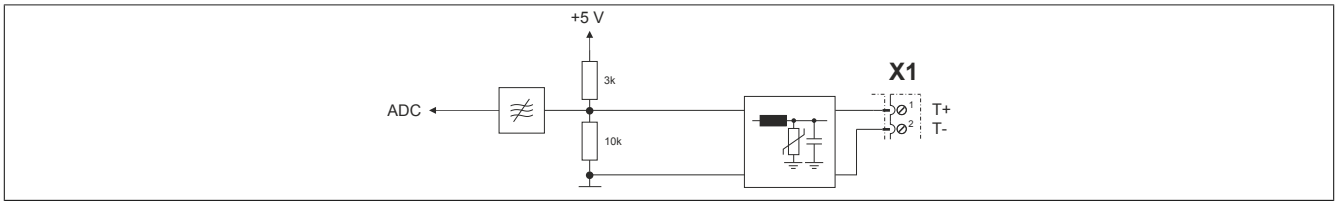


Figure 40: Temperature sensor

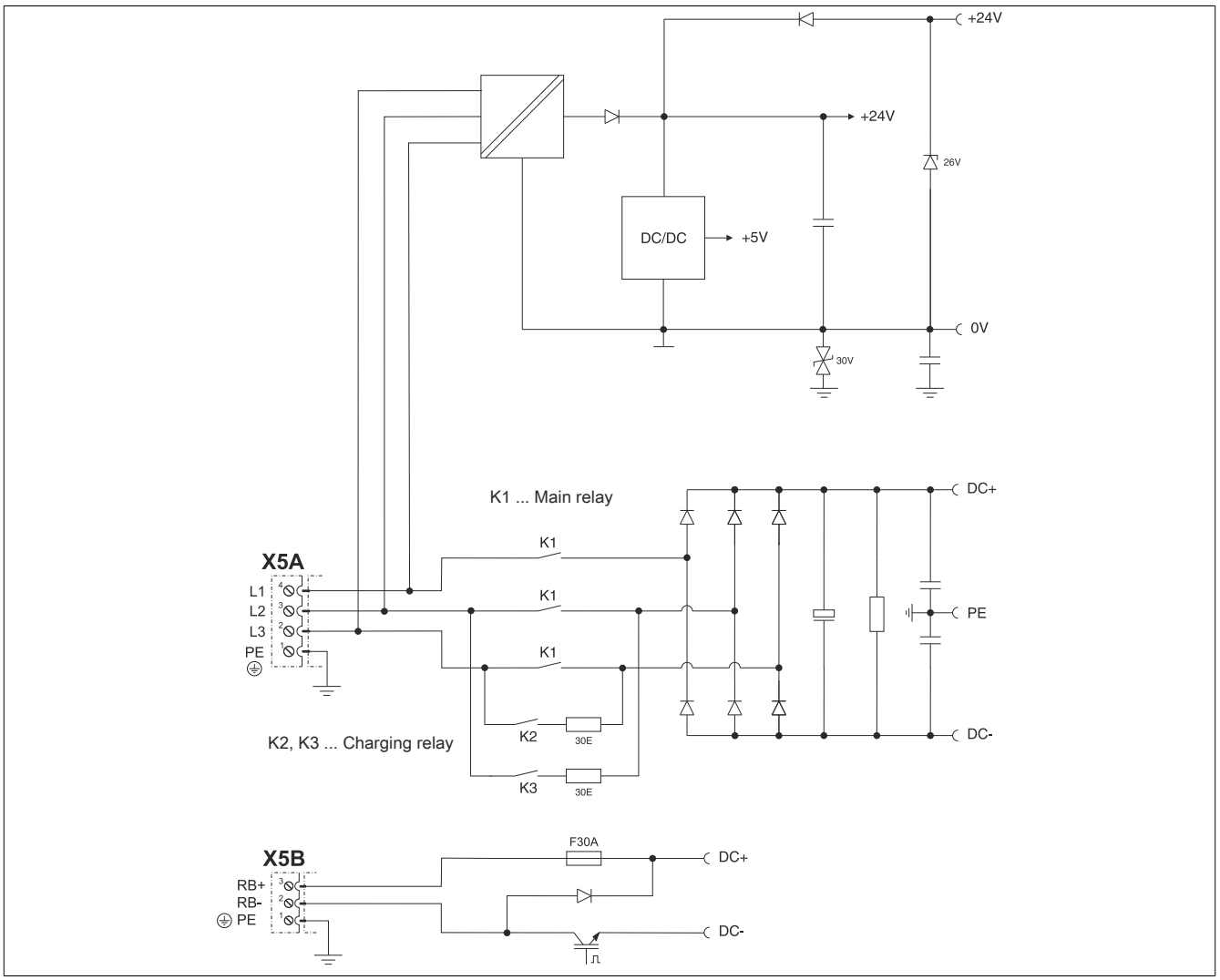


Figure 41: Power unit 8B0P0220Hx00.000-1, 8B0P0440Hx00.000-1

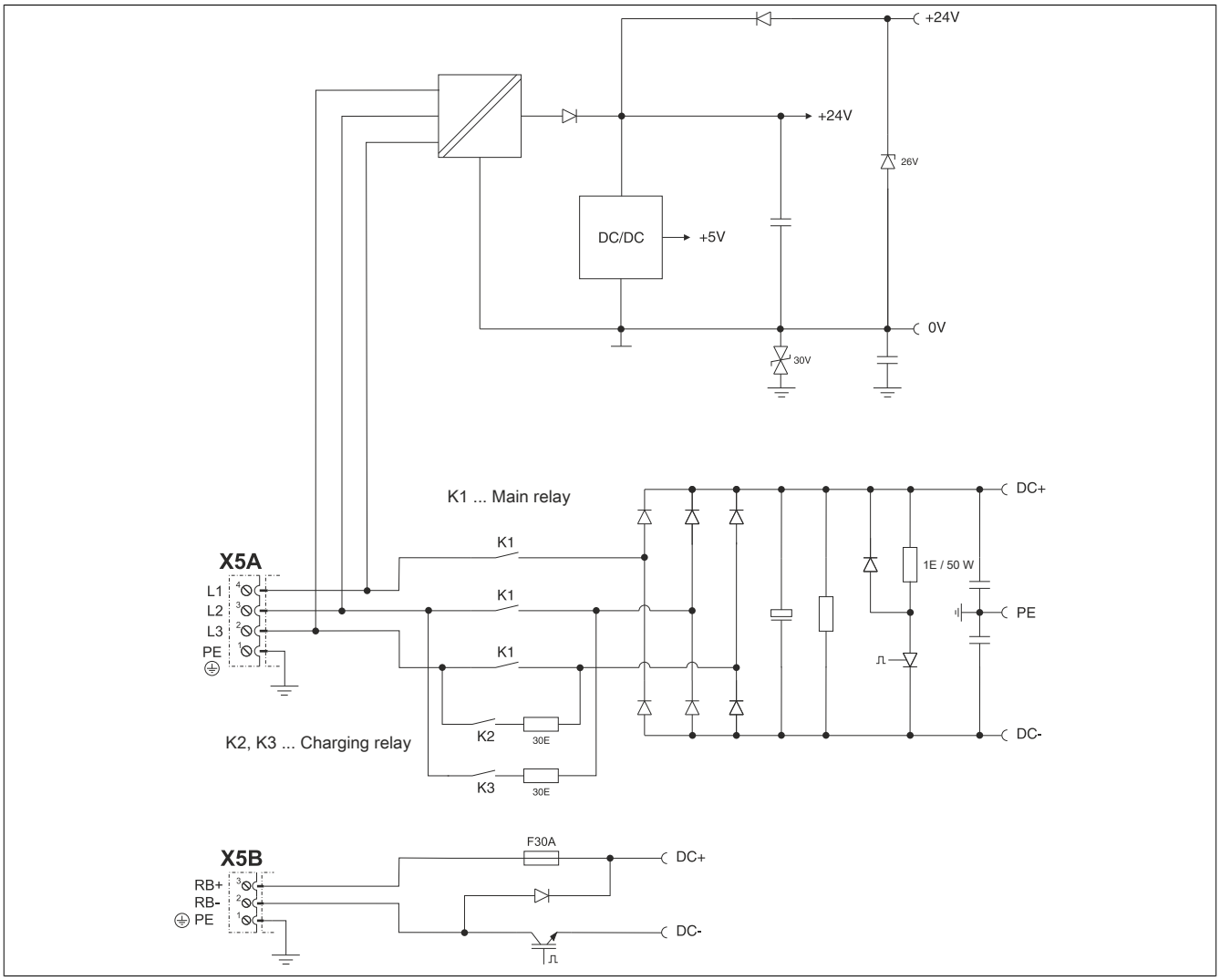


Figure 42: Power unit 8B0P0220Hx00.001-1, 8B0P0440Hx00.001-1

9 8BVP power supply modules

9.1 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1

9.1.1 Order data

Model number	Short description	Figure
	Wall mounting	
8BVP0220HW00.000-1	ACOPOSmulti power supply module 22 A, HV, wall mounting	
8BVP0440HW00.000-1	ACOPOSmulti power supply module 44 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8BVP0220HC00.000-1	ACOPOSmulti power supply module, 22 A, HV, cold plate or feed-through mounting	
8BVP0440HC00.000-1	ACOPOSmulti power supply module, 44 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZVP044000.000-1A	Screw clamp set for ACOPOSmulti modules 8BVP0220Hx00 and 8BVP0440Hx00: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.204A-00, 1x 8TB4104.202L-10	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS007.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 2x 45°; 4x screws	
8SCS008.0000-00	ACOPOSmulti shield component set: 1 shield plate 2x type 0, 1 hose clamp, B 9 mm, D 23-35 mm	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2104.204A-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 4: T- T + F- F+, A keying: 0000	

Table 68: 8BVP0220HW00.000-1, 8BVP0440HW00.000-1, 8BVP0220HC00.000-1, 8BVP0440HC00.000-1 - Order data

Model number	Short description	Figure
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB4104.202L-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 2: PE L3 L2 L1, keying L: 1010	

Table 68: 8BVP0220HW00.000-1, 8BVP0440HW00.000-1, 8BVP0220HC00.000-1, 8BVP0440HC00.000-1 - Order data

9.1.2 Technical data

Model number	8BVP0220HW00.000-1	8BVP0220HC00.000-1	8BVP0440HW00.000-1	8BVP0440HC00.000-1
General information				
B&R ID code	0xA7CF	0xA7CE	0xA074	0xA073
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2			
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Mains connection				
Network configurations	TT, TN-S, TN-C-S [1]			
Mains input voltage	3x 220 to 3x 480 VAC ±10%			
Frequency	50/60 Hz ±4%			
Installed load [2]	Max. 15.6 kW		Max. 31.1 kW	
Inrush current at 400 VAC	Max. 67 A			
Switch-on interval [3]	>300 s			
Max. DC bus capacitance depending on mains voltage				
230 VAC	17.4 mF			
400 VAC	5.8 mF			
480 VAC	4 mF			
Nominal switching frequency	5 kHz			
Possible switching frequencies [4]	5/10 kHz	5 / 10 kHz	5/10 kHz	5 / 10 kHz
Integrated line filter per EN 61800-3, category C3 [5]	No			
Integrated regeneration choke	No			
Capable of power regeneration	Yes			
Power factor correction (PFC)	Yes			
Design				
L1, L2, L3, PE	Male connector			
PE	M5 threaded bolt			
Shield connection [6]	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.5 to 16 mm²			
Approbation data				
UL/C-UL-US	20 to 6 AWG			
CSA	20 to 6 AWG			
Terminal cable cross section dimension of shield connection	23 to 35 mm			
DC bus connection				
Voltage				
Nominal	750 VDC			
Continuous power (supply and regeneration) [7]	15 kW		30 kW	
Reduction of continuous power depending on mains input voltage				
Mains input voltage <3x 400 VAC	37.5 W/V * (400 V - Mains input voltage)		75 W/V * (400 V - Mains input voltage)	
Reduction of continuous power depending on DC bus voltage (U_{DC})				
U_{DC} <750 VDC	P * (1 - U_{DC}/750) [8]			
Reduction of continuous power depending on switching frequency [9]				
Switching frequency 5 kHz	No reduction	-	1.11 kW/K (from 40°C) [10]	-
Switching frequency 10 kHz	0.27 kW/K (from 31°C)	-	0.35 kW/K (from -10°C) [11]	-

Table 69: 8BVP0220HW00.000-1, 8BVP0220HC00.000-1, 8BVP0440HW00.000-1, 8BVP0440HC00.000-1 - Technical data

Model number	8BVP0220HW00.000-1	8BVP0220HC00.000-1	8BVP0440HW00.000-1	8BVP0440HC00.000-1
Reduction of continuous power depending on switching frequency and mounting method [12]				
Switching frequency 5 kHz				
Cold plate mounting [13]	-	No reduction	-	0.56 kW/K (starting at 45°C) [10]
Feed-through mounting	-	No reduction	-	In preparation
Switching frequency 10 kHz				
Cold plate mounting [13]	-	0.33 kW/K (starting at 49°C)	-	0.43 kW/K (starting at 6°C) [14]
Feed-through mounting	-	0.37 kW/K (starting at 40°C)	-	In preparation
Reduction of continuous power depending on installation elevation				
Starting at 500 m above sea level	1.5 kW per 1000 m		3 kW per 1000 m	
Peak power (supply and regeneration)	37.5 kW		60 kW	
Power dissipation depending on switching frequency [15]				
Switching frequency 5 kHz	[0.28*P²+7.9*P+40] W		[0.15*P²+10.5*P+40] W	
Switching frequency 10 kHz	[0.9*P²+5.3*P+110] W		[0.42*P²+16*P+130] W	
DC bus capacitance	495 µF		825 µF	
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	No			
Design	ACOPOSmulti backplane			
24 VDC supply [16]				
Input voltage	25 VDC ±1.6%			
Input capacitance	4.7 µF			
Max. power consumption	$P_{SLOT1} + P_{SLOT2} + P_{24\ V\ Out} + P_{Fan8BVF...}$ [17]	$P_{SLOT1} + P_{SLOT2} + P_{24\ V\ Out} + P_{Fan8BVF...}$ [18]	$P_{SLOT1} + P_{SLOT2} + P_{24\ V\ Out} + P_{Fan8BVF...}$ [17]	$P_{SLOT1} + P_{SLOT2} + P_{24\ V\ Out} + P_{Fan8BVF...}$ [18]
Design	ACOPOSmulti backplane			
24 VDC Out				
Quantity	2			
Output voltage				
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)			
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%			
Fuse protection	250 mA (slow-blow) electronic, automatic reset			
Filter fan connection				
Output voltage	24 V +5.8% / -0.1%			
Continuous current	4.2 A			
Max. overcurrent limitation	10 A			
Protective measures				
Overload protection	No			
Short circuit protection	Yes			
Open circuit monitoring	No			
Undervoltage monitoring	No			
Trigger inputs				
Quantity	2			
Wiring	Sink			
Electrical isolation				
Input - Power supply module	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Switching threshold				
Low	<5 V			
High	>15 V			
Input current at nominal voltage	Approx. 10 mA			
Switching delay				
Rising edge	52 µs ±0.5 µs (digitally filtered)	52 µs ± 0.5 µs (digitally filtered)	52 µs ±0.5 µs (digitally filtered)	52 µs ± 0.5 µs (digitally filtered)
Falling edge	53 µs ±0.5 µs (digitally filtered)	53 µs ± 0.5 µs (digitally filtered)	53 µs ±0.5 µs (digitally filtered)	53 µs ± 0.5 µs (digitally filtered)
Modulation compared to ground potential	Max. ±38 V			
Electrical characteristics				
Discharge capacitance	0.9 µF			

Table 69: 8BVP0220HW00.000-1, 8BVP0220HC00.000-1, 8BVP0440HW00.000-1, 8BVP0440HC00.000-1 - Technical data

Model number	8BVP0220HW00.000-1	8BVP0220HC00.000-1	8BVP0440HW00.000-1	8BVP0440HC00.000-1
Operating conditions				
Permissible mounting orientations				
Hanging vertically		Yes		
Lying horizontally		Yes		
Standing horizontally		No		
Installation at elevations above sea level				
Nominal		0 to 500 m		
Maximum [19]		4000 m		
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)		
Overvoltage category per EN 61800-5-1		III		
Degree of protection per EN 60529		IP20		
Environmental conditions				
Temperature				
Operation				
Nominal		5 to 40°C		
Maximum [20]		55°C		
Storage		-25 to 55°C		
Transport		-25 to 70°C		
Relative humidity				
Operation		5 to 85%		
Storage		5 to 95%		
Transport		Max. 95% at 40°C		
Mechanical characteristics				
Dimensions [21]				
Width		106.5 mm		
Height		317 mm		
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 5.2 kg	Approx. 4.2 kg	Approx. 5.5 kg	Approx. 4.5 kg
Module width		2		

Table 69: 8BVP0220HW00.000-1, 8BVP0220HC00.000-1, 8BVP0440HW00.000-1, 8BVP0440HC00.000-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) The specified value includes the heat dissipation from the respective 8BVF line filter and 8BVR regeneration choke.
3) At max. DC bus capacitance.
4) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous power and increases the CPU load.
5) Limit values from EN 61800-3 C3 (second environment).
6) The cable does not require shielding up to a total cable length of 3 m between the line filter, regeneration choke and power supply module. Please contact B&R when using cable lengths >3 m.
7) Valid under the following conditions: 3x 400 VAC mains input voltage, DC bus nominal voltage 750 VDC, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
8) P ... Actual continuous power available (value adjusted to the actual environmental conditions)
9) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
10) Value for the nominal switching frequency.
11) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
12) Valid for the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
13) The temperature specifications refer to the return temperature of the cold plate mounting plate.
14) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
Caution! Condensation can occur at low flow temperatures and return temperatures.
15) Valid for a mains input voltage of 400 VAC and a DC bus voltage of 750 VDC. P ... Continuous power [kW].
16) The power supply modules have an integrated DC bus power supply for the electronics. The 24 VDC supply from the ACOPOSmulti backplane only feeds the +24 VDC of the trigger inputs and the encoder power supplies on the encoder modules.
17) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
$P_{24\ V\ Out}$ ... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
$P_{Fan8BVF...}$ ... Power [W] that is output to the connections X4A/F- and X4A/F+ on the module (see the technical data for the respective 8BVF... line filter).
18) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
$P_{24\ V\ Out}$ ... Power [W] that is output to connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
$P_{Fan8BVF...}$ ... Power [W] that is output to connections X4A/F- and X4A/F+ on the module (see the technical data for the respective 8BVF... line filter).
19) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go beyond this must be arranged with B&R.
20) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
21) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

9.1.3 Wiring

9.1.3.1 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1 - Pinout overview

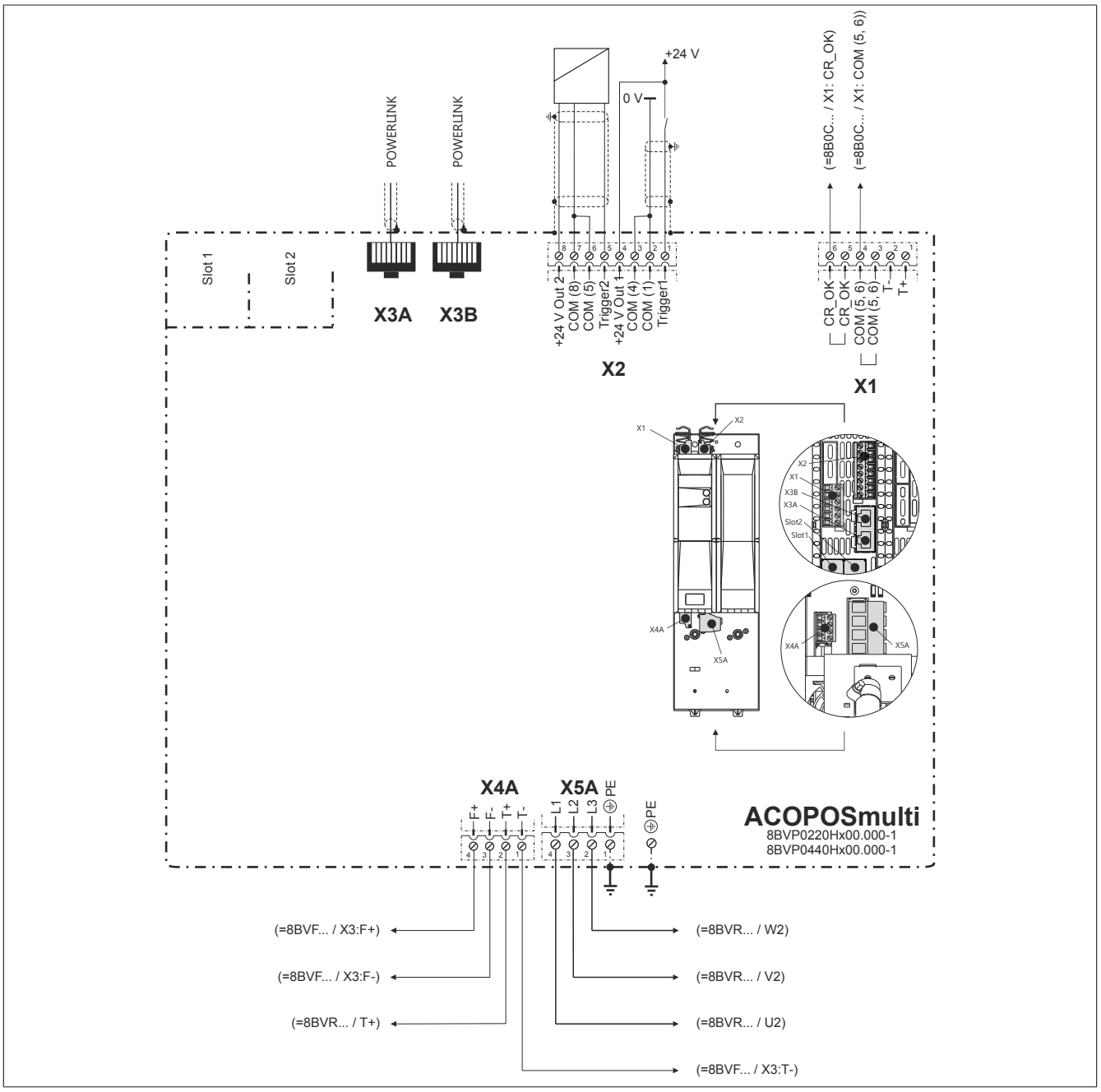


Figure 43: 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1 - Pinout overview

9.1.3.1.1 Connector X1 - Pinout

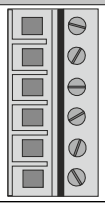
X1	Pin	Description	Function
	1	T+	Temperature sensor +
	2	T-	Temperature sensor -
	3	COM (5, 6)	DC bus ready 0 V
	4	COM (5, 6)	DC bus ready 0 V
	5	CR_OK	DC bus ready [1]
	6	CR_OK	DC bus ready [1]

Table 70: Connector X1 - Pinout

1) Output CR_OK is only set if the following condition is met:
The charging relay is closed and DC bus voltage U_{DC} >270 VDC.

Danger!

The connections for the temperature sensors are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

9.1.3.1.2 Connector X2 - Pinout

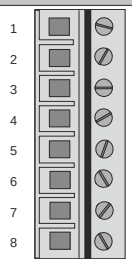
X2	Pin	Description	Function
	1	Trigger1	Trigger1
	2	COM (1)	Trigger 1 0 V
	3	COM (4)	+24 V output 1 0 V
	4	+24 V Out 1	+24 V output 1
	5	Trigger2	Trigger2
	6	COM (5)	Trigger 2 0 V
	7	COM (8)	+24 V output 2 0 V
	8	+24 V Out 2	+24 V output 2

Table 71: Connector X2 - Pinout

9.1.3.1.3 Connectors X3A, X3B - Pinout

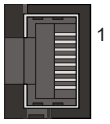
X3A, X3B	Pin	Description	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 72: X3A, X3B connectors - Pinout

9.1.3.1.4 Connector X4A - Pinout

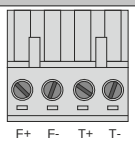
X4A	Description	Function
	T-	Power system: Temperature sensor -
	T+	Power system: Temperature sensor +
	F-	Power system: Fan -
	F+	Power system: Fan +

Table 73: Connector X4A - Pinout

Danger!

The connections for temperature sensor and fan are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Warning!

Temperature sensors are only permitted to be connected to the X4A/T+ and X4A/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT1 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

9.1.3.1.5 Connector X5A - Pinout

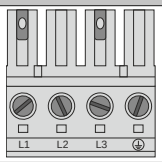
X5A	Description	Function
	PE	Power system: Protective ground conductor
	L3	Power system: Mains connection L3
	L2	Power system: Mains connection L2
	L1	Power system: Mains connection L1

Table 74: Connector X5A - Pinout

Danger!

Before switching on the module, it is important to make sure that the housing is properly connected to ground (PE rail). Ground connections must also be established if the module is connected for test purposes or only being operated for a short period of time!

9.1.3.1.6 Additional protective ground connection (PE)

The protective ground conductor is secured to the M5 threaded bolt provided for this purpose using a cable lug.

For information concerning dimensioning, see Protective ground connection (PE) .

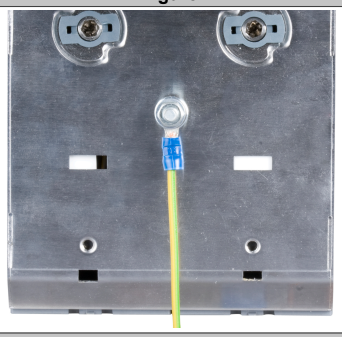
Figure	Pin	Description	Function
	---	PE	Protective ground conductor
Terminal cross sections	**[mm²]**		**AWG**
Cable lug for M5 threaded bolt	0.25 - 16		23 - 5

Table 75: Additional protective ground connection (PE)

Danger!

Before switching on the power supply, it must be ensured that the housing of the 8BVP power supply module is properly connected to ground potential (PE rail). Ground connections must also be established if the 8BVP power supply module is connected for test purposes or only being operated for a short period of time!

9.1.3.1.7 Input/Output circuit diagram

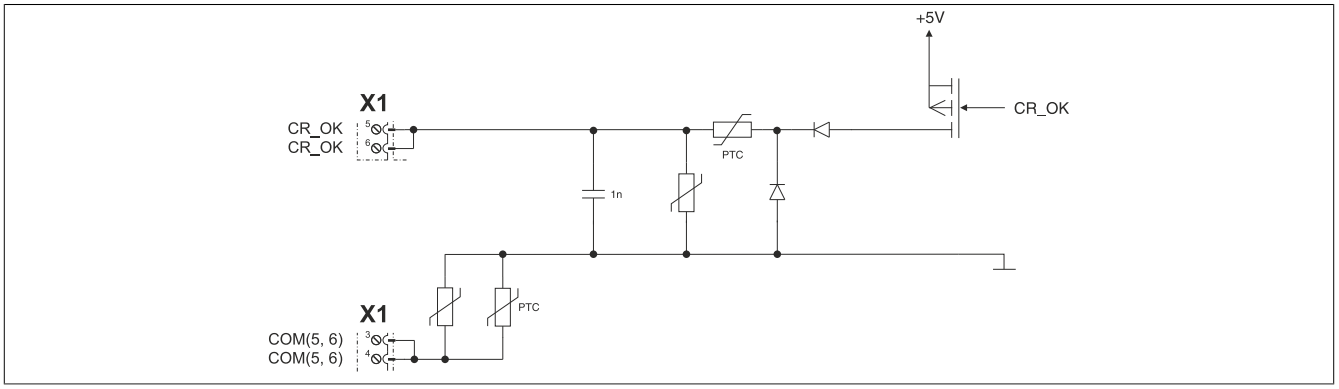


Figure 44: 8B0C - Enable

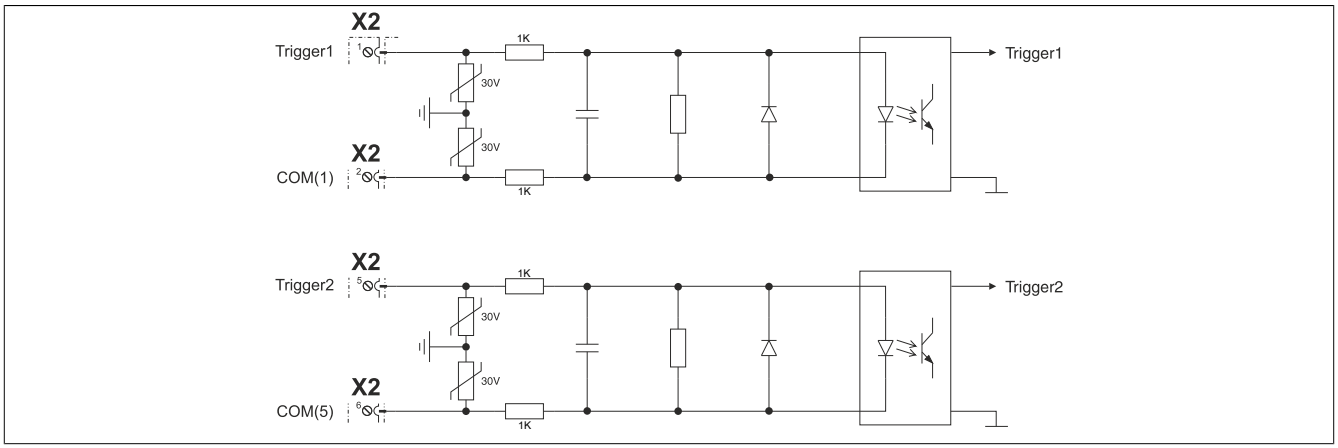


Figure 45: Trigger inputs

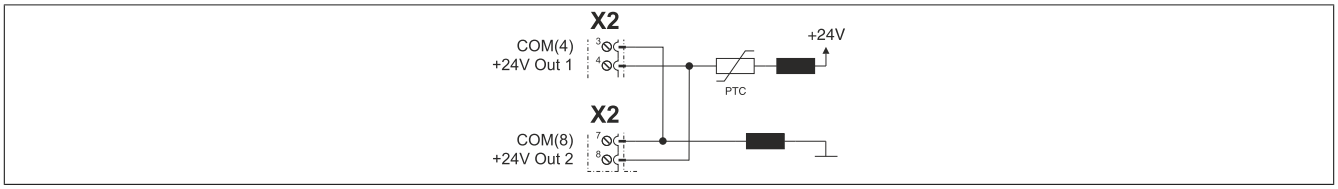


Figure 46: 24 VDC out

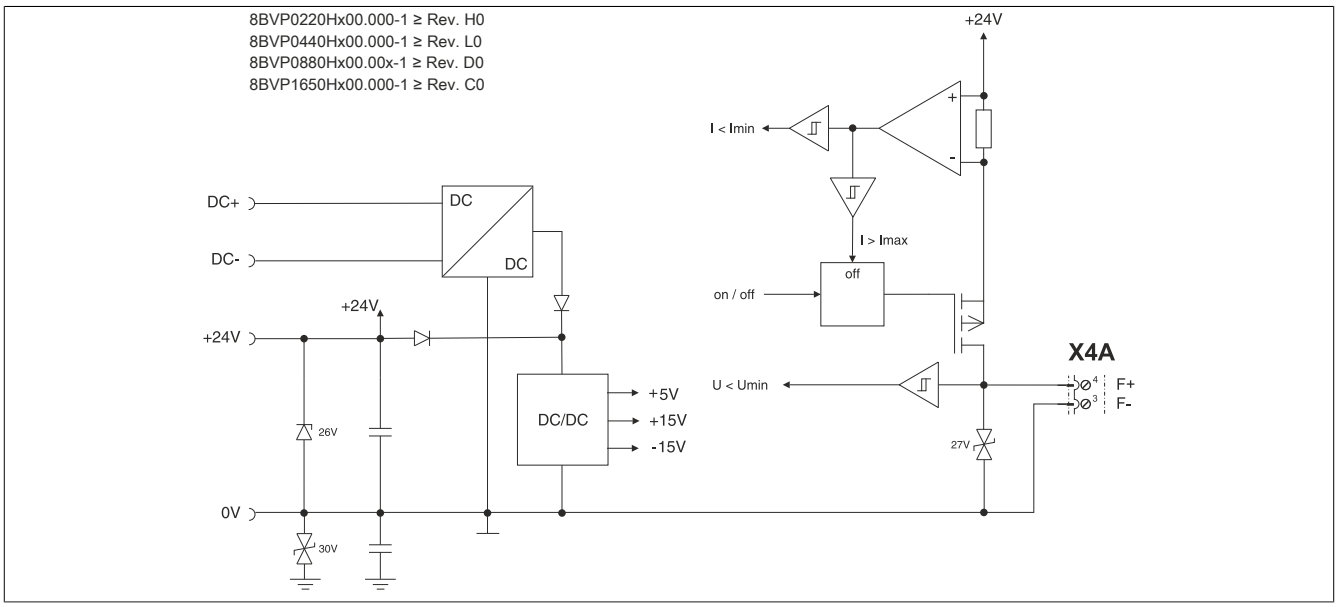


Figure 47: 8BVF fan - Control

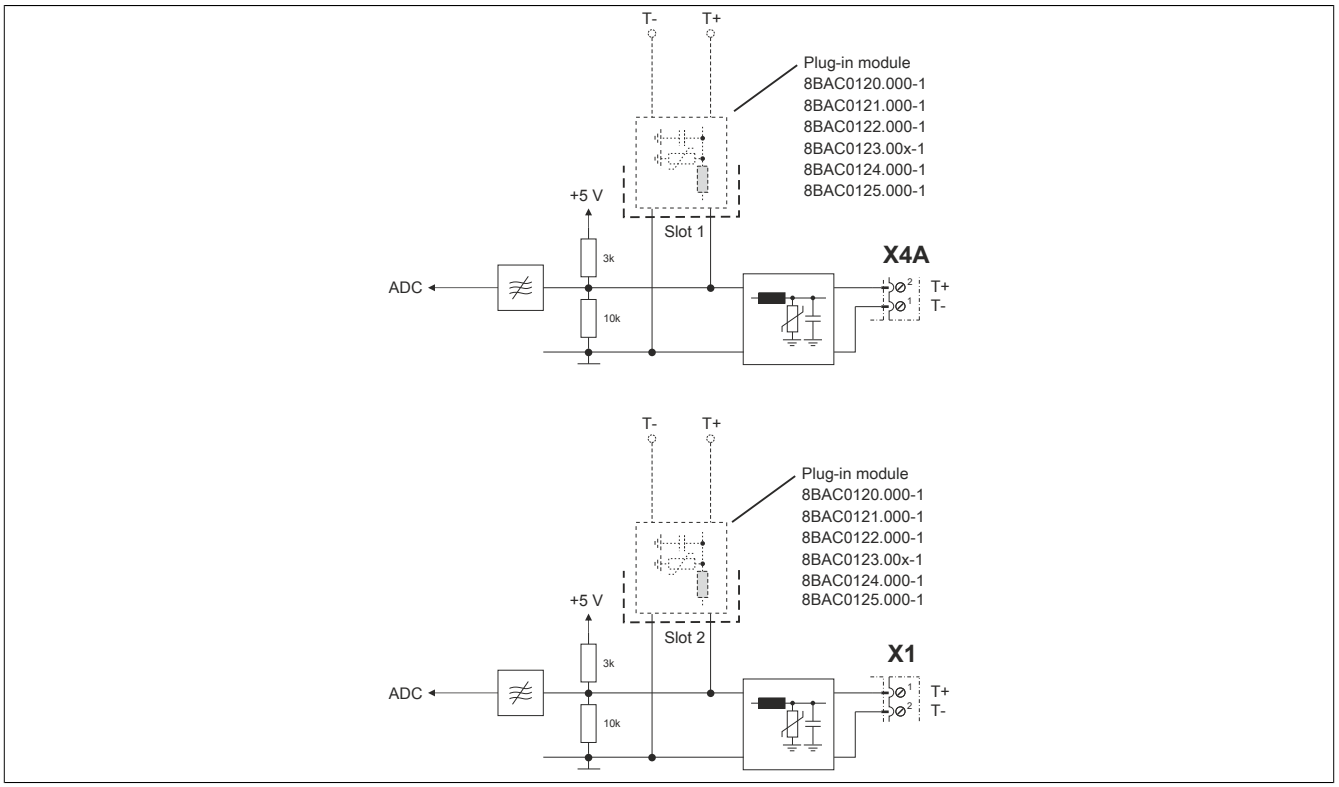


Figure 48: Temperature sensor

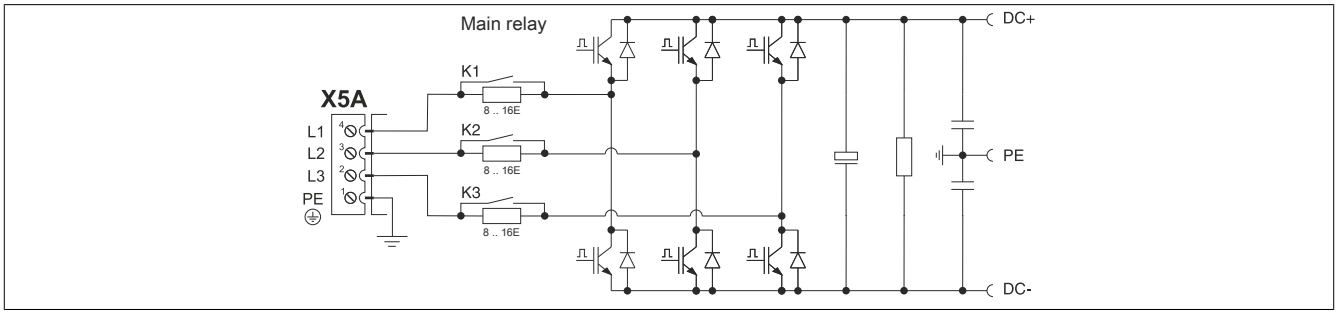


Figure 49: Power unit

9.2 8BVP0880Hx00.004-1

9.2.1 Order data

Model number	Short description	Figure
	Cold plate or feed-through mounting	
8BVP0880HC00.004-1	ACOPOSmulti power supply module, 88 A, HV, cold plate or feed-through mounting	
	Wall mounting	
8BVP0880HW00.004-1	ACOPOSmulti power supply module 88 A, HV, wall mounting	
	Required accessories	
	Terminal block sets	
8BZVP165000.000-1A	Screw clamp set for ACOPOSmulti modules 8BVP0880Hx00 and 8BVP1650Hx00: 1x 8TB2104.204A-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS001.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 1, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS003.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 4x 45°; 8x screws	
8SCS004.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 0, 2 hose clamps, B 9 mm, D 32-50 mm	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2104.204A-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 4: T- T + F- F+, A keying: 0000	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	

Table 76: 8BVP0880HC00.004-1, 8BVP0880HW00.004-1 - Order data

9.2.2 Technical data

Model number	8BVP0880HC00.004-1	8BVP0880HW00.004-1
General information		
B&R ID code	0xA6A1	0xA6A2
Cooling and mounting method	Cold plate or feed-through mounting	Wall mounting
Slots for plug-in modules	2	
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
Mains connection		
Network configurations	TT, TN-S, TN-C-S [1]	TT, TN-S, TN-C-S [2]
Mains input voltage	3x 220 to 3x 480 VAC ±10%	
Frequency	50/60 Hz ±4%	50 / 60 Hz ±4%
Installed load [3]	Max. 62 kW	
Inrush current at 400 VAC	Max. 133 A	
Switch-on interval [4]	>300 s	
Max. DC bus capacitance depending on mains voltage		
230 VAC	34.8 mF	
400 VAC	11.5 mF	
480 VAC	8 mF	
Nominal switching frequency	5 kHz	
Possible switching frequencies [5]	5 / 10 kHz	
Integrated line filter per EN 61800-3, category C3 [6]	No	
Integrated regeneration choke	No	
Capable of power regeneration	Yes	
Power factor correction (PFC)	Yes	
Design		
L1, L2, L3, PE	M8 threaded bolt	
Shield connection [7]	Yes	
Connection cross section range		
Flexible and fine wire lines	--- [8]	
Terminal cable cross section dimension of shield connection	32 to 50 mm	
DC bus connection		
Voltage		
Nominal	750 VDC	
Continuous power (supply and regeneration) [9]	60 kW	
Reduction of continuous power depending on mains input voltage		
Mains input voltage <3x 400 VAC	150 W/V * (400 V - Mains input voltage)	
Reduction of continuous power depending on DC bus voltage (U_{DC})		
U_{DC} <750 VDC	0.08 kW/V [10]	
Reduction of continuous power depending on switching frequency [11]		
Switching frequency 5 kHz	-	0.97 kW/K (from 41°C) [12]
Switching frequency 10 kHz	-	0.64 kW/K (from -5°C) [13]
Reduction of continuous power depending on switching frequency and mounting method [14]		
Switching frequency 5 kHz		
Cold plate mounting [15]	1.3 kW/K (starting at 58°C) [12]	-
Feed-through mounting	In preparation	-
Switching frequency 10 kHz		
Cold plate mounting [15]	0.95 kW/K (starting at 27°C)	-
Feed-through mounting	In preparation	-
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	6 kW per 1000 m	
Peak power (supply and regeneration)	120 kW	
Power dissipation depending on switching frequency [16]		
Switching frequency 5 kHz	[0.065*P²+11.4*P+90] W	
Switching frequency 10 kHz	[0.22*P²+16.1*P+185] W	
DC bus capacitance	1650 µF	
Protective measures		
Overload protection	Yes	
Short circuit and ground fault protection	No	
Design	ACOPOSmulti backplane	
24 VDC supply [17]		
Input voltage	25 VDC ±1.6%	

Table 77: 8BVP0880HC00.004-1, 8BVP0880HW00.004-1 - Technical data

Model number	8BVP0880HC00.004-1	8BVP0880HW00.004-1
Input capacitance	4.7 µF	
Max. power consumption	$P_{SLOT1} + P_{SLOT2} + P_{24\ V\ Out} + P_{Fan8BVF...}$ [18]	$P_{SLOT1} + P_{SLOT2} + P_{24\ V\ Out} + P_{Fan8BVF...}$ [19]
Design	ACOPOSmulti backplane	
24 VDC Out		
Quantity	2	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Fuse protection	250 mA (slow-blow) electronic, automatic reset	
Filter fan connection		
Output voltage	24 V +5.8% / -0.1%	
Continuous current	4.2 A	
Max. overcurrent limitation	10 A	
Protective measures		
Overload protection	No	
Short circuit protection	Yes	
Open circuit monitoring	No	
Undervoltage monitoring	No	
Trigger inputs		
Quantity	2	
Wiring	Sink	
Electrical isolation		
Input - Power supply module	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
Rising edge	52 µs ± 0.5 µs (digitally filtered)	52 µs ±0.5 µs (digitally filtered)
Falling edge	53 µs ± 0.5 µs (digitally filtered)	53 µs ±0.5 µs (digitally filtered)
Modulation compared to ground potential	Max. ±38 V	
Electrical characteristics		
Discharge capacitance	0.9 µF	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [20]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [21]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [22]		
Width	213.5 mm	
Height	317 mm	
Depth		
Wall mounting	-	263 mm
Cold plate	212 mm	-
Feed-through mounting	209 mm	-
Weight	Approx. 7.9 kg	Approx. 10.2 kg
Module width	4	

Table 77: 8BVP0880HC00.004-1, 8BVP0880HW00.004-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) In the USA, TT and TN power mains are commonly referred to as "Delta/Wye with grounded Wye neutral".
3) The specified value already contains the power dissipation of the associated 8BVF line filter and associated 8BVR regeneration choke.

4) At max. loadable DC bus capacitance.
5) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons results in a reduction in continuous power and higher CPU utilization.
6) Limit values from EN 61800-3 C3 (second environment).
7) Cables do not have to be shielded up to a total length of 3 m between the line filter, regeneration choke and power supply module. Please contact B&R when using cable lengths >3 m.
8) The connection is made with cable lugs for M8 (0.32") threaded bolts. The nominal cross section of the cable lug must match the cross section of the conductor that is to be connected in the particular application.
9) Valid under the following conditions: 3x 400 VAC mains input voltage, DC bus nominal voltage 750 VDC, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
10) P ... Actual continuous power available (value adjusted to the actual environmental conditions)
11) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
12) Value for the nominal switching frequency.
13) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
14) Valid for the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
15) The temperature specifications refer to the return temperature of the cold plate mounting plate.
16) Valid for a mains input voltage of 400 VAC and a DC bus voltage of 750 VDC. P ... Continuous power [kW].
17) The power supply modules have an integrated DC bus power supply for the electronics. The 24 VDC power supply from the ACOPOSmulti backplane only feeds the +24 VDC of the trigger inputs and the encoder power supplies on the encoder modules.
18) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
$P_{24\ V\ Out}$ ... Power [W] that is output to connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
$P_{Fan8BVF...}$ ... Power [W] that is output to connections X4A/F- and X4A/F+ on the module (see the technical data for the respective 8BVF... line filter).
19) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module)
$P_{24\ V\ Out}$ ... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
$P_{Fan8BVF...}$ ... Power [W] that is output to the connections X4A/F- and X4A/F+ on the module (see the technical data for the respective 8BVF... line filter).
20) Continuous operation at an installation elevation of 500 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
21) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.
22) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

9.2.3 Wiring

9.2.3.1 8BVP0880Hx00.004-1 - Pinout overview

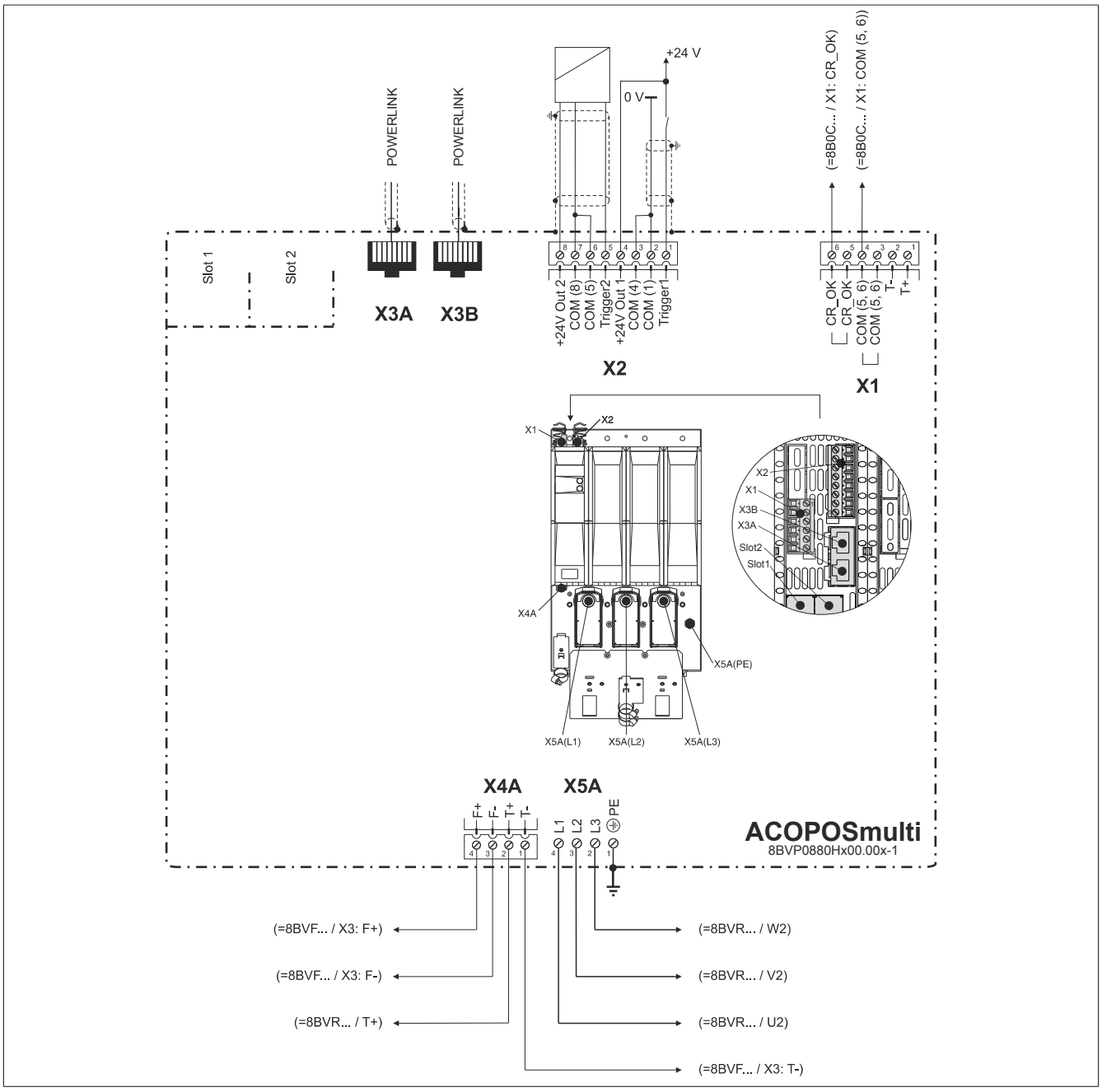


Figure 50: 8BVP0880Hx00.004-1 - Pinout overview

9.2.3.1.1 Connector X1 - Pinout

X1	Pin	Description	Function
	1	T+	Temperature sensor +
	2	T-	Temperature sensor -
	3	COM (5, 6)	DC bus ready 0 V
	4	COM (5, 6)	DC bus ready 0 V
	5	CR_OK	DC bus ready [1]
	6	CR_OK	DC bus ready [1]

Table 78: Connector X1 - Pinout

1) Output CR_OK is only set if the following condition is met:
The charging relay is closed and DC bus voltage U_{DC} >270 VDC.

Danger!

The connections for the temperature sensors are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

9.2.3.1.2 Connector X2 - Pinout

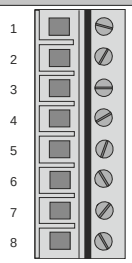
X2	Pin	Description	Function
	1	Trigger1	Trigger1
	2	COM (1)	Trigger 1 0 V
	3	COM (4)	+24 V output 1 0 V
	4	+24 V Out 1	+24 V output 1
	5	Trigger2	Trigger2
	6	COM (5)	Trigger 2 0 V
	7	COM (8)	+24 V output 2 0 V
	8	+24 V Out 2	+24 V output 2

Table 79: Connector X2 - Pinout

9.2.3.1.3 Connectors X3A, X3B - Pinout

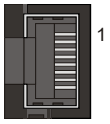
X3A, X3B	Pin	Description	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 80: X3A, X3B connectors - Pinout

9.2.3.1.4 Connector X4A - Pinout

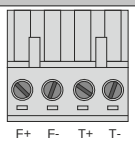
X4A	Description	Function
	T-	Power system: Temperature sensor -
	T+	Power system: Temperature sensor +
	F-	Power system: Fan -
	F+	Power system: Fan +

Table 81: Connector X4A - Pinout

Danger!

The connections for temperature sensor and fan are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Warning!

Temperature sensors are only permitted to be connected to the X4A/T+ and X4A/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT1 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

9.2.3.1.5 Connector X5A - Pinout

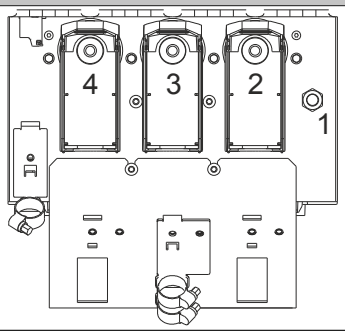
X5A	Pin	Description	Function
	1	PE	Power system: Protective ground conductor
	2	L3	Power system: Mains connection L3
	3	L2	Power system: Mains connection L2
	4	L1	Power system: Mains connection L1
	Tightening torque for the M8 nuts: 12 Nm		

Table 82: X5A - Pinout

Danger!

Before switching on the module, it is important to make sure that the housing is properly connected to ground (PE rail). Ground connections must also be established if the module is connected for test purposes or only being operated for a short period of time!

Mains connection L1, L2, L3 - Cable installation

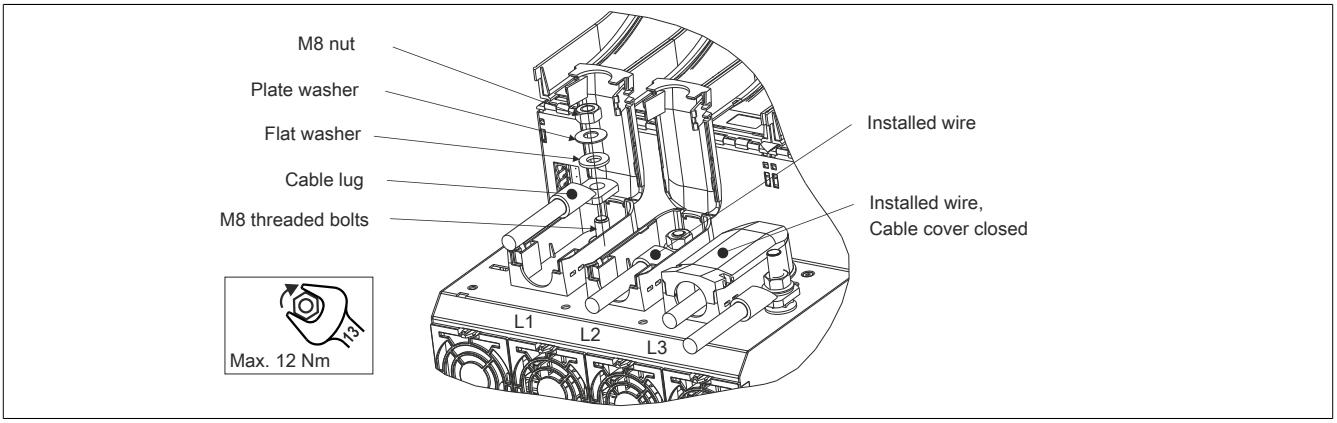
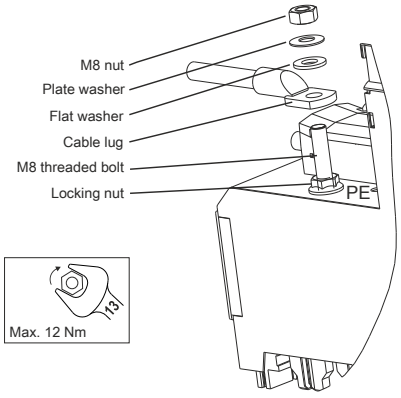
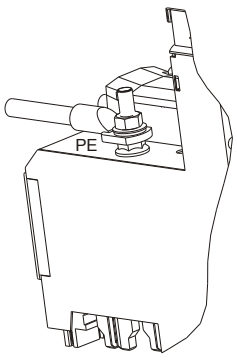


Figure 51: Mains connection L1, L2, L3 - Cable installation

PE connection (1-wire) - Cable installation



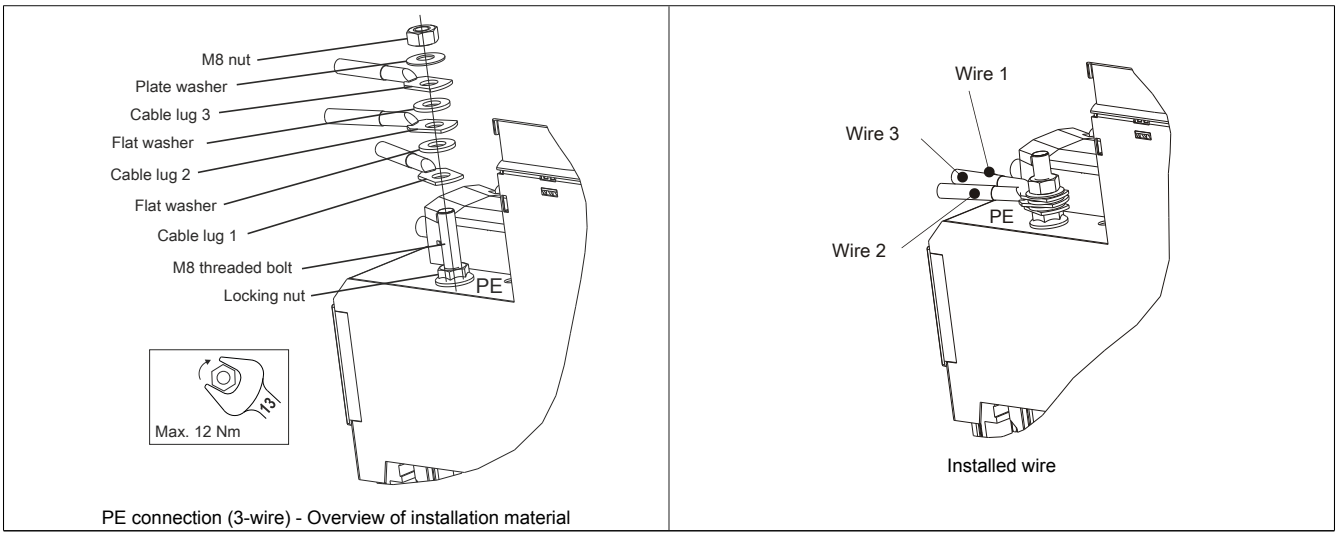
PE connection (1-wire) - Overview of installation material



Installed wire

Table 83: PE connection (1-wire) - Cable installation

PE connection (3-wire) - Cable installation



PE connection (3-wire) - Overview of installation material

Table 84: PE connection (3-wire) - Cable installation

9.2.3.1.6 Input/Output circuit diagram

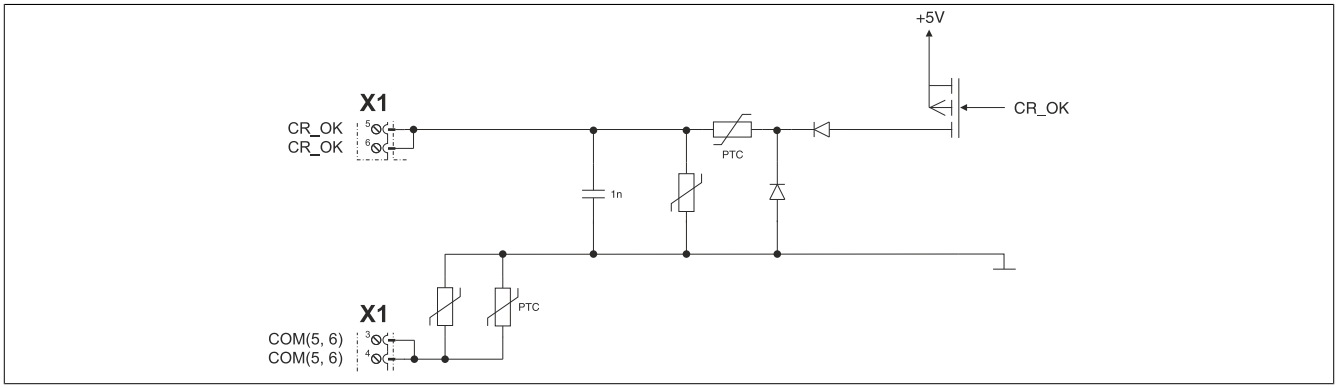


Figure 52: 8B0C - Enable

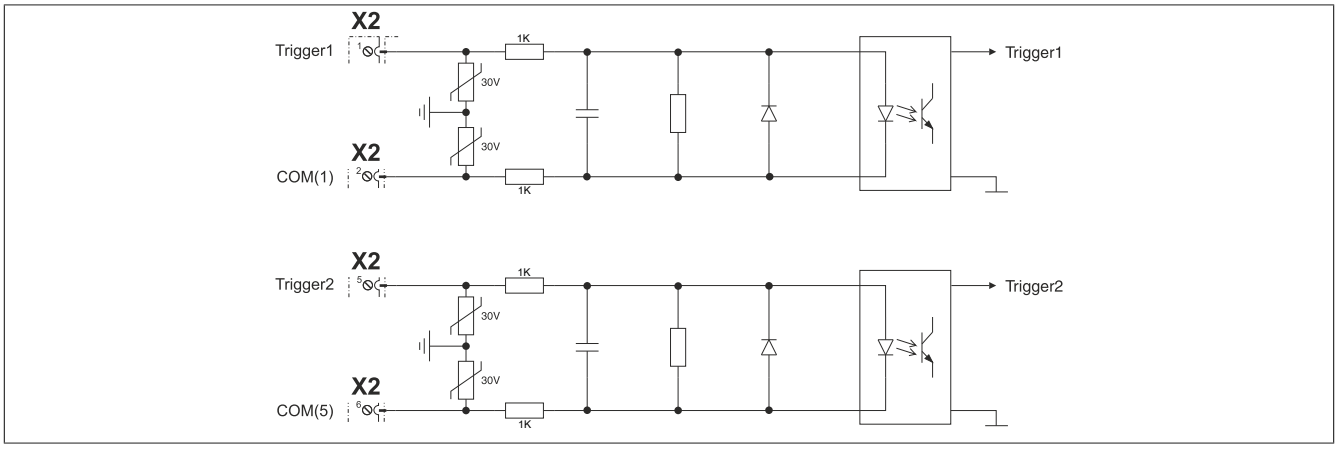


Figure 53: Trigger inputs

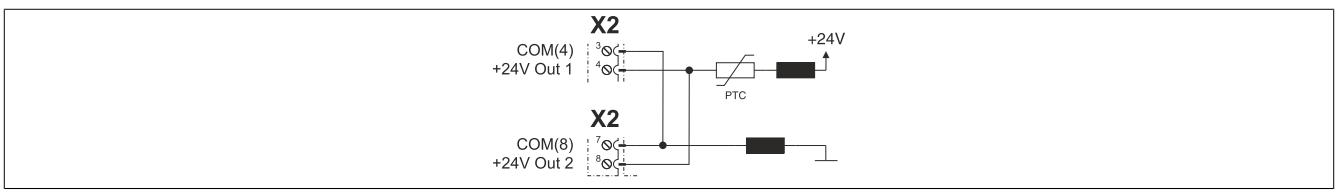


Figure 54: 24 VDC out

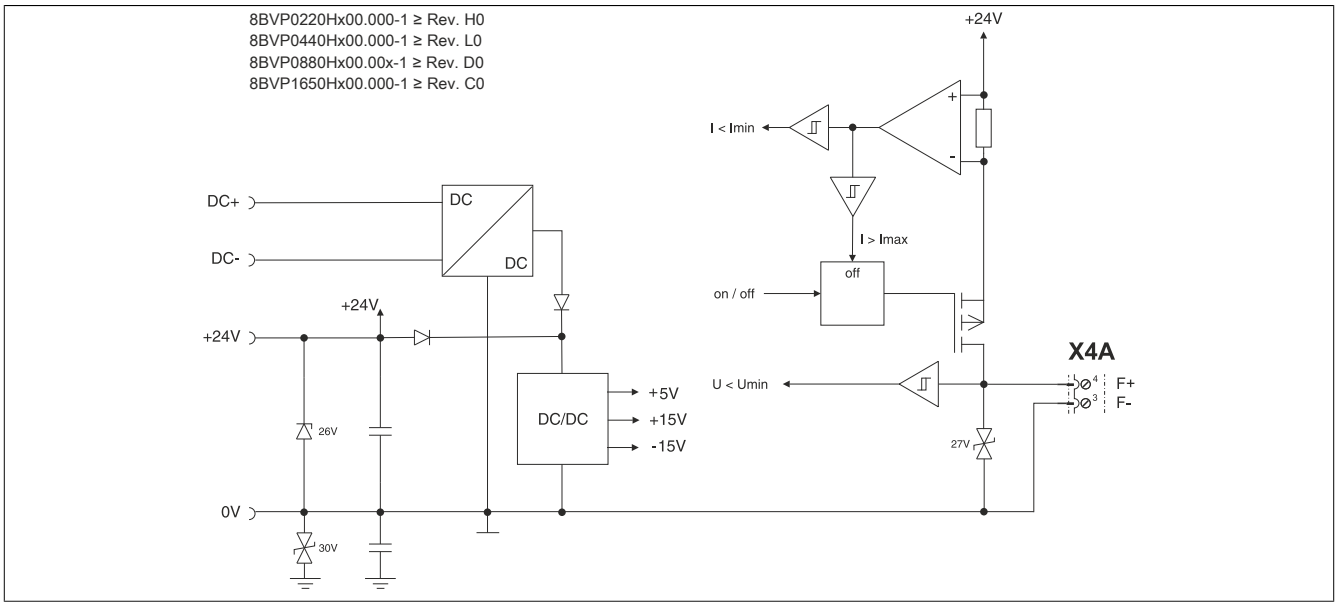


Figure 55: Internal 24 V generation and control of 8BVF fans

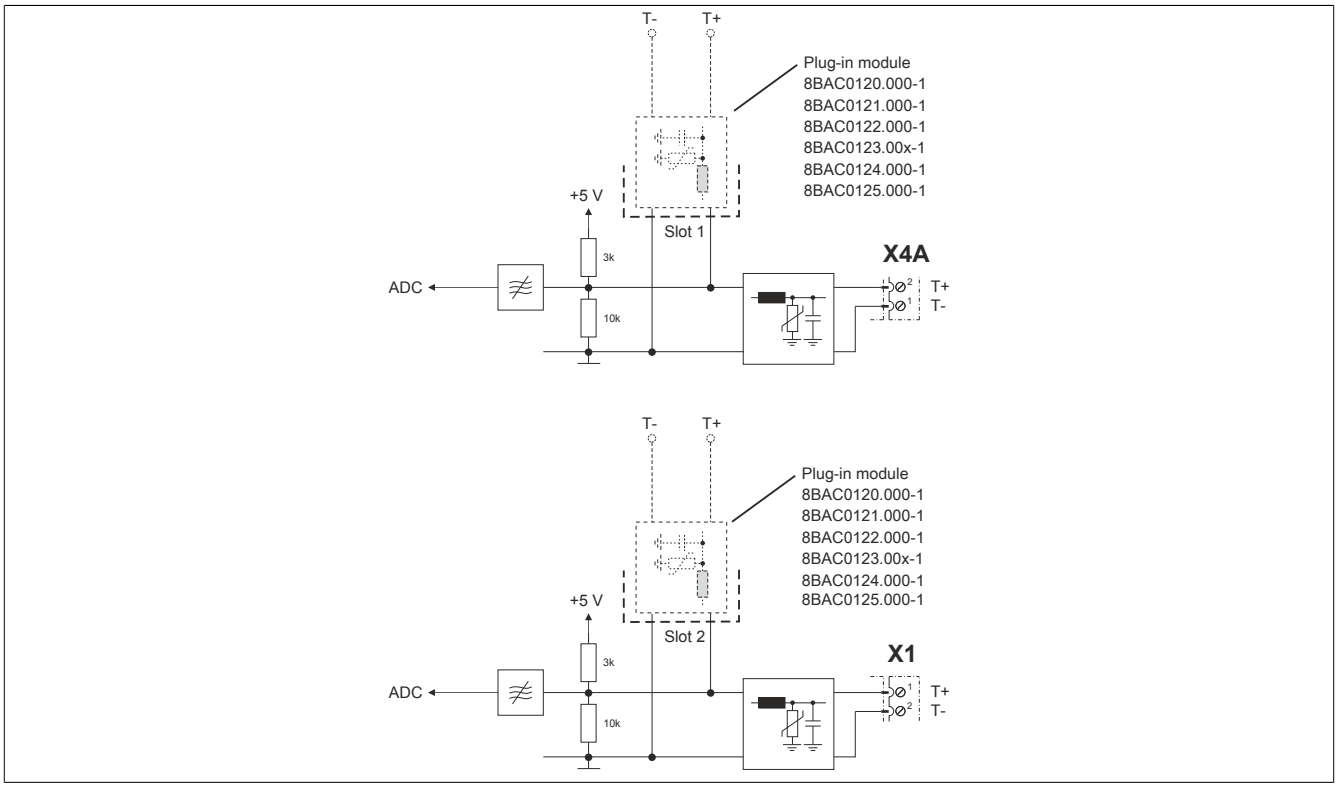


Figure 56: Temperature sensor

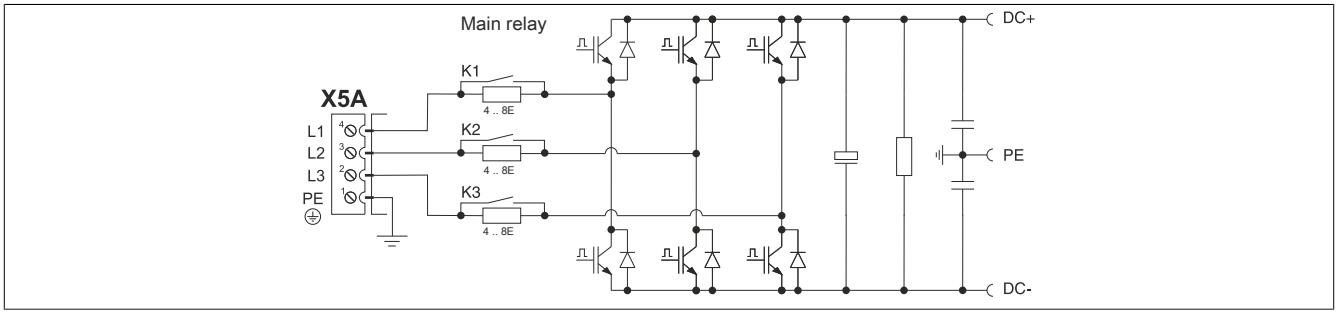


Figure 57: Power unit

9.3 8BVP1650Hx00.000-1

9.3.1 Order data

Model number	Short description	Figure
	Cold plate or feed-through mounting	
8BVP1650HC00.000-1	ACOPOSmulti power supply module, 165 A, HV, cold plate or feed-through mounting	
	Wall mounting	
8BVP1650HW00.000-1	ACOPOSmulti power supply module, 165 A, HV, wall mounting	
	Required accessories	
	Terminal block sets	
8BZVP165000.000-1A	Screw clamp set for ACOPOSmulti modules 8BVP0880Hx00 and 8BVP1650Hx00: 1x 8TB2104.204A-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS001.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 1, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS003.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 4x 45°; 8x screws	
8SCS004.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 0, 2 hose clamps, B 9 mm, D 32-50 mm	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2104.204A-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 4: T- T + F- F+, A keying: 0000	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	

Table 85: 8BVP1650HC00.000-1, 8BVP1650HW00.000-1 - Order data

9.3.2 Technical data

Model number	8BVP1650HC00.000-1	8BVP1650HW00.000-1
General information		
B&R ID code	0xAD85	0xAD91
Cooling and mounting method	Cold plate or feed-through mounting	Wall mounting
Slots for plug-in modules	2	
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
Mains connection		
Network configurations	TT, TN-S, TN-C-S [1]	
Mains input voltage	3x 220 to 3x 480 VAC ±10%	
Frequency	50 / 60 Hz ±4%	
Installed load [2]	Max. 124 kW	
Inrush current at 400 VAC	Max. 102 A	
Switch-on interval [3]	>800 s	
Max. DC bus capacitance depending on mains voltage		
230 VAC	69.7 mF	
400 VAC	23 mF	
480 VAC	16 mF	
Nominal switching frequency	5 kHz	
Possible switching frequencies [4]	5 / 10 kHz	
Integrated line filter per EN 61800-3, category C3 [5]	No	
Integrated regeneration choke	No	
Capable of power regeneration	Yes	
Power factor correction (PFC)	Yes	
Design		
L1, L2, L3, PE	M8 threaded bolt	
Shield connection [6]	Yes	
Connection cross section range		
Flexible and fine wire lines	--- [7]	
Terminal cable cross section dimension of shield connection	32 to 50 mm	
DC bus connection		
Voltage		
Nominal	750 VDC	
Continuous power (supply and regeneration) [8]	120 kW	
Reduction of continuous power depending on mains input voltage		
Mains input voltage <3x 400 VAC	300 W/V * (400 V - Mains input voltage)	
Reduction of continuous power depending on DC bus voltage (U_{DC})		
U_{DC} <750 VDC	P * (1 - U_{DC}/750) [9]	
Reduction of continuous power depending on switching frequency [10]		
Switching frequency 5 kHz	-	In preparation
Switching frequency 10 kHz	-	In preparation
Reduction of continuous power depending on switching frequency and mounting method [11]		
Switching frequency 5 kHz		
Cold plate mounting [12]	2.3 kW/K (starting at 53°C) [13]	-
Feed-through mounting	In preparation	-
Switching frequency 10 kHz		
Cold plate mounting [12]	1.3 kW/K (starting at 17°C)	-
Feed-through mounting	In preparation	-
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	12 kW per 1000 m	
Peak power (supply and regeneration)	240 kW	
Power dissipation depending on switching frequency [14]		
Switching frequency 5 kHz	[0.043 * P² + 8.09 * P + 1452] W	
Switching frequency 10 kHz	[0.053 * P² + 8.76 * P + 2084] W	
DC bus capacitance	3630 µF	
Protective measures		
Overload protection	Yes	
Short circuit and ground fault protection	No	
Design	ACOPOSmulti backplane	
24 VDC supply [15]		
Input voltage	25 VDC ±1.6%	

Table 86: 8BVP1650HC00.000-1, 8BVP1650HW00.000-1 - Technical data

Model number	8BVP1650HC00.000-1	8BVP1650HW00.000-1
Input capacitance	4.7 µF	
Max. power consumption	37 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{Fan8BVF...}$ [16]	
Design	ACOPOSmulti backplane	
24 VDC Out		
Quantity	2	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Fuse protection	250 mA (slow-blow) electronic, automatic reset	
Filter fan connection		
Output voltage	24 V +5.8% / -0.1%	
Continuous current	4.2 A	
Max. overcurrent limitation	10 A	
Protective measures		
Overload protection	No	
Short circuit protection	Yes	
Open circuit monitoring	No	
Undervoltage monitoring	No	
Trigger inputs		
Quantity	2	
Wiring	Sink	
Electrical isolation		
Input - Power supply module	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
Rising edge	52 µs ± 0.5 µs (digitally filtered)	
Falling edge	53 µs ± 0.5 µs (digitally filtered)	
Modulation compared to ground potential	Max. ±38 V	
Electrical characteristics		
Discharge capacitance	1.8 µF	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [17]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [18]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [19]		
Width	427.5 mm	
Height	317 mm	
Depth		
Wall mounting	-	263 mm
Cold plate	212 mm	-
Feed-through mounting	209 mm	-
Weight	Approx. 18.4 kg	26 kg
Module width	8	

Table 86: 8BVP1650HC00.000-1, 8BVP1650HW00.000-1 - Technical data

1) TT and TN power systems are commonly referred to as "Delta/Wye with grounded wye neutral" in the USA.
2) The specified value already contains the power dissipation of the associated 8BVF line filter and associated 8BVR regeneration choke.
3) At max. loadable DC bus capacitance.

4) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons results in a reduction in continuous power and higher CPU utilization.
5) Limit values from EN 61800-3 C3 (second environment).
6) Cables do not have to be shielded up to a total length of 3 m between the line filter, regeneration choke and power supply module. Please contact B&R when using cable lengths >3 m.
7) The connection is made with cable lugs for M8 (0.32") threaded bolts. The nominal cross section of the cable lug must match the cross section of the conductor that is to be connected in the particular application.
8) Valid under the following conditions: 3x 400 VAC mains input voltage, DC bus nominal voltage 750 VDC, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
9) P ... Actual continuous power available (value adjusted to the actual environmental conditions)
10) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
11) Valid for the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
12) The temperature specifications refer to the return temperature of the cold plate mounting plate.
13) Value for the nominal switching frequency.
14) Valid for a mains input voltage of 400 VAC and a DC bus voltage of 750 VDC. P ... Continuous power [kW].
15) The power supply modules have an integrated DC bus power supply for the electronics. The 24 VDC power supply from the ACOPOSmulti backplane only feeds the +24 VDC of the trigger inputs and the encoder power supplies on the encoder modules.
16) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
$P_{24\ V\ Out}$ ... Power [W] that is output to connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
$P_{Fan8BVF...}$ ... Power [W] that is output to connections X4A/F- and X4A/F+ on the module (see the technical data for the respective 8BVF... line filter).
17) Continuous operation at an installation elevation of 500 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
18) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.
19) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

9.3.3 Wiring

9.3.3.1 8BVP1650Hx00.000-1 - Pinout overview

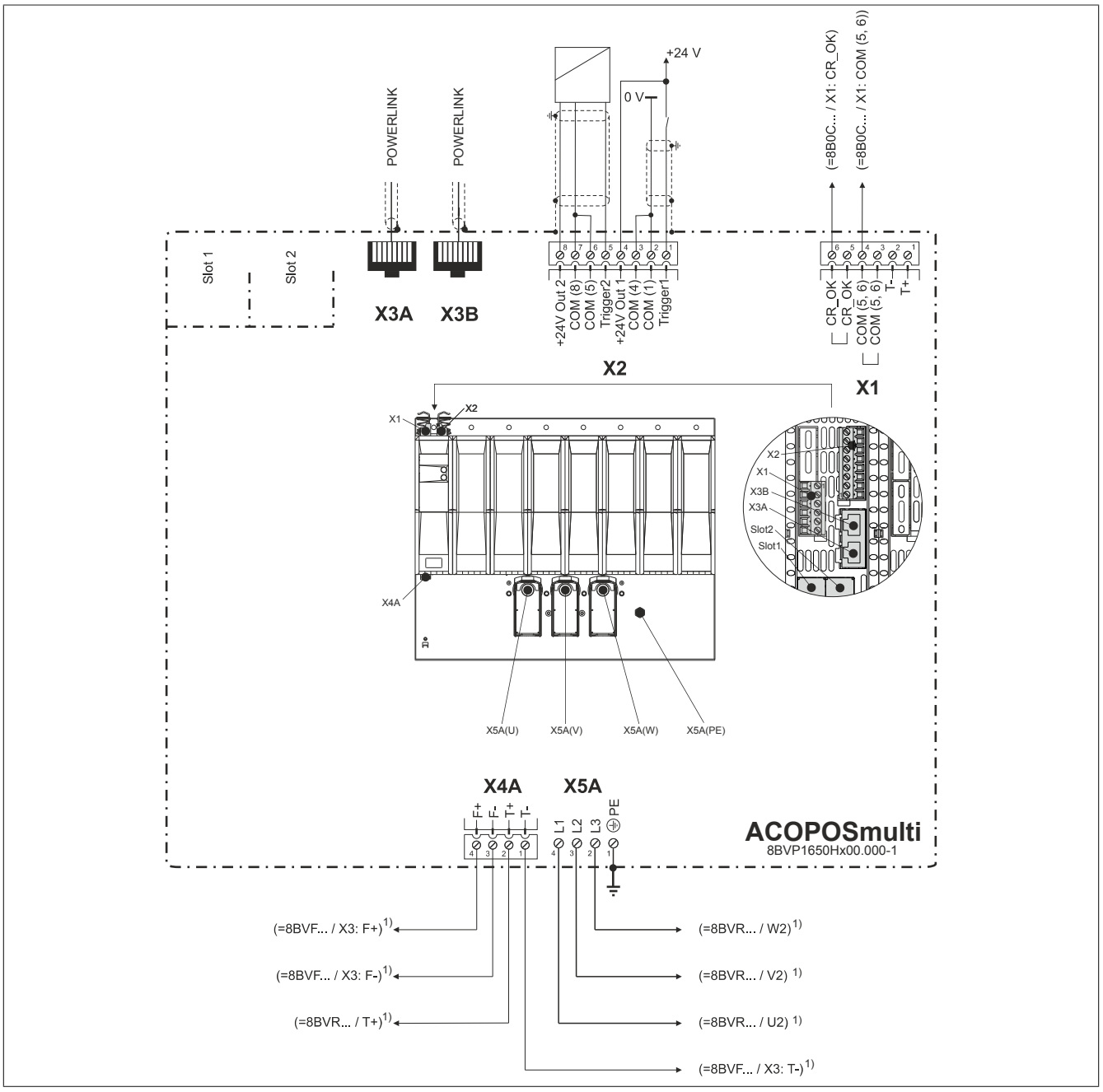


Figure 58: 8BVP1650Hx00.000-1 - Pinout overview

1) The mains connection for 8BVP1650 power supply modules can have one of two different wiring variations (2x 8BVF0880 + 1x 8BVR1650 or 2x 8BVF0880 + 2x 8BVR0880) depending on the 8BVR regeneration choke used. See section "8BVP1650 mains connection" for more details.

9.3.3.1.1 Connector X1 - Pinout

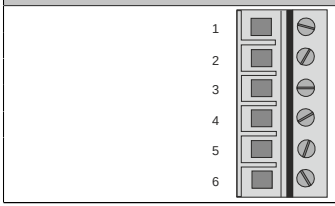
X1	Pin	Description	Function
	1	T+	Temperature sensor +
	2	T-	Temperature sensor -
	3	COM (5, 6)	DC bus ready 0 V
	4	COM (5, 6)	DC bus ready 0 V
	5	CR_OK	DC bus ready 1)
	6	CR_OK	DC bus ready 1)

Table 87: Connector X1 - Pinout

1) Output CR_OK is only set if the following condition is met:
The charging relay is closed and DC bus voltage U_{DC} >270 VDC.

Danger!

The connections for the temperature sensors are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

9.3.3.1.2 Connector X2 - Pinout

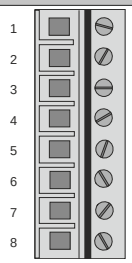
X2	Pin	Description	Function
	1	Trigger1	Trigger1
	2	COM (1)	Trigger 1 0 V
	3	COM (4)	+24 V output 1 0 V
	4	+24 V Out 1	+24 V output 1
	5	Trigger2	Trigger2
	6	COM (5)	Trigger 2 0 V
	7	COM (8)	+24 V output 2 0 V
	8	+24 V Out 2	+24 V output 2

Table 88: Connector X2 - Pinout

9.3.3.1.3 Connectors X3A, X3B - Pinout

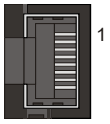
X3A, X3B	Pin	Description	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 89: X3A, X3B connectors - Pinout

9.3.3.1.4 Connector X4A - Pinout

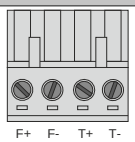
X4A	Description	Function
	T-	Power system: Temperature sensor -
	T+	Power system: Temperature sensor +
	F-	Power system: Fan -
	F+	Power system: Fan +

Table 90: Connector X4A - Pinout

Danger!

The connections for temperature sensor and fan are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Warning!

Temperature sensors are only permitted to be connected to the X4A/T+ and X4A/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT1 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

9.3.3.1.5 X5A - Pinout

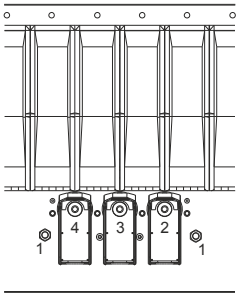
X5A	Pin	Description	Function
	1	PE	Power system: Protective ground conductor
	2	L3	Power system: Mains connection L3
	3	L2	Power system: Mains connection L2
	4	L1	Power system: Mains connection L1
	Tightening torque for the M8 nuts: 12 Nm		

Table 91: X5A - Pinout

Danger!

Before switching on the module, it is important to make sure that the housing is properly connected to ground (PE rail). Ground connections must also be established if the module is connected for test purposes or only being operated for a short period of time!

Mains connection L1, L2, L3 - Cable installation

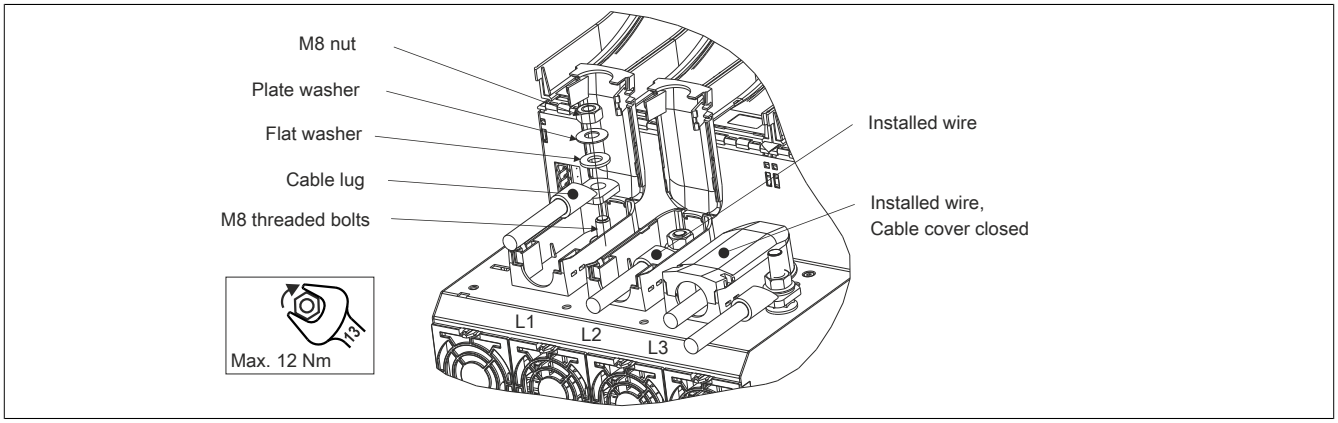
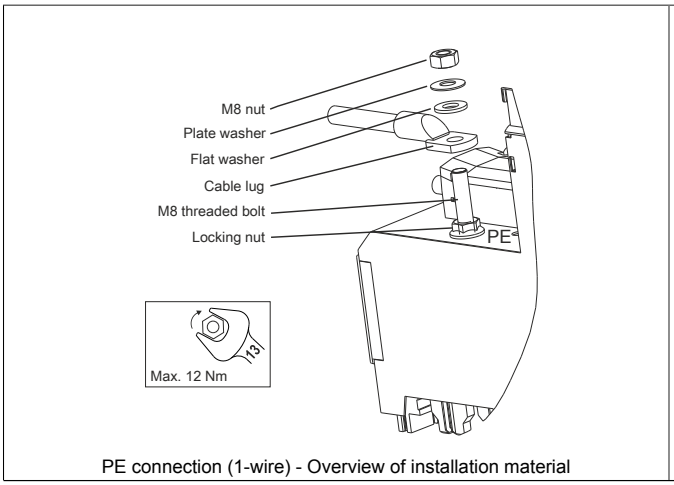
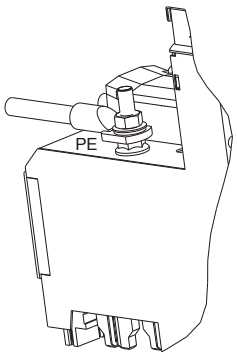


Figure 59: Mains connection L1, L2, L3 - Cable installation

PE connection (1-wire) - Cable installation



PE connection (1-wire) - Overview of installation material



Installed wire

Table 92: PE connection (1-wire) - Cable installation

PE connection (3-wire) - Cable installation

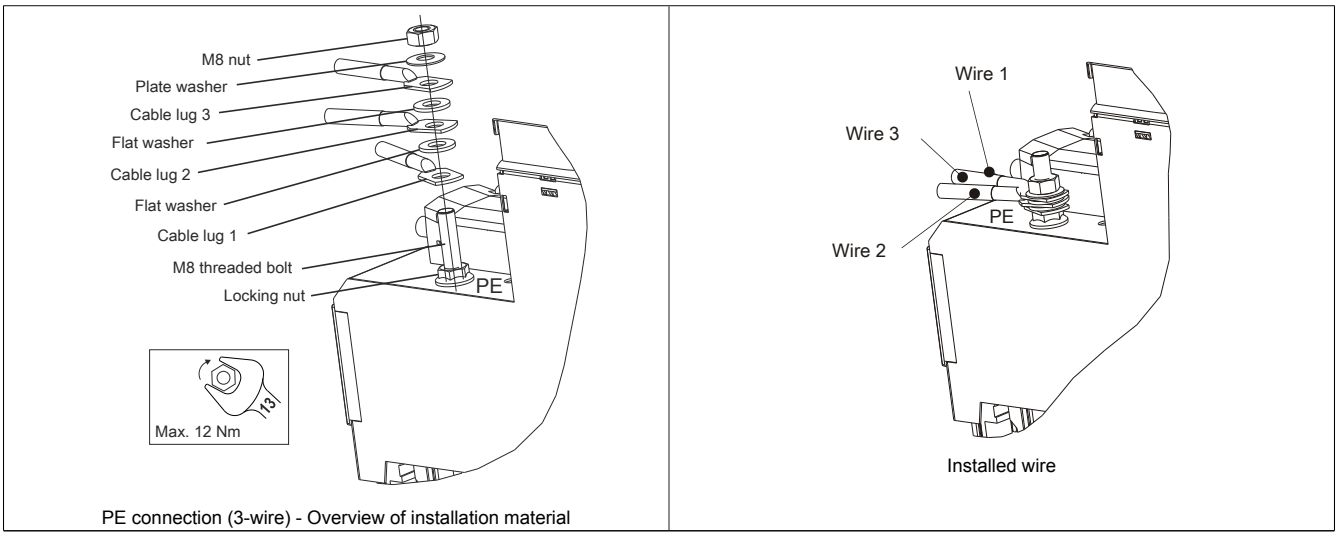


Table 93: PE connection (3-wire) - Cable installation

9.3.3.1.6 Input/Output circuit diagram

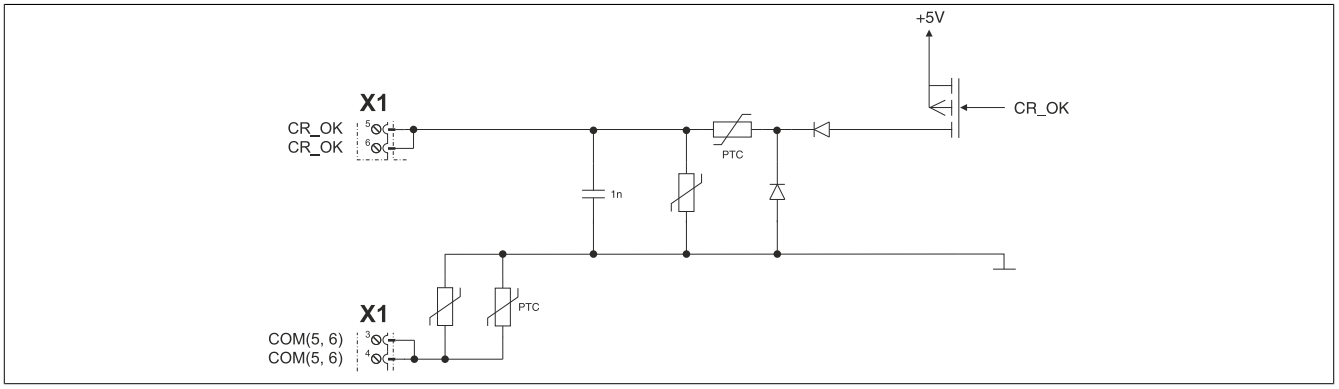


Figure 60: 8B0C - Enable

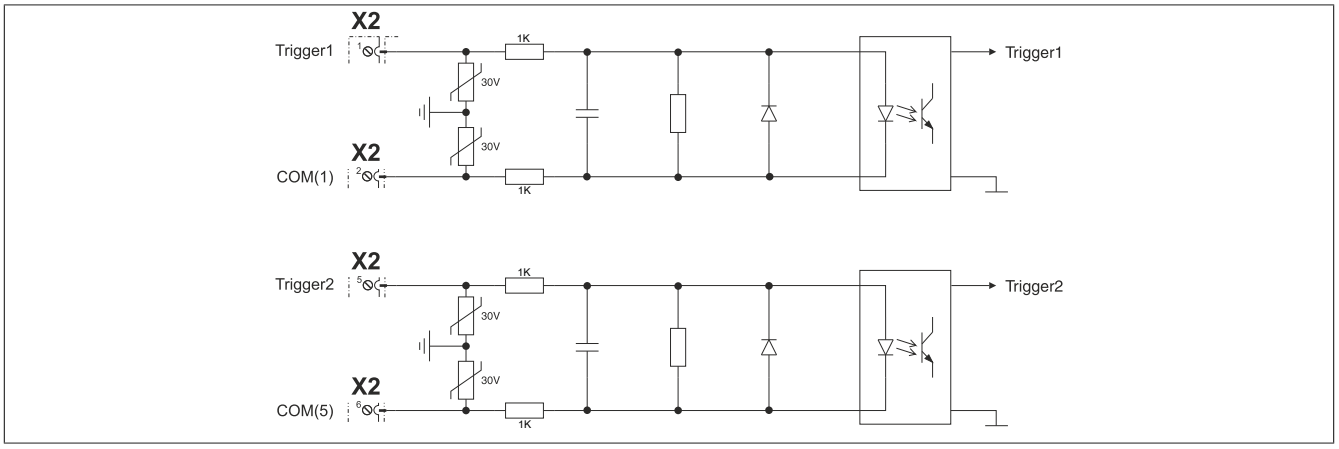


Figure 61: Trigger inputs

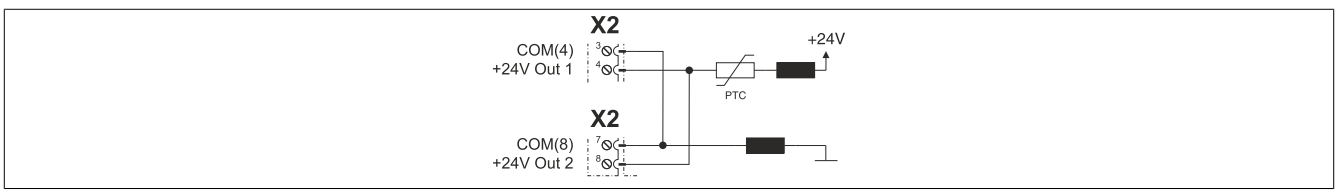


Figure 62: 24 VDC out

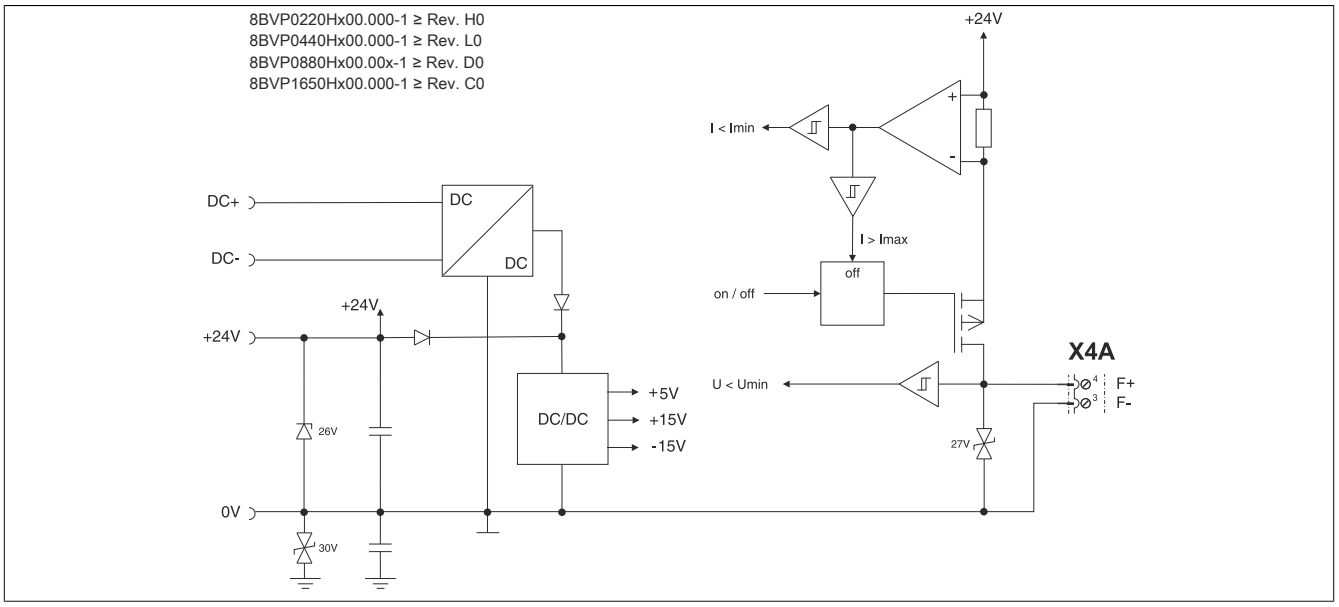


Figure 63: 8BVF fan - Control

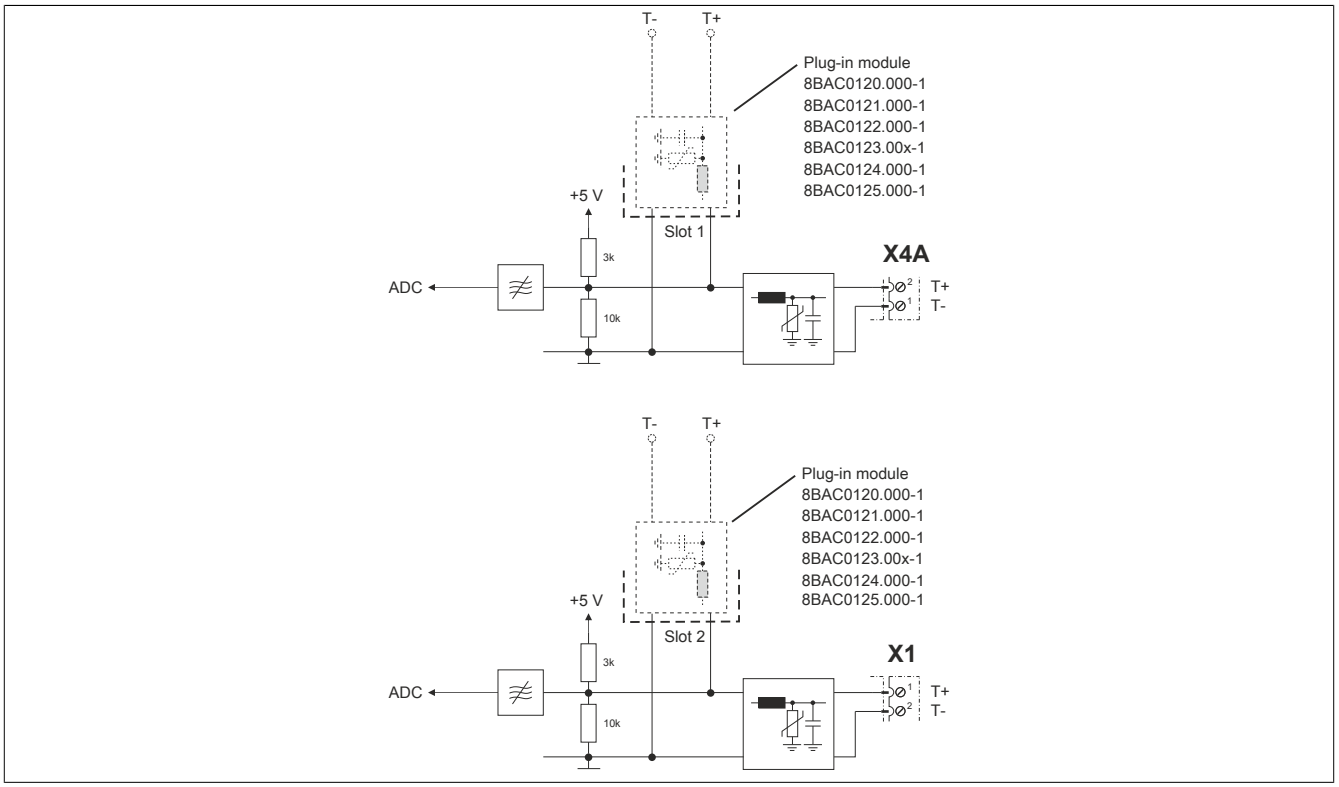


Figure 64: Temperature sensor

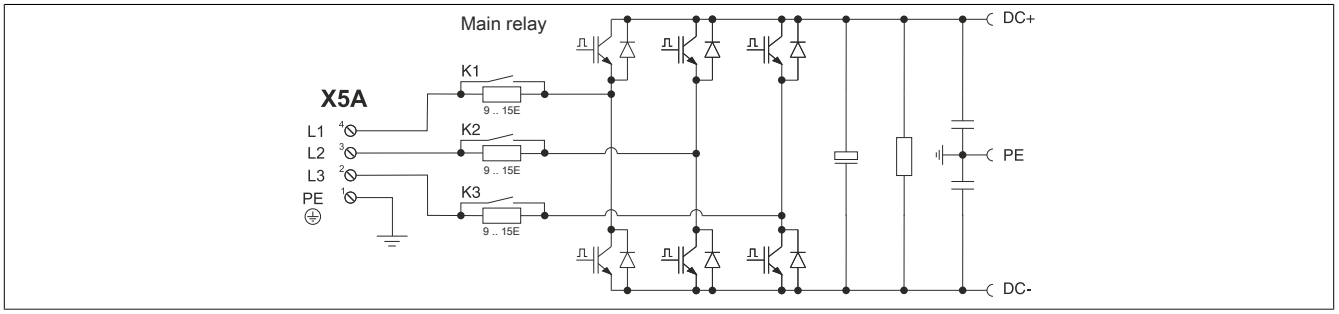


Figure 65: Power unit

9.4 POWERLINK node number setting

The POWERLINK node number can be set using the two hexadecimal coded rotary switches located behind the module's black cover.

<table>
<tr><th colspan="2">Figure</th><th>Coded rotary switches</th><th>POWERLINK node number</th></tr>
<tr><td rowspan="4">

Cover closed</td><td rowspan="4">

Cover open</td><td>1</td><td>16s position (high)</td></tr>
<tr><td>2</td><td>1s position (low)</td></tr>
<tr><td colspan="2">A change to the POWERLINK node number only takes effect the next time the ACOPOSmulti drive system is switched on.</td></tr>
<tr><td colspan="2">Information:
In principle, node numbers between $01 and $FD are permitted.
However, node numbers between $F0 and $FD are intended for future system expansions. To ensure compatibility, these node numbers should be avoided.
Node numbers $00, $FE and $FF are reserved and are therefore not permitted to be set.</td></tr>
</table>

Table 94: Setting the POWERLINK node number

10 8B0C auxiliary supply modules

Warning!

8B0C auxiliary supply modules are components of the ACOPOSmulti drive system and may only be used together with this system.

Information:

Up to five auxiliary supply modules with any power rating can be connected in parallel.

Information:

Auxiliary supply module 8B0C0160Hx00.A01-1 provides only +42 VDC for external consumers and therefore cannot be used for the +24 VDC power supply of an ACOPOSmulti drive system!

To ensure the +24 VDC power supply of an ACOPOSmulti drive system, an additional 8B0C auxiliary supply module (not 8B0C0160Hxc00.A01-1!) is required.

10.1 8B0C0160Hx00.000-1, 8B0C0320Hx00.000-1

10.1.1 8B0C0160Hx00.000-1

10.1.1.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0C0160HW00.000-1	ACOPOSmulti auxiliary supply module 16 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8B0C0160HC00.000-1	ACOPOSmulti auxiliary supply module 16 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZ0C032000.000-1A	Screw clamp set for ACOPOSmulti 8B0C0xx0Hx00.000-1 modules: 1x 8TB2106.2010-00	
	Optional accessories	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Terminal blocks	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	

Table 95: 8B0C0160HW00.000-1, 8B0C0160HC00.000-1 - Order data

10.1.1.2 Technical data

Model number	8B0C0160HW00.000-1	8B0C0160HC00.000-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
DC bus connection		
Voltage		
Nominal	750 VDC	
Operating range in continuous operation	260 to 800 VDC	
Full continuous power	315 to 800 VDC	
Continuous power consumption	Max. 445 W	
Power dissipation with continuous power [1)]	22 W (0% continuous power) 27 W (50% continuous power) 45 W (100% continuous power)	
DC bus capacitance	220 nF	
Design	ACOPOSmulti backplane	
24 VDC output		
Continuous power [2)]	400 W	

Table 96: 8B0C0160HW00.000-1, 8B0C0160HC00.000-1 - Technical data

Model number	8B0C0160HW00.000-1	8B0C0160HC00.000-1
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Continuous current	16 ADC	
Reduction of continuous power at ambient temperatures starting at 40°C	No reduction	
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	40 W per 1000 m	
Reduction of continuous power depending on cooling method	No reduction	
Startup delay	Max. 1 s	
Startup time	Approx. 5 to 20 ms	
Residual ripple	Typ. 50 mV_{SS}	
24 VDC internal system voltage supply		
Output voltage [3]	25 VDC ±1.6%	
Peak current (<4 s)		
DC bus voltage (U_{DC}): 350 to 800 VDC	21 ADC	
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 26 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±50 VDC	
Output/Input isolation	SELV / PELV requirements	
Design	ACOPOSmulti backplane	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [4]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [5]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 3 kg	Approx. 2.5 kg
Module width	1	

Table 96: 8B0C0160HW00.000-1, 8B0C0160HC00.000-1 - Technical data

1) Continuous power on the 24 VDC output
2) Valid in the following conditions: 750 VDC DC bus voltage, 55°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) When a fault occurs, the output voltage is limited to a max. of 60 VDC.
4) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
5) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

10.1.2 8B0C0320Hx00.000-1

10.1.2.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0C0320HW00.000-1	ACOPOSmulti auxiliary supply module 32 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8B0C0320HC00.000-1	ACOPOSmulti auxiliary supply module 32 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZ0C032000.000-1A	Screw clamp set for ACOPOSmulti 8B0C0xx0Hx00.000-1 modules: 1x 8TB2106.2010-00	
	Optional accessories	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Terminal blocks	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	

Table 97: 8B0C0320HW00.000-1, 8B0C0320HC00.000-1 - Order data

10.1.2.2 Technical data

Model number	8B0C0320HW00.000-1	8B0C0320HC00.000-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
DC bus connection		
Voltage		
Nominal	750 VDC	
Operating range in continuous operation	260 to 800 VDC	
Full continuous power	315 to 800 VDC	
Continuous power consumption	Max. 880 W	
Power dissipation with continuous power [1]	22 W (0% continuous power) 35 W (50% continuous power) 80 W (100% continuous power)	
DC bus capacitance	220 nF	
Design	ACOPOSmulti backplane	
24 VDC output		
Continuous power [2]	800 W	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Continuous current	32 ADC	
Reduction of continuous power at ambient temperatures starting at 40°C	No reduction	
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	80 W per 1000 m	
Reduction of continuous power depending on cooling method	No reduction	
Startup delay	Max. 1 s	
Startup time	Approx. 5 to 20 ms	
Residual ripple	Typ. 50 mV_{SS}	
24 VDC internal system voltage supply		
Output voltage [3]	25 VDC ±1.6%	
Peak current (<4 s)		
DC bus voltage (U_{DC}): 350 to 800 VDC	42 ADC	

Table 98: 8B0C0320HW00.000-1, 8B0C0320HC00.000-1 - Technical data

Model number	8B0C0320HW00.000-1	8B0C0320HC00.000-1
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 26 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±50 VDC	
Output/Input isolation	SELV / PELV requirements	
Design	ACOPOSmulti backplane	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [4]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [5]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 3 kg	Approx. 2.5 kg
Module width	1	

Table 98: 8B0C0320HW00.000-1, 8B0C0320HC00.000-1 - Technical data

1) Continuous power on the 24 VDC output
2) Valid in the following conditions: 750 VDC DC bus voltage, 55°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) When a fault occurs, the output voltage is limited to a max. of 60 VDC.
4) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
5) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

10.1.3 Wiring

10.1.3.1 Pinout overview - 8B0C0160Hx00.000-1, 8B0C0320Hx00.000-1

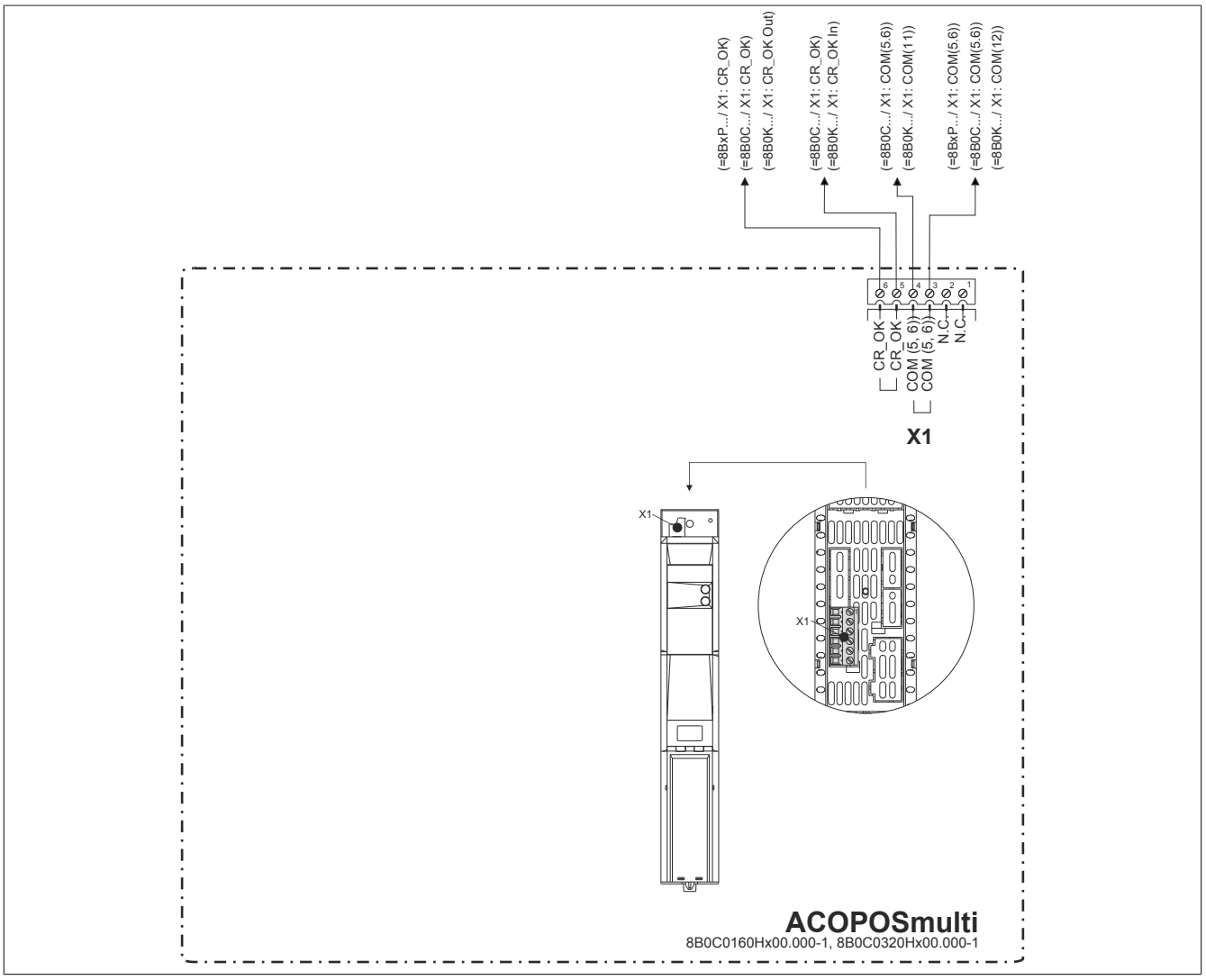


Figure 66: Pinout overview - 8B0C0160Hx00.000-1, 8B0C0320Hx00.000-1

10.1.3.1.1 Connector X1 - Pinout

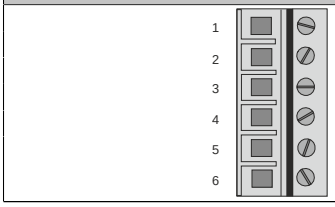
X1	Pin	Description	Function
	1	---	---
	2	---	---
	3	COM (5, 6)	DC bus ready 0 V
	4	COM (5, 6)	DC bus ready 0 V
	5	CR_OK	DC bus ready
	6	CR_OK	DC bus ready

Table 99: Connector X1 - Pinout

10.1.3.1.2 Input/output circuit diagram

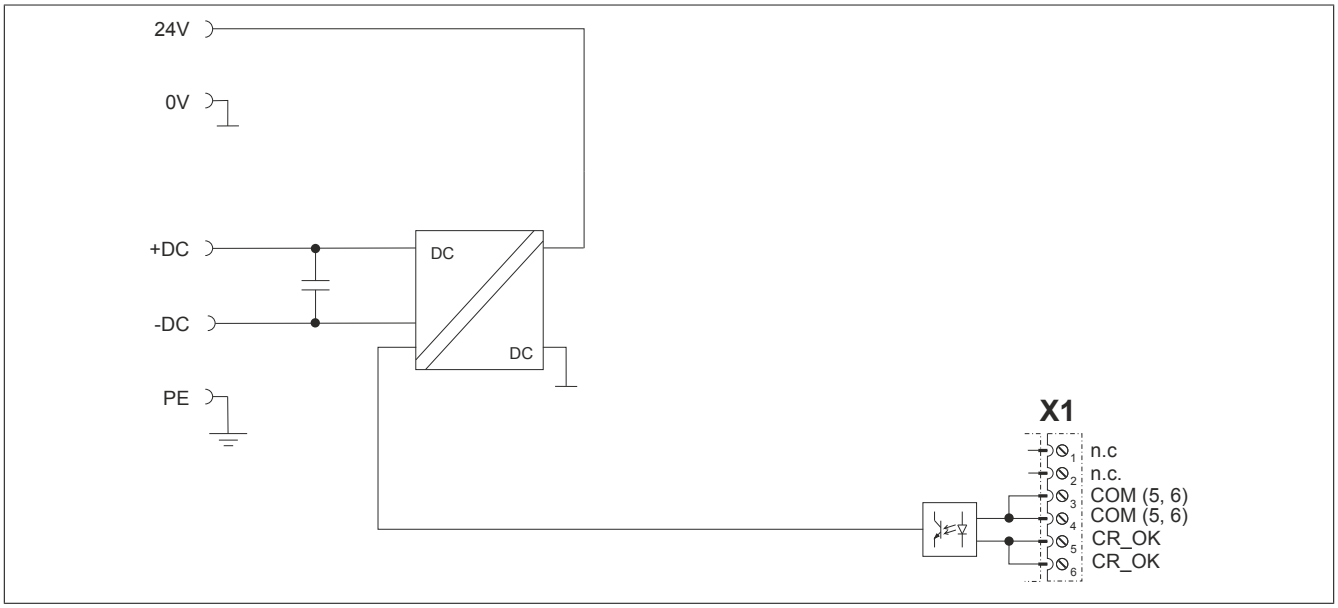


Figure 67: Input/output circuit diagram - 8B0C0160Hx00.000-1, 8B0C0320Hx00.000-1

10.2 8B0C0160Hx00.001-1, 8B0C0320Hx00.002-1

10.2.1 8B0C0160Hx00.001-1

10.2.1.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0C0160HW00.001-1	ACOPOSmulti auxiliary supply module, 16 A, HV, wall mounting, 24VOut 1x 16 A, 1x 5 A	
	Cold plate or feed-through mounting	
8B0C0160HC00.001-1	ACOPOSmulti auxiliary supply module, 16 A, HV, cold plate or feed-through mounting, 24 V Out 1x 16 A, 1x 5 A	
	Required accessories	
	Terminal block sets	
8BZ0C016000.001-1A	Screw clamp set for ACOPOSmulti modules 8B0C0160Hx00.001-1: 1x 8TB3104.201M-11, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	
	Optional accessories	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Terminal blocks	
8TB2104.2010-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB3104.201M-11	Screw clamp 4-pin, single-row, spacing: 7.62 mm, label 1: numbered serially, M keying: 1011	

Table 100: 8B0C0160HW00.001-1, 8B0C0160HC00.001-1 - Order data

10.2.1.2 Technical data

Model number	8B0C0160HW00.001-1	8B0C0160HC00.001-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
DC bus connection		
Voltage		
Nominal	750 VDC	
Operating range in continuous operation	260 to 800 VDC	
Full continuous power	315 to 800 VDC	
Continuous power consumption	Max. 445 W	
Power dissipation with continuous power [1]	22 W (0% continuous power) 27 W (50% continuous power) 45 W (100% continuous power)	
DC bus capacitance	220 nF	
Design	ACOPOSmulti backplane	
24 VDC output		
Continuous power [2]	400 W	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Continuous current	16 ADC	
Reduction of continuous power at ambient temperatures starting at 40°C	No reduction	
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	40 W per 1000 m	
Reduction of continuous power depending on cooling method	No reduction	
Startup delay	Max. 1 s	
Startup time	Approx. 5 to 20 ms	
Residual ripple	Typ. 50 mV_{SS}	

Table 101: 8B0C0160HW00.001-1, 8B0C0160HC00.001-1 - Technical data

Model number	8B0C0160HW00.001-1	8B0C0160HC00.001-1
Terminal connection cross section of 24 VDC Out 1 output		
Flexible and fine wire lines		
With wire end sleeves	0.5 to 6 mm²	
Approbation data		
UL/C-UL-US	22 to 10 AWG	
CSA	22 to 10 AWG	
Terminal connection cross section of 24 VDC Out 2 output		
Flexible and fine wire lines		
With wire end sleeves	0.2 to 2.5 mm²	
Approbation data		
UL/C-UL-US	22 to 12 AWG	
CSA	22 to 12 AWG	
24 VDC internal system voltage supply		
Output voltage [3]	25 VDC ±1.6%	
Peak current (<4 s)		
DC bus voltage (U_{DC}): 350 to 800 VDC	21 ADC	
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 26 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±50 VDC	
Output/Input isolation	SELV / PELV requirements	
Design	ACOPOSmulti backplane	
24 VDC Out		
Output voltage [3]		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Protection of 24 VDC Out 1 output	16 A (slow-blow) electronic, automatic reset	
Protection of 24 VDC Out 2 output	5 A (slow-blow) electronic, automatic reset	
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 35 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±50 VDC	
Output/Input isolation	SELV / PELV requirements	
Design		
24 VDC, COM	Male connector	
24 VDC Out 1 controller input		
Wiring	Sink	
Electrical isolation		
Input - 24 VDC	Yes	
Modulation compared to ground potential	Max. ±50 V	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low (24 VDC Out 1 is switched on)	<5 V	
High (24 VDC Out 1 is switched off) [4]	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
ON (24 VDC Out 1 is switched on)	Max. 25 ms	
OFF (24 VDC Out 1 is switched off)	Max. 0.25 ms	
Design	Male connector	
Terminal connection cross sections		
Flexible and fine wire lines		
With wire end sleeves	0.2 to 2.5 mm²	
Approbation data		
UL/C-UL-US	30 to 12 AWG	
CSA	22 to 12 AWG	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [5]	4000 m	

Table 101: 8B0C0160HW00.001-1, 8B0C0160HC00.001-1 - Technical data

Model number	8B0C0160HW00.001-1	8B0C0160HC00.001-1
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [6]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 3.2 kg	Approx. 2.7 kg
Module width	1	

Table 101: 8B0C0160HW00.001-1, 8B0C0160HC00.001-1 - Technical data

1) Continuous power on the 24 VDC output
2) Valid in the following conditions: 750 VDC DC bus voltage, 55°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) When a fault occurs, the output voltage is limited to a max. of 60 VDC.
4) The output and any connected loads are not actively discharged when switched off.
5) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
6) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

10.2.2 8B0C0320Hx00.002-1

10.2.2.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0C0320HW00.002-1	ACOPOSmulti auxiliary supply module, 32 A, HV, wall mounting, 24VOut 1x 32 A, 1x 5 A	
	Cold plate or feed-through mounting	
8B0C0320HC00.002-1	ACOPOSmulti auxiliary supply module, 32 A, HV, cold plate or feed-through mounting, 24 V Out 1x 32 A, 1x 5 A	
	Required accessories	
	Terminal block sets	
8BZ0C032000.002-1A	Screw clamp set for ACOPOSmulti 8B0C0320Hx00.002-1 modules: 1x 8TB3104.201M-11, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	
	Optional accessories	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Terminal blocks	
8TB2104.2010-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB3104.201M-11	Screw clamp 4-pin, single-row, spacing: 7.62 mm, label 1: numbered serially, M keying: 1011	

Table 102: 8B0C0320HW00.002-1, 8B0C0320HC00.002-1 - Order data

10.2.2.2 Technical data

Model number	8B0C0320HW00.002-1	8B0C0320HC00.002-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
DC bus connection		
Voltage		
Nominal	750 VDC	
Operating range in continuous operation	260 to 800 VDC	
Full continuous power	315 to 800 VDC	
Continuous power consumption	Max. 880 W	
Power dissipation with continuous power [1]	22 W (0% continuous power) 35 W (50% continuous power) 80 W (100% continuous power)	
DC bus capacitance	220 nF	
Design	ACOPOSmulti backplane	
24 VDC output		
Continuous power [2]	800 W	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Continuous current	32 ADC	
Reduction of continuous power at ambient temperatures starting at 40°C	No reduction	
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	80 W per 1000 m	
Reduction of continuous power depending on cooling method	No reduction	
Startup delay	Max. 1 s	
Startup time	Approx. 5 to 20 ms	
Residual ripple	Typ. 50 mV_{SS}	
24 VDC internal system voltage supply		
Output voltage [3]	25 VDC ±1.6%	
Peak current (<4 s)		
DC bus voltage (U_{DC}): 350 to 800 VDC	42 ADC	

Table 103: 8B0C0320HW00.002-1, 8B0C0320HC00.002-1 - Technical data

Model number	8B0C0320HW00.002-1	8B0C0320HC00.002-1
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 26 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±50 VDC	
Output/Input isolation	SELV / PELV requirements	
Design	ACOPOSmulti backplane	
24 VDC Out		
Output voltage [3]		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Protection of 24 VDC Out 1 output	32 A (slow-blow) electronic, automatic reset	
Protection of 24 VDC Out 2 output	5 A (slow-blow) electronic, automatic reset	
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 35 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±50 VDC	
Output/Input isolation	SELV / PELV requirements	
Design		
24 VDC, COM	Male connector	
Terminal connection cross section of 24 VDC Out 1 output		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 6 mm²	
Approbation data		
UL/C-UL-US	22 to 10 AWG	
CSA	22 to 10 AWG	
Terminal connection cross section of 24 VDC Out 2 output		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	22 to 12 AWG	
CSA	22 to 12 AWG	
24 VDC Out 1 controller input		
Wiring	Sink	
Electrical isolation		
Input - 24 VDC	Yes	
Modulation compared to ground potential	Max. ±50 V	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low (24 VDC Out 1 is switched on)	<5 V	
High (24 VDC Out 1 is switched off) [4]	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
ON (24 VDC Out 1 is switched on)	Max. 25 ms	
OFF (24 VDC Out 1 is switched off)	Max. 0.25 ms	
Design	Male connector	
Terminal connection cross sections		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	30 to 12 AWG	
CSA	22 to 12 AWG	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [5]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	

Table 103: 8B0C0320HW00.002-1, 8B0C0320HC00.002-1 - Technical data

Model number	8B0C0320HW00.002-1	8B0C0320HC00.002-1
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [6]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 3.2 kg	Approx. 2.6 kg
Module width	1	

Table 103: 8B0C0320HW00.002-1, 8B0C0320HC00.002-1 - Technical data

1) Continuous power on the 24 VDC output
2) Valid in the following conditions: 750 VDC DC bus voltage, 55°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) When a fault occurs, the output voltage is limited to a max. of 60 VDC.
4) The output and any connected loads are not actively discharged when switched off.
5) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
6) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

10.2.3 Wiring

10.2.3.1 Pinout overview - 8B0C0160Hx00.001-1, 8B0C0320Hx00.002-1

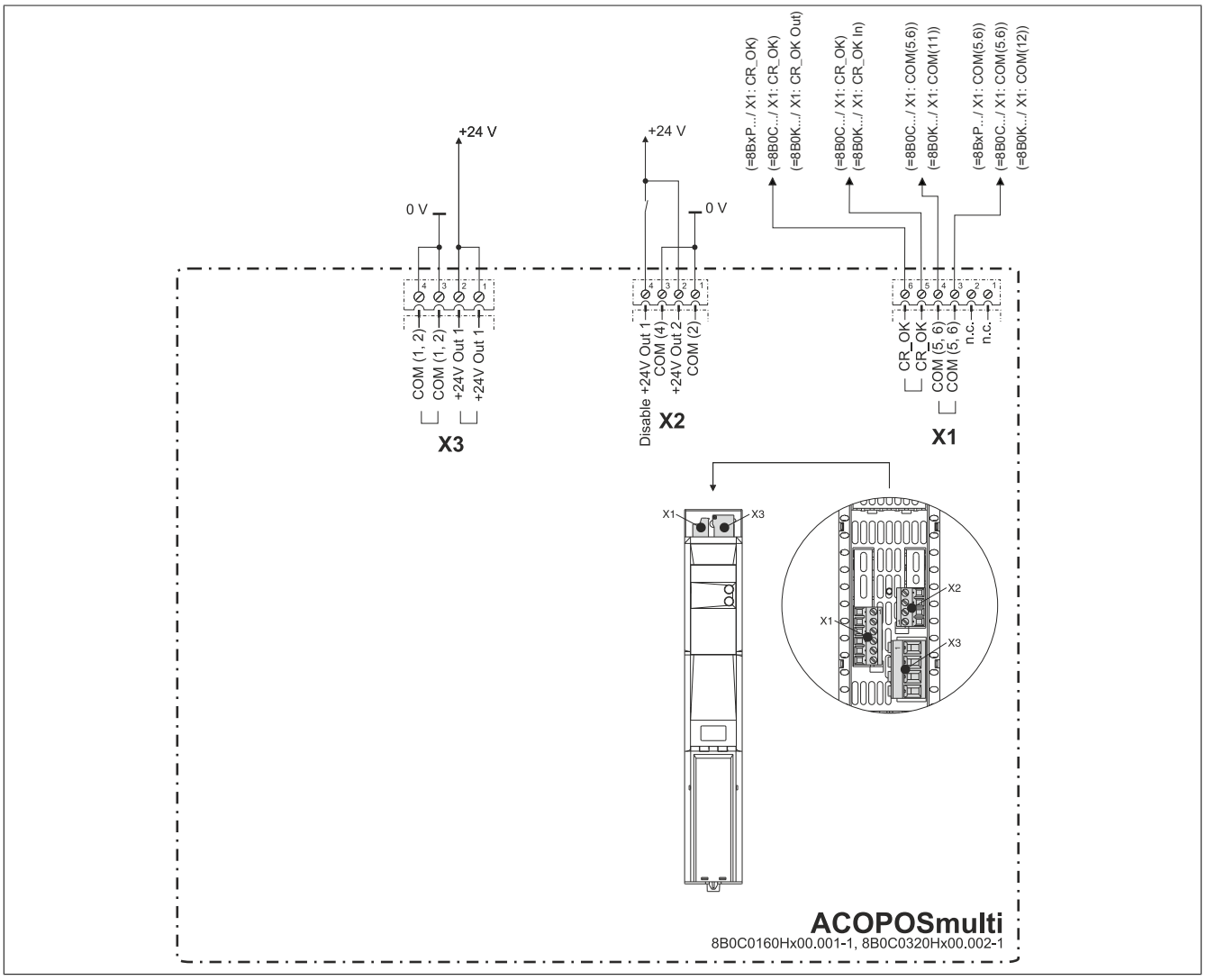


Figure 68: Pinout overview - 8B0C0160Hx00.001-1, 8B0C0320Hx00.002-1

10.2.3.1.1 Connector X1 - Pinout

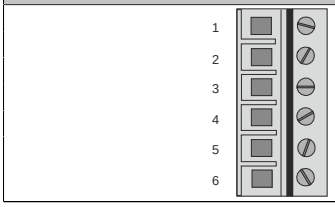
X1	Pin	Description	Function
	1	---	---
	2	---	---
	3	COM (5, 6)	DC bus ready 0 V
	4	COM (5, 6)	DC bus ready 0 V
	5	CR_OK	DC bus ready
	6	CR_OK	DC bus ready

Table 104: Connector X1 - Pinout

10.2.3.1.2 X2 connector - Pinout

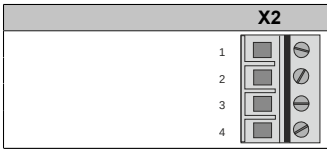
X2	Pin	Name	Function
	1	COM (2)	+24 V output 2 0 V
	2	+24V Out 2	+24 V output 2
	3	COM (4)	Disable +24 V output 1 0 V
	4	Disable +24V Out 1	Disable +24 V output 1

Table 105: X2 connector - Pinout

10.2.3.1.3 X3 connector - Pinout

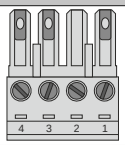
X3	Pin	Name	Function
	1	+24V Out 1	+24 V output 1
	2	+24V Out 1	+24 V output 1
	3	COM (1, 2))	+24 V output 1 0 V
	4	COM (1, 2))	+24 V output 1 0 V

Table 106: X3 connector - Pinout

Information:

B&R recommends grounding both COM connections (1, 2) on the X3 plug to achieve a defined relationship between the signal ground and ground potential. Alternatively, the COM (2) connection can also be grounded on the X2 connector.

10.2.3.1.4 Input/output circuit diagram

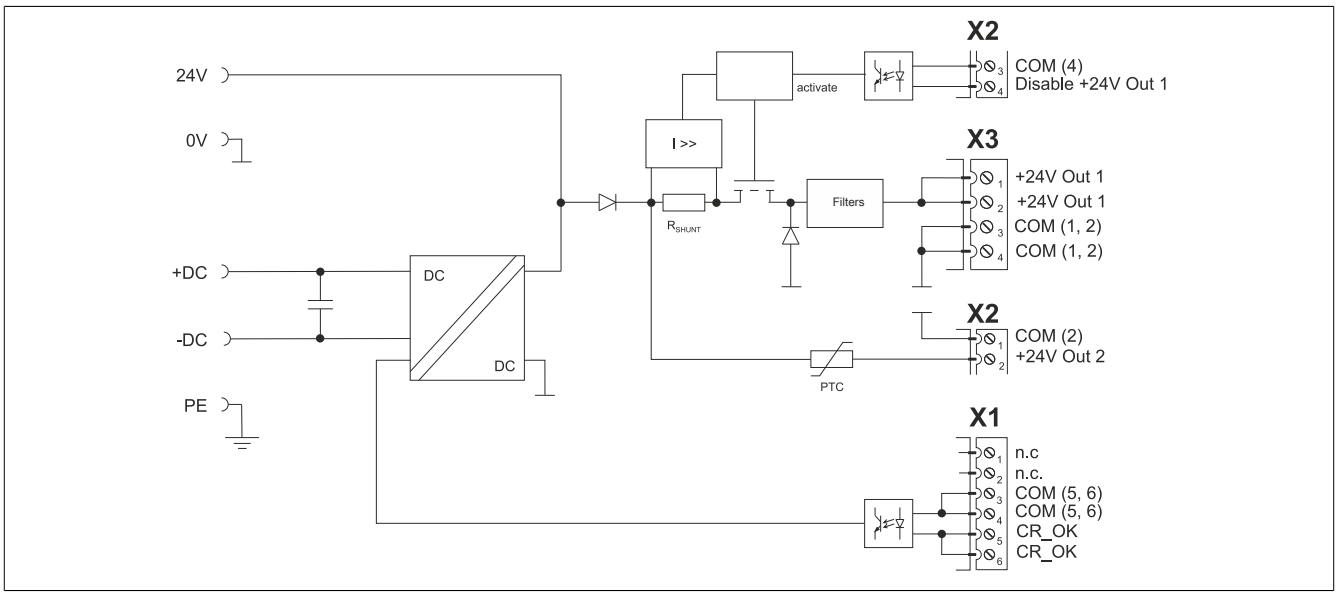


Figure 69: Input/output circuit diagram - 8B0C0160Hx00.001-1, 8B0C0320Hx00.002-1

10.2.3.1.5 Connecting multiple 8B0C auxiliary supply modules in parallel

Warning!

When the external 24 V outputs (24 V Out 1, 24 V Out 2) are connected in parallel, the corresponding COM connections must also be connected in parallel!

10.3 8B0C0160Hx00.A01-1

10.3.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0C0160HW00.A01-1	ACOPOSmulti auxiliary supply module, 16 A, HV, wall mounting, 42VOut 1x 16A, 1x 3A	
	Cold plate or feed-through mounting	
8B0C0160HC00.A01-1	ACOPOSmulti auxiliary supply module, 16 A, HV, cold plate or feed-through mounting, 42 V Out 1x 16 A, 1x 3 A	
	Required accessories	
	Terminal block sets	
8BZ0C016000.A01-1A	Screw clamp terminal block set for ACOPOSmulti 8B0C0160Hx00.A01-1 modules: 1x 8TB3104.201H-11, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	
	Optional accessories	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Terminal blocks	
8TB2104.2010-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB3104.201H-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 1: numbered serially, H keying: 1110	

Table 107: 8B0C0160HW00.A01-1, 8B0C0160HC00.A01-1 - Order data

10.3.2 Technical data

Model number	8B0C0160HW00.A01-1	8B0C0160HC00.A01-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
DC bus connection		
Voltage		
Nominal	750 VDC	
Operating range in continuous operation	260 to 800 VDC	
Full continuous power	315 to 800 VDC	
Continuous power consumption	Max. 880 W	
Power dissipation with continuous power [1]	25 W (0% continuous power) 36 W (50% continuous power) 70 W (100% continuous power)	
DC bus capacitance	220 nF	
Design	ACOPOSmulti backplane	
24 VDC internal system voltage supply		
Design	ACOPOSmulti backplane	
42 VDC output		
Continuous power [2]	800 W	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	0 V	
DC bus voltage (U_{DC}): 315 to 800 VDC	42 VDC	
Continuous current	16 ADC	
Reduction of continuous power at ambient temperatures starting at 40°C	No reduction	
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	80 W per 1000 m	
Reduction of continuous power depending on cooling method	No reduction	
Startup delay	Max. 1 s	
Startup time	Approx. 5 to 20 ms	
Residual ripple	Typ. 50 mV_{SS}	
42 VDC Out		
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	0 V	
DC bus voltage (U_{DC}): 315 to 800 VDC	42 VDC ±6%	

Table 108: 8B0C0160HW00.A01-1, 8B0C0160HC00.A01-1 - Technical data

Model number	8B0C0160HW00.A01-1	8B0C0160HC00.A01-1
Peak current (<4 s) over total DC bus voltage operating range	21 ADC	
Protection of 42 VDC Out 1 output	16 A (slow-blow) electronic, automatic reset	
Protection of 42 VDC Out 2 output	3 A (slow-blow) electronic, automatic reset	
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 60 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±96 VDC	
Output/Input isolation	SELV / PELV requirements	
Design		
42 VDC, COM	Male connector	
Terminal connection cross section of 42 VDC Out 1 output		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 6 mm²	
Approbation data		
UL/C-UL-US	22 to 10 AWG	
CSA	22 to 10 AWG	
Terminal connection cross section of 42 VDC Out 2 output		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	22 to 12 AWG	
CSA	22 to 12 AWG	
42 VDC Out 1 controller input		
Wiring	Sink	
Electrical isolation		
Input - 42 VDC	Yes	
Modulation compared to ground potential	Max. ±50 V	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low (42 VDC Out 1 is switched on)	<5 V	
High (42 VDC Out 1 is switched off)	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
ON (42 VDC Out 1 is switched on)	Max. 25 ms	
OFF (42 VDC Out 1 is switched off) [3]	Max. 0.25 ms	
Design	Male connector	
Terminal connection cross sections		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	22 to 12 AWG	
CSA	22 to 12 AWG	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [4]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	

Table 108: 8B0C0160HW00.A01-1, 8B0C0160HC00.A01-1 - Technical data

Model number	8B0C0160HW00.A01-1	8B0C0160HC00.A01-1
Mechanical characteristics		
Dimensions [5]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 3.2 kg	Approx. 2.6 kg
Module width	1	

Table 108: 8B0C0160HW00.A01-1, 8B0C0160HC00.A01-1 - Technical data

1) Continuous power on the 42 VDC output
2) Valid in the following conditions: 750 VDC DC bus voltage, 55°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) The output and any connected loads are not actively discharged when switched off.
4) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
5) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

10.3.3 Wiring

10.3.3.1 8B0C0160Hx00.A01-1 - Pinout overview

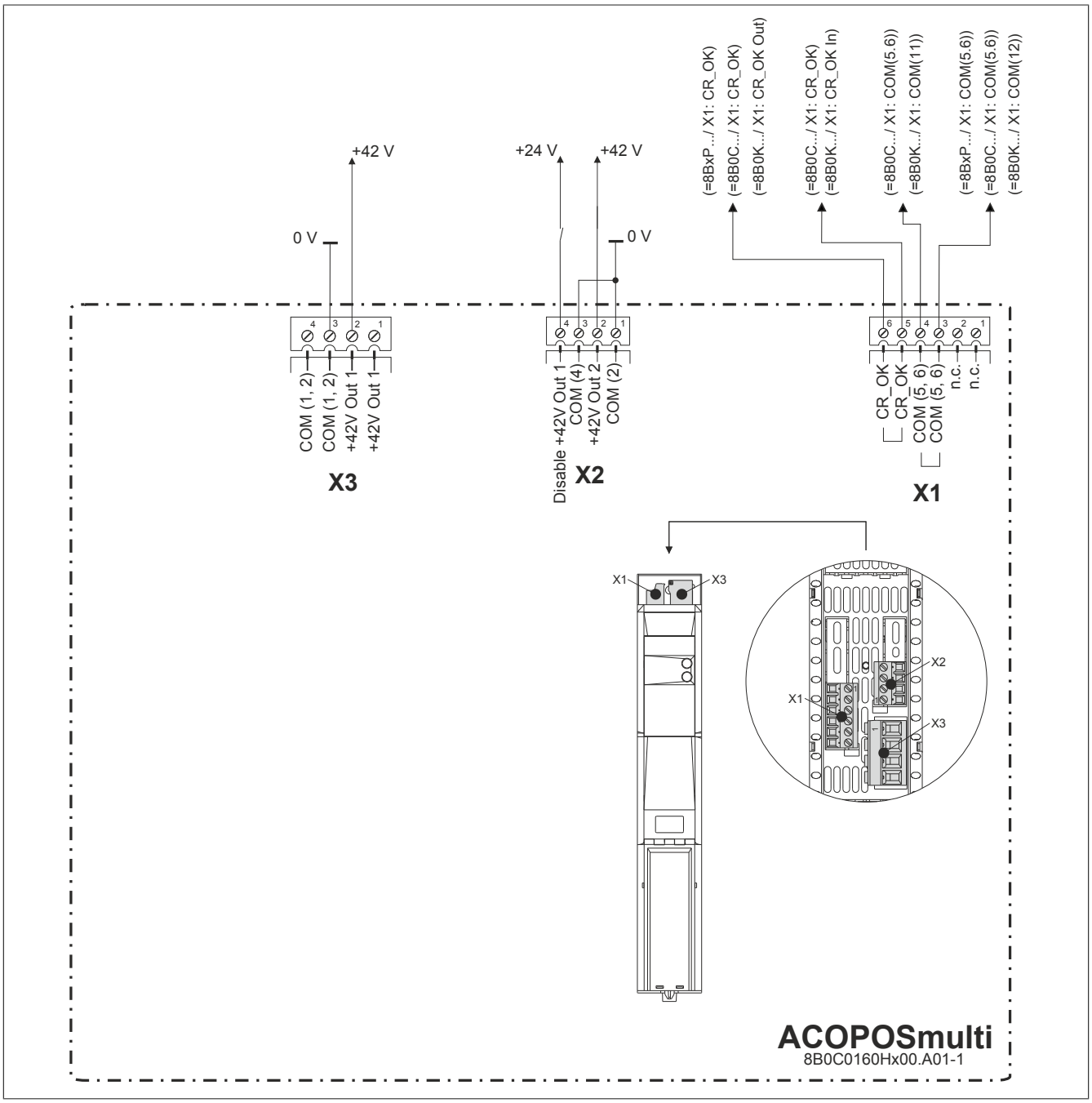


Figure 70: 8B0C0160Hx00.A01-1 - Pinout overview

10.3.3.1.1 Connector X1 - Pinout

X1	Pin	Description	Function
	1	---	---
	2	---	---
	3	COM (5, 6)	DC bus ready 0 V
	4	COM (5, 6)	DC bus ready 0 V
	5	CR_OK	DC bus ready
	6	CR_OK	DC bus ready

Table 109: Connector X1 - Pinout

10.3.3.1.2 Pinout - Connector X2 with 42 Out

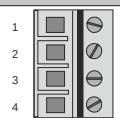
X2	Pin	Name	Function
	1	COM (2)	+42 V output 2 0 V
	2	+42 V Out 2	+42 V output 2
	3	COM (4)	Disable +42 V output 1 0 V
	4	Disable +42 V Out 1	Disable +42 V output 1

Table 110: Pinout - Connector X2 with 42 Out

10.3.3.1.3 X3 connector - Pinout

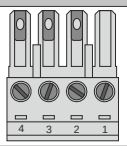
X3	Pin	Name	Function
	1	+42V Out 1	+42 V output 1
	2	+42V Out 1	+42 V output 1
	3	COM (1, 2)	+42 V output 1 0 V
	4	COM (1, 2)	+42 V output 1 0 V

Table 111: X3 connector - Pinout

Information:

B&R recommends grounding both COM connections (1, 2) on the X3 connector to achieve a defined relationship between the signal ground and ground potential. Alternatively, the COM (2) connection can also be grounded on the X2 connector.

10.3.3.1.4 Input/Output circuit diagram

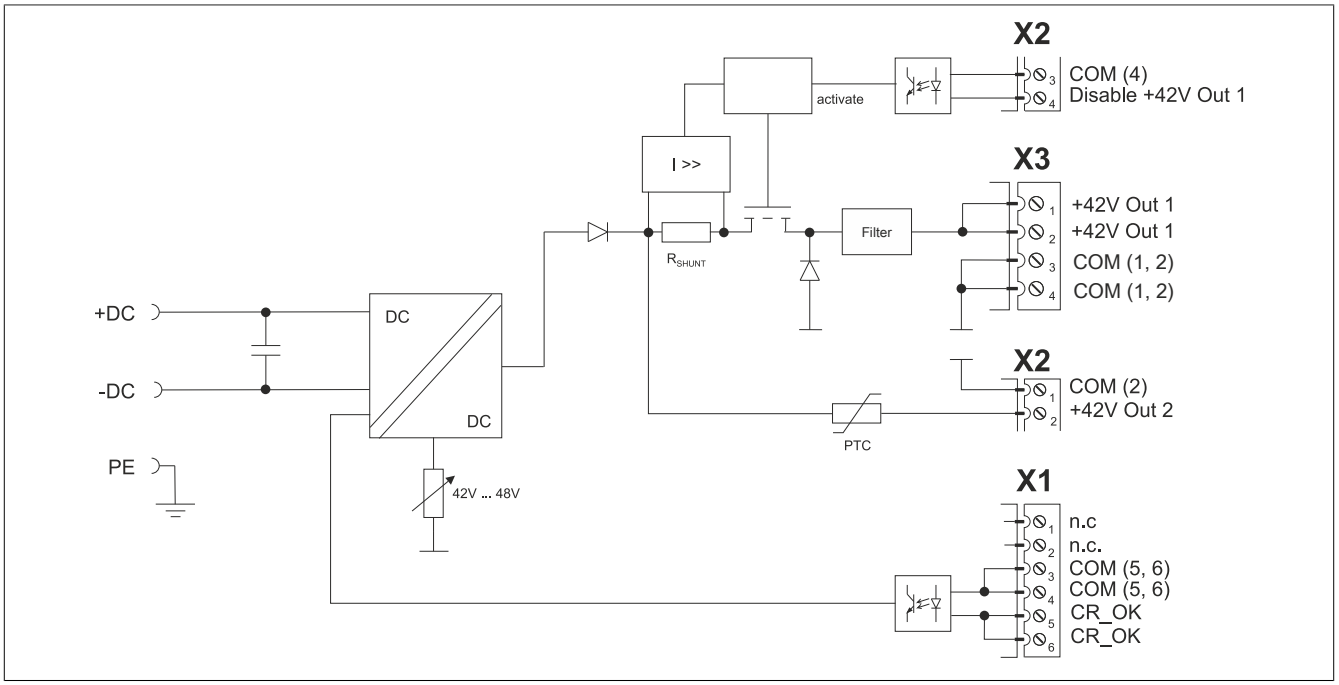


Figure 71: 8B0C0160Hx00.A01-1 - Input/Output circuit diagram

10.3.3.1.5 Connecting multiple 8B0C auxiliary supply modules in parallel

Warning!

When the external 42 V outputs (42 V Out 1, 24 V Out 2) are connected in parallel, the corresponding COM connections must also be connected in parallel!

10.4 8B0C0320Hx00.00A-1

Danger!

ACOPOSmulti auxiliary supply modules (8B0C0320Hx00.00A-1) must not be used in combination with ACOPOSmulti SafeMOTION inverter modules!

Information:

Up to five auxiliary supply modules with any power rating can be connected in parallel.

Limitation:

If 8B0C0320Hx00.00A-1 auxiliary supply modules are connected in parallel, then the total output power cannot exceed 80% of the total output power of the 8B0C0320Hx00.00A-1 units connected in parallel.

10.4.1 General information

8B0C0320Hx00.00A-1 ACOPOSmulti auxiliary supply modules provide an internal 24 VDC supply to ACOPOSmulti drive systems.

In addition, the user is also provided with two 24 VDC outputs (one of which is switchable) and one input for supplying 24 VDC via an external voltage source (e.g. UPS).

Area of application

ACOPOSmulti drive systems can detect a power failure and are able to initiate immediate shutdown of the connected motors.

The brake energy that occurs when braking is returned to the DC bus, and the auxiliary supply module can use it to create the 24 VDC supply voltage for the ACOPOSmulti drive system. This provides the ACOPOSmulti drive system as well as any connected encoders and sensors, control and visualization systems and any present safety system with 24 VDC during the braking procedure.

There are applications in which the generated braking energy is not sufficient for supplying 24 VDC up until the motors have come to a standstill or in which the 24 VDC supply is still required for a short time after the motors have come to a stop in order to properly shut down any connected control and visualization systems or to save data from the ACOPOSmulti drive system.

In these cases, an external 24 VDC source (e.g. UPS), connected to the ACOPOSmulti 8B0C0320Hx00.00A-1 auxiliary supply module input, ensures a sufficient 24 VDC supply to the ACOPOSmulti drive system and any connected external 24 VDC consumers for a sufficient amount of time. [2)]

ACOPOSmulti 8B0C0320Hx00.00A-1 auxiliary supply modules also make it possible to operate ACOPOSmulti drive systems using just an external 24 VDC supply without having to supply the DC bus. This provides an easy way to start up individual system components.

[2)] B&R recommends switching off any unnecessary 24 VDC consumers. This can be done using the switchable 24 VDC output on the auxiliary supply module.

10.4.2 Order data

Model number	Short description	Figure
	Wall mounting	
8B0C0320HW00.00A-1	ACOPOSmulti auxiliary supply module, 32 A, HV, wall mounting, 24VIn 1x 30 A, 24VOut 1x 30 A, 1x 5 A	
	Cold plate or feed-through mounting	
8B0C0320HC00.00A-1	ACOPOSmulti auxiliary supply module, 32 A, HV, cold plate or feed-through mounting, 24 V In 1x 30 A, 24 V Out 1x 30 A, 1x5 A	
	Required accessories	
	Terminal block sets	
8BZ0C032000.00A-1A	Screw clamp set for ACOPOSmulti 8B0C0320Hx00.00A-1 modules: 1x 8TB3104.201M-11, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	
	Optional accessories	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Terminal blocks	
8TB2104.2010-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB3104.201M-11	Screw clamp 4-pin, single-row, spacing: 7.62 mm, label 1: numbered serially, M keying: 1011	

Table 112: 8B0C0320HW00.00A-1, 8B0C0320HC00.00A-1 - Order data

10.4.3 Technical data

Model number	8B0C0320HW00.00A-1	8B0C0320HC00.00A-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
DC bus connection		
Voltage		
Nominal	750 VDC	
Operating range in continuous operation	260 to 800 VDC	
Full continuous power	315 to 800 VDC	
Continuous power consumption	Max. 880 W	
Power dissipation with continuous power [1]	22 W (0% continuous power) 35 W (50% continuous power) 80 W (100% continuous power)	
DC bus capacitance	220 nF	
Design	ACOPOSmulti backplane	
24 VDC output		
Continuous power [2]	800 W	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Continuous current		
Normal mode (via DC bus)	32 ADC	
Supply mode (via +24 Vin)	30 ADC	
Reduction of continuous power at ambient temperatures starting at 40°C	No reduction	
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	80 W per 1000 m	
Reduction of continuous power depending on cooling method	No reduction	
Startup delay	Max. 1 s	
Startup time	Approx. 5 to 20 ms	
Residual ripple	Typ. 50 mV_{SS}	
24 VDC internal system voltage supply		
Output voltage [3]	25 VDC ±1.6%	
Peak current (<4 s)		
DC bus voltage (U_{DC}): 350 to 800 VDC	42 ADC	

Table 113: 8B0C0320HW00.00A-1, 8B0C0320HC00.00A-1 - Technical data

Model number	8B0C0320HW00.00A-1	8B0C0320HC00.00A-1
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 26 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±50 VDC	
Output/Input isolation	SELV / PELV requirements	
Design	ACOPOSmulti backplane	
24 VDC Out		
Output voltage [3]		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC} / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Protection of 24 VDC Out 1 output	30 A (slow-blow) electronic, automatic reset	
Protection of 24 VDC Out 2 output	5 A (slow-blow) electronic, automatic reset	
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes	
Short circuit protection	Yes	
Feedback protection	Max. 35 VDC (also when turned off)	
Overtemperature protection	Yes	
Dielectric strength to ground	±50 VDC	
Output/Input isolation	SELV / PELV requirements	
Design		
24 VDC, COM	Male connector	
Terminal connection cross section of 24 VDC Out 1 output		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 6 mm²	
Approbation data		
UL/C-UL-US	22 to 10 AWG	
CSA	22 to 10 AWG	
Terminal connection cross section of 24 VDC Out 2 output		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	22 to 12 AWG	
CSA	22 to 12 AWG	
24 VDC Out 1 controller input		
Wiring	Sink	
Electrical isolation		
Input - 24 VDC	Yes	
Modulation compared to ground potential	Max. ±50 V	
Input voltage [4]		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low (24 VDC Out 1 is switched on)	<5 V	
High (24 VDC Out 1 is switched off)	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
ON (24 VDC Out 1 is switched on)	Max. 25 ms	
OFF (24 VDC Out 1 is switched off) [5]	Max. 0.25 ms	
Design	Male connector	
Terminal connection cross sections		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 2.5 mm²	
Approbation data		
UL/C-UL-US	30 to 12 AWG	
CSA	22 to 12 AWG	
24 VDC In		
Input voltage [6]		
Minimum	23 VDC	
Nominal	24 VDC	
Maximum	26 VDC	
Voltage drop between input and internal 24 VDC system voltage supply	<0.5 V	
Switch-on threshold	+24 VDC internal system voltage supply <21.5 VDC	
Max. continuous current	30 A	
Switching delay		
When switching to supply mode	Typical 5 ms	
When starting up via 24 Vin	Typ. 2 s	

Table 113: 8B0C0320HW00.00A-1, 8B0C0320HC00.00A-1 - Technical data

Model number	8B0C0320HW00.00A-1	8B0C0320HC00.00A-1
Status indicators	24Vi LED ERRi LED	
Undervoltage detection	Yes (<20 VDC)	
Overvoltage detection	Yes (>26 VDC)	
Protective measures		
Open circuit protection	Yes	
Overload protection	Yes, ticker operation when overload (T_{ON} = 1 s, T_{OFF} = 2.4 s)	
Short circuit protection	Yes	
Overtemperature protection	Yes	
Design		
24 VDC In, COM	Male connector	
Terminal connection cross section of input "24 VDC In"		
Flexible and fine wire lines		
With wire end sleeves	0.5 to 6 mm²	
Approbation data		
UL/C-UL-US	22 to 10 AWG	
CSA	22 to 10 AWG	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [7]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [8]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 3.3 kg	Approx. 2.9 kg
Module width	1	

Table 113: 8B0C0320HW00.00A-1, 8B0C0320HC00.00A-1 - Technical data

1) Continuous power on the 24 VDC output
2) Valid in the following conditions: 750 VDC DC bus voltage, 55°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) When a fault occurs, the output voltage is limited to a max. of 60 VDC.
4) The module's +24 Vin input is resistant to damage in a voltage range from -32 VDC to +32 VDC.
5) The output and any connected loads are not actively discharged when switched off.
6) The module's +24 Vin input is resistant to damage in a voltage range from -32 VDC to +32 VDC.
If a voltage outside the voltage range is applied to the +24 V In input, it is possible that this voltage is switched through directly to the 24 VDC outputs on the module without voltage limiting.
7) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
8) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

10.4.4 Wiring

10.4.4.1 8B0C0320Hx00.00A-1 - Pinout overview

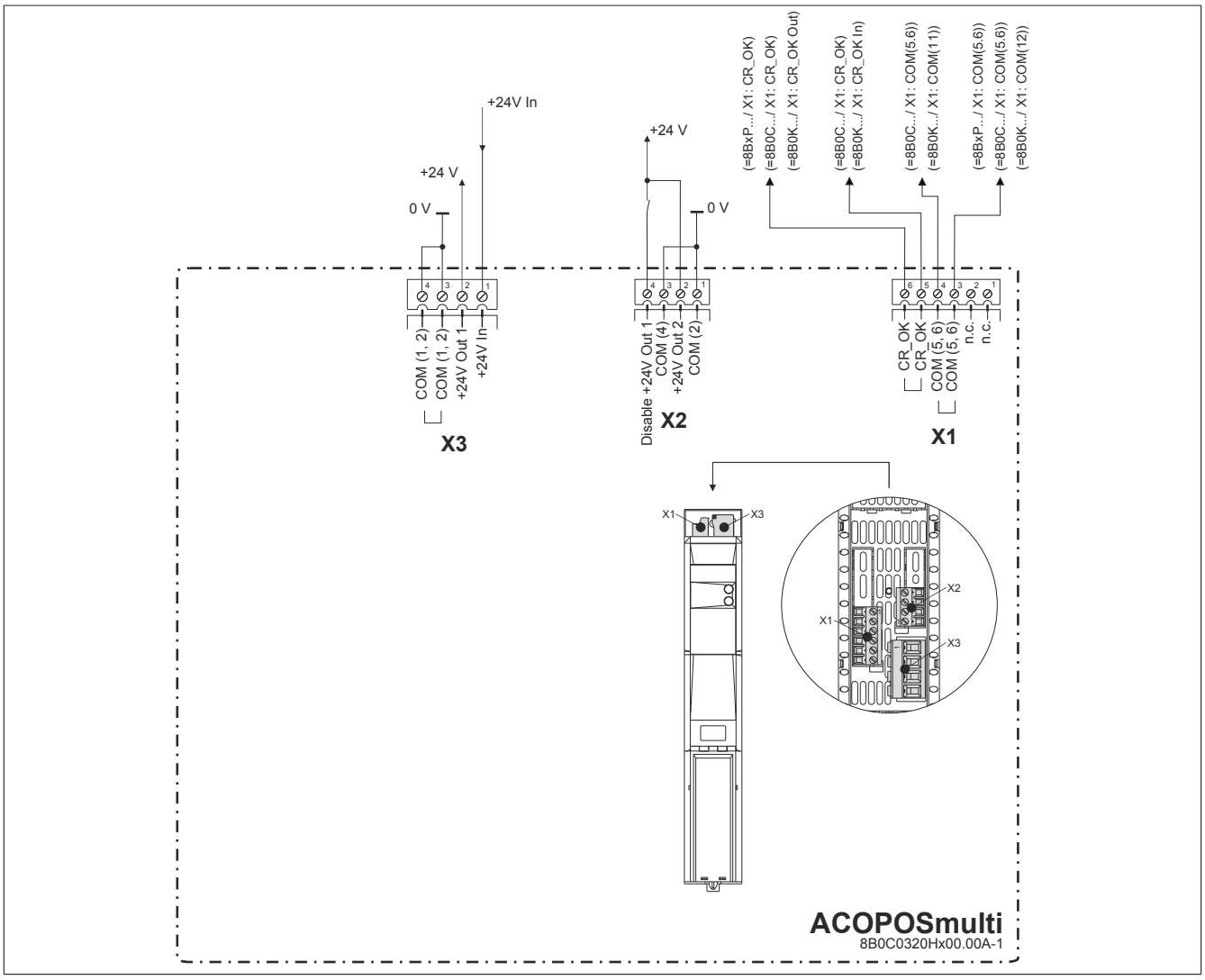


Figure 72: 8B0C0320Hx00.00A-1 - Pinout overview

10.4.4.1.1 Connector X1 - Pinout

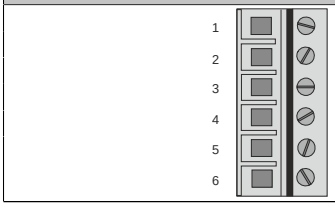
X1	Pin	Description	Function
	1	---	---
	2	---	---
	3	COM (5, 6)	DC bus ready 0 V
	4	COM (5, 6)	DC bus ready 0 V
	5	CR_OK	DC bus ready
	6	CR_OK	DC bus ready

Table 114: Connector X1 - Pinout

10.4.4.1.2 X2 connector - Pinout

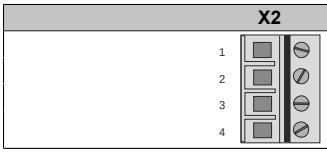
X2	Pin	Name	Function
	1	COM (2)	+24 V output 2 0 V
	2	+24V Out 2	+24 V output 2
	3	COM (4)	Disable +24 V output 1 0 V
	4	Disable +24V Out 1	Disable +24 V output 1

Table 115: X2 connector - Pinout

10.4.4.1.3 X3 connector - Pinout

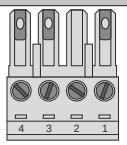
X3	Pin	Name	Function
	1	+24V In	+24 V feed
	2	+24V Out 1	+24 V output 1
	3	COM (1, 2) 1)	+24 V output 1 0 V
	4	COM (1, 2) 1)	+24 V output 1 0 V

Table 116: X3 connector - Pinout

1) The connections X3/3 and X3/4 are connected with each other inside the device.

Information:

B&R recommends grounding both COM connections (1, 2) on the X3 connector to achieve a defined relationship between the signal ground and ground potential. Alternatively, the COM (2) connection can also be grounded on the X2 connector.

10.4.4.1.4 Input/Output circuit diagram

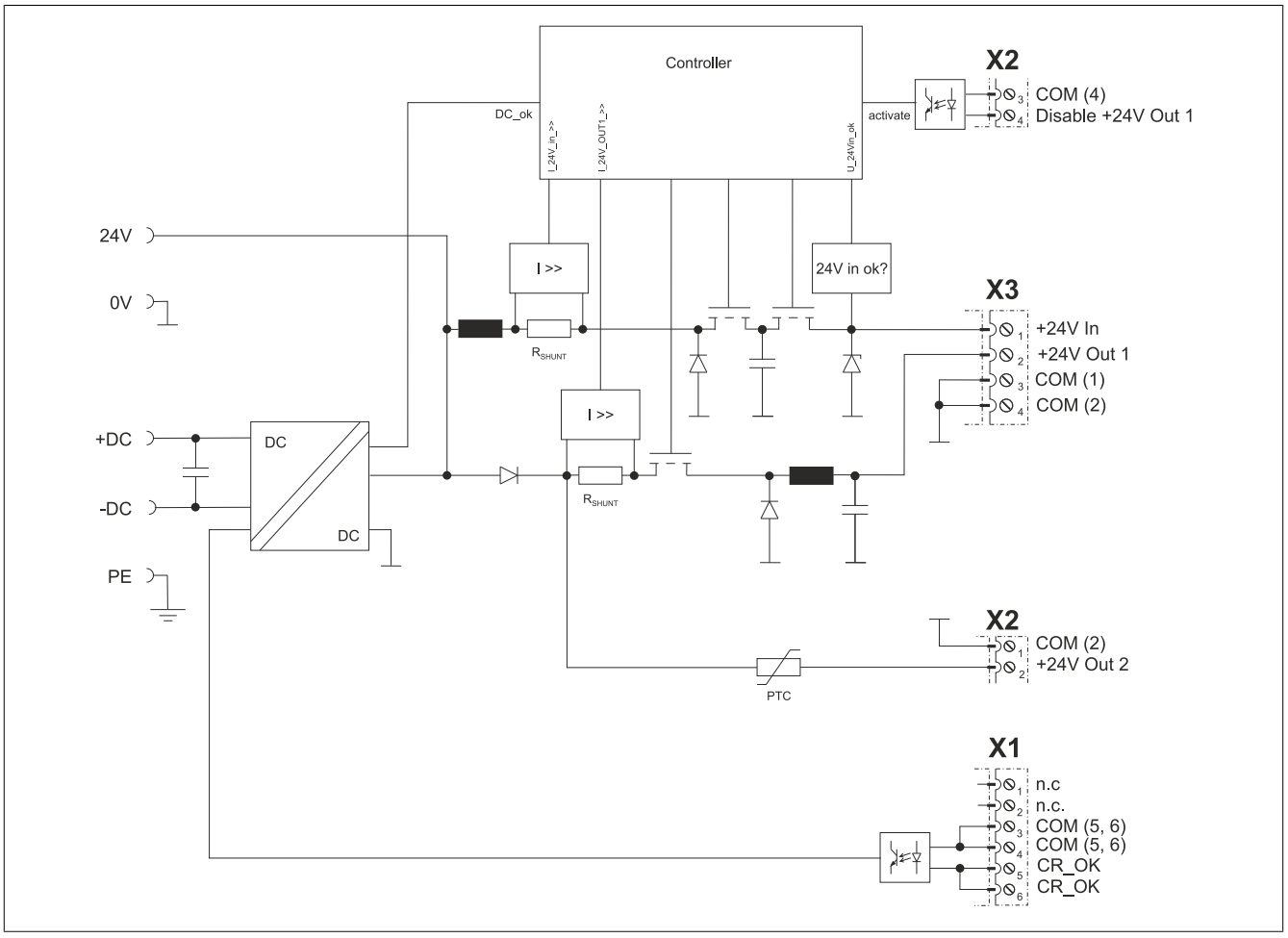


Figure 73: 8B0C0320Hx00.00A-1 - Input/Output circuit diagram

10.4.4.1.5 Connecting multiple 8B0C auxiliary supply modules in parallel

Warning!

When the external 24 V outputs (24 V Out 1, 24 V Out 2) are connected in parallel, the corresponding COM connections must also be connected in parallel!

11 8BVI inverter modules

Caution!

8MS synchronous motors are not suitable for operation with ACOPOSmulti drive systems and are therefore not permitted to be connected to ACOPOSmulti 8BVI inverter modules!

11.1 Single-axis modules (single- and double-width)

11.1.1 8BVI0014HxS0.000-1, 8BVI0028HxS0.000-1

11.1.1.1 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI0014HWS0.000-1	ACOPOSmulti inverter module, 1.9 A, HV, wall mounting	
8BVI0028HWS0.000-1	ACOPOSmulti inverter module, 3.8 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8BVI0014HCS0.000-1	ACOPOSmulti inverter module, 1.9 A, HV, cold plate or feed-through mounting	
8BVI0028HCS0.000-1	ACOPOSmulti inverter module, 3.8 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZVI0055S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI00xxHxS0 modules: 1x 8TB3104.204G-11, 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
	Terminal blocks	

Table 117: 8BVI0014HWS0.000-1, 8BVI0028HWS0.000-1, 8BVI0014HCS0.000-1, 8BVI0028HCS0.000-1 - Order data

Model number	Short description	Figure
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB3104.204G-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, G keying: 0110	

Table 117: 8BVI0014HWS0.000-1, 8BVI0028HWS0.000-1, 8BVI0014HCS0.000-1, 8BVI0028HCS0.000-1 - Order data

11.1.1.2 Technical data

Model number	8BVI0014HWS0.000-1	8BVI0014HCS0.000-1	8BVI0028HWS0.000-1	8BVI0028HCS0.000-1
General information				
B&R ID code	0x26DE	0x253F	0x26E0	0x253E
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2			
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Functional safety[1)]	Yes			
DC bus connection				
Voltage				
Nominal	750 VDC			
Continuous power consumption [2)]	1.46 kW		2.87 kW	
Power dissipation depending on switching frequency [3)]				
Switching frequency 5 kHz	[0.6 * I_M^2 + 1.3 * I_M + 60] W			
Switching frequency 10 kHz	[0.97 * I_M^2 + 0.5 * I_M + 110] W			
Switching frequency 20 kHz	[1.7 * I_M^2 - 0.7 * I_M + 225] W			
DC bus capacitance	165 µF			
Design	ACOPOSmulti backplane			
24 VDC supply				
Input voltage	25 VDC ±1.6%			
Input capacitance	23.5 µF			
Max. power consumption	12 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake}$[4)]			
Design	ACOPOSmulti backplane			
24 VDC output				
Quantity	2			
Output voltage				
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/ 315)			
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%			
Fuse protection	250 mA (slow-blow) electronic, automatic reset			
Motor connection				
Quantity	1			
Continuous power per motor connection [2)]	1.4 kW		2.8 kW	
Continuous current per motor connection [2)]	1.9 A_{eff}		3.8 A_{eff}	
Reduction of continuous current depending on switching frequency [5)]				
Switching frequency 5 kHz	No reduction	-	No reduction	-
Switching frequency 10 kHz	No reduction	-	No reduction	-
Switching frequency 20 kHz	0.11 A/K (from 33°C) [6)]	-	0.12 A/K (from 33°C) [6)]	-
Reduction of continuous current depending on switching frequency and mounting method [7)]				
Switching frequency 5 kHz				
Cold plate mounting [8)]	-	No reduction	-	No reduction
Feed-through mounting	-	No reduction	-	No reduction
Switching frequency 10 kHz				
Cold plate mounting [8)]	-	No reduction	-	0.6 A/K (from 58°C)
Feed-through mounting	-	No reduction	-	No reduction
Switching frequency 20 kHz				
Cold plate mounting [8)]	-	0.13 A/K (from 46°C)	-	0.1 A/K (from 34°C) [9)]
Feed-through mounting	-	0.1 A/K (from 41°C)	-	0.1 A/K (from 18°C) [6)]

Table 118: 8BVI0014HWS0.000-1, 8BVI0014HCS0.000-1, 8BVI0028HWS0.000-1, 8BVI0028HCS0.000-1 - Technical data

Model number	8BVI0014HWS0.000-1	8BVI0014HCS0.000-1	8BVI0028HWS0.000-1	8BVI0028HCS0.000-1
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	0.19 A_{eff} per 1000 m		0.38 A_{eff} per 1000 m	
Peak current	4.7 A_{eff}		9.5 A_{eff}	
Nominal switching frequency	5 kHz			
Possible switching frequencies [10]	5 / 10 / 20 kHz			
Electrical stress of connected motor per IEC TS 60034-25 [11]	Limit value curve A			
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [12]			
Design				
U, V, W, PE	Male connector			
Shield connection	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.25 to 6 mm²			
Approbation data				
UL/C-UL-US	30 to 10 AWG			
CSA	28 to 10 AWG			
Terminal cable cross section dimension of shield connection	12 to 22 mm			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	25 m			
Switching frequency 10 kHz	25 m			
Switching frequency 20 kHz	10 m			
Motor holding brake connection				
Quantity	1			
Output voltage [13]	24 VDC +5.8% / -0% [14]			
Continuous current	1.1 A			
Max. internal resistance	0.5 Ω			
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	1.5 Ws			
Max. switching frequency	0.5 Hz			
Protective measures				
Overload and short circuit protection	Yes			
Open circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open circuit monitoring	Approx. 0.25 A			
Response threshold for undervoltage monitoring	24 VDC +0% / -4%			
Enable inputs				
Quantity	2			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Input current at nominal voltage	Approx. 30 mA			
Switching threshold				
Low	<5 V			
High	>15 V			
Switching delay at nominal input voltage				
Enable 1 → 0, PWM off	Max. 20.5 ms			
Enable 0 → 1, ready for PWM	Max. 100 µs			
Modulation compared to ground potential	Max. ±38 V			
OSSD signal connections [15]	permitted Max. test pulse length: 500 µs			
Trigger inputs				
Quantity	2			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			

Table 118: 8BVI0014HWS0.000-1, 8BVI0014HCS0.000-1, 8BVI0028HWS0.000-1, 8BVI0028HCS0.000-1 - Technical data

Model number	8BVI0014HWS0.000-1	8BVI0014HCS0.000-1	8BVI0028HWS0.000-1	8BVI0028HCS0.000-1
Input voltage				
Nominal		24 VDC		
Maximum		30 VDC		
Switching threshold				
Low		<5 V		
High		>15 V		
Input current at nominal voltage		Approx. 10 mA		
Switching delay				
Rising edge		52 µs ±0.5 µs (digitally filtered)		
Falling edge		53 µs ±0.5 µs (digitally filtered)		
Modulation compared to ground potential		Max. ±38 V		
Electrical characteristics				
Discharge capacitance		0.14 µF		
Operating conditions				
Permissible mounting orientations				
Hanging vertically		Yes		
Lying horizontally		Yes		
Standing horizontally		No		
Installation at elevations above sea level				
Nominal		0 to 500 m		
Maximum [16]		4000 m		
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)		
Overvoltage category per EN 61800-5-1		III		
Degree of protection per EN 60529		IP20		
Environmental conditions				
Temperature				
Operation				
Nominal		5 to 40°C		
Maximum [17]		55°C		
Storage		-25 to 55°C		
Transport		-25 to 70°C		
Relative humidity				
Operation		5 to 85%		
Storage		5 to 95%		
Transport		Max. 95% at 40°C		
Mechanical characteristics				
Dimensions [18]				
Width		53 mm		
Height		317 mm		
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 2.6 kg	Approx. 2.1 kg	Approx. 2.6 kg	Approx. 2.1 kg
Module width		1		

Table 118: 8BVI0014HWS0.000-1, 8BVI0014HCS0.000-1, 8BVI0028HWS0.000-1, 8BVI0028HCS0.000-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) I_M ... Current on X5A motor connection [A_{Eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module).
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
6) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
7) Valid in the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
8) The temperature specifications refer to the return temperature of the cold plate mounting plate.
9) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
   Caution! Condensation can occur at low flow temperatures and return temperatures.
10) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load.
11) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
12) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with EC regulation 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output (Power element: Limit speed exceeded).

13) During project development, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. The operating voltage range of the holding brake can be found in the user's manual for the respective motor.
14) The specified value is only valid under the following conditions:
- The 24 VDC supply for the module is provided by an 8B0C auxiliary supply module installed on the same mounting plate.
- Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.

If the 24 VDC supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.
15) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
16) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
17) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
18) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.1.2 8BVI0055HxS0.000-1, 8BVI0110HxS0.000-1

11.1.2.1 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI0055HWS0.000-1	ACOPOSmulti inverter module, 7.6 A, HV, wall mounting	
8BVI0110HWS0.000-1	ACOPOSmulti inverter module, 15.1 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8BVI0055HCS0.000-1	ACOPOSmulti inverter module, 7.6 A, HV, cold plate or feed-through mounting	
8BVI0110HCS0.000-1	ACOPOSmulti inverter module, 15.1 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZVI0055S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI00xxHxS0 modules: 1x 8TB3104.204G-11, 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
8BZVI0110S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0110HxS0 modules: 1x 8TB3104.204G-11, 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
	Terminal blocks	
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB3104.204G-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, G keying: 0110	

Table 119: 8BVI0055HWS0.000-1, 8BVI0110HWS0.000-1, 8BVI0055HCS0.000-1, 8BVI0110HCS0.000-1 - Order data

11.1.2.2 Technical data

Model number	8BVI0055HWS0.000-1	8BVI0055HCS0.000-1	8BVI0110HWS0.000-1	8BVI0110HCS0.000-1
General information				
B&R ID code	0x26E2	0x253D	0x270E	0x269B
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2			
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Functional safety[1]	Yes			
DC bus connection				
Voltage				
Nominal	750 VDC			
Continuous power consumption [2]	5.6 kW		11.2 kW	
Power dissipation depending on switching frequency [3]				
Switching frequency 5 kHz	[0.6 * I_M^2 + 1.3 * I_M + 60] W		[0.16 * I_M^2 + 5.6 * I_M + 55] W	
Switching frequency 10 kHz	[0.97 * I_M^2 + 0.5 * I_M + 110] W		[0.49 * I_M^2 + 4.7 * I_M + 95] W	
Switching frequency 20 kHz	[1.7 * I_M^2 - 0.7 * I_M + 225] W		[0.87 * I_M^2 + 10 * I_M + 200] W	
DC bus capacitance	165 µF		330 µF	
Design	ACOPOSmulti backplane			
24 VDC supply				
Input voltage	25 VDC ±1.6%			
Input capacitance	23.5 µF			
Max. power consumption	12 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake}$ [4]			
Design	ACOPOSmulti backplane			
24 VDC output				
Quantity	2			
Output voltage				
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/ 315)			
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%			
Fuse protection	250 mA (slow-blow) electronic, automatic reset			
Motor connection				
Quantity	1			
Continuous power per motor connection [2]	5.5 kW		11 kW	
Continuous current per motor connection [2]	7.6 A_{eff}		15.1 A_{eff}	
Reduction of continuous current depending on switching frequency [5]				
Switching frequency 5 kHz	No reduction	-	No reduction	-
Switching frequency 10 kHz	0.2 A/K (from 49°C)	-	0.26 A/K (from 33°C) [6]	-
Switching frequency 20 kHz	0.13 A/K (from 4°C) [6]	-	0.15 A/K (from -28°C) [6]	-
Reduction of continuous current depending on switching frequency and mounting method [7]				
Switching frequency 5 kHz				
Cold plate mounting [8]	-	0.65 A/K (from 57°C) [9]	-	0.73 A/K (from 55°C) [9]
Feed-through mounting	-	No reduction	-	0.29 A/K (from 49°C) [9]
Switching frequency 10 kHz				
Cold plate mounting [8]	-	0.28 A/K (from 46°C)	-	0.32 A/K (from 35°C) [10]
Feed-through mounting	-	0.15 A/K (from 34°C) [6]	-	0.17 A/K (from 11°C) [6]
Switching frequency 20 kHz				
Cold plate mounting [8]	-	0.14 A/K (from 5°C) [10]	-	0.18 A/K (from -13°C) [10]
Feed-through mounting	-	0.08 A/K (from -33°C) [6]	-	0.11 A/K (from -73°C) [6]
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	0.76 A_{eff} per 1000 m		1.51 A_{eff} per 1000 m	
Peak current	18.9 A_{eff}		37.7 A_{eff}	
Nominal switching frequency	5 kHz			
Possible switching frequencies [11]	5 / 10 / 20 kHz			
Electrical stress of connected motor per IEC TS 60034-25 [12]	Limit value curve A			
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [13]			

Table 120: 8BVI0055HWS0.000-1, 8BVI0055HCS0.000-1, 8BVI0110HWS0.000-1, 8BVI0110HCS0.000-1 - Technical data

Model number	8BVI0055HWS0.000-1	8BVI0055HCS0.000-1	8BVI0110HWS0.000-1	8BVI0110HCS0.000-1
Design				
U, V, W, PE	Male connector			
Shield connection	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.25 to 6 mm²			
Approbation data				
UL/C-UL-US	30 to 10 AWG			
CSA	28 to 10 AWG			
Terminal cable cross section dimension of shield connection	12 to 22 mm			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	25 m			
Switching frequency 10 kHz	25 m			
Switching frequency 20 kHz	10 m			
Motor holding brake connection				
Quantity	1			
Output voltage [14]	24 VDC +5.8% / -0% [15]			
Continuous current	1.1 A		2.1 A	
Max. internal resistance	0.5 Ω		0.3 Ω	
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	1.5 Ws		3 Ws	
Max. switching frequency	0.5 Hz			
Protective measures				
Overload and short circuit protection	Yes			
Open circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open circuit monitoring	Approx. 0.25 A		Approx. 0.5 A	
Response threshold for undervoltage monitoring	24 VDC +0% / -4%			
Enable inputs				
Quantity	2			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Input current at nominal voltage	Approx. 30 mA			
Switching threshold				
Low	<5 V			
High	>15 V			
Switching delay at nominal input voltage				
Enable 1 → 0, PWM off	Max. 20.5 ms			
Enable 0 → 1, ready for PWM	Max. 100 µs			
Modulation compared to ground potential	Max. ±38 V			
OSSD signal connections [16]	permitted Max. test pulse length: 500 µs			
Trigger inputs				
Quantity	2			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Switching threshold				
Low	<5 V			
High	>15 V			
Input current at nominal voltage	Approx. 10 mA			
Switching delay				
Rising edge	52 µs ±0.5 µs (digitally filtered)			
Falling edge	53 µs ±0.5 µs (digitally filtered)			
Modulation compared to ground potential	Max. ±38 V			

Table 120: 8BVI0055HWS0.000-1, 8BVI0055HCS0.000-1, 8BVI0110HWS0.000-1, 8BVI0110HCS0.000-1 - Technical data

Model number	8BVI0055HWS0.000-1	8BVI0055HCS0.000-1	8BVI0110HWS0.000-1	8BVI0110HCS0.000-1
Electrical characteristics				
Discharge capacitance	0.14 µF			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Lying horizontally	Yes			
Standing horizontally	No			
Installation at elevations above sea level				
Nominal	0 to 500 m			
Maximum [17]	4000 m			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP20			
Environmental conditions				
Temperature				
Operation				
Nominal	5 to 40°C			
Maximum [18]	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%			
Storage	5 to 95%			
Transport	Max. 95% at 40°C			
Mechanical characteristics				
Dimensions [19]				
Width	53 mm			
Height	317 mm			
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 2.7 kg	Approx. 2.2 kg	Approx. 2.9 kg	Approx. 2.4 kg
Module width	1			

Table 120: 8BVI0055HWS0.000-1, 8BVI0055HCS0.000-1, 8BVI0110HWS0.000-1, 8BVI0110HCS0.000-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) I_M ... Current on X5A motor connection [A_{Eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module).
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
6) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
7) Valid in the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
8) The temperature specifications refer to the return temperature of the cold plate mounting plate.
9) Value for the nominal switching frequency.
10) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
    Caution! Condensation can occur at low flow temperatures and return temperatures.
11) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load.
12) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
13) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with EC regulation 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output (Power element: Limit speed exceeded).
14) During project development, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. The operating voltage range of the holding brake can be found in the user's manual for the respective motor.
15) The specified value is only valid under the following conditions:
    - The 24 VDC supply for the module is provided by an 8B0C auxiliary supply module installed on the same mounting plate.
    - Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.
    If the 24 VDC supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
    If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.
16) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
17) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.

18) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.

19) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.1.3 8BVI0220HxS0.000-1

11.1.3.1 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI0220HWS0.000-1	ACOPOSmulti inverter module, 22 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8BVI0220HCS0.000-1	ACOPOSmulti inverter module, 22 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZVI0220S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0220HxS0 modules: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-00	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB4104.204G-00	4-pin screw clamp, single row, spacing: 10.16 mm, label 4: PE W V U, G keying: 0110	

Table 121: 8BVI0220HWS0.000-1, 8BVI0220HCS0.000-1 - Order data

11.1.3.2 Technical data

Model number	8BVI0220HWS0.000-1	8BVI0220HCS0.000-1
General information		
B&R ID code	0xA16C	0xA168
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2	
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
Functional safety[1)]	Yes	
DC bus connection		
Voltage		
Nominal	750 VDC	
Continuous power consumption [2)]	16.2 kW	
Power dissipation depending on switching frequency [3)]		
Switching frequency 5 kHz	[0.13 * I_M^2 + 5.5 * I_M + 40] W	
Switching frequency 10 kHz	[0.43 * I_M^2 + 3.7 * I_M + 110] W	
Switching frequency 20 kHz	[1.4 * I_M^2 + 1.97 * I_M + 230] W	
DC bus capacitance	495 µF	
Design	ACOPOSmulti backplane	
24 VDC supply		
Input voltage	25 VDC ±1.6%	
Input capacitance	32.9 µF	
Max. power consumption	20 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake}$[4)]	
Design	ACOPOSmulti backplane	
24 VDC output		
Quantity	2	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/ 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Fuse protection	250 mA (slow-blow) electronic, automatic reset	
Motor connection		
Quantity	1	
Continuous power per motor connection [2)]	16 kW	
Continuous current per motor connection [2)]	22 A_{Eff}	
Reduction of continuous current depending on switching frequency [5)]		
Switching frequency 5 kHz	No reduction	-
Switching frequency 10 kHz	0.4 A/K (from 31°C) [6)]	-
Switching frequency 20 kHz	0.31 A/K (from -16°C) [6)]	-
Reduction of continuous current depending on switching frequency and mounting method [7)]		
Switching frequency 5 kHz		
Cold plate mounting [8)]	-	No reduction
Feed-through mounting	-	No reduction
Switching frequency 10 kHz		
Cold plate mounting [8)]	-	0.36 A/K (from 5°C) [9)]
Feed-through mounting	-	0.39 A/K (from 26°C) [6)]
Switching frequency 20 kHz		
Cold plate mounting [8)]	-	0.5 A/K (from 49°C)
Feed-through mounting	-	0.15 A/K (from -59°C) [6)]
Reduction of continuous current depending on installation elevation		
Starting at 500 m above sea level	2.2 A_{Eff} per 1000 m	
Peak current	55 A_{Eff}	
Nominal switching frequency	5 kHz	
Possible switching frequencies [10)]	5 / 10 / 20 kHz	
Electrical stress of connected motor per IEC TS 60034-25 [11)]	Limit value curve A	
Protective measures		
Overload protection	Yes	
Short circuit and ground fault protection	Yes	
Max. output frequency	598 Hz [12)]	
Design		
U, V, W, PE	Male connector	
Shield connection	Yes	

Table 122: 8BVI0220HWS0.000-1, 8BVI0220HCS0.000-1 - Technical data

Model number	8BVI0220HWS0.000-1	8BVI0220HCS0.000-1
Terminal connection cross section		
Flexible and fine wire lines		
With wire end sleeves	0.5 to 6 mm²	
Approbation data		
UL/C-UL-US	20 to 8 AWG	
CSA	20 to 8 AWG	
Terminal cable cross section dimension of shield connection	12 to 22 mm	
Max. motor line length depending on switching frequency		
Switching frequency 5 kHz	25 m	
Switching frequency 10 kHz	25 m	
Switching frequency 20 kHz	25 m	
Motor holding brake connection		
Quantity	1	
Output voltage [13]	24 VDC +5.8% / -0% [14]	
Continuous current	4.2 A	
Max. internal resistance	0.15 Ω	
Extinction potential	Approx. 30 V	
Max. extinction energy per switching operation	3 Ws	
Max. switching frequency	0.5 Hz	
Protective measures		
Overload and short circuit protection	Yes	
Open circuit monitoring	Yes	
Undervoltage monitoring	Yes	
Response threshold for open circuit monitoring	Approx. 0.5 A	
Response threshold for undervoltage monitoring	24 VDC +0% / -4%	
Enable inputs		
Quantity	2	
Wiring	Sink	
Electrical isolation		
Input - Inverter module	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Input current at nominal voltage	Approx. 30 mA	
Switching threshold		
Low	<5 V	
High	>15 V	
Switching delay at nominal input voltage		
Enable 1 → 0, PWM off	Max. 20.5 ms	
Enable 0 → 1, ready for PWM	Max. 100 µs	
Modulation compared to ground potential	Max. ±38 V	
OSSD signal connections [15]	Permitted Max. test pulse length: 500 µs	
Trigger inputs		
Quantity	2	
Wiring	Sink	
Electrical isolation		
Input - Inverter module	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
Rising edge	52 µs ±0.5 µs (digitally filtered)	
Falling edge	53 µs ±0.5 µs (digitally filtered)	
Modulation compared to ground potential	Max. ±38 V	
Electrical characteristics		
Discharge capacitance	0.22 µF	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [16]	4000 m	

Table 122: 8BVI0220HWS0.000-1, 8BVI0220HCS0.000-1 - Technical data

Model number	8BVI0220HWS0.000-1	8BVI0220HCS0.000-1
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [17]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [18]		
Width	106.5 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 5.2 kg	Approx. 3.9 kg
Module width	2	

Table 122: 8BVI0220HWS0.000-1, 8BVI0220HCS0.000-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) I_M ... Current on X5A motor connection [A_{Eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
6) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
7) Valid for the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
8) The temperature specifications refer to the return temperature of the cold plate mounting plate.
9) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
   Caution! Condensation can occur at low flow temperatures and return temperatures.
10) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load.
11) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
12) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output (power unit: limit speed exceeded).
13) During the project development phase, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. The operating voltage range of the holding brake can be found in the user's manual for the respective motor.
14) The specified value is only valid under the following conditions:
   - The 24 VDC supply for the module is provided by an 8B0C auxiliary supply module installed on the same mounting plate.
   - Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.
   If the 24 VDC supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
   If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.
15) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
16) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go beyond this must be arranged with B&R.
17) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
18) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.1.4 8BVI0330HxS0.000-1, 8BVI0440HxS0.000-1

11.1.4.1 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI0330HWS0.000-1	ACOPOSmulti inverter module, 33 A, HV, wall mounting	
8BVI0440HWS0.000-1	ACOPOSmulti inverter module, 44 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8BVI0330HCS0.000-1	ACOPOSmulti inverter module, 33 A, HV, cold plate or feed-through mounting	
8BVI0440HCS0.000-1	ACOPOSmulti inverter module, 44 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZVI0440S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0330HxS0, 8BVI0440HxS0 modules: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-10	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS007.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 2x 45°; 4x screws	
8SCS008.0000-00	ACOPOSmulti shield component set: 1 shield plate 2x type 0, 1 hose clamp, B 9 mm, D 23-35 mm	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB4104.204G-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 4: PE W V U, G keying: 0110	

Table 123: 8BVI0330HWS0.000-1, 8BVI0440HWS0.000-1, 8BVI0330HCS0.000-1, 8BVI0440HCS0.000-1 - Order data

11.1.4.2 Technical data

Model number	8BVI0330HWS0.000-1	8BVI0330HCS0.000-1	8BVI0440HWS0.000-1	8BVI0440HCS0.000-1
General information				
B&R ID code	0xAD78	0xAD77	0xA075	0xA076
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2			
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Functional safety[1]	Yes			
DC bus connection				
Voltage				
Nominal	750 VDC			
Continuous power consumption [2]	24.4 kW		32.5 kW	
Power dissipation depending on switching frequency [3]				
Switching frequency 5 kHz	[0.07 * I_M^2 + 7.3 * I_M + 40] W			
Switching frequency 10 kHz	[0.2 * I_M^2 + 11.1 * I_M + 130] W			
Switching frequency 20 kHz	[1.85 * I_M^2 + 3.8 * I_M + 300] W			
DC bus capacitance	990 µF			
Design	ACOPOSmulti backplane			
24 VDC supply				
Input voltage	25 VDC ±1.6%			
Input capacitance	32.9 µF			
Max. power consumption	25 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake}$ [4]			
Design	ACOPOSmulti backplane			
24 VDC output				
Quantity	2			
Output voltage				
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/315)			
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%			
Fuse protection	250 mA (slow-blow) electronic, automatic reset			
Motor connection				
Quantity	1			
Continuous power per motor connection [2]	24 kW		32 kW	
Continuous current per motor connection [2]	33 A_{eff}		44 A_{eff}	
Reduction of continuous current depending on switching frequency [5]				
Switching frequency 5 kHz	1.57 A/K (starting at 40°C) [6]	-	1.57 A/K (starting at 40°C) [6]	-
Switching frequency 10 kHz	0.5 A/K (starting at -10°C) [7]	-	0.5 A/K (starting at -10°C) [7]	-
Switching frequency 20 kHz	0.36 A/K (starting at -77°C) [7]	-	0.36 A/K (starting at -77°C) [7]	-
Reduction of continuous current depending on switching frequency and mounting method [8]				
Switching frequency 5 kHz				
Cold plate mounting [9]	-	0.8 A/K (starting at 45°C) [6]	-	0.8 A/K (starting at 45°C) [6]
Feed-through mounting	-	1.26 A/K (starting at 40°C)	-	1.26 A/K (starting at 40°C) [6]
Switching frequency 10 kHz				
Cold plate mounting [9]	-	0.62 A/K (starting at 6°C) [10]	-	0.62 A/K (starting at 6°C) [10]
Feed-through mounting	-	0.37 A/K (starting at -36°C) [7]	-	0.37 A/K (starting at -36°C) [7]
Switching frequency 20 kHz				
Cold plate mounting [9]	-	0.32 A/K (starting at -82°C) [10]	-	0.32 A/K (starting at -82°C) [10]
Feed-through mounting	-	0.24 A/K (starting at -137°C) [7]	-	0.24 A/K (starting at -137°C) [7]
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	3.3 A_{eff} per 1000 m		4.4 A_{eff} per 1000 m	
Peak current	83 A_{eff}		88 A_{eff}	
Nominal switching frequency	5 kHz			
Possible switching frequencies [11]	5 / 10 / 20 kHz			
Electrical stress of connected motor per IEC TS 60034-25 [12]	Limit value curve A			

Table 124: 8BVI0330HWS0.000-1, 8BVI0330HCS0.000-1, 8BVI0440HWS0.000-1, 8BVI0440HCS0.000-1 - Technical data

Model number	8BVI0330HWS0.000-1	8BVI0330HCS0.000-1	8BVI0440HWS0.000-1	8BVI0440HCS0.000-1
Protective measures				
Overload protection		Yes		
Short circuit and ground fault protection		Yes		
Max. output frequency		598 Hz [13]		
Design				
U, V, W, PE		Male connector		
Shield connection		Yes		
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves		0.5 to 16 mm²		
Approbation data				
UL/C-UL-US		20 to 6 AWG		
CSA		20 to 6 AWG		
Terminal cable cross section dimension of shield connection		23 to 35 mm		
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz		25 m		
Switching frequency 10 kHz		25 m		
Switching frequency 20 kHz		25 m		
Motor holding brake connection				
Quantity		1		
Output voltage [14]		24 VDC +5.8% / -0% [15]		
Continuous current		4.2 A		
Max. internal resistance		0.15 Ω		
Extinction potential		Approx. 30 V		
Max. extinction energy per switching operation		3 Ws		
Max. switching frequency		0.5 Hz		
Protective measures				
Overload and short circuit protection		Yes		
Open circuit monitoring		Yes		
Undervoltage monitoring		Yes		
Response threshold for open circuit monitoring		Approx. 0.5 A		
Response threshold for undervoltage monitoring		24 VDC +0% / -4%		
Enable inputs				
Quantity		2		
Wiring		Sink		
Electrical isolation				
Input - Inverter module		Yes		
Input - Input		Yes		
Input voltage				
Nominal		24 VDC		
Maximum		30 VDC		
Input current at nominal voltage		Approx. 30 mA		
Switching threshold				
Low		<5 V		
High		>15 V		
Switching delay at nominal input voltage				
Enable 1 → 0, PWM off		Max. 20.5 ms		
Enable 0 → 1, ready for PWM		Max. 100 µs		
Modulation compared to ground potential		Max. ±38 V		
OSSD signal connections [16]		Permissible Max. test pulse length: 500 µs		
Trigger inputs				
Quantity		2		
Wiring		Sink		
Electrical isolation				
Input - Inverter module		Yes		
Input - Input		Yes		
Input voltage				
Nominal		24 VDC		
Maximum		30 VDC		
Switching threshold				
Low		<5 V		
High		>15 V		
Input current at nominal voltage		Approx. 10 mA		

Table 124: 8BVI0330HWS0.000-1, 8BVI0330HCS0.000-1, 8BVI0440HWS0.000-1, 8BVI0440HCS0.000-1 - Technical data

Model number	8BVI0330HWS0.000-1	8BVI0330HCS0.000-1	8BVI0440HWS0.000-1	8BVI0440HCS0.000-1
Switching delay				
Rising edge	52 µs ±0.5 µs (digitally filtered)			
Falling edge	53 µs ±0.5 µs (digitally filtered)			
Modulation compared to ground potential	Max. ±38 V			
Electrical characteristics				
Discharge capacitance	0.22 µF			
Operating conditions				
Permissible mounting orientations				
Hanging vertically	Yes			
Lying horizontally	Yes			
Standing horizontally	No			
Installation at elevations above sea level				
Nominal	0 to 500 m			
Maximum [17]	4000 m			
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)			
Overvoltage category per EN 61800-5-1	III			
Degree of protection per EN 60529	IP20			
Environmental conditions				
Temperature				
Operation				
Nominal	5 to 40°C			
Maximum [18]	55°C			
Storage	-25 to 55°C			
Transport	-25 to 70°C			
Relative humidity				
Operation	5 to 85%			
Storage	5 to 95%			
Transport	Max. 95% at 40°C			
Mechanical characteristics				
Dimensions [19]				
Width	106.5 mm			
Height	317 mm			
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 5.4 kg	Approx. 4.3 kg	Approx. 5.4 kg	Approx. 4.3 kg
Module width	2			

Table 124: 8BVI0330HWS0.000-1, 8BVI0330HCS0.000-1, 8BVI0440HWS0.000-1, 8BVI0440HCS0.000-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) I_M ... Current on motor connection X5A [A_{eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$ ... Power [W] that is output to connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
6) Value for the nominal switching frequency.
7) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
8) Valid for the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
9) The temperature specifications refer to the return temperature of the cold plate mounting plate.
10) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
    Caution! Condensation can occur at low flow temperatures and return temperatures.
11) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load.
12) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
13) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
14) During the project development phase, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. For the operating voltage range of the holding brake, see the user documentation for the motor being used.
15) The specified value is only valid under the following conditions:
    - The 24 VDC power supply for the module is provided by an auxiliary supply module 8B0C located on the same mounting plate.
    - Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.
    If the 24 VDC power supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
    If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.

16) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
17) Continuous operation at an installation elevation of 500 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
18) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.
19) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.1.5 Wiring

11.1.5.1 Single-axis modules (single- and double-width) - Pinout overview

Single-width

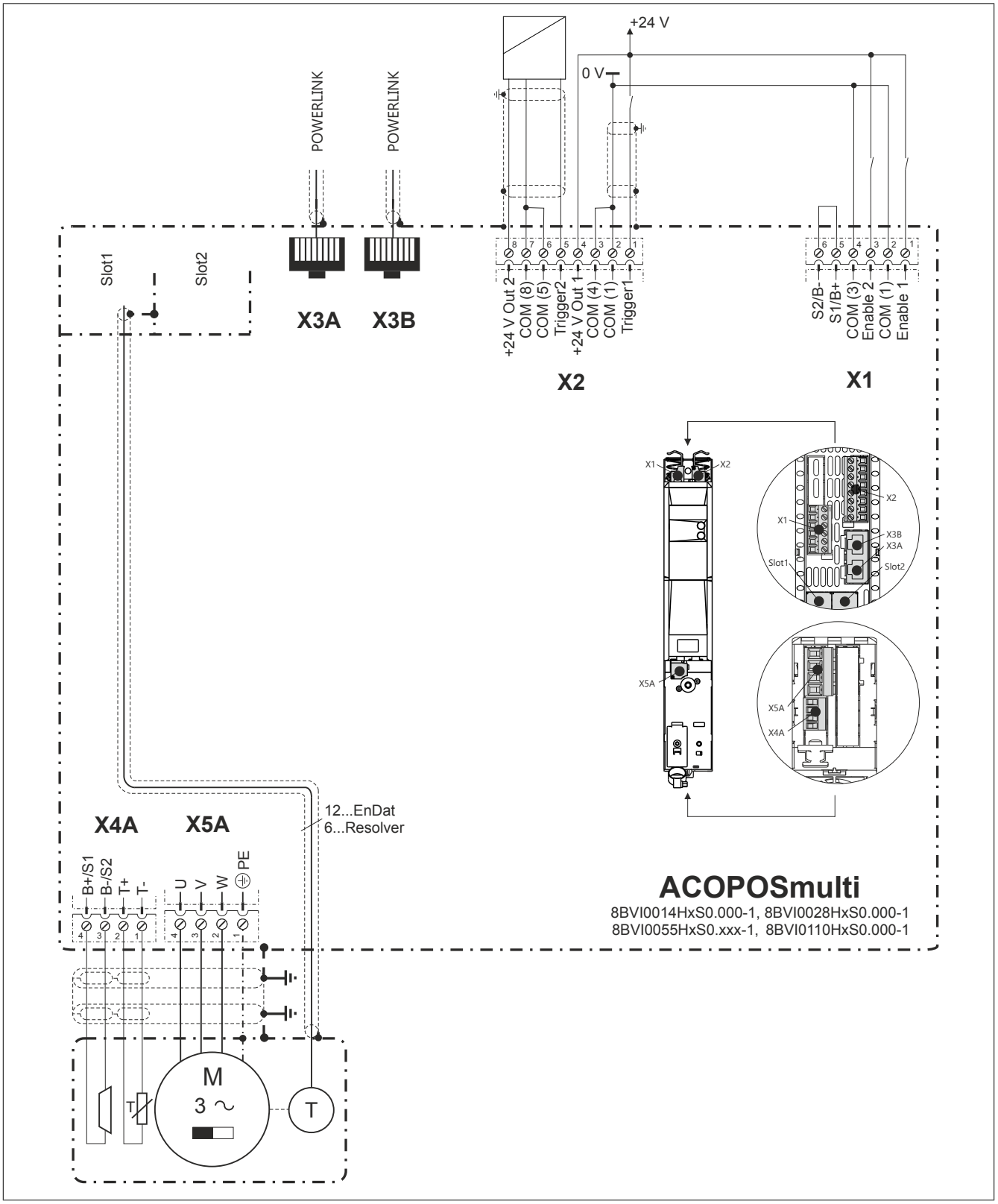


Figure 74: 8BVI0014HxS0.000-1, 8BVI0028HxS0.000-1, 8BVI0055HxS0.000-1, 8BVI0110HxS0.000-1 - Pinout overview

Double-width

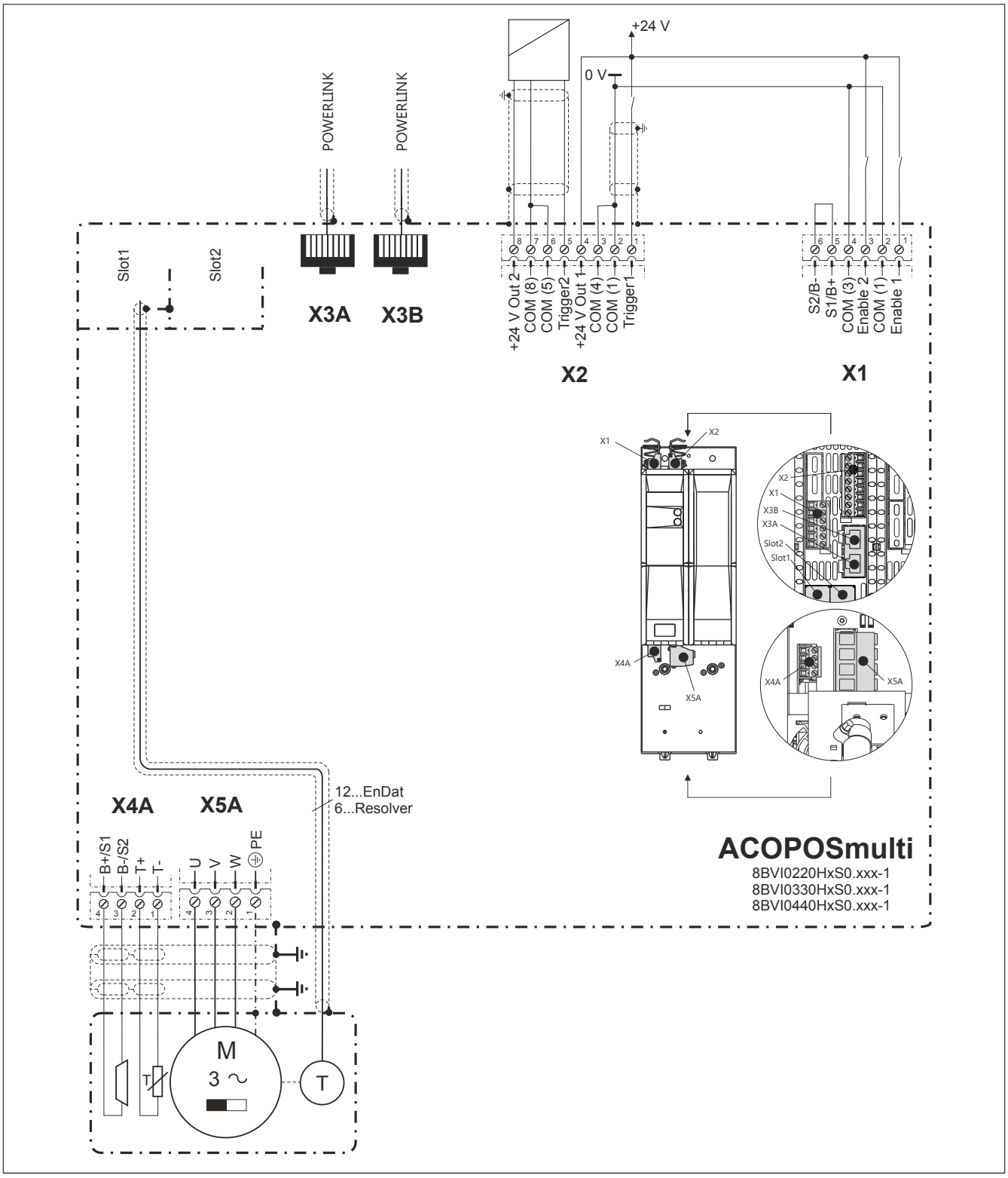


Figure 75: 8BVI0220HxS0.000-1, 8BVI0330HxS0.000-1, 8BVI0440HxS0.000-1 - Pinout overview

11.1.5.1.1 X1 connector - Pinout

X1	Pin	Name	Function
	1	Enable 1 1)	Axis 1: Enable 1
	2	COM (1)	Axis 1: Enable 1 0 V
	3	Enable 2 1)	Axis 1: Enable 2
	4	COM (3)	Axis 1: Enable 2 0 V
	5	S1/B+ 2)	Axis 1: Brake + / Activation of the external holding brake
	6	S2/B- 2)	Axis 1: Brake - / Activation of the external holding brake

Table 125: X1 connector - Pinout

1) Wiring is not permitted to exceed a total length of 30 m.
2) If the connection is used to activate the external holding brake (S1/S2), then the cabling is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via the S1/S2 connections) instead of via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Danger!

The connections for the motor temperature sensors and the motor holding brake are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOSmulti inverter modules cannot determine if a holding brake is connected with reverse polarity!

Wiring the connections for the motor holding brake

Activating the motor holding brake internally via the ACOPOSmulti inverter module

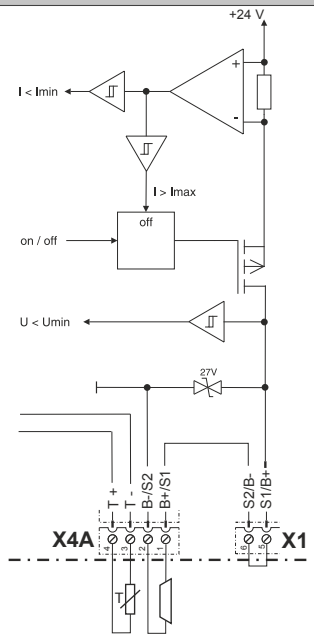
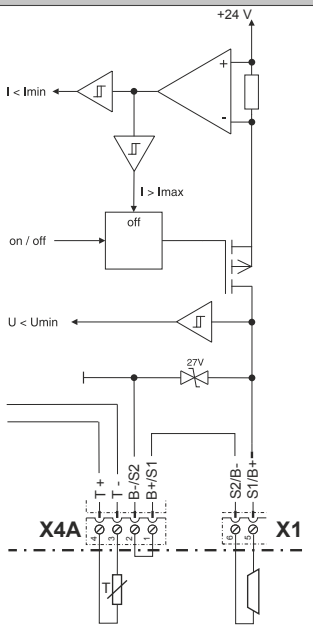
Holding brake connected to the X4A connector	Holding brake connected to the X1 connector	Description
		• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Information: **A jumper must be placed between S1/B+ and S2/B- on the X1 connector.**	**Information:** **A jumper must be placed between B+/S1 and B-/S2 on the X4A connector.**	

Table 126: Activating the motor holding brake internally

Activation of the motor holding brake internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts

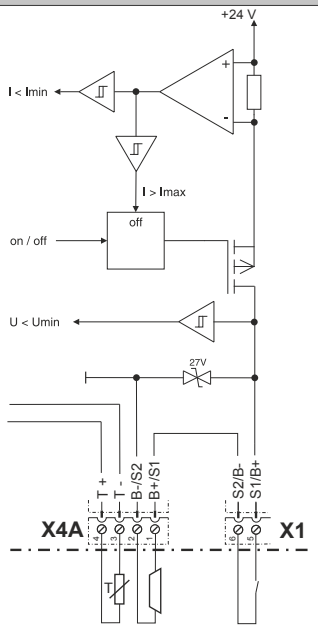
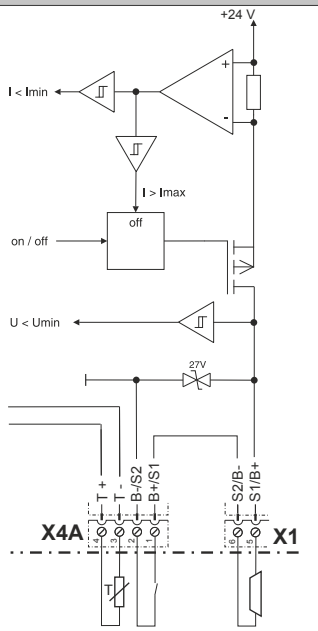
Holding brake connected to the X4A connector	Holding brake connected to the X1 connector	Description
		• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts[1)] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.[2)]**

Table 127: Activating the motor holding brake internally and/or externally

1) Activating the holding brake via external safety circuits can therefore be handled independently of the control functionality integrated in the ACOPOSmulti inverter.
2) The parameters are set using ParID 90 (1 ... Internal monitoring active; 5 ... Internal monitoring not active).

11.1.5.1.2 X2 connector - Pinout

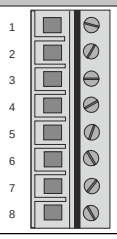
X2	Pin	Name	Function
	1	Trigger1	Trigger 1
	2	COM (1)	Trigger 1 0 V
	3	COM (4)	+24 V output 1 0 V
	4	+24 V Out 1	+24 V output 1
	5	Trigger2	Trigger 2
	6	COM (5)	Trigger 2 0 V
	7	COM (8)	+24 V output 2 0 V
	8	+24 V Out 2	+24 V output 2

Table 128: X2 connector - Pinout

11.1.5.1.3 Connectors X3A, X3B - Pinout

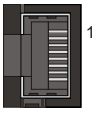
X3A, X3B	Pin	Name	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 129: X3A, X3B connectors - Pinout

11.1.5.1.4 Connector X4A - Pinout

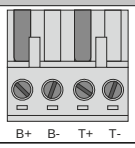
X4A	Name	Function
	T-	Axis 1: Temperature sensor -
	T+	Axis 1: Temperature sensor +
	B-/S2 1)	Axis 1: Brake - / Activation of the external holding brake
	B+/S1 1)	Axis 1: Brake + / Activation of the external holding brake

Table 130: Connector X4A - Pinout

1) If the connection is used to activate the external holding brake (S1/S2), then the cabling is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Danger!

The connections for the motor temperature sensors and the motor holding brake are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOSmulti inverter modules cannot determine if a holding brake is connected with reverse polarity!

Warning!

Temperature sensors are only permitted to be connected to the X4A/T+ and X4A/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT1 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

Wiring the connections for the motor holding brake

Activating the motor holding brake internally via the ACOPOSmulti inverter module

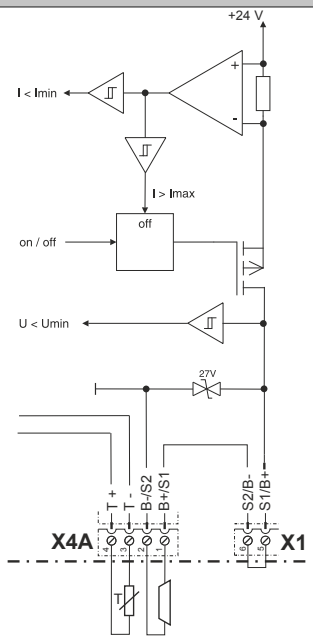
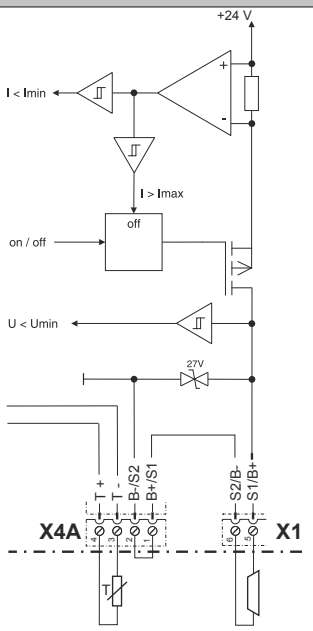
Holding brake connected to the X4A connector	Holding brake connected to the X1 connector	Description
 **Information:** **A jumper must be placed between S1/B+ and S2/B- on the X1 connector.**	 **Information:** **A jumper must be placed between B+/S1 and B-/S2 on the X4A connector.**	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module

Table 131: Activating the motor holding brake internally

Activation of the motor holding brake internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts

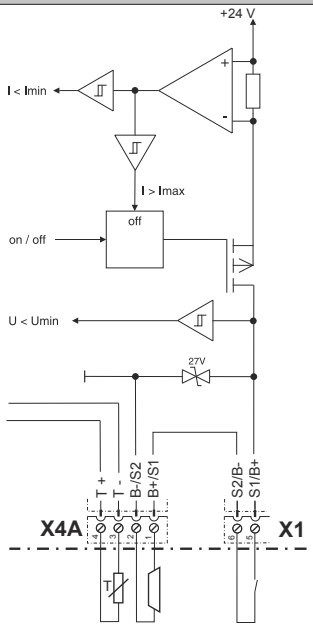
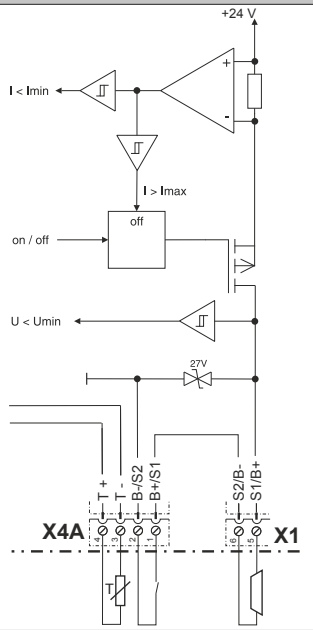
Holding brake connected to the X4A connector	Holding brake connected to the X1 connector	Description
		• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts[1)] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.[2)]**

Table 132: Activating the motor holding brake internally and/or externally

1) Activating the holding brake via external safety circuits can therefore be handled independently of the control functionality integrated in the ACOPOSmulti inverter.
2) The parameters are set using ParID 90 (1 ... Internal monitoring active; 5 ... Internal monitoring not active).

11.1.5.1.5 X5A connector - Pinout

Single-width

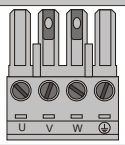
X5A	Name	Function
	⏚	Axis 1: Protective ground conductor
	W	Axis 1: Motor connection W
	V	Axis 1: Motor connection V
	U	Axis 1: Motor connection U

Table 133: Connector X5A - Pinout

Double-width

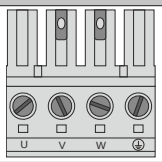
X5A	Name	Function
	⏚	Axis 1: Protective ground conductor
	W	Axis 1: Motor connection W
	V	Axis 1: Motor connection V
	U	Axis 1: Motor connection U

Table 134: Connector X5A - Pinout

Information:

An additional PE wire does not have to be connected to the threaded bolt beside the X5A connector. The PE connection on the male X5A connector is required and sufficient.

11.1.5.1.6 Input/Output circuit diagram

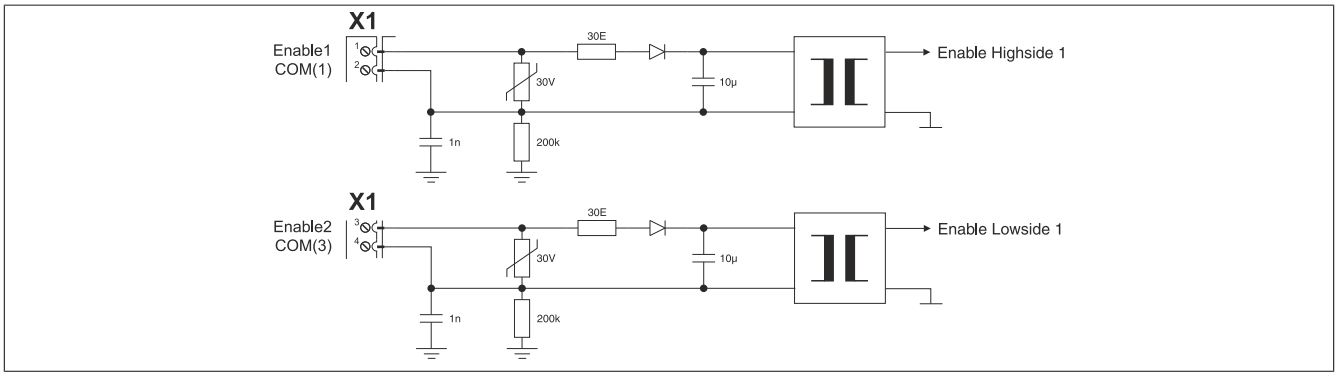


Figure 76: Enable

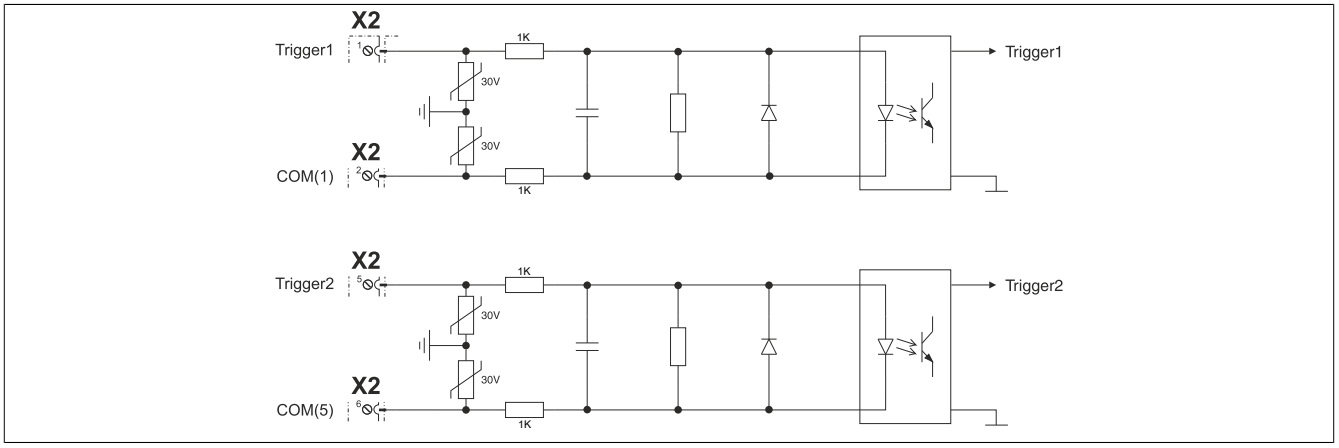


Figure 77: Trigger inputs

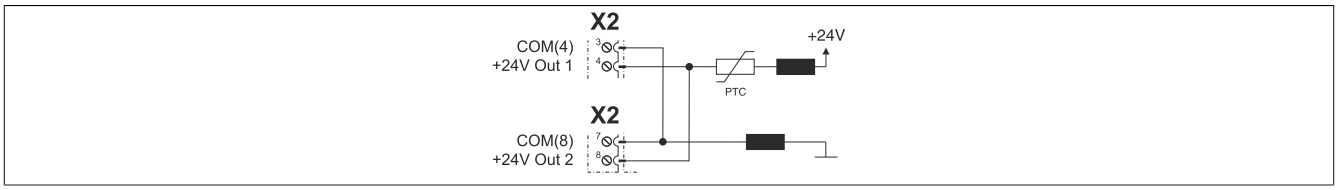


Figure 78: 24 VDC out

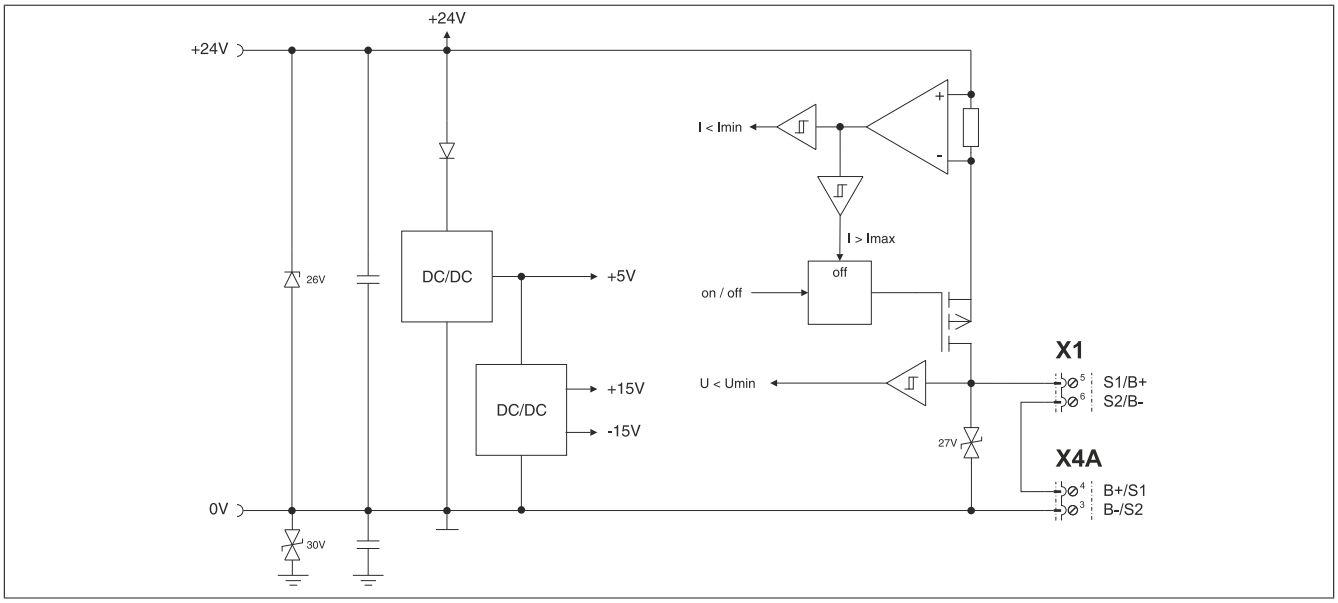


Figure 79: Holding brake

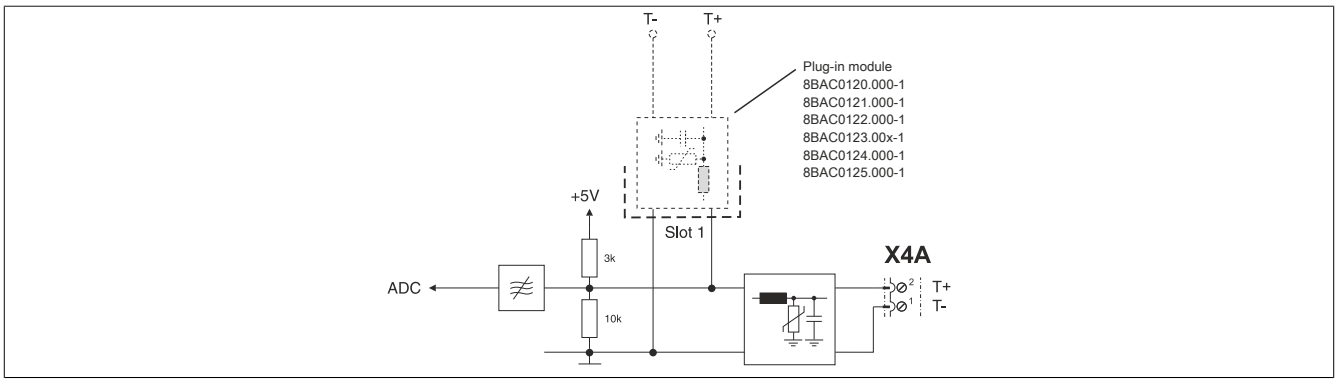


Figure 80: Temperature sensor

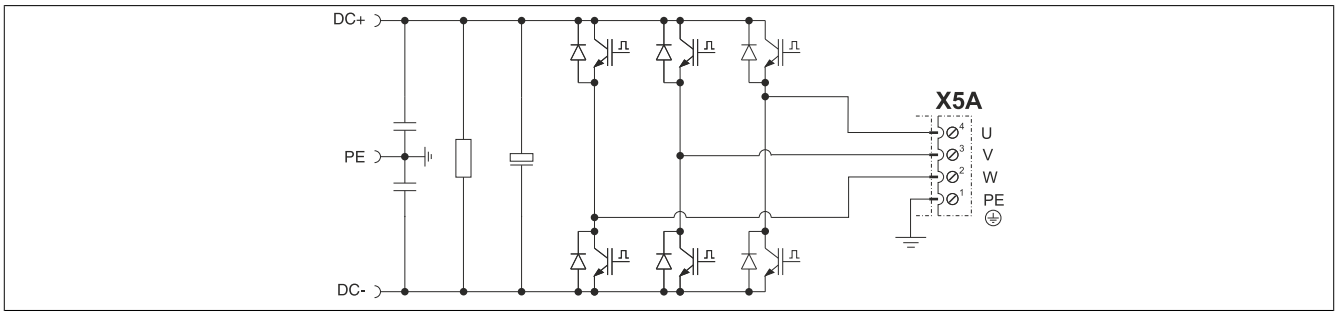


Figure 81: Motor

11.2 Single-axis modules (4x- and 8x-width)

11.2.1 8BVI0660HxS0.000-1, 8BVI0880HxS0.004-1

11.2.1.1 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI0660HWS0.000-1	ACOPOSmulti inverter module, 66 A, HV, wall mounting	
8BVI0880HWS0.004-1	ACOPOSmulti inverter module, 88 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8BVI0660HCS0.000-1	ACOPOSmulti inverter module, 66 A, HV, cold plate or feed-through mounting	
8BVI0880HCS0.004-1	ACOPOSmulti inverter module, 88 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZVI1650S0.000-1A	Screw clamp terminal block set for ACOPOSmulti 8BVI0660HxS0, 8BVI0880HxS0 and 8BVI16500HxS0 modules: 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS001.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 1, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS003.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 4x 45°; 8x screws	
8SCS004.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 0, 2 hose clamps, B 9 mm, D 32-50 mm	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	

Table 135: 8BVI0660HWS0.000-1, 8BVI0880HWS0.004-1, 8BVI0660HCS0.000-1, 8BVI0880HCS0.004-1 - Order data

Model number	Short description	Figure
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	

Table 135: 8BVI0660HWS0.000-1, 8BVI0880HWS0.004-1, 8BVI0660HCS0.000-1, 8BVI0880HCS0.004-1 - Order data

11.2.1.2 Technical data

Model number	8BVI0660HWS0.000-1	8BVI0660HCS0.000-1	8BVI0880HWS0.004-1	8BVI0880HCS0.004-1
General information				
B&R ID code	0xBE8A	0xBE88	0xA69F	0xA64A
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2			
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Functional safety[1]	Yes			
DC bus connection				
Voltage				
Nominal	750 VDC			
Continuous power consumption [2]	48.8 kW		65 kW	
Power dissipation depending on switching frequency [3]				
Switching frequency 5 kHz	$[0.03 * I_M^2 + 7.9 * I_M + 90]$ W			
Switching frequency 10 kHz	$[0.11 * I_M^2 + 11 * I_M + 185]$ W			
Switching frequency 20 kHz	$[0.17 * I_M^2 + 27 * I_M + 310]$ W			
DC bus capacitance	1980 µF			
Design	ACOPOSmulti backplane			
24 VDC supply				
Input voltage	25 VDC ±1.6%			
Input capacitance	32.9 µF			
Max. power consumption	$27 W + P_{SLOT1} + P_{SLOT2} + P_{24 V Out} + P_{HoldingBrake}$[4]			
Design	ACOPOSmulti backplane			
24 VDC output				
Quantity	2			
Output voltage				
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/ 315)			
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%			
Fuse protection	250 mA (slow-blow) electronic, automatic reset			
Motor connection				
Quantity	1			
Continuous power per motor connection [2]	48 kW		64 kW	
Continuous current per motor connection [2]	66 A_{eff}		88 A_{eff}	
Reduction of continuous current depending on switching frequency [5]				
Switching frequency 5 kHz	1.4 A/K (from 41°C) [6]	-	1.4 A/K (from 41°C) [6]	-
Switching frequency 10 kHz	0.92 A/K (from -5°C) [7]	-	0.92 A/K (from -5°C) [7]	-
Switching frequency 20 kHz	0.56 A/K (from -90°C) [7]	-	0.56 A/K (from -90°C) [7]	-
Reduction of continuous current depending on switching frequency and mounting method [8]				
Switching frequency 5 kHz				
Cold plate mounting [9]	-	1.9 A/K (from 58°C) [6]	-	1.9 A/K (from 58°C) [6]
Feed-through mounting	-	1.82 A/K (from 40°C) [6]	-	1.82 A/K (from 40°C) [6]
Switching frequency 10 kHz				
Cold plate mounting [9]	-	1.36 A/K (from 27°C) [10]	-	1.36 A/K (from 27°C) [10]
Feed-through mounting	-	0.88 A/K (from -12°C) [7]	-	0.88 A/K (from -12°C) [7]
Switching frequency 20 kHz				
Cold plate mounting [9]	-	0.75 A/K (from -37°C) [10]	-	0.75 A/K (from -37°C) [10]
Feed-through mounting	-	0.54 A/K (from -106°C) [7]	-	0.54 A/K (from -106°C) [7]

Table 136: 8BVI0660HWS0.000-1, 8BVI0660HCS0.000-1, 8BVI0880HWS0.004-1, 8BVI0880HCS0.004-1 - Technical data

Model number	8BVI0660HWS0.000-1	8BVI0660HCS0.000-1	8BVI0880HWS0.004-1	8BVI0880HCS0.004-1
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	6.6 A_{eff} per 1000 m		8.8 A_{eff} per 1000 m	
Peak current	132 A_{eff}		176 A_{eff}	
Nominal switching frequency	5 kHz			
Possible switching frequencies [11]	5 / 10 / 20 kHz			
Electrical stress of connected motor per IEC TS 60034-25 [12]	Limit value curve A			
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [13]			
Design				
U, V, W, PE	M8 threaded bolt			
Shield connection	Yes			
Connection cross section range				
Flexible and fine wire lines	--- [14]			
Terminal cable cross section dimension of shield connection	12 to 50 mm [15]			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	25 m			
Switching frequency 10 kHz	25 m			
Switching frequency 20 kHz	25 m			
Motor holding brake connection				
Quantity	1			
Output voltage [16]	24 VDC +5.8% / -0% [17]			
Continuous current	4.2 A			
Max. internal resistance	0.15 Ω			
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	3 Ws			
Max. switching frequency	0.5 Hz			
Protective measures				
Overload and short circuit protection	Yes			
Open circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open circuit monitoring	Approx. 0.5 A			
Response threshold for undervoltage monitoring	24 VDC +0% / -4%			
Enable inputs				
Quantity	2			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Input current at nominal voltage	Approx. 30 mA			
Switching threshold				
Low	<5 V			
High	>15 V			
Switching delay at nominal input voltage				
Enable 1 → 0, PWM off	Max. 20.5 ms			
Enable 0 → 1, ready for PWM	Max. 100 µs			
Modulation compared to ground potential	Max. ±38 V			
OSSD signal connections [18]	permitted Max. test pulse length: 500 µs			
Trigger inputs				
Quantity	2			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			

Table 136: 8BVI0660HWS0.000-1, 8BVI0660HCS0.000-1, 8BVI0880HWS0.004-1, 8BVI0880HCS0.004-1 - Technical data

Model number	8BVI0660HWS0.000-1	8BVI0660HCS0.000-1	8BVI0880HWS0.004-1	8BVI0880HCS0.004-1
Switching threshold				
Low		<5 V		
High		>15 V		
Input current at nominal voltage		Approx. 10 mA		
Switching delay				
Rising edge		52 µs ±0.5 µs (digitally filtered)		
Falling edge		53 µs ±0.5 µs (digitally filtered)		
Modulation compared to ground potential		Max. ±38 V		
Electrical characteristics				
Discharge capacitance		0.44 µF		
Operating conditions				
Permissible mounting orientations				
Hanging vertically		Yes		
Lying horizontally		Yes		
Standing horizontally		No		
Installation at elevations above sea level				
Nominal		0 to 500 m		
Maximum [19]		4000 m		
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)		
Overvoltage category per EN 61800-5-1		III		
Degree of protection per EN 60529		IP20		
Environmental conditions				
Temperature				
Operation				
Nominal		5 to 40°C		
Maximum [20]		55°C		
Storage		-25 to 55°C		
Transport		-25 to 70°C		
Relative humidity				
Operation		5 to 85%		
Storage		5 to 95%		
Transport		Max. 95% at 40°C		
Mechanical characteristics				
Dimensions [21]				
Width		213.5 mm		
Height		317 mm		
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 10.9 kg	Approx. 8 kg	Approx. 10.9 kg	Approx. 7.1 kg
Module width		4		

Table 136: 8BVI0660HWS0.000-1, 8BVI0660HCS0.000-1, 8BVI0880HWS0.004-1, 8BVI0880HCS0.004-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) I_M ... Current on X5A motor connection [A_{Eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module).
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
6) Value for the nominal switching frequency.
7) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
8) Valid in the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
9) The temperature specifications refer to the return temperature of the cold plate mounting plate.
10) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
    Caution! Condensation can occur at low flow temperatures and return temperatures.
11) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load.
12) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
13) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with EC regulation 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output (Power element: Limit speed exceeded).
14) The connection is made with cable lugs for M8 (0.32") threaded bolts. The nominal cross section of the cable lug must match the cross section of the conductor that is to be connected in the particular application.
15) The maximum diameter that can be clamped depends on the shield component set.

16) During project development, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. The operating voltage range of the holding brake can be found in the user's manual for the respective motor.
17) The specified value is only valid under the following conditions:
- The 24 VDC supply for the module is provided by an 8B0C auxiliary supply module installed on the same mounting plate.
- Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.

If the 24 VDC supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.
18) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
19) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
20) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
21) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.2.2 8BVI1650HxS0.000-1

11.2.2.1 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI1650HWS0.000-1	ACOPOSmulti inverter module, 165 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8BVI1650HCS0.000-1	ACOPOSmulti inverter module, 165 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Terminal block sets	
8BZVI1650S0.000-1A	Screw clamp terminal block set for ACOPOSmulti 8BVI0660HxS0, 8BVI0880HxS0 and 8BVI16500HxS0 modules: 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS001.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 1, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS003.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 4x 45°; 8x screws	
8SCS004.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 0, 2 hose clamps, B 9 mm, D 32-50 mm	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	
	Terminal blocks	
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2210-00	Push-in terminal block 6-pin, 1-row, spacing: 5.08 mm, label 1: numbered consecutively	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	

Table 137: 8BVI1650HWS0.000-1, 8BVI1650HCS0.000-1 - Order data

11.2.2.2 Technical data

Model number	8BVI1650HWS0.000-1	8BVI1650HCS0.000-1
General information		
B&R ID code	0xAD84	0xAD83
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2	
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
Functional safety[1]	Yes	
DC bus connection		
Voltage		
Nominal	750 VDC	
Continuous power consumption [2]	121.8 kW	
Power dissipation depending on switching frequency [3]		
Switching frequency 5 kHz	[0.001 * I_M^2 + 9.9 * I_M + 165] W	
Switching frequency 10 kHz	[0.17 * I_M^2 + 10.8 * I_M + 320] W	
Switching frequency 20 kHz	In preparation	
DC bus capacitance	3630 µF	
Design	ACOPOSmulti backplane	
24 VDC supply		
Input voltage	25 VDC ±1.6%	
Input capacitance	32.9 µF	
Max. power consumption	37 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake}$[4]	
Design	ACOPOSmulti backplane	
24 VDC output		
Quantity	2	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/ 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Fuse protection	250 mA (slow-blow) electronic, automatic reset	
Motor connection		
Quantity	1	
Continuous power per motor connection [2]	120 kW	
Continuous current per motor connection [2]	165 A_{eff}	
Reduction of continuous current depending on switching frequency [5]		
Switching frequency 5 kHz	3.48 A/K (from 40°C) [6]	-
Switching frequency 10 kHz	1.17 A/K (from -34°C) [7]	-
Switching frequency 20 kHz	0.66 A/K (from -165°C) [7]	-
Reduction of continuous current depending on switching frequency and mounting method [8]		
Switching frequency 5 kHz		
Cold plate mounting [9]	-	3.1 A/K (from 53°C) [6]
Feed-through mounting	-	2.82 A/K (from 40°C) [6]
Switching frequency 10 kHz		
Cold plate mounting [9]	-	1.8 A/K (from 17°C) [10]
Feed-through mounting	-	1.5 A/K (from -13°C) [7]
Switching frequency 20 kHz		
Cold plate mounting [9]	-	1.2 A/K (from -60°C) [10]
Feed-through mounting	-	0.72 A/K (from -141 °C) [7]
Reduction of continuous current depending on installation elevation		
Starting at 500 m above sea level	16.5 A_{eff} per 1000 m	
Peak current	330 A_{eff}	
Nominal switching frequency	5 kHz	
Possible switching frequencies [11]	5 / 10 / 20 kHz	
Electrical stress of connected motor per IEC TS 60034-25 [12]	Limit value curve A	
Protective measures		
Overload protection	Yes	
Short circuit and ground fault protection	Yes	
Max. output frequency	598 Hz [13]	
Design		
U, V, W, PE	M8 threaded bolt	
Shield connection	Yes	
Connection cross section range		
Flexible and fine wire lines	--- [14]	
Terminal cable cross section dimension of shield connection	12 to 50 mm [15]	

Table 138: 8BVI1650HWS0.000-1, 8BVI1650HCS0.000-1 - Technical data

Model number	8BVI1650HWS0.000-1	8BVI1650HCS0.000-1
Max. motor line length depending on switching frequency		
Switching frequency 5 kHz	25 m	
Switching frequency 10 kHz	25 m	
Switching frequency 20 kHz	25 m	
Motor holding brake connection		
Quantity	1	
Output voltage [16]	24 VDC +5.8% / -0% [17]	
Continuous current	4.2 A	
Max. internal resistance	0.15 Ω	
Extinction potential	Approx. 30 V	
Max. extinction energy per switching operation	3 Ws	
Max. switching frequency	0.5 Hz	
Protective measures		
Overload and short circuit protection	Yes	
Open circuit monitoring	Yes	
Undervoltage monitoring	Yes	
Response threshold for open circuit monitoring	Approx. 0.5 A	
Response threshold for undervoltage monitoring	24 VDC +0% / -4%	
Enable inputs		
Quantity	2	
Wiring	Sink	
Electrical isolation		
Input - Inverter module	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Input current at nominal voltage	Approx. 30 mA	
Switching threshold		
Low	<5 V	
High	>15 V	
Switching delay at nominal input voltage		
Enable 1 → 0, PWM off	Max. 20.5 ms	
Enable 0 → 1, ready for PWM	Max. 100 µs	
Modulation compared to ground potential	Max. ±38 V	
OSSD signal connections [18]	permitted Max. test pulse length: 500 µs	
Trigger inputs		
Quantity	2	
Wiring	Sink	
Electrical isolation		
Input - Inverter module	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
Rising edge	52 µs ±0.5 µs (digitally filtered)	
Falling edge	53 µs ±0.5 µs (digitally filtered)	
Modulation compared to ground potential	Max. ±38 V	
Electrical characteristics		
Discharge capacitance	0.9 µF	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [19]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	

Table 138: 8BVI1650HWS0.000-1, 8BVI1650HCS0.000-1 - Technical data

Model number	8BVI1650HWS0.000-1	8BVI1650HCS0.000-1
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [20]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [21]		
Width	427.5 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	24.7 kg	Approx. 19.5 kg
Module width	8	

Table 138: 8BVI1650HWS0.000-1, 8BVI1650HCS0.000-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) I_M ... Current on X5A motor connection [A_{Eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module).
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
6) Value for the nominal switching frequency.
7) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
8) Valid in the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
9) The temperature specifications refer to the return temperature of the cold plate mounting plate.
10) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
    Caution! Condensation can occur at low flow temperatures and return temperatures.
11) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load.
12) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
13) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output (Power unit: Limit speed exceeded).
14) The connection is made with cable lugs for M8 (0.32") threaded bolts. The nominal cross section of the cable lug must match the cross section of the conductor that is to be connected in the particular application.
15) The maximum diameter that can be clamped depends on the shield component set.
16) During project development, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. The operating voltage range of the holding brake can be found in the user's manual for the respective motor.
17) The specified value is only valid under the following conditions:
    - The 24 VDC supply for the module is provided by an 8B0C auxiliary supply module installed on the same mounting plate.
    - Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.
    If the 24 VDC supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
    If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.
18) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
19) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
20) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
21) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.2.3 Wiring

11.2.3.1 Single-axis modules (4x- and 8x- width) - Pinout overview

4x-width

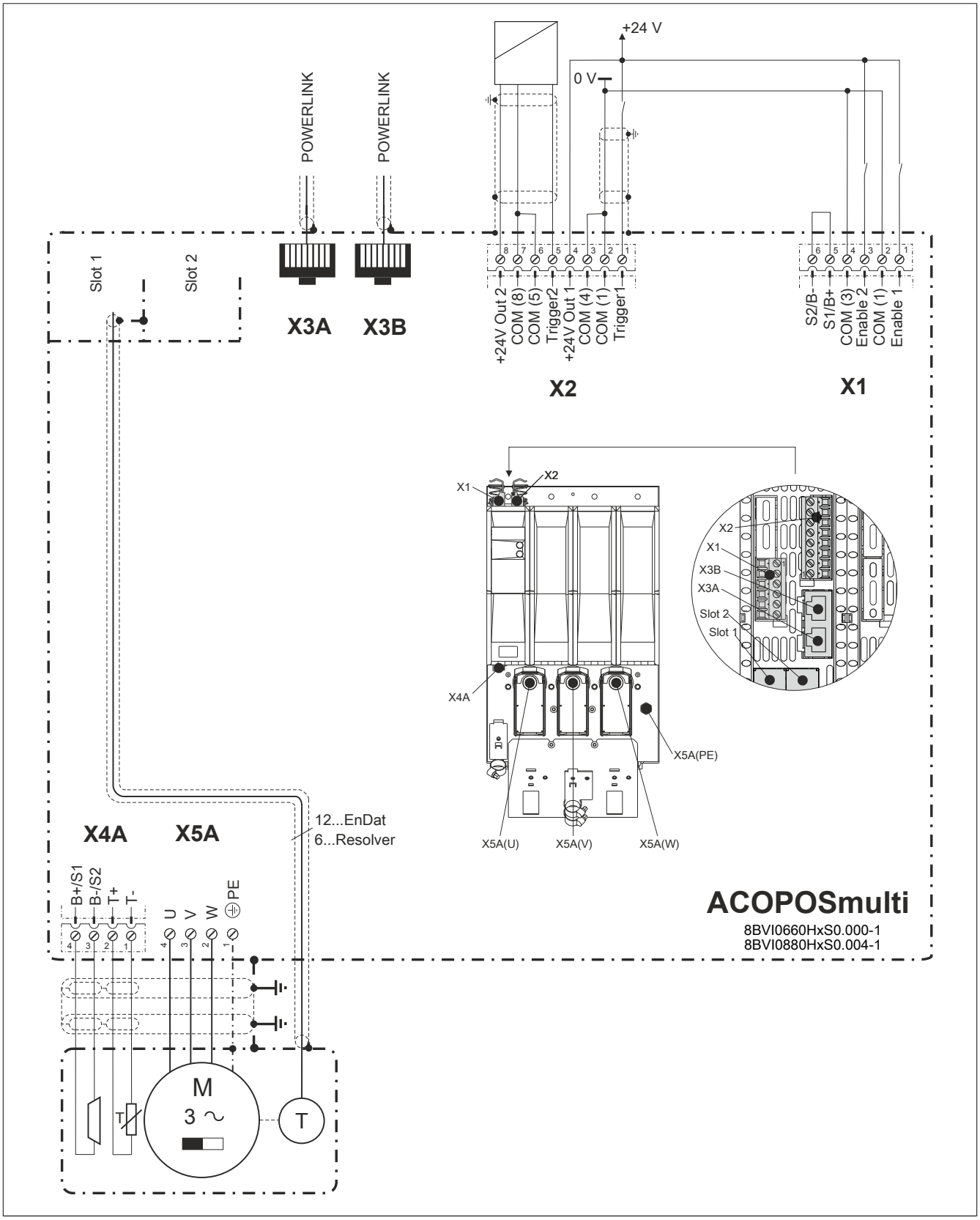


Figure 82: 8BVI0660HxS0.000-1, 8BVI0880HxS0.004-1 - Pinout overview

8x-width

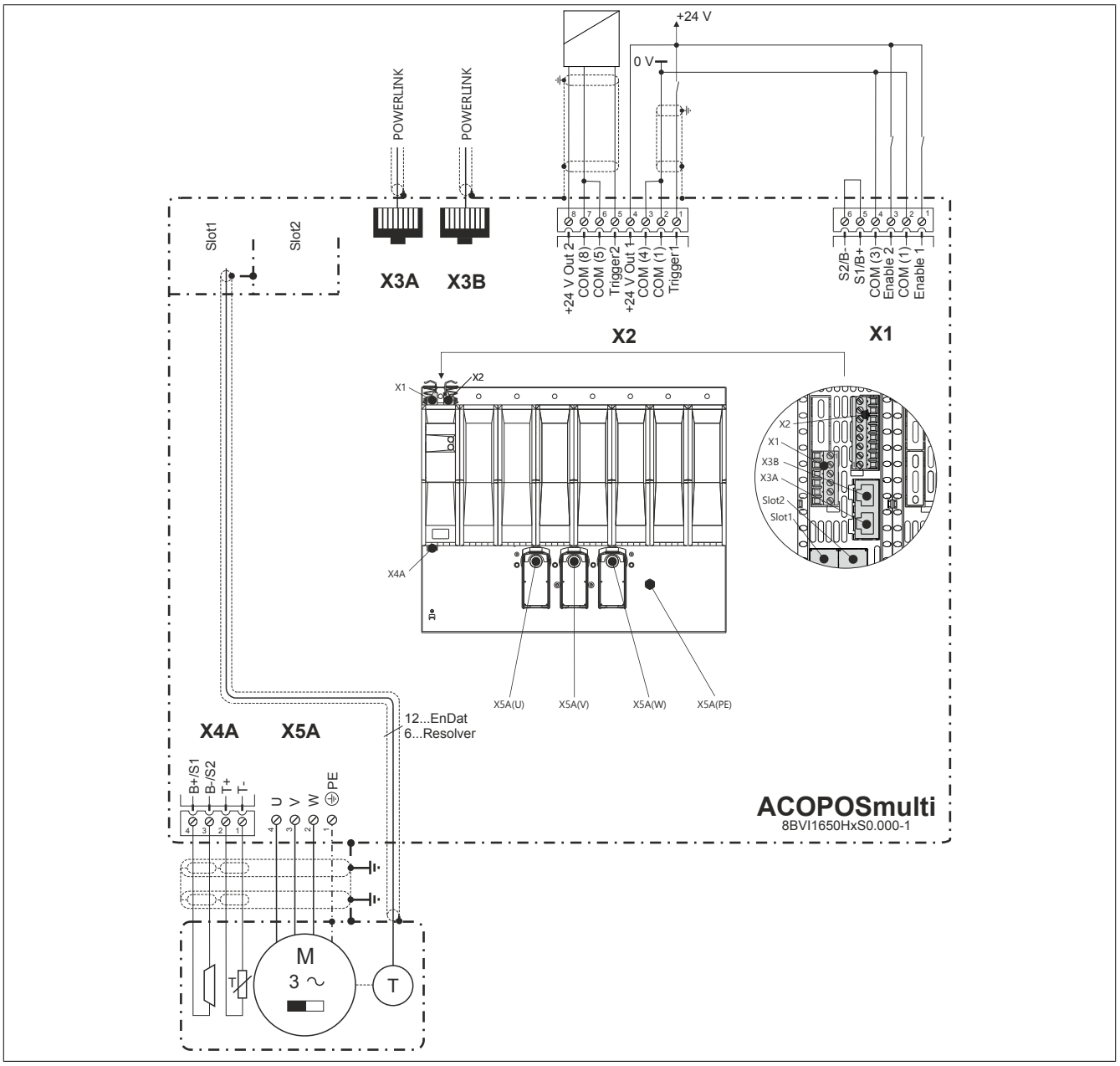


Figure 83: 8BVI1650HxS0.000-1 - Pinout overview

11.2.3.1.1 X1 connector - Pinout

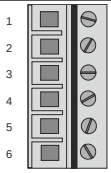
X1	Pin	Name	Function
	1	Enable 1 [1)]	Axis 1: Enable 1
	2	COM (1)	Axis 1: Enable 1 0 V
	3	Enable 2 [1)]	Axis 1: Enable 2
	4	COM (3)	Axis 1: Enable 2 0 V
	5	S1/B+ [2)]	Axis 1: Brake + / Activation of the external holding brake
	6	S2/B- [2)]	Axis 1: Brake - / Activation of the external holding brake

Table 139: X1 connector - Pinout

1) Wiring is not permitted to exceed a total length of 30 m.
2) If the connection is used to activate the external holding brake (S1/S2), then the cabling is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via the S1/S2 connections) instead of via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Danger!

The connections for the motor temperature sensors and the motor holding brake are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOSmulti inverter modules cannot determine if a holding brake is connected with reverse polarity!

Wiring the connections for the motor holding brake

Activating the motor holding brake internally via the ACOPOSmulti inverter module

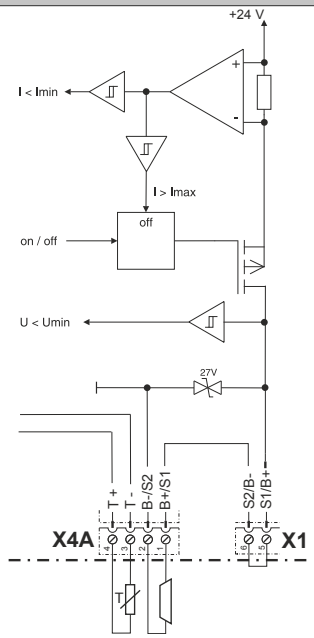
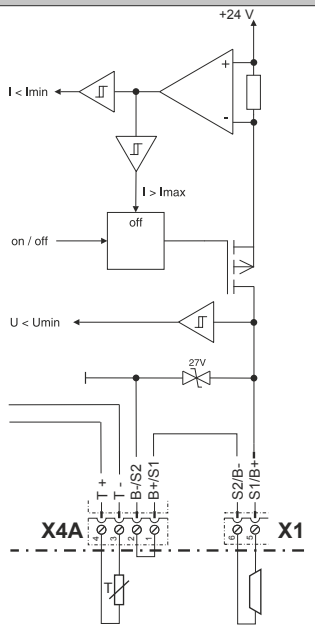
Holding brake connected to the X4A connector	Holding brake connected to the X1 connector	Description
		• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Information: **A jumper must be placed between S1/B+ and S2/B- on the X1 connector.**	**Information:** **A jumper must be placed between B+/S1 and B-/S2 on the X4A connector.**	

Table 140: Activating the motor holding brake internally

Activation of the motor holding brake internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts

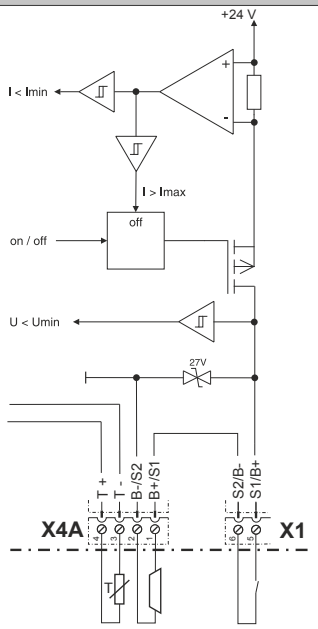
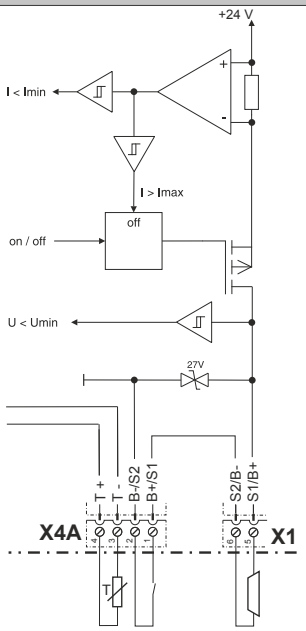
Holding brake connected to the X4A connector	Holding brake connected to the X1 connector	Description
		• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts[1)] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.[2)]**

Table 141: Activating the motor holding brake internally and/or externally

1) Activating the holding brake via external safety circuits can therefore be handled independently of the control functionality integrated in the ACOPOSmulti inverter.
2) The parameters are set using ParID 90 (1 ... Internal monitoring active; 5 ... Internal monitoring not active).

11.2.3.1.2 Connector X2 - Pinout

X2	Pin	Name	Function
	1	Trigger1	Trigger 1
	2	COM (1)	Trigger 1 0 V
	3	COM (4)	+24 V output 1 0 V
	4	+24 V Out 1	+24 V output 1
	5	Trigger2	Trigger 2
	6	COM (5)	Trigger 2 0 V
	7	COM (8)	+24 V output 2 0 V
	8	+24 V Out 2	+24 V output 2

Table 142: Connector X2 - Pinout

11.2.3.1.3 Connectors X3A, X3B - Pinout

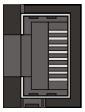
X3A, X3B	Pin	Name	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 143: X3A, X3B connectors - Pinout

11.2.3.1.4 Connector X4A - Pinout

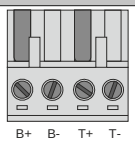
X4A	Name	Function
	T-	Axis 1: Temperature sensor -
	T+	Axis 1: Temperature sensor +
	B-/S2 1)	Axis 1: Brake - / Activation of the external holding brake
	B+/S1 1)	Axis 1: Brake + / Activation of the external holding brake

Table 144: Connector X4A - Pinout

1) If the connection is used to activate the external holding brake (S1/S2), then the cabling is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Danger!

The connections for the motor temperature sensors and the motor holding brake are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOSmulti inverter modules cannot determine if a holding brake is connected with reverse polarity!

Warning!

Temperature sensors are only permitted to be connected to the X4A/T+ and X4A/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT1 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

Wiring the connections for the motor holding brake

Activating the motor holding brake internally via the ACOPOSmulti inverter module

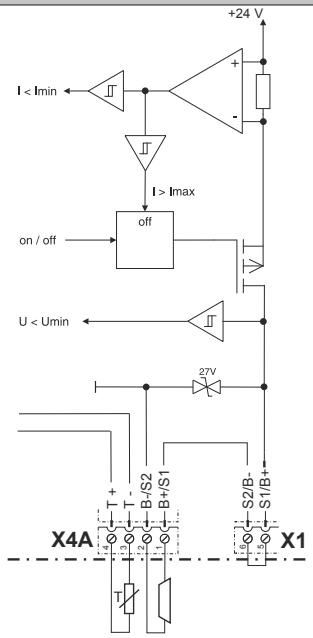
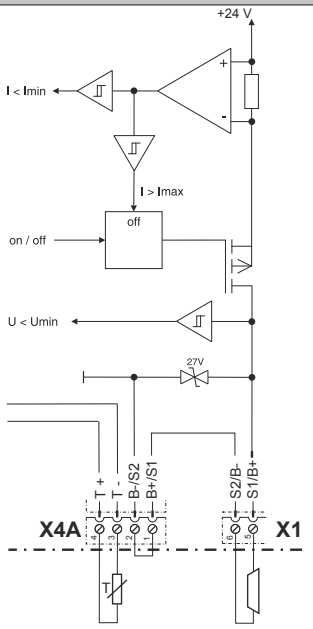
Holding brake connected to the X4A connector	Holding brake connected to the X1 connector	Description
 **Information:** **A jumper must be placed between S1/B+ and S2/B- on the X1 connector.**	 **Information:** **A jumper must be placed between B+/S1 and B-/S2 on the X4A connector.**	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module

Table 145: Activating the motor holding brake internally

Activation of the motor holding brake internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts

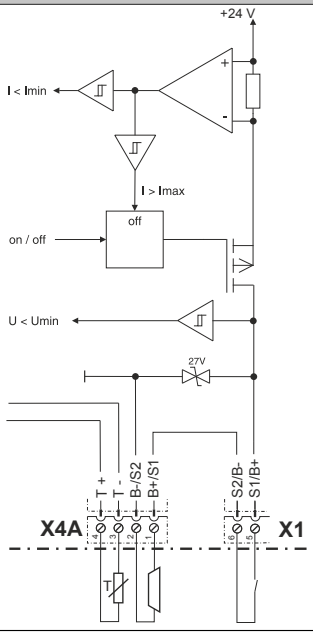
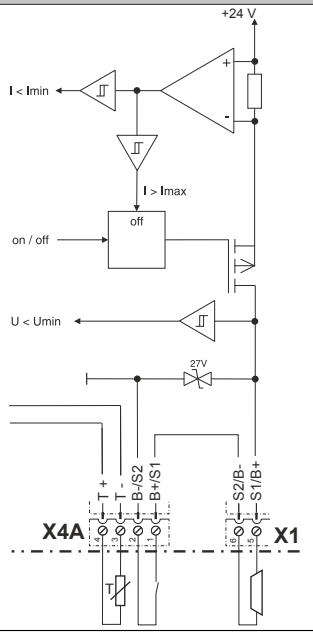
Holding brake connected to the X4A connector	Holding brake connected to the X1 connector	Description
		• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts[1)] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.[2)]**

Table 146: Activating the motor holding brake internally and/or externally

1) Activating the holding brake via external safety circuits can therefore be handled independently of the control functionality integrated in the ACOPOSmulti inverter.
2) The parameters are set using ParID 90 (1 ... Internal monitoring active; 5 ... Internal monitoring not active).

11.2.3.1.5 X5A connector - Pinout

4x-width

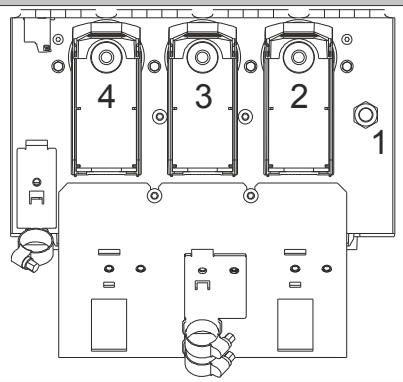
X5A	Pin	Name	Function
	1	PE	Axis 1: Protective ground conductor
	2	W	Axis 1: Motor connection W
	3	V	Axis 1: Motor connection V
	4	U	Axis 1: Motor connection U
	Holding torque for the M8 nuts: 12 Nm		

Table 147: X5A - Pinout

8x-width

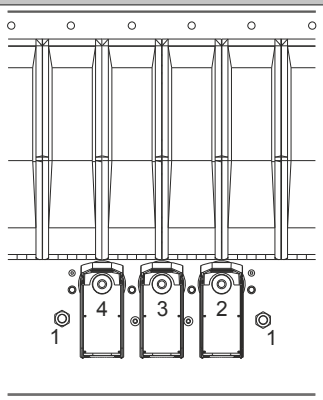
X5A	Pin	Name	Function
	1	PE	Axis 1: Protective ground conductor
	2	W	Axis 1: Motor connection W
	3	V	Axis 1: Motor connection V
	4	U	Axis 1: Motor connection U
	Holding torque for the M8 nuts: 12 Nm		

Table 148: X5A - Pinout

Cable installation for motor connections U, V, W

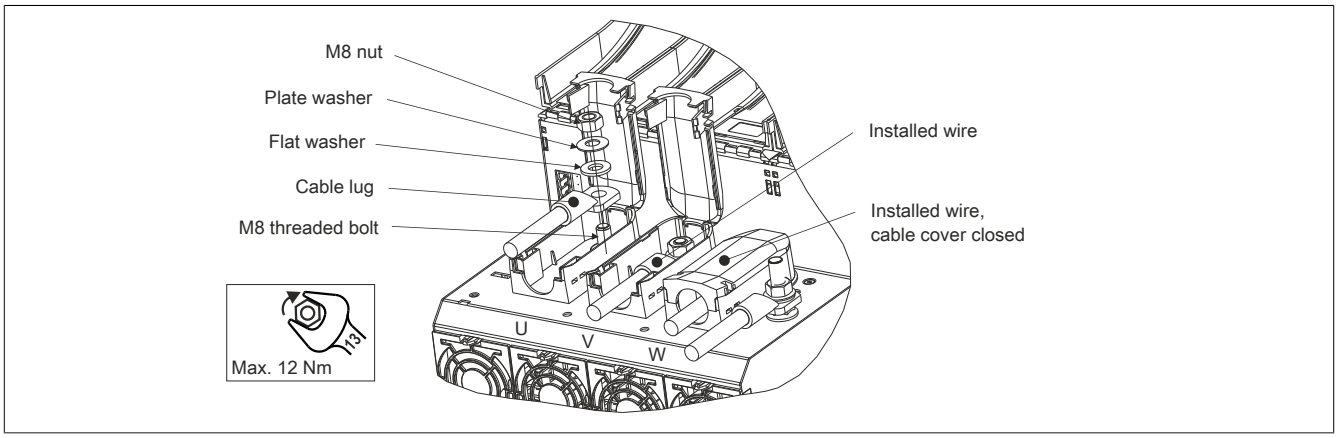
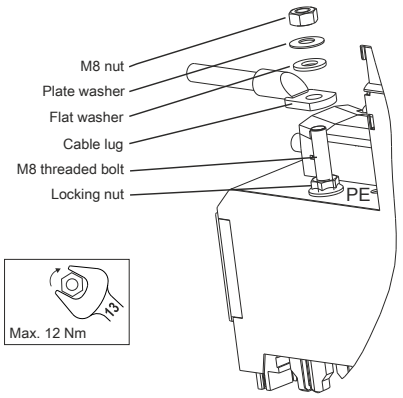
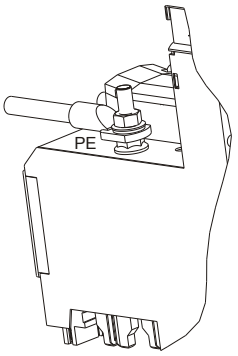


Figure 84: Cable installation for motor connections U, V, W

PE connection (1-wire) - Cable installation



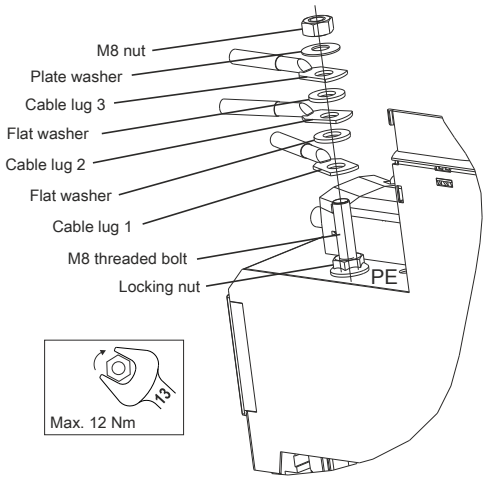
PE connection (1-wire) - Overview of installation material



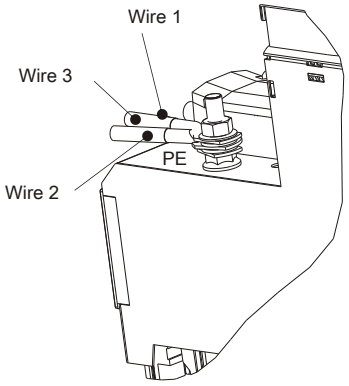
Installed wire

Table 149: PE connection (1-wire) - Cable installation

PE connection (3-wire) - Cable installation



PE connection (3-wire) - Overview of installation material



Installed wire

Table 150: PE connection (3-wire) - Cable installation

11.2.3.1.6 Input/Output circuit diagram

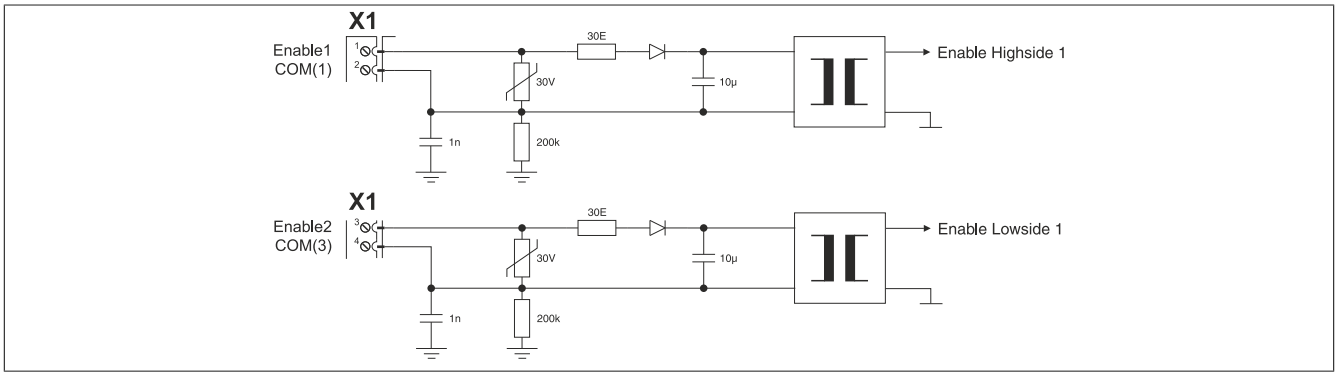


Figure 85: Enable

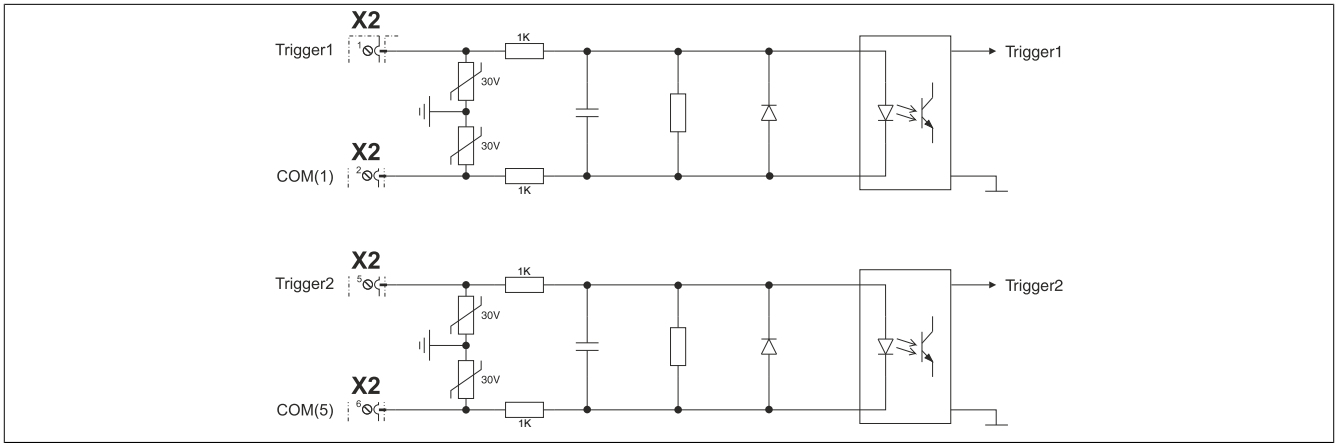


Figure 86: Trigger inputs

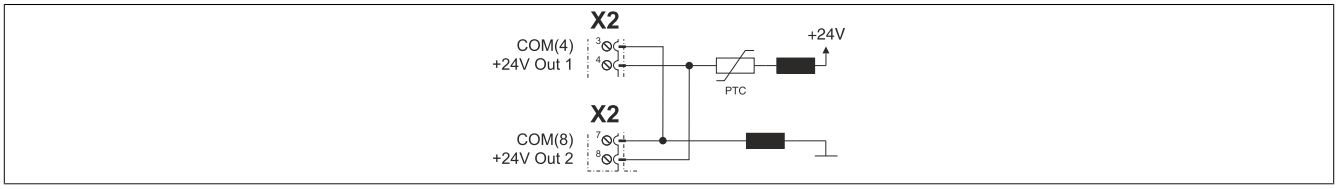


Figure 87: 24 VDC out

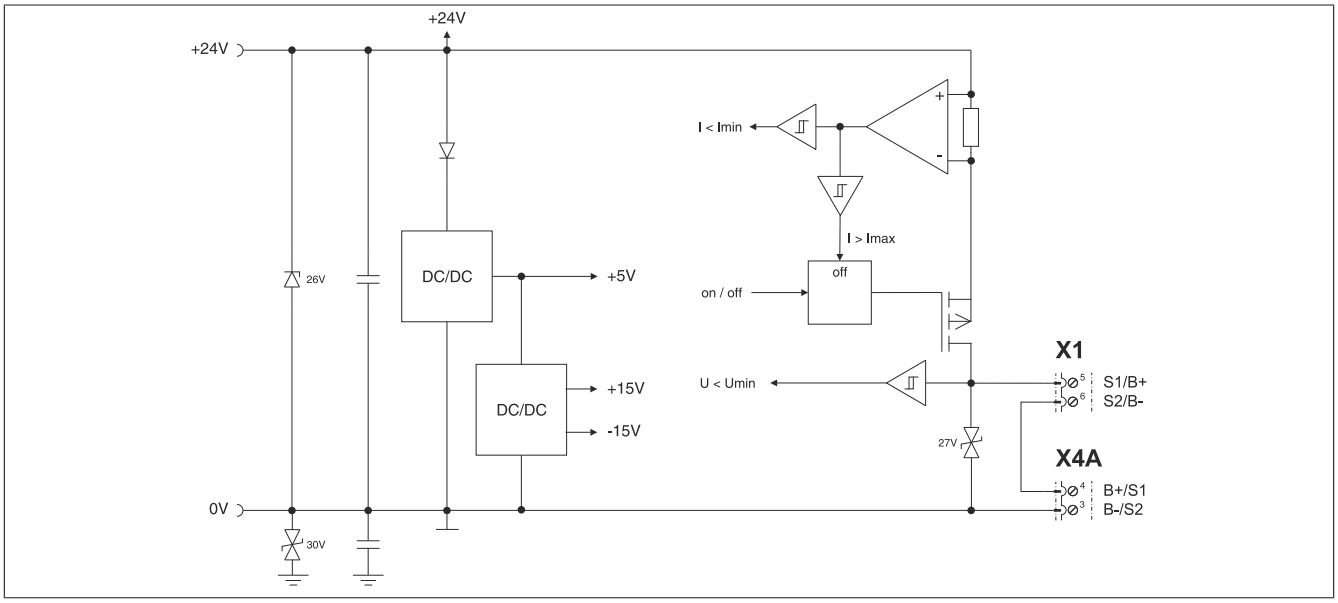


Figure 88: Holding brake

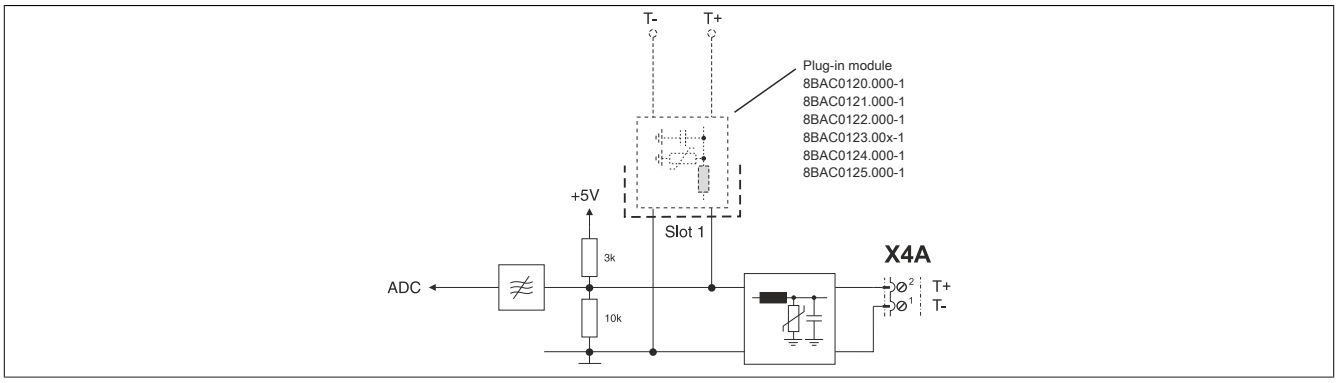


Figure 89: Temperature sensor

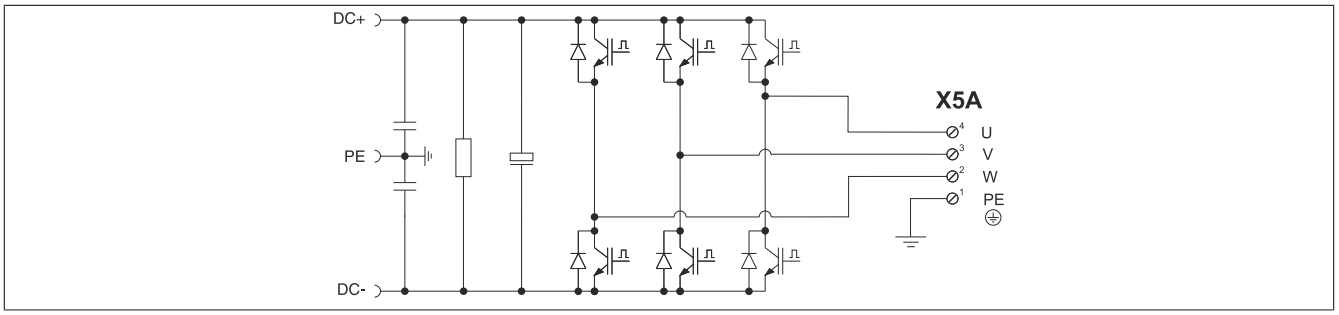


Figure 90: Motor

11.3 Dual-axis modules (single-width)

11.3.1 8BVI0014HxD0.000-1, 8BVI0028HxD0.000-1

11.3.1.1 General information

Dual-axis modules contain two complete standalone inverters in one inverter module.

11.3.1.2 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI0014HWD0.000-1	ACOPOSmulti inverter module 1.9 A, HV, wall mounting, 2 axes	
8BVI0028HWD0.000-1	ACOPOSmulti inverter module 3.8 A, HV, wall mounting, 2 axes	
	Cold plate or feed-through mounting	
8BVI0014HCD0.000-1	ACOPOSmulti inverter module 1.9 A, HV, cold plate or feed-through mounting, 2 axes	
8BVI0028HCD0.000-1	ACOPOSmulti inverter module 3.8 A, HV, cold plate or feed-through mounting, 2 axes	
	Required accessories	
	Terminal block sets	
8BZVI0055D0.000-1A	Screw clamp set for ACOPOSmulti 8BVI00xxHxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
	Terminal blocks	
8TB2104.203F-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, F keying: 0101	
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	

Table 151: 8BVI0014HWD0.000-1, 8BVI0028HWD0.000-1, 8BVI0014HCD0.000-1, 8BVI0028HCD0.000-1 - Order data

Model number	Short description	Figure
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2112.2010-00	12-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB3104.204G-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, G keying: 0110	
8TB3104.204K-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, K keying: 1001	

Table 151: 8BVI0014HWD0.000-1, 8BVI0028HWD0.000-1, 8BVI0014HCD0.000-1, 8BVI0028HCD0.000-1 - Order data

11.3.1.3 Technical data

Model number	8BVI0014HWD0.000-1	8BVI0014HCD0.000-1	8BVI0028HWD0.000-1	8BVI0028HCD0.000-1
General information				
B&R ID code	0x26DF	0x253C	0x26E1	0x253B
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2			
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Functional safety[1]	Yes			
DC bus connection				
Voltage				
Nominal	750 VDC			
Continuous power consumption [2]	2.91 kW		5.73 kW	
Power dissipation depending on switching frequency [3]				
Switching frequency 5 kHz	$[1.2 * I_M^2 + 2.62 * I_M + 100]$ W			
Switching frequency 10 kHz	$[2.56 * I_M^2 + 2.8 * I_M + 200]$ W			
Switching frequency 20 kHz	$[6 * I_M^2 - 9.4 * I_M + 430]$ W			
DC bus capacitance	165 µF			
Design	ACOPOSmulti backplane			
24 VDC supply				
Input voltage	25 VDC ±1.6%			
Input capacitance	23.5 µF			
Max. power consumption	16 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake(s)}$[4]			
Design	ACOPOSmulti backplane			
24 VDC output				
Quantity	2			
Output voltage				
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/ 315)			
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%			
Fuse protection	250 mA (slow-blow) electronic, automatic reset			
Motor connection				
Quantity	2			
Continuous power per motor connection [2]	1.4 kW		2.8 kW	
Continuous current per motor connection [2]	1.9 A_{eff}		3.8 A_{eff}	
Reduction of continuous current depending on switching frequency [5]				
Switching frequency 5 kHz	No reduction	-	No reduction	-
Switching frequency 10 kHz	No reduction	-	No reduction	-
Switching frequency 20 kHz	0.11 A/K (from 15°C) [6]	-	0.12 A/K (from 13°C) [6]	-
Reduction of continuous current depending on switching frequency and mounting method [7]				
Switching frequency 5 kHz				
Cold plate mounting [8]	-	No reduction	-	No reduction
Feed-through mounting	-	No reduction	-	No reduction
Switching frequency 10 kHz				
Cold plate mounting [8]	-	No reduction	-	0.6 A/K (from 57°C)
Feed-through mounting	-	No reduction	-	No reduction
Switching frequency 20 kHz				
Cold plate mounting [8]	-	0.13 A/K (from 45°C)	-	0.12 A/K (from 34°C) [9]
Feed-through mounting	-	0.14 A/K (from 32°C) [6]	-	0.09 A/K (from 6°C) [6]

Table 152: 8BVI0014HWD0.000-1, 8BVI0014HCD0.000-1, 8BVI0028HWD0.000-1, 8BVI0028HCD0.000-1 - Technical data

Model number	8BVI0014HWD0.000-1	8BVI0014HCD0.000-1	8BVI0028HWD0.000-1	8BVI0028HCD0.000-1
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	0.19 A_{eff} per 1000 m		0.38 A_{eff} per 1000 m	
Peak current per motor connection	4.7 A_{eff}		9.5 A_{eff}	
Nominal switching frequency	5 kHz			
Possible switching frequencies [10]	5 / 10 / 20 kHz			
Electrical stress of connected motor per IEC TS 60034-25 [11]	Limit value curve A			
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [12]			
Design				
U, V, W, PE	Male connector			
Shield connection	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.25 to 6 mm²			
Approbation data				
UL/C-UL-US	30 to 10 AWG			
CSA	28 to 10 AWG			
Terminal cable cross section dimension of shield connection	12 to 22 mm			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	25 m			
Switching frequency 10 kHz	25 m			
Switching frequency 20 kHz	10 m			
Motor holding brake connection				
Quantity	2			
Output voltage [13]	24 VDC +5.8% / -0% [14]			
Continuous current	1.1 A			
Max. internal resistance	0.5 Ω			
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	1.5 Ws			
Max. switching frequency	0.5 Hz			
Protective measures				
Overload and short circuit protection	Yes			
Open circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open circuit monitoring	Approx. 0.25 A			
Response threshold for undervoltage monitoring	24 VDC +0% / -4%			
Enable inputs				
Quantity	4 (2 per axis)			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Input current at nominal voltage	Approx. 30 mA			
Switching threshold				
Low	<5 V			
High	>15 V			
Switching delay at nominal input voltage				
Enable 1 → 0, PWM off	Max. 20.5 ms			
Enable 0 → 1, ready for PWM	Max. 100 µs			
Modulation compared to ground potential	Max. ±38 V			
OSSD signal connections [15]	permitted Max. test pulse length: 500 µs			
Trigger inputs				
Quantity	2			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			

Table 152: 8BVI0014HWD0.000-1, 8BVI0014HCD0.000-1, 8BVI0028HWD0.000-1, 8BVI0028HCD0.000-1 - Technical data

Model number	8BVI0014HWD0.000-1	8BVI0014HCD0.000-1	8BVI0028HWD0.000-1	8BVI0028HCD0.000-1
Input voltage				
Nominal		24 VDC		
Maximum		30 VDC		
Switching threshold				
Low		<5 V		
High		>15 V		
Input current at nominal voltage		Approx. 10 mA		
Switching delay				
Rising edge		52 µs ±0.5 µs (digitally filtered)		
Falling edge		53 µs ±0.5 µs (digitally filtered)		
Modulation compared to ground potential		Max. ±38 V		
Electrical characteristics				
Discharge capacitance		0.2 µF		
Operating conditions				
Permissible mounting orientations				
Hanging vertically		Yes		
Lying horizontally		Yes		
Standing horizontally		No		
Installation at elevations above sea level				
Nominal		0 to 500 m		
Maximum [16]		4000 m		
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)		
Overvoltage category per EN 61800-5-1		III		
Degree of protection per EN 60529		IP20		
Environmental conditions				
Temperature				
Operation				
Nominal		5 to 40°C		
Maximum [17]		55°C		
Storage		-25 to 55°C		
Transport		-25 to 70°C		
Relative humidity				
Operation		5 to 85%		
Storage		5 to 95%		
Transport		Max. 95% at 40°C		
Mechanical characteristics				
Dimensions [18]				
Width		53 mm		
Height		317 mm		
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 2.8 kg	Approx. 2.3 kg	Approx. 2.8 kg	Approx. 2.3 kg
Module width		1		

Table 152: 8BVI0014HWD0.000-1, 8BVI0014HCD0.000-1, 8BVI0028HWD0.000-1, 8BVI0028HCD0.000-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) $I_M = 0.5 * (I_{X5A} + I_{X5B})$
   I_{X5A} ... Current on X5A motor connection [A_{Eff}]
   I_{X5B} ... Current on X5B motor connection [A_{Eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module).
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
6) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
7) Valid in the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
8) The temperature specifications refer to the return temperature of the cold plate mounting plate.
9) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
   Caution! Condensation can occur at low flow temperatures and return temperatures.
10) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load. When using 2-axis modules, the increased CPU load reduces the functionality of the drive; if this is not taken into consideration, the computing time can be exceeded in extreme cases.
11) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!

12) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with EC regulation 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output (Power element: Limit speed exceeded).
13) During project development, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. The operating voltage range of the holding brake can be found in the user's manual for the respective motor.
14) The specified value is only valid under the following conditions:
- The 24 VDC supply for the module is provided by an 8B0C auxiliary supply module installed on the same mounting plate.
- Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.

If the 24 VDC supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.
15) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
16) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
17) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
18) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.3.2 8BVI0055HxD0.000-1

11.3.2.1 General information

Dual-axis modules contain two complete standalone inverters in one inverter module.

11.3.2.2 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI0055HWD0.000-1	ACOPOSmulti inverter module 7.6 A, HV, wall mounting, 2 axes	
	Cold plate or feed-through mounting	
8BVI0055HCD0.000-1	ACOPOSmulti inverter module 7.6 A, HV, cold plate or feed-through mounting, 2 axes	
	Required accessories	
	Terminal block sets	
8BZVI0055D0.000-1A	Screw clamp set for ACOPOSmulti 8BVI00xxHxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
	Terminal blocks	
8TB2104.203F-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, F keying: 0101	
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	

Table 153: 8BVI0055HWD0.000-1, 8BVI0055HCD0.000-1 - Order data

Model number	Short description	Figure
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2112.2010-00	12-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB3104.204G-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, G keying: 0110	
8TB3104.204K-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, K keying: 1001	

Table 153: 8BVI0055HWD0.000-1, 8BVI0055HCD0.000-1 - Order data

11.3.2.3 Technical data

Model number	8BVI0055HWD0.000-1	8BVI0055HCD0.000-1
General information		
B&R ID code	0x20B5	0x200D
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2	
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
Functional safety[1]	Yes	
DC bus connection		
Voltage		
Nominal	750 VDC	
Continuous power consumption [2]	11.19 kW	
Power dissipation depending on switching frequency [3]		
Switching frequency 5 kHz	[1.2 * I_M^2 + 2.62 * I_M + 100] W	
Switching frequency 10 kHz	[2.56 * I_M^2 + 2.8 * I_M + 200] W	
Switching frequency 20 kHz	[6 * I_M^2 - 9.4 * I_M + 430] W	
DC bus capacitance	330 µF	
Design	ACOPOSmulti backplane	
24 VDC supply		
Input voltage	25 VDC ±1.6%	
Input capacitance	23.5 µF	
Max. power consumption	16 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake(s)}$[4]	
Design	ACOPOSmulti backplane	
24 VDC output		
Quantity	2	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/ 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Fuse protection	250 mA (slow-blow) electronic, automatic reset	
Motor connection		
Quantity	2	
Continuous power per motor connection [2]	5.5 kW	
Continuous current per motor connection [2]	7.6 A_{eff}	
Reduction of continuous current depending on switching frequency [5]		
Switching frequency 5 kHz	No reduction	-
Switching frequency 10 kHz	0.22 A/K (from 43°C)	-
Switching frequency 20 kHz	0.15 A/K (from -14°C) [6]	-
Reduction of continuous current depending on switching frequency and mounting method [7]		
Switching frequency 5 kHz		
Cold plate mounting [8]	-	0.72 A/K (from 56°C) [9]
Feed-through mounting	-	No reduction
Switching frequency 10 kHz		
Cold plate mounting [8]	-	0.28 A/K (from 43°C)
Feed-through mounting	-	0.17 A/K (from 23°C) [6]
Switching frequency 20 kHz		
Cold plate mounting [8]	-	0.13 A/K (from 3°C) [10]
Feed-through mounting	-	0.12 A/K (from -21°C) [6]
Reduction of continuous current depending on installation elevation		
Starting at 500 m above sea level	0.76 A_{eff} per 1000 m	
Peak current per motor connection	18.9 A_{eff}	
Nominal switching frequency	5 kHz	
Possible switching frequencies [11]	5 / 10 / 20 kHz	

Table 154: 8BVI0055HWD0.000-1, 8BVI0055HCD0.000-1 - Technical data

Model number	8BVI0055HWD0.000-1	8BVI0055HCD0.000-1
Electrical stress of connected motor per IEC TS 60034-25 [12]	Limit value curve A	
Protective measures		
Overload protection	Yes	
Short circuit and ground fault protection	Yes	
Max. output frequency	598 Hz [13]	
Design		
U, V, W, PE	Male connector	
Shield connection	Yes	
Terminal connection cross section		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 6 mm²	
Approbation data		
UL/C-UL-US	30 to 10 AWG	
CSA	28 to 10 AWG	
Terminal cable cross section dimension of shield connection	12 to 22 mm	
Max. motor line length depending on switching frequency		
Switching frequency 5 kHz	25 m	
Switching frequency 10 kHz	25 m	
Switching frequency 20 kHz	10 m	
Motor holding brake connection		
Quantity	2	
Output voltage [14]	24 VDC +5.8% / -0% [15]	
Continuous current	1.1 A	
Max. internal resistance	0.5 Ω	
Extinction potential	Approx. 30 V	
Max. extinction energy per switching operation	1.5 Ws	
Max. switching frequency	0.5 Hz	
Protective measures		
Overload and short circuit protection	Yes	
Open circuit monitoring	Yes	
Undervoltage monitoring	Yes	
Response threshold for open circuit monitoring	Approx. 0.25 A	
Response threshold for undervoltage monitoring	24 VDC +0% / -4%	
Enable inputs		
Quantity	4 (2 per axis)	
Wiring	Sink	
Electrical isolation		
Input - Inverter module	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Input current at nominal voltage	Approx. 30 mA	
Switching threshold		
Low	<5 V	
High	>15 V	
Switching delay at nominal input voltage		
Enable 1 → 0, PWM off	Max. 20.5 ms	
Enable 0 → 1, ready for PWM	Max. 100 µs	
Modulation compared to ground potential	Max. ±38 V	
OSSD signal connections [16]	permitted Max. test pulse length: 500 µs	
Trigger inputs		
Quantity	2	
Wiring	Sink	
Electrical isolation		
Input - Inverter module	Yes	
Input - Input	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Switching threshold		
Low	<5 V	
High	>15 V	
Input current at nominal voltage	Approx. 10 mA	
Switching delay		
Rising edge	52 µs ±0.5 µs (digitally filtered)	
Falling edge	53 µs ±0.5 µs (digitally filtered)	
Modulation compared to ground potential	Max. ±38 V	

Table 154: 8BVI0055HWD0.000-1, 8BVI0055HCD0.000-1 - Technical data

Model number	8BVI0055HWD0.000-1	8BVI0055HCD0.000-1
Electrical characteristics		
Discharge capacitance	0.2 µF	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [17]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [18]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [19]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 2.9 kg	Approx. 2.3 kg
Module width	1	

Table 154: 8BVI0055HWD0.000-1, 8BVI0055HCD0.000-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) $I_M = 0.5 * (I_{X5A} + I_{X5B})$
   I_{X5A} ... Current on X5A motor connection [A_{Eff}]
   I_{X5B} ... Current on X5B motor connection [A_{Eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module).
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$... Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid in the following conditions: 750 VDC DC bus voltage. The temperature specifications refer to the ambient temperature.
6) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
7) Valid in the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min).
8) The temperature specifications refer to the return temperature of the cold plate mounting plate.
9) Value for the nominal switching frequency.
10) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
    Caution! Condensation can occur at low flow temperatures and return temperatures.
11) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load. When using 2-axis modules, the increased CPU load reduces the functionality of the drive; if this is not taken into consideration, the computing time can be exceeded in extreme cases.
12) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
13) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with EC regulation 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output (Power element: Limit speed exceeded).
14) During project development, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. The operating voltage range of the holding brake can be found in the user's manual for the respective motor.
15) The specified value is only valid under the following conditions:
    - The 24 VDC supply for the module is provided by an 8B0C auxiliary supply module installed on the same mounting plate.
    - Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.
    If the 24 VDC supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
    If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.
16) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
17) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.

18) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
19) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.3.3 Wiring

11.3.3.1 2-axis modules (single-width) - Pinout overview

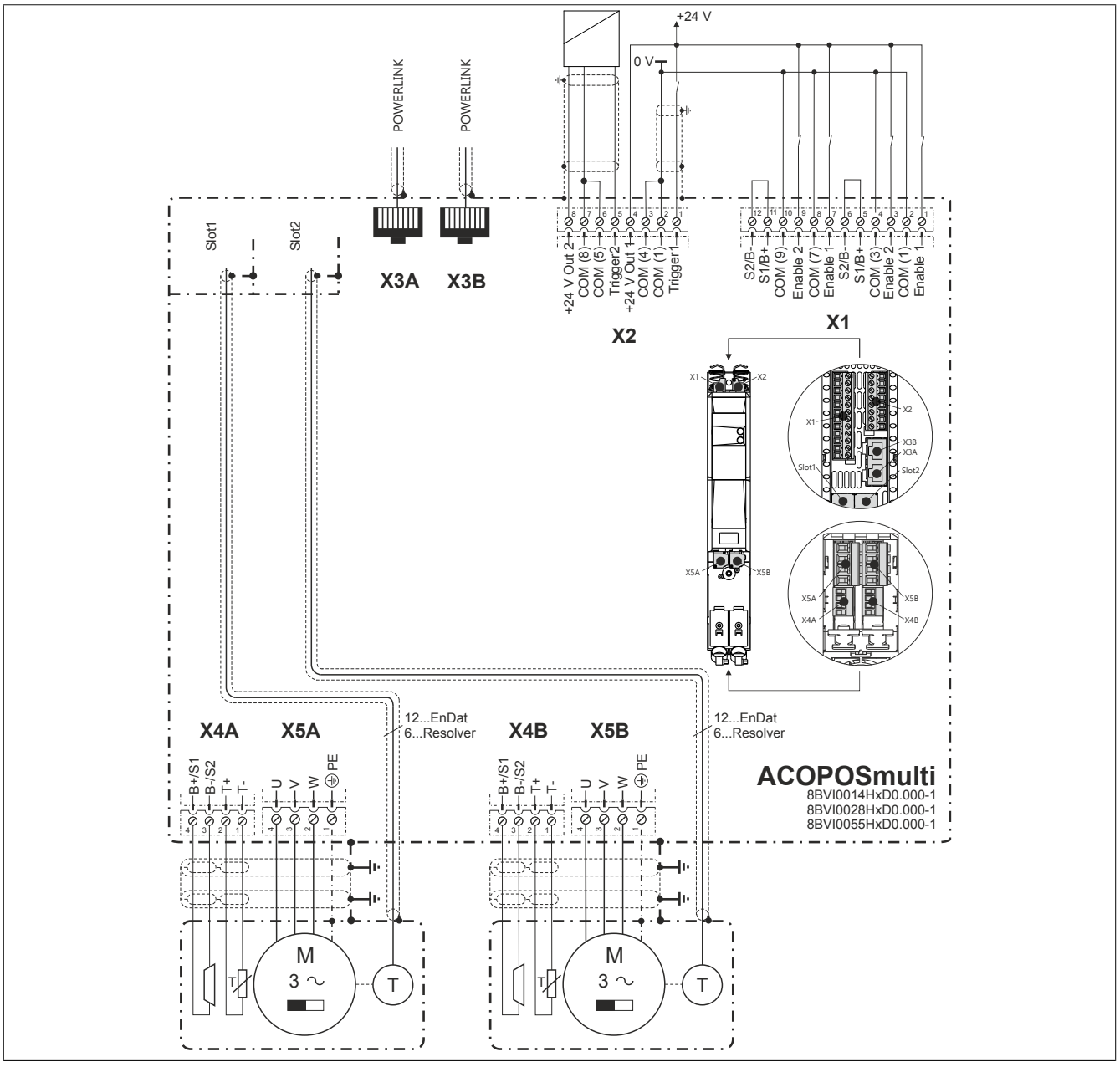


Figure 91: 8BVI0014HxD0.000-1, 8BVI0028HxD0.000-1, 8BVI0055HxD0.000-1 - Pinout overview

11.3.3.1.1 Connector X1 - Pinout

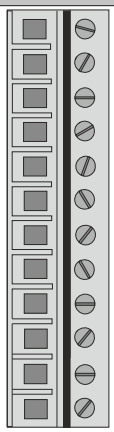
X1	Pin	Name	Function
	1	Enable 1 1)	Axis 2: Enable 1
	2	COM (1)	Axis 2: Enable 1 0 V
	3	Enable 2 1)	Axis 2: Enable 2
	4	COM (3)	Axis 2: Enable 2 0 V
	5	S1/B+ 2)	Axis 2: Brake + / Activation of the external holding brake
	6	S2/B- 2)	Axis 2: Brake - / Activation of the external holding brake
	7	Enable 1 1)	Axis 1: Enable 1
	8	COM (7)	Axis 1: Enable 1 0 V
	9	Enable 2 1)	Axis 1: Enable 2
	10	COM (9)	Axis 1: Enable 2 0 V
	11	S1/B+ 2)	Axis 1: Brake + / Activation of the external holding brake
	12	S2/B- 2)	Axis 1: Brake - / Activation of the external holding brake

Table 155: Connector X1 - Pinout

1) Wiring is not permitted to exceed a total length of 30 m.
2) If the connection is used to activate the external holding brake (S1/S2), then the cabling is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Danger!

The connections for the motor holding brake are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOSmulti inverter modules cannot determine if a holding brake is connected with reverse polarity!

Wiring the connections for the motor holding brake

Activating the motor holding brake internally via the ACOPOSmulti inverter module

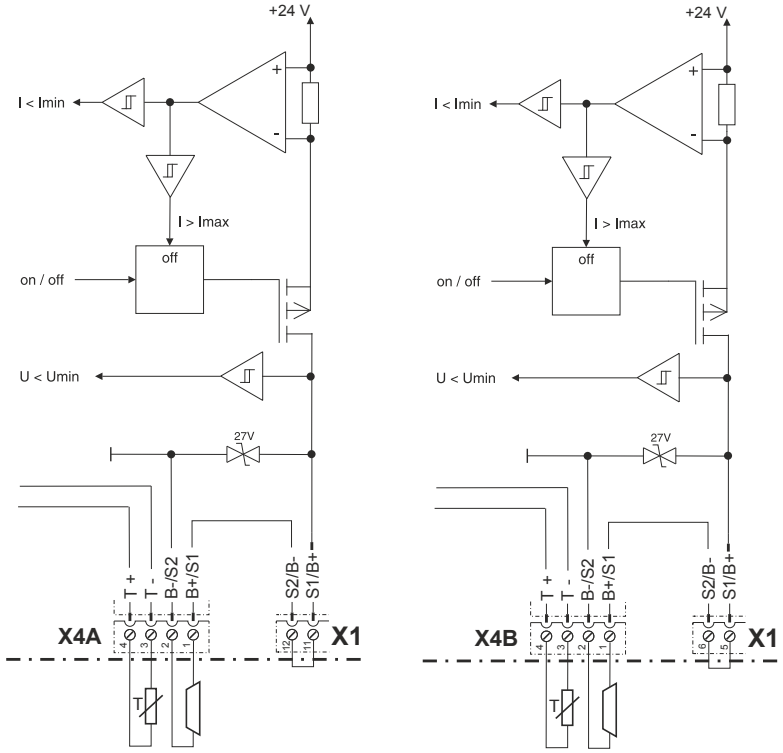
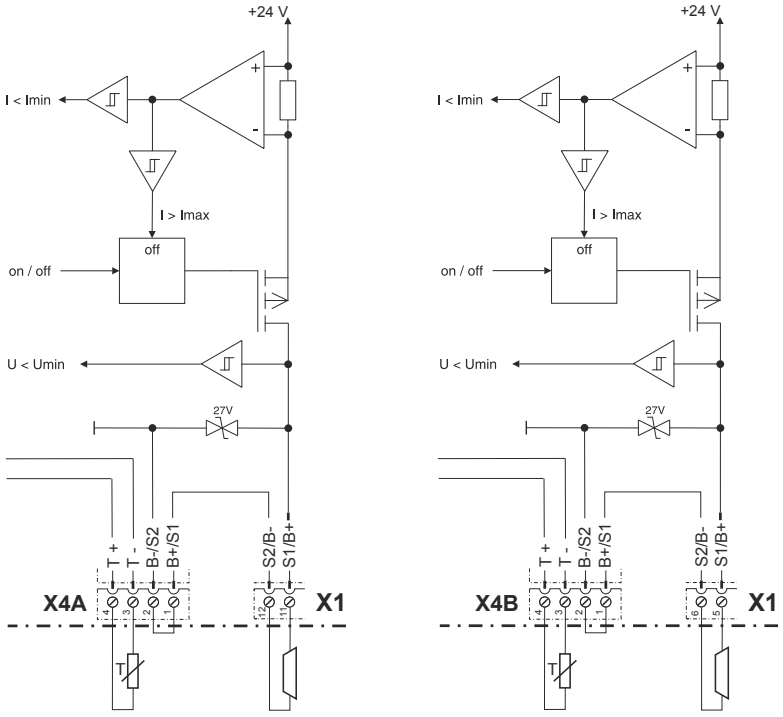
Holding brake connected to the X4A and X4B connectors	Description
 **Information:** **Jumpers must be placed between S1/B+ and S2/B- on the X1 connector.**	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Holding brake connected to the X1 connector	**Description**
 **Information:** **Jumpers must be placed between B+/S1 and B-/S2 on the X4A and X4B connector.**	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module

Table 156: Activating the motor holding brake internally

Activation of the motor holding brake internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts

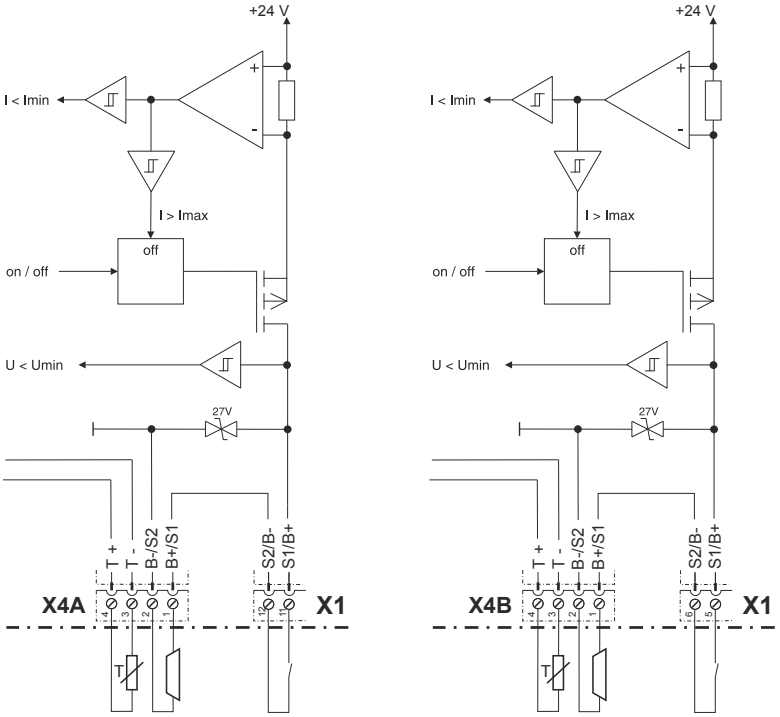
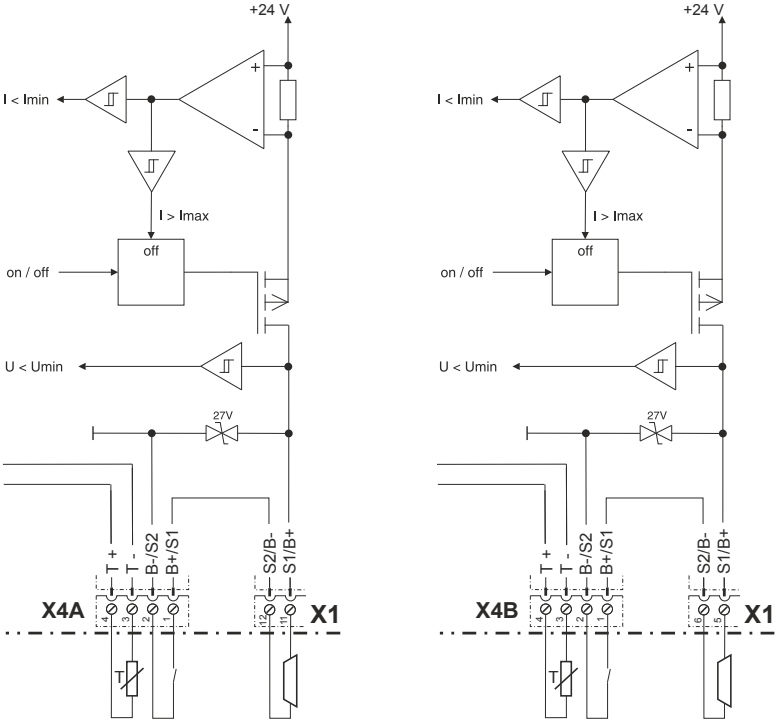
Holding brake connected to the X4A and X4B connectors	Description
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Possible internally by the ACOPOSmulti inverter module and also externally using potential free contacts [1] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.** [2]
Holding brake connected to the X1 connector	**Description**
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Possible internally by the ACOPOSmulti inverter module and also externally using potential free contacts [1] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.** [2]

Table 157: Activating the motor holding brake internally and/or externally

1) Activating the holding brake via external safety circuits can therefore be handled independently of the control functionality integrated in the ACOPOSmulti inverter.
2) The parameters are set using ParID 90 (1 ... Internal monitoring active; 5 ... Internal monitoring not active).

11.3.3.1.2 Connector X2 - Pinout

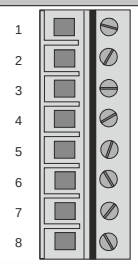
X2	Pin	Name	Function
	1	Trigger1	Trigger 1
	2	COM (1)	Trigger 1 0 V
	3	COM (4)	+24 V output 1 0 V
	4	+24 V Out 1	+24 V output 1
	5	Trigger2	Trigger 2
	6	COM (5)	Trigger 2 0 V
	7	COM (8)	+24 V output 2 0 V
	8	+24 V Out 2	+24 V output 2

Table 158: Connector X2 - Pinout

11.3.3.1.3 Connectors X3A, X3B - Pinout

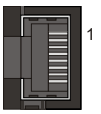
X3A, X3B	Pin	Name	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 159: X3A, X3B connectors - Pinout

11.3.3.1.4 X4A, X4B connectors - Pinout

Danger!

The connections for the motor temperature sensors and the motor holding brake are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOSmulti inverter modules cannot determine if a holding brake is connected with reverse polarity!

Connector X4A - Pinout

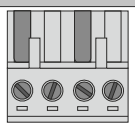
X4A	Name	Function
	T-	Axis 1: Temperature sensor -
	T+	Axis 1: Temperature sensor +
	B-/S2 [1)]	Axis 1: Brake - / Activation of the external holding brake
	B+/S1 [1)]	Axis 1: Brake + / Activation of the external holding brake

Table 160: Connector X4A - Pinout

1) If the connection is used to activate the external holding brake (S1/S2), then the cabling is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Warning!

Temperature sensors are only permitted to be connected to the X4A/T+ and X4A/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT1 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

Connector X4B - Pinout

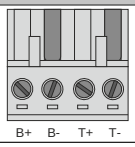
X4B	Name	Function
	T-	Axis 2: Temperature sensor -
	T+	Axis 2: Temperature sensor +
	B-/S2 1) 2)	Axis 2: Brake - / Activation of the external holding brake
	B+/S1 1) 2)	Axis 2: Brake + / Activation of the external holding brake

Table 161: Connector X4B - Pinout

1) Wiring is not permitted to exceed a total length of 3 m.
2) If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Warning!

Temperature sensors are only permitted to be connected to the X4B/T+ and X4B/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT2 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

Wiring the connections for the motor holding brake

Activating the motor holding brake internally via the ACOPOSmulti inverter module

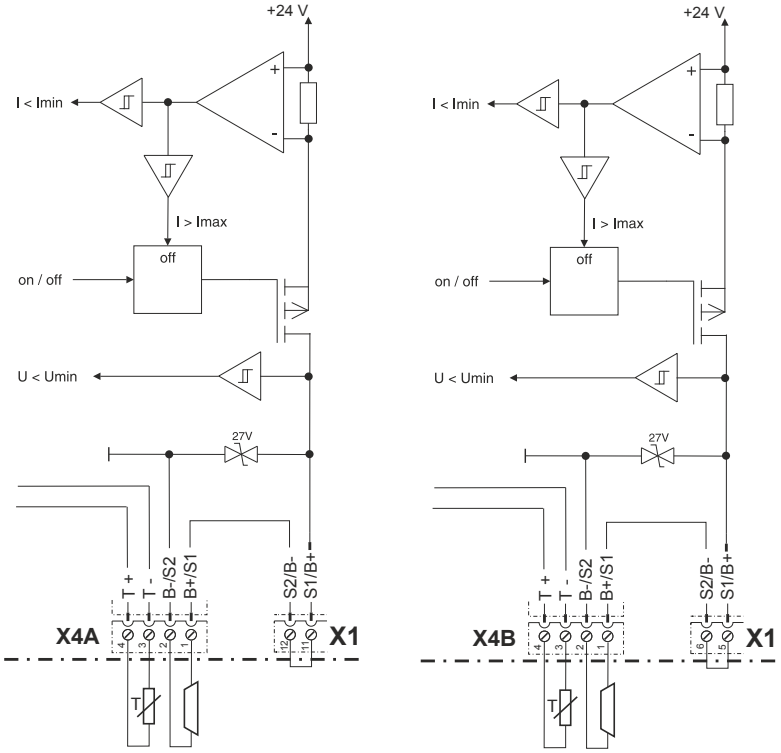
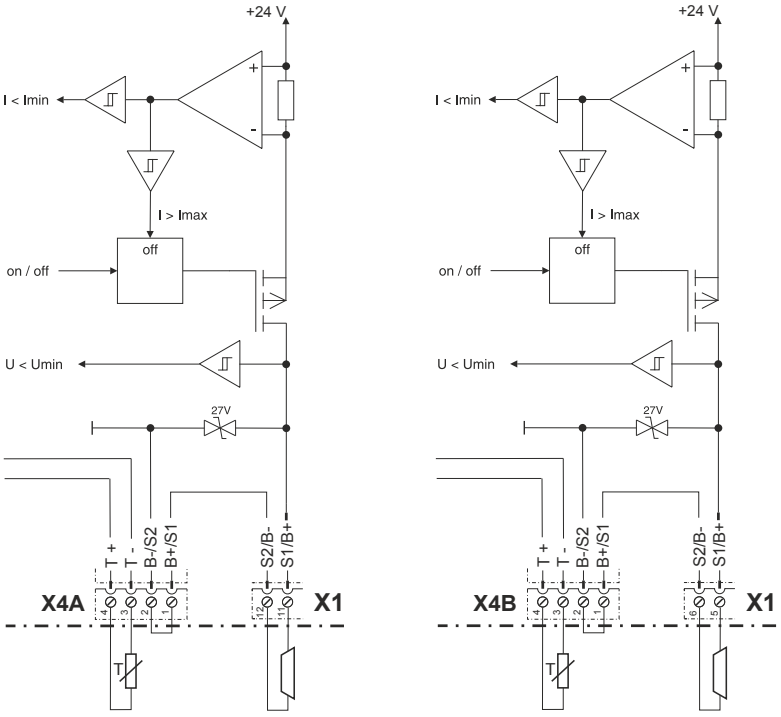
Holding brake connected to the X4A and X4B connectors	Description
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Information: **Jumpers must be placed between S1/B+ and S2/B- on the X1 connector.**	
Holding brake connected to the X1 connector	**Description**
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Information: **Jumpers must be placed between B+/S1 and B-/S2 on the X4A and X4B connector.**	

Table 162: Activating the motor holding brake internally

Activation of the motor holding brake internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts

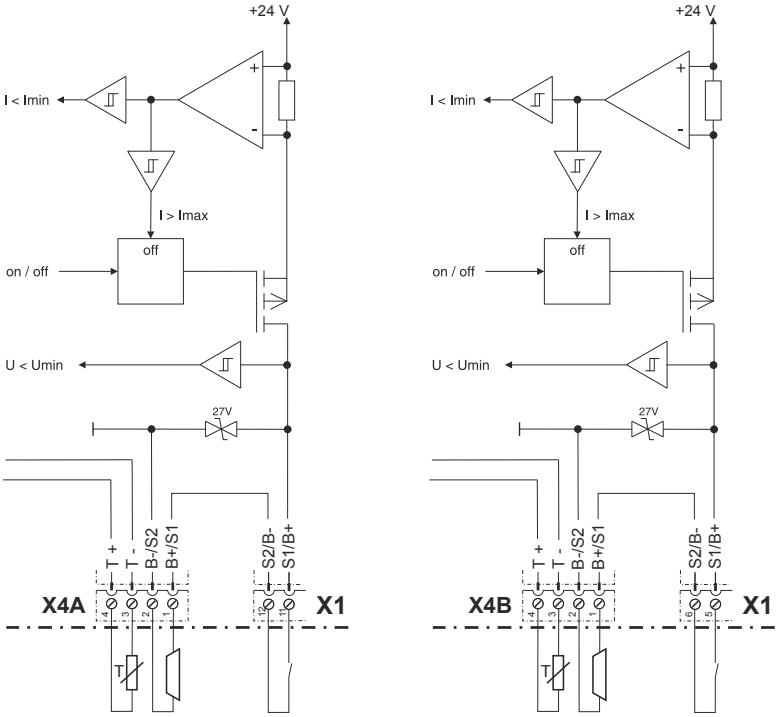
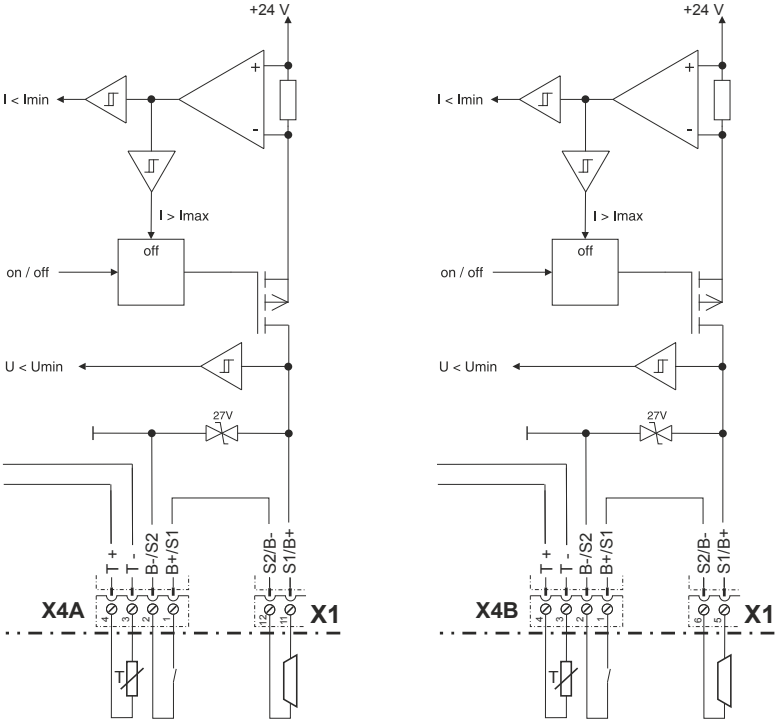
Holding brake connected to the X4A and X4B connectors	Description
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Possible internally by the ACOPOSmulti inverter module and also externally using potential free contacts [1] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.** [2]
Holding brake connected to the X1 connector	**Description**
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Possible internally by the ACOPOSmulti inverter module and also externally using potential free contacts [1] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.** [2]

Table 163: Activating the motor holding brake internally and/or externally

1) Activating the holding brake via external safety circuits can therefore be handled independently of the control functionality integrated in the ACOPOSmulti inverter.
2) The parameters are set using ParID 90 (1 ... Internal monitoring active; 5 ... Internal monitoring not active).

11.3.3.1.5 Connector X5A - Pinout

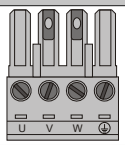
X5A	Name	Function
	⏚	Axis 1: Protective ground conductor
	W	Axis 1: Motor connection W
	V	Axis 1: Motor connection V
	U	Axis 1: Motor connection U

Table 164: Connector X5A - Pinout

11.3.3.1.6 Connector X5B - Pinout

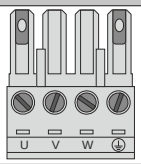
X5B	Name	Function
	⏚	Axis 2: Protective ground conductor
	W	Axis 2: Motor connection W
	V	Axis 2: Motor connection V
	U	Axis 2: Motor connection U

Table 165: Connector X5B - Pinout

11.3.3.1.7 Input/Output circuit diagram

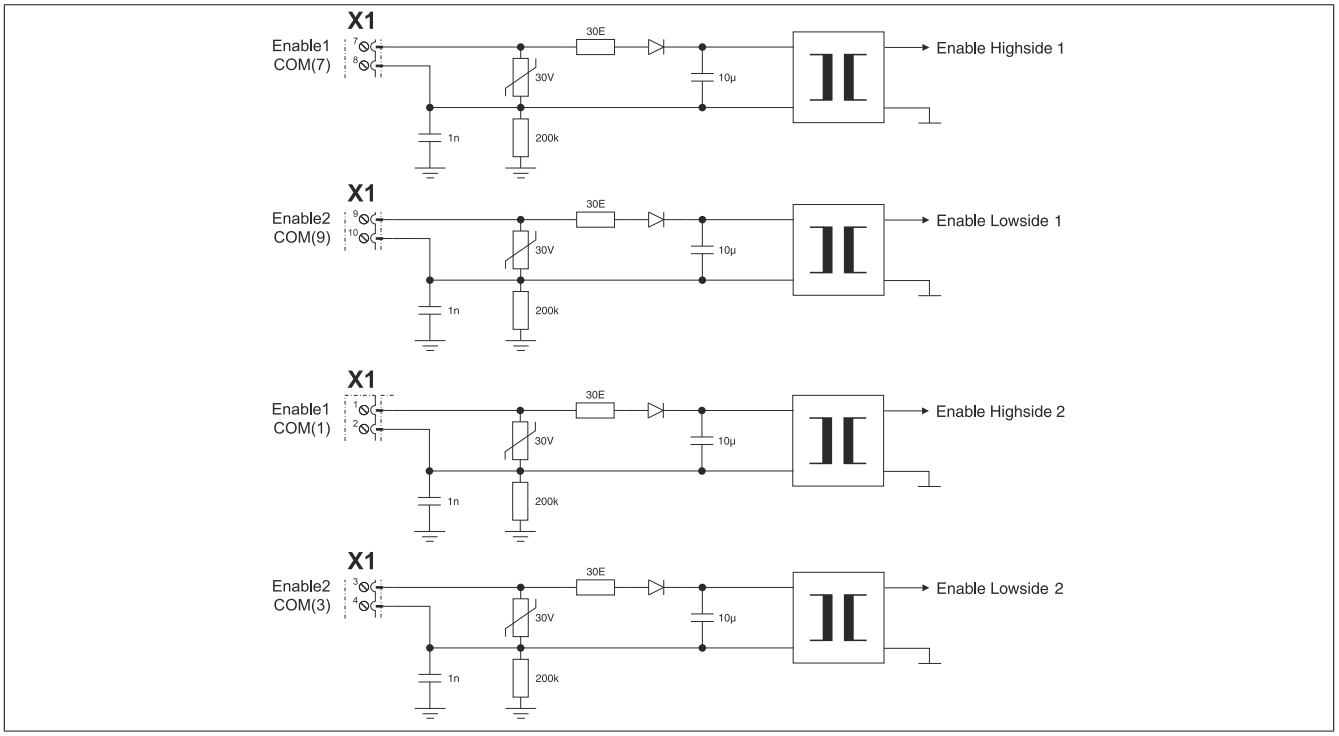


Figure 92: Enable

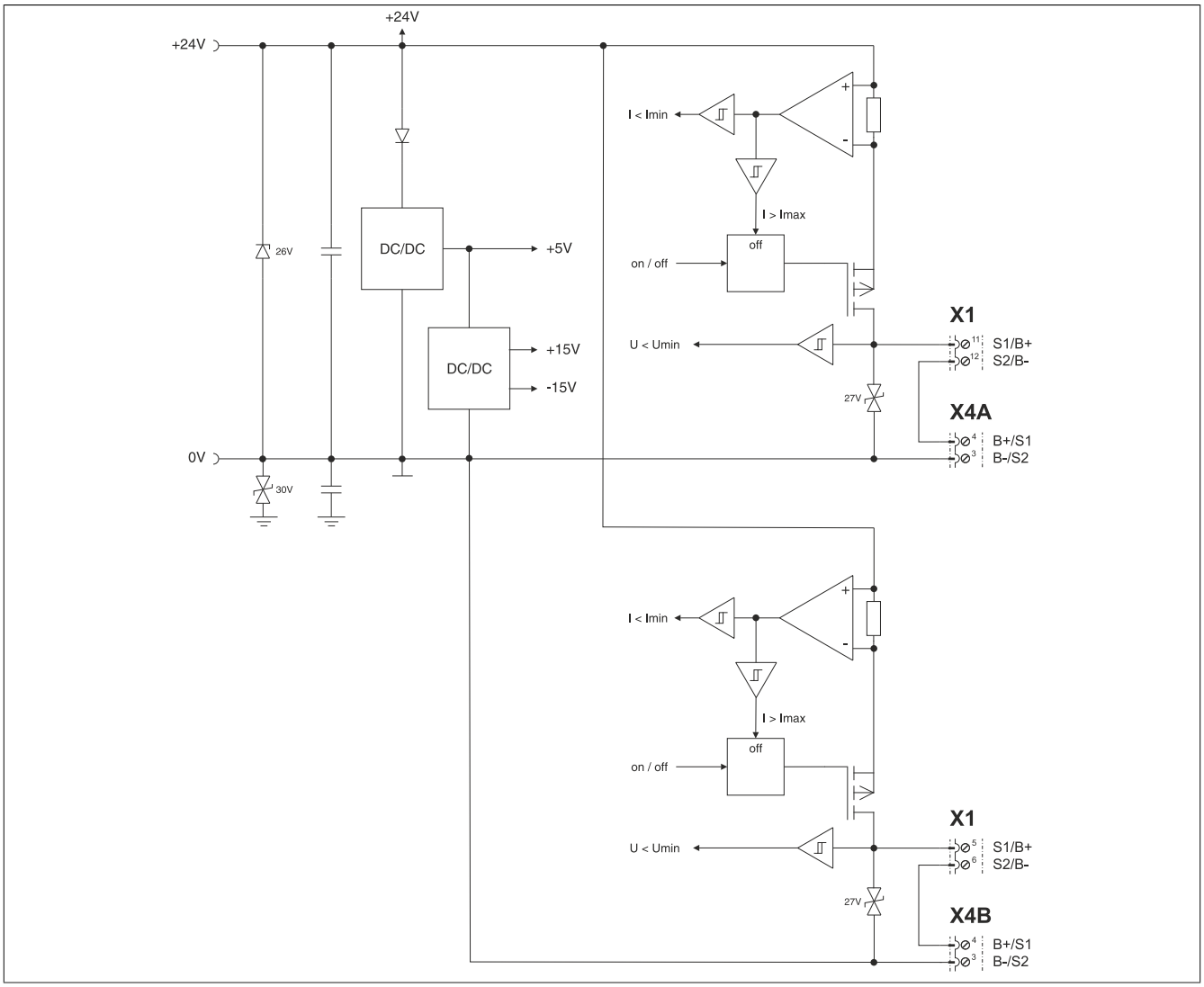


Figure 93: Holding brake

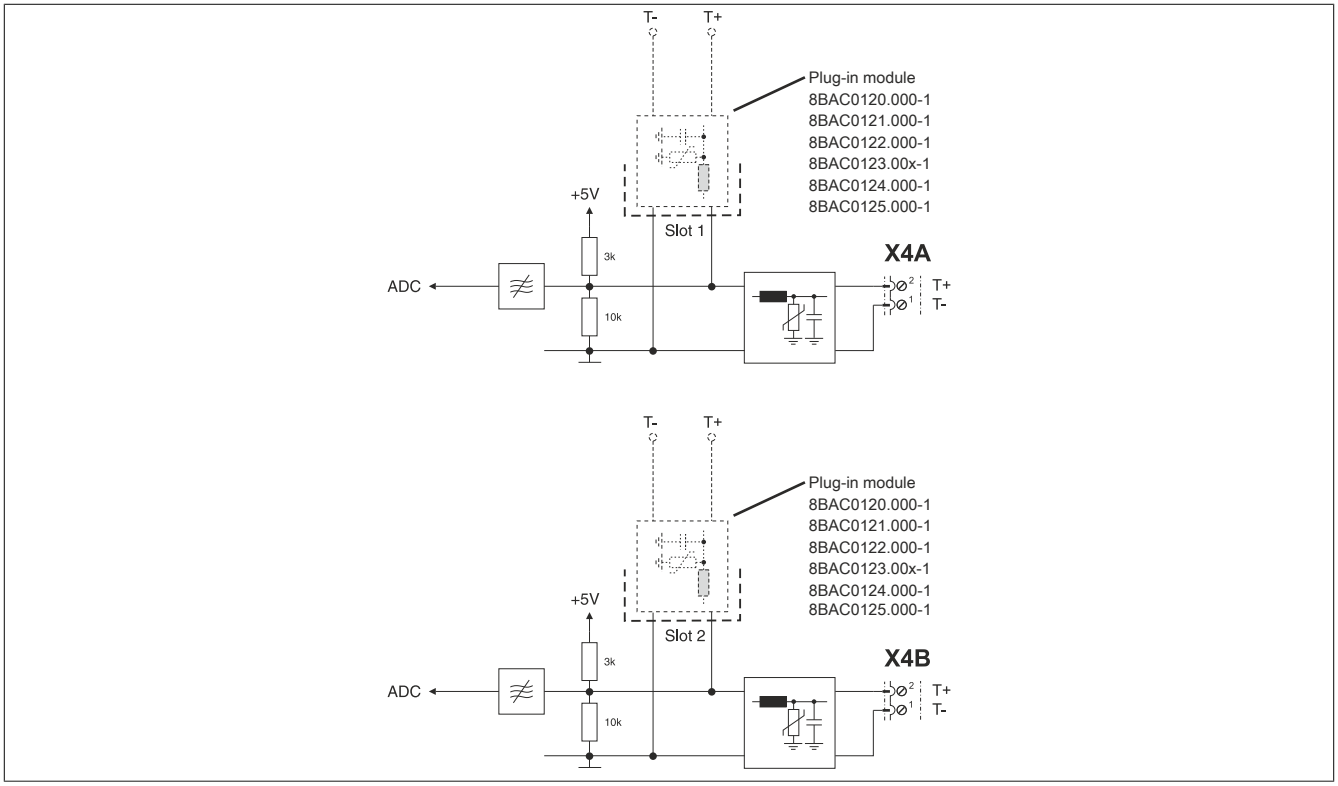


Figure 94: Temperature sensor

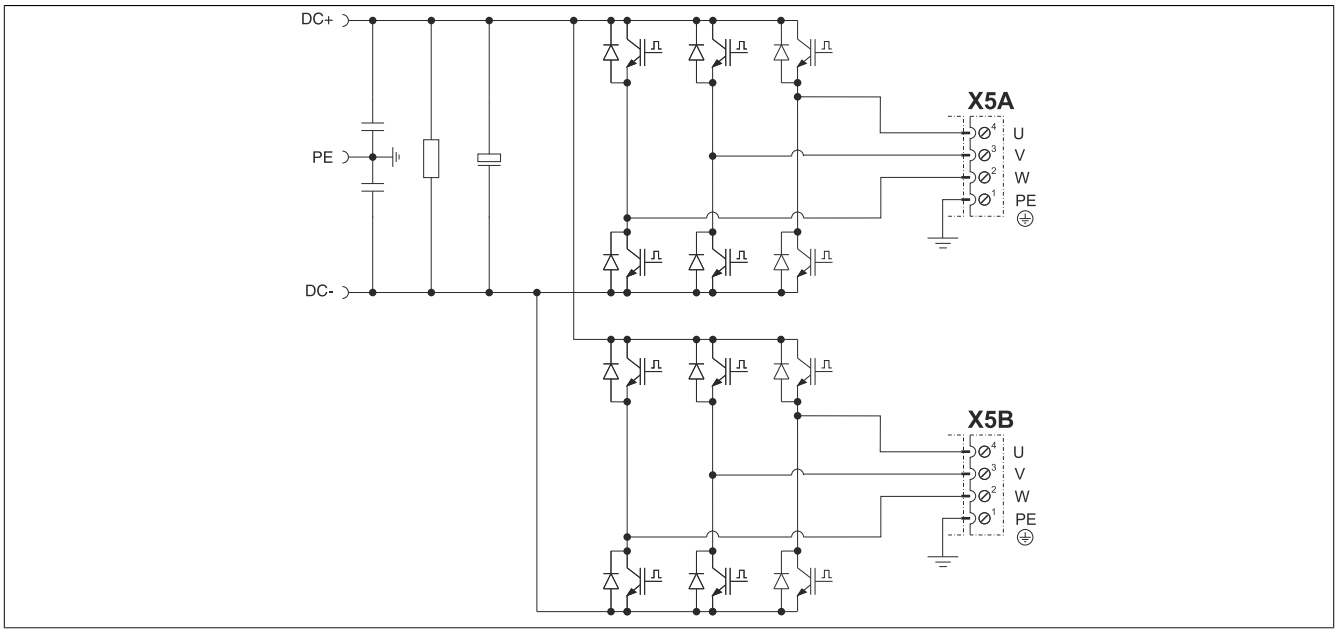


Figure 95: Motor

11.4 Dual-axis modules (double-width)

11.4.1 8BVI0110HxD0.000-1, 8BVI0220HxD0.000-1

11.4.1.1 General information

Dual-axis modules contain two complete standalone inverters in one inverter module.

11.4.1.2 Order data

Model number	Short description	Figure
	Wall mounting	
8BVI0110HWD0.000-1	ACOPOSmulti inverter module, 15.1 A, HV, wall mounting, 2 axes	
8BVI0220HWD0.000-1	ACOPOSmulti inverter module, 22 A, HV, wall mounting, 2 axes	
	Cold plate or feed-through mounting	
8BVI0110HCD0.000-1	ACOPOSmulti inverter module, 15.1 A, HV, cold plate or feed-through mounting, 2 axes	
8BVI0220HCD0.000-1	ACOPOSmulti inverter module, 22 A, HV, cold plate or feed-through mounting, 2 axes	
	Required accessories	
	Terminal block sets	
8BZVI0110D0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0110HxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	
8BZVI0220D0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0220HxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	
	Optional accessories	
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	POWERLINK/Ethernet cables	
X20CA0E61.00020	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.2 m	
X20CA0E61.00025	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.25 m	
X20CA0E61.00030	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.3 m	
X20CA0E61.00035	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.35 m	
X20CA0E61.00050	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 0.5 m	
X20CA0E61.00100	POWERLINK/Ethernet connection cable, RJ45 to RJ45, 1 m	
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	
	Terminal blocks	

Table 166: 8BVI0110HWD0.000-1, 8BVI0220HWD0.000-1, 8BVI0110HCD0.000-1, 8BVI0220HCD0.000-1 - Order data

Model number	Short description	Figure
8TB2104.203F-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, F keying: 0101	
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2112.2010-00	12-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB3104.204G-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, G keying: 0110	
8TB3104.204K-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, K keying: 1001	

Table 166: 8BVI0110HWD0.000-1, 8BVI0220HWD0.000-1, 8BVI0110HCD0.000-1, 8BVI0220HCD0.000-1 - Order data

11.4.1.3 Technical data

Model number	8BVI0110HWD0.000-1	8BVI0110HCD0.000-1	8BVI0220HWD0.000-1	8BVI0220HCD0.000-1
General information				
B&R ID code	0xA8E5	0xA8E3	0xA8E6	0xA8E4
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting	Wall mounting	Cold plate or feed-through mounting
Slots for plug-in modules	2			
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Functional safety[1]	Yes			
DC bus connection				
Voltage				
Nominal	750 VDC			
Continuous power consumption [2]	22.3 kW		32.37 kW	
Power dissipation depending on switching frequency [3]				
Switching frequency 5 kHz	[0.33 * I_M^2 + 11 * I_M + 90] W		[0.65 * I_M^2 - 0.35 * I_M+ 64] W	
Switching frequency 10 kHz	[0.97 * I_M^2 + 9.5 * I_M + 170] W		[2.16 * I_M^2 - 10.912 * I_M+ 190] W	
Switching frequency 20 kHz	[1.66 * I_M^2 + 21 * I_M + 380] W		-	
DC bus capacitance	660 µF		1320 µF	
Design	ACOPOSmulti backplane			
24 VDC supply				
Input voltage	25 VDC ±1.6%			
Input capacitance	23.5 µF			
Max. power consumption	20 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake(s)}$[4]		21 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ + $P_{HoldingBrake(s)}$[4]	
Design	ACOPOSmulti backplane			
24 VDC output				
Quantity	2			
Output voltage				
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (U_{DC}/315)			
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%			
Fuse protection	250 mA (slow-blow) electronic, automatic reset			
Motor connection				
Quantity	2			
Continuous power per motor connection [2]	11 kW		16 kW	
Continuous current per motor connection [2]	15.1 A_{eff}		22 A_{eff}	
Reduction of continuous current depending on switching frequency [5]				
Switching frequency 5 kHz	No reduction	-	0.33 A/K (starting at 40°C) [6]	-
Switching frequency 10 kHz	0.19 A/K (starting at 29°C) [7]	-	0.17 A/K (starting at -25°C) [7]	-
Switching frequency 20 kHz	0.15 A/K (starting at -38°C) [7]	-		

Table 167: 8BVI0110HWD0.000-1, 8BVI0110HCD0.000-1, 8BVI0220HWD0.000-1, 8BVI0220HCD0.000-1 - Technical data

Model number	8BVI0110HWD0.000-1	8BVI0110HCD0.000-1	8BVI0220HWD0.000-1	8BVI0220HCD0.000-1
Reduction of continuous current depending on switching frequency and mounting method [5]				
Switching frequency 5 kHz				
Cold plate mounting [8]	-	0.38 A/K (starting at 51°C) [6]	-	0.99 A/K (starting at 40°C) [6]
Feed-through mounting	-	0.27 A/K (starting at 46°C) [6]	-	0.52 A/K (starting at 40°C) [6]
Switching frequency 10 kHz				
Cold plate mounting [8]	-	0.25 A/K (starting at 24°C) [9]	-	0.29 A/K (starting at 10°C) [9]
Feed-through mounting	-	0.16 A/K (starting at 2°C) [7]	-	0.23 A/K (starting at 0°C) [7]
Switching frequency 20 kHz				
Cold plate mounting [8]	-	0.19 A/K (starting at -14°C) [9]	-	
Feed-through mounting	-	0.14 A/K (starting at -74°C) [7]	-	
Reduction of continuous current depending on installation elevation				
Starting at 500 m above sea level	1.51 A_{eff} per 1000 m		2.2 A_{eff} per 1000 m	
Peak current per motor connection	37.7 A_{eff}		55 A_{eff} [10]	
Nominal switching frequency	5 kHz			
Possible switching frequencies [11]	5 / 10 / 20 kHz		5 / 10 kHz	
Electrical stress of connected motor per IEC TS 60034-25 [12]	Limit value curve A			
Protective measures				
Overload protection	Yes			
Short circuit and ground fault protection	Yes			
Max. output frequency	598 Hz [13]			
Design				
U, V, W, PE	Male connector			
Shield connection	Yes			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	0.25 to 6 mm²			
Approbation data				
UL/C-UL-US	30 to 10 AWG			
CSA	28 to 10 AWG			
Terminal cable cross section dimension of shield connection	12 to 22 mm			
Max. motor line length depending on switching frequency				
Switching frequency 5 kHz	25 m			
Switching frequency 10 kHz	25 m			
Switching frequency 20 kHz	10 m		-	
Motor holding brake connection				
Quantity	2			
Output voltage [14]	24 VDC +5.8% / -0% [15]			
Continuous current	2.1 A			
Max. internal resistance	0.3 Ω			
Extinction potential	Approx. 30 V			
Max. extinction energy per switching operation	3 Ws			
Max. switching frequency	0.5 Hz			
Protective measures				
Overload and short circuit protection	Yes			
Open circuit monitoring	Yes			
Undervoltage monitoring	Yes			
Response threshold for open circuit monitoring	Approx. 0.5 A			
Response threshold for undervoltage monitoring	24 VDC +0% / -4%			
Enable inputs				
Quantity	4 (2 per axis)			
Wiring	Sink			
Electrical isolation				
Input - Inverter module	Yes			
Input - Input	Yes			
Input voltage				
Nominal	24 VDC			
Maximum	30 VDC			
Input current at nominal voltage	Approx. 30 mA			
Switching threshold				
Low	<5 V			
High	>15 V			

Table 167: 8BVI0110HWD0.000-1, 8BVI0110HCD0.000-1, 8BVI0220HWD0.000-1, 8BVI0220HCD0.000-1 - Technical data

Model number	8BVI0110HWD0.000-1	8BVI0110HCD0.000-1	8BVI0220HWD0.000-1	8BVI0220HCD0.000-1
Switching delay at nominal input voltage				
Enable 1 → 0, PWM off		Max. 20.5 ms		
Enable 0 → 1, ready for PWM		Max. 100 µs		
Modulation compared to ground potential		Max. ±38 V		
OSSD signal connections [16]		Permissible Max. test pulse length: 500 µs		
Trigger inputs				
Quantity		2		
Wiring		Sink		
Electrical isolation				
Input - Inverter module		Yes		
Input - Input		Yes		
Input voltage				
Nominal		24 VDC		
Maximum		30 VDC		
Switching threshold				
Low		<5 V		
High		>15 V		
Input current at nominal voltage		Approx. 10 mA		
Switching delay				
Rising edge		52 µs ±0.5 µs (digitally filtered)		
Falling edge		53 µs ±0.5 µs (digitally filtered)		
Modulation compared to ground potential		Max. ±38 V		
Electrical characteristics				
Discharge capacitance		0.44 µF		
Operating conditions				
Permissible mounting orientations				
Hanging vertically		Yes		
Lying horizontally		Yes		
Standing horizontally		No		
Installation at elevations above sea level				
Nominal		0 to 500 m		
Maximum [17]		4000 m		
Pollution degree per EN 61800-5-1		2 (non-conductive pollution)		
Overvoltage category per EN 61800-5-1		III		
Degree of protection per EN 60529		IP20		
Environmental conditions				
Temperature				
Operation				
Nominal		5 to 40°C		
Maximum [18]		55°C		
Storage		-25 to 55°C		
Transport		-25 to 70°C		
Relative humidity				
Operation		5 to 85%		
Storage		5 to 95%		
Transport		Max. 95% at 40°C		
Mechanical characteristics				
Dimensions [19]				
Width		106.5 mm		
Height		317 mm		
Depth				
Wall mounting	263 mm	-	263 mm	-
Cold plate	-	212 mm	-	212 mm
Feed-through mounting	-	209 mm	-	209 mm
Weight	Approx. 5.3 kg	Approx. 4.1 kg	Approx. 5.7 kg	Approx. 4.4 kg
Module width		2		

Table 167: 8BVI0110HWD0.000-1, 8BVI0110HCD0.000-1, 8BVI0220HWD0.000-1, 8BVI0220HCD0.000-1 - Technical data

1) Achievable safety classifications (safety integrity level, safety category, performance level) are documented in the user's manual (section "Safety technology").
2) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
3) $I_M = 0.5 * (I_{X5A} + I_{X5B})$
   I_{X5A} ... Current on motor connection X5A [A_{eff}]
   I_{X5B} ... Current on motor connection X5B [A_{eff}]
4) P_{SLOT1} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module)
   P_{SLOT2} ... Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).
   $P_{24\ V\ Out}$ ... Power [W] that is output to connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W).
5) Valid for the following conditions: 750 VDC DC bus voltage, minimum permissible coolant flow volume (3 l/min). The temperature specifications refer to the return temperature of the cold plate mounting plate.
6) Value for the nominal switching frequency.

7) The module cannot supply the full continuous current at this switching frequency. This unusual value for the ambient temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
8) The temperature specifications refer to the return temperature of the cold plate mounting plate.
9) The module cannot supply the full continuous current at this switching frequency. This unusual value for the return temperature, at which derating of the continuous current must be taken into account, ensures that the derating of the continuous current can be determined in the same manner as at other switching frequencies.
Caution! Condensation can occur at low flow temperatures and return temperatures.
10) The thermal pulse load capacity is lower than for the 8BVI0220HxS0.000-1 1-axis module. It is therefore not possible to simply replace two 8BVI0220HxS0.000-1 1-axis modules with one 8BVI0220HxD0.000-1 2-axis module. If this is required, the load cycle must be examined in detail.
11) B&R recommends operating the module at its nominal switching frequency. Operating the module at a higher switching frequency for application-specific reasons reduces the continuous current and increases the CPU load. When using 2-axis modules, the increased CPU load reduces the functionality of the drive; if this is not taken into consideration, the computing time can be exceeded in extreme cases.
12) If necessary, the stress of the motor isolation system can be reduced by an additional externally wired dv/dt choke. For example, the RWK 305 three-phase du/dt choke from Schaffner (www.schaffner.com) can be used. Important: Even when using a dv/dt choke, it is necessary to ensure that an EMC-compatible, low inductance shield connection is used!
13) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Council Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
14) During the project development phase, it is necessary to check if the minimum voltage can be maintained on the holding brake with the specified wiring. For the operating voltage range of the holding brake, see the user documentation for the motor being used.
15) The specified value is only valid under the following conditions:
- The 24 VDC power supply for the module is provided by an auxiliary supply module 8B0C located on the same mounting plate.
- Connection between S1 and S2 (activation of the external holding brake) using a jumper with a max. length of 10 cm.
If the 24 VDC power supply for the module is applied to the mounting plate using an 8BVE expansion module, then the output voltage is reduced because of voltage drops on the expansion cable. In this case, undervoltage monitoring must be disabled.
If jumpers longer than 10 cm are used to connect S1 and S2, then the output voltage is reduced because of voltage drops on the jumpers.
16) OSSD (output signal switching device) signals are used to monitor signal lines for short circuits and cross faults.
17) Continuous operation at an installation elevation of 500 m to 4,000 m above sea level is possible taking the specified reduction of continuous current into account. Requirements that go beyond this must be arranged with B&R.
18) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the specified reduction of continuous torque into account, but this results in premature aging of components.
19) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

11.4.2 Wiring

11.4.2.1 2-axis modules (double-width) - Pinout overview

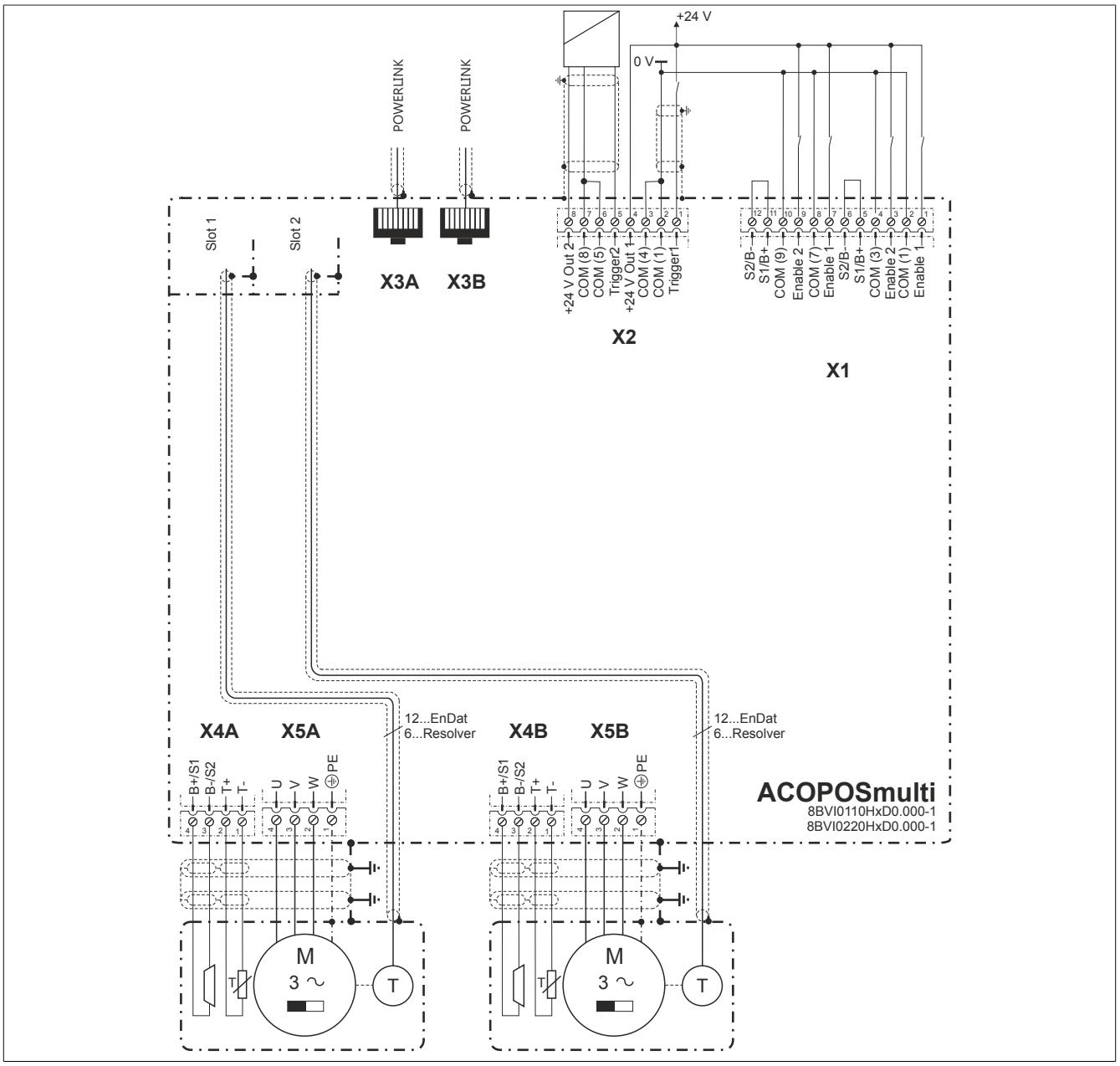


Figure 96: 8BVI0110HxD0.000-1, 8BVI0220HxD0.000-1 - Pinout overview

11.4.2.1.1 Connector X1 - Pinout

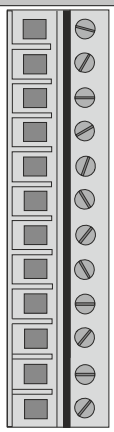
X1	Pin	Name	Function
	1	Enable 1 [1)]	Axis 2: Enable 1
	2	COM (1)	Axis 2: Enable 1 0 V
	3	Enable 2 [1)]	Axis 2: Enable 2
	4	COM (3)	Axis 2: Enable 2 0 V
	5	S1/B+ [2)]	Axis 2: Brake + / Activation of the external holding brake
	6	S2/B- [2)]	Axis 2: Brake - / Activation of the external holding brake
	7	Enable 1 [1)]	Axis 1: Enable 1
	8	COM (7)	Axis 1: Enable 1 0 V
	9	Enable 2 [1)]	Axis 1: Enable 2
	10	COM (9)	Axis 1: Enable 2 0 V
	11	S1/B+ [2)]	Axis 1: Brake + / Activation of the external holding brake
	12	S2/B- [2)]	Axis 1: Brake - / Activation of the external holding brake

Table 168: Connector X1 - Pinout

1) Wiring is not permitted to exceed a total length of 30 m.
2) If the connection is used to activate the external holding brake (S1/S2), then the cabling is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Danger!

The connections for the motor holding brake are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOSmulti inverter modules cannot determine if a holding brake is connected with reverse polarity!

Wiring the connections for the motor holding brake

Activating the motor holding brake internally via the ACOPOSmulti inverter module

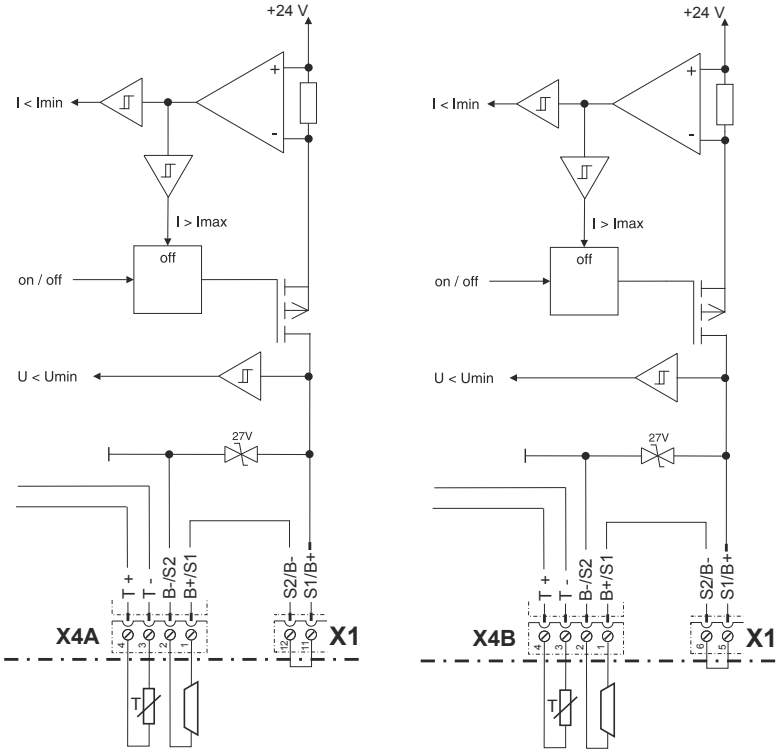
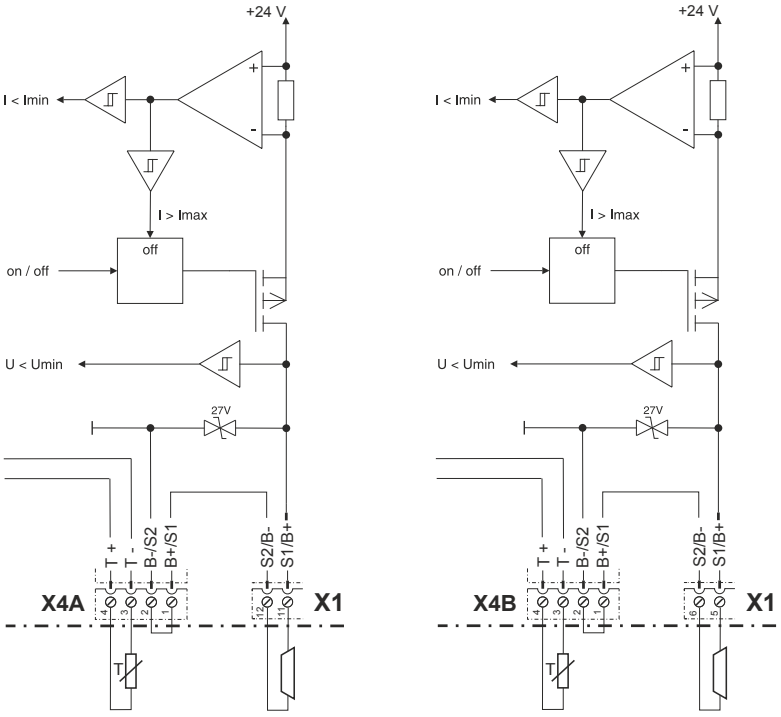
Holding brake connected to the X4A and X4B connectors	Description
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Information: **Jumpers must be placed between S1/B+ and S2/B- on the X1 connector.**	
Holding brake connected to the X1 connector	**Description**
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Information: **Jumpers must be placed between B+/S1 and B-/S2 on the X4A and X4B connector.**	

Table 169: Activating the motor holding brake internally

Activation of the motor holding brake internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts

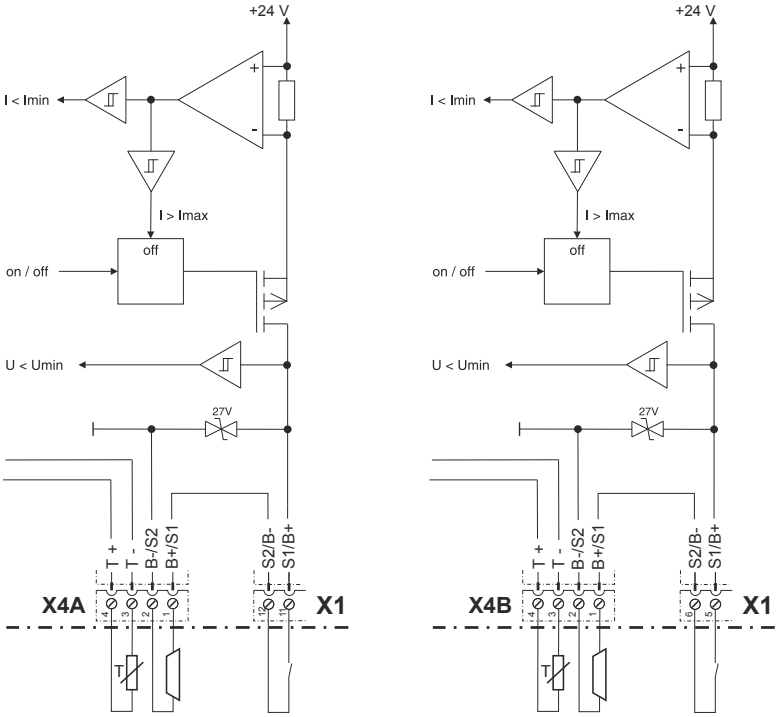
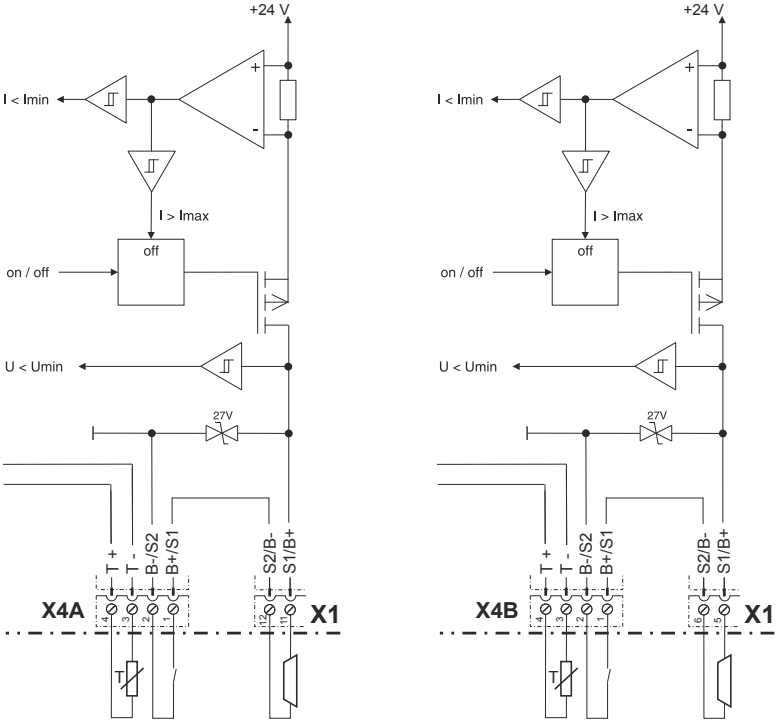
Holding brake connected to the X4A and X4B connectors	Description
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Possible internally by the ACOPOSmulti inverter module and also externally using potential free contacts [1] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.** [2]
Holding brake connected to the X1 connector	**Description**
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Possible internally by the ACOPOSmulti inverter module and also externally using potential free contacts [1] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.** [2]

Table 170: Activating the motor holding brake internally and/or externally

1) Activating the holding brake via external safety circuits can therefore be handled independently of the control functionality integrated in the ACOPOSmulti inverter.
2) The parameters are set using ParID 90 (1 ... Internal monitoring active; 5 ... Internal monitoring not active).

11.4.2.1.2 Connector X2 - Pinout

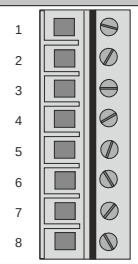
X2	Pin	Name	Function
	1	Trigger1	Trigger 1
	2	COM (1)	Trigger 1 0 V
	3	COM (4)	+24 V output 1 0 V
	4	+24 V Out 1	+24 V output 1
	5	Trigger2	Trigger 2
	6	COM (5)	Trigger 2 0 V
	7	COM (8)	+24 V output 2 0 V
	8	+24 V Out 2	+24 V output 2

Table 171: Connector X2 - Pinout

11.4.2.1.3 Connectors X3A, X3B - Pinout

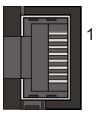
X3A, X3B	Pin	Name	Function
	1	RXD	Receive signal
	2	RXD\	Receive signal inverted
	3	TXD	Transmit signal
	4	Shield	Shield
	5	Shield	Shield
	6	TXD\	Transmit signal inverted
	7	Shield	Shield
	8	Shield	Shield

Table 172: X3A, X3B connectors - Pinout

11.4.2.1.4 X4A, X4B connectors - Pinout

Danger!

The connections for the motor temperature sensors and the motor holding brake are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

If B+ and B- are swapped when connecting the permanent magnet holding brakes, then the brakes cannot be opened! ACOPOSmulti inverter modules cannot determine if a holding brake is connected with reverse polarity!

Connector X4A - Pinout

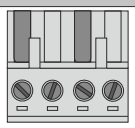
X4A	Name	Function
	T-	Axis 1: Temperature sensor -
	T+	Axis 1: Temperature sensor +
	B-/S2 [1)]	Axis 1: Brake - / Activation of the external holding brake
	B+/S1 [1)]	Axis 1: Brake + / Activation of the external holding brake

Table 173: Connector X4A - Pinout

1) If the connection is used to activate the external holding brake (S1/S2), then the cabling is not permitted to exceed a total length of 3 m.
If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Warning!

Temperature sensors are only permitted to be connected to the X4A/T+ and X4A/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT1 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

Connector X4B - Pinout

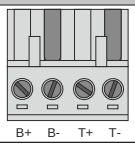
X4B	Name	Function
	T-	Axis 2: Temperature sensor -
	T+	Axis 2: Temperature sensor +
	B-/S2 1) 2)	Axis 2: Brake - / Activation of the external holding brake
	B+/S1 1) 2)	Axis 2: Brake + / Activation of the external holding brake

Table 174: Connector X4B - Pinout

1) Wiring is not permitted to exceed a total length of 3 m.
2) If the holding brake is connected via an additional external relay contact (ground-in e.g. via connections S1/S2) instead of only via the internal transistor, then the internal quenching circuit has no effect! In this case, the customer must make sure that neither the relay contact nor the braking coil are damaged when switching off the brake. This can be done by interconnecting the coil or - better still - interconnecting the contact with a quenching circuit.

Warning!

Temperature sensors are only permitted to be connected to the X4B/T+ and X4B/T- connectors on an ACOPOSmulti module under the following conditions:

- **There is no ACOPOSmulti plug-in module in SLOT2 on the ACOPOSmulti module with a temperature sensor connected to T+ and T-**

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

Wiring the connections for the motor holding brake

Activating the motor holding brake internally via the ACOPOSmulti inverter module

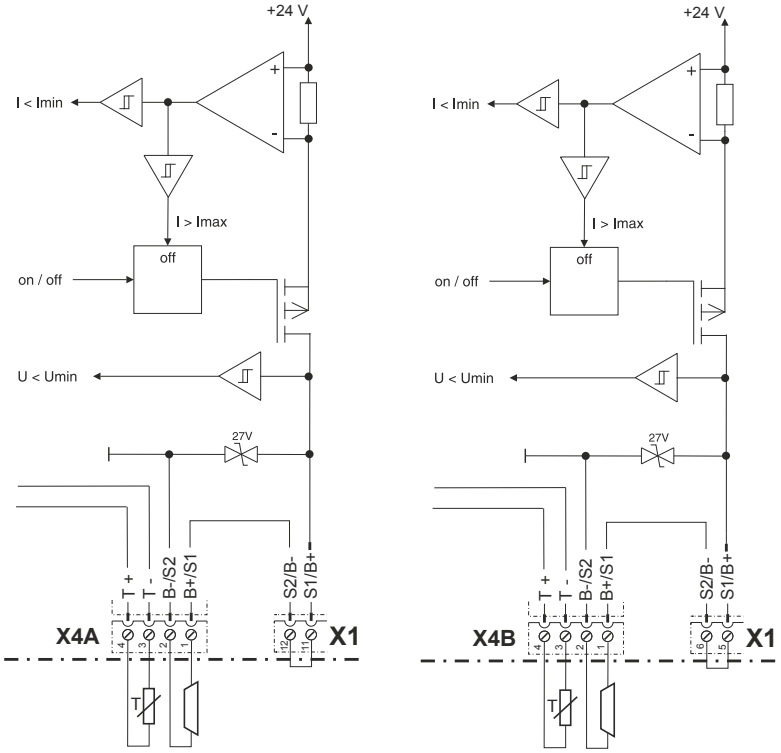
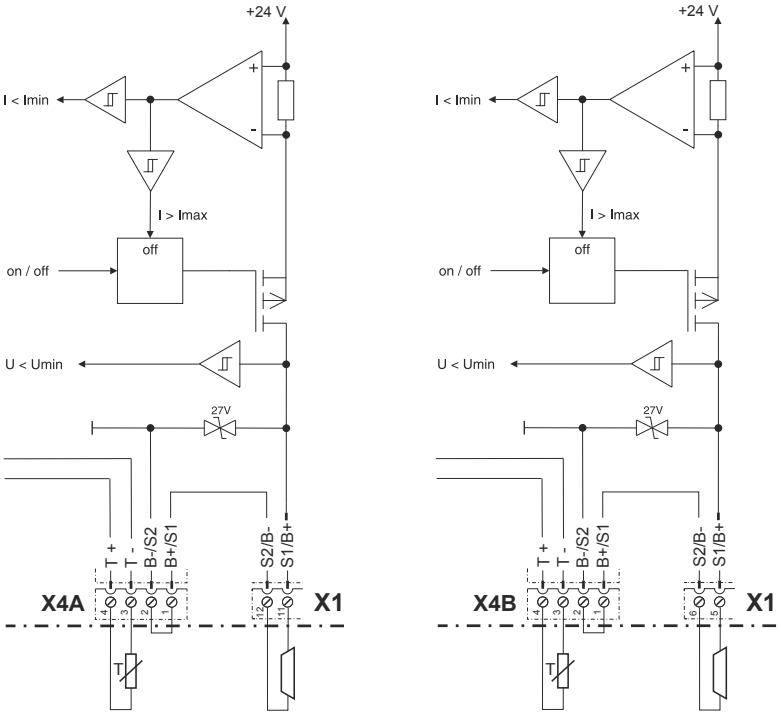
Holding brake connected to the X4A and X4B connectors	Description
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Information: **Jumpers must be placed between S1/B+ and S2/B- on the X1 connector.**	
Holding brake connected to the X1 connector	**Description**
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Internally via the ACOPOSmulti inverter module • **Monitoring:** Internally via the ACOPOSmulti inverter module
Information: **Jumpers must be placed between B+/S1 and B-/S2 on the X4A and X4B connector.**	

Table 175: Activating the motor holding brake internally

Activation of the motor holding brake internally via the ACOPOSmulti inverter module and/or externally via potential-free contacts

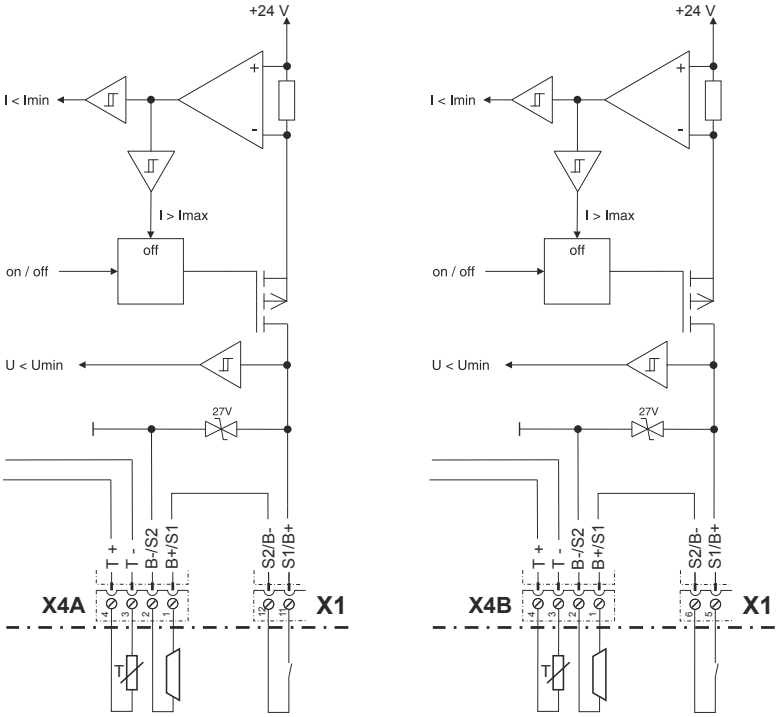
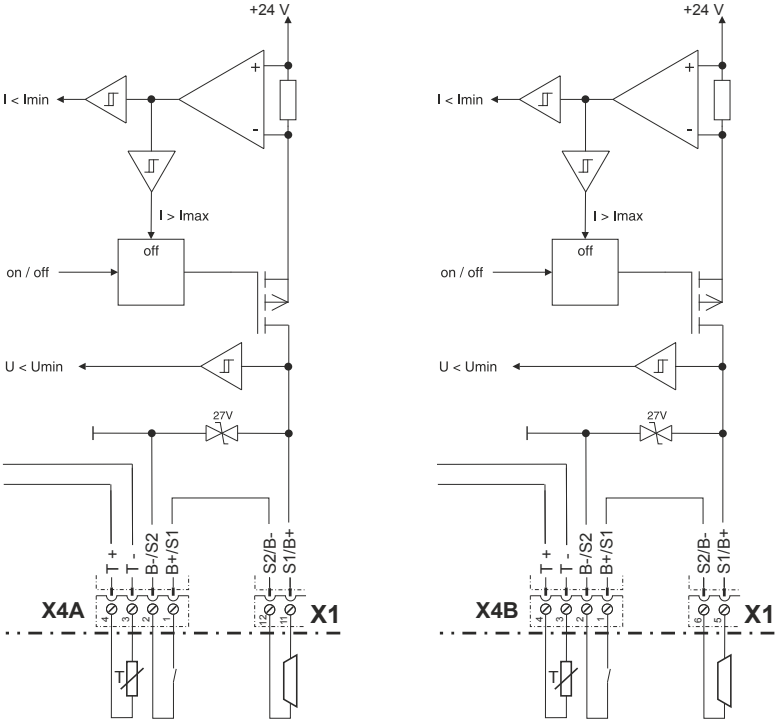
Holding brake connected to the X4A and X4B connectors	Description
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Possible internally by the ACOPOSmulti inverter module and also externally using potential free contacts [1] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.** [2]
Holding brake connected to the X1 connector	**Description**
	• **Supply:** Internally via the ACOPOSmulti inverter module • **Activation:** Possible internally by the ACOPOSmulti inverter module and also externally using potential free contacts [1] • **Monitoring:** Internally via the ACOPOSmulti inverter module **Information:** **The parameters for internal monitoring via the ACOPOSmulti inverter module must be set according to the requirements of the application.** [2]

Table 176: Activating the motor holding brake internally and/or externally

1) Activating the holding brake via external safety circuits can therefore be handled independently of the control functionality integrated in the ACOPOSmulti inverter.
2) The parameters are set using ParID 90 (1 ... Internal monitoring active; 5 ... Internal monitoring not active).

11.4.2.1.5 Connector X5A - Pinout

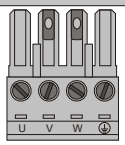
X5A	Name	Function
	⏚	Axis 1: Protective ground conductor
	W	Axis 1: Motor connection W
	V	Axis 1: Motor connection V
	U	Axis 1: Motor connection U

Table 177: Connector X5A - Pinout

11.4.2.1.6 Connector X5B - Pinout

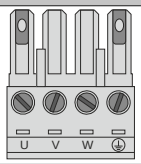
X5B	Name	Function
	⏚	Axis 2: Protective ground conductor
	W	Axis 2: Motor connection W
	V	Axis 2: Motor connection V
	U	Axis 2: Motor connection U

Table 178: Connector X5B - Pinout

11.4.2.1.7 Input/Output circuit diagram

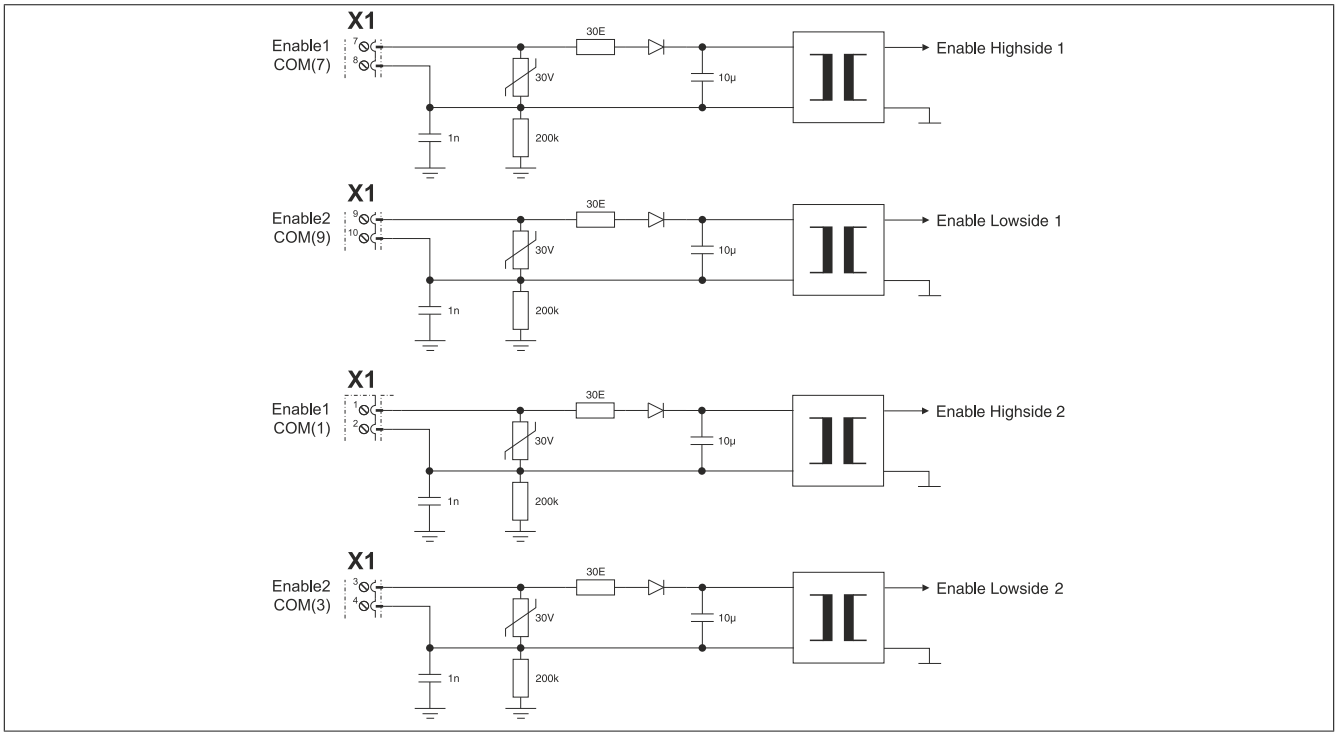


Figure 97: Enable

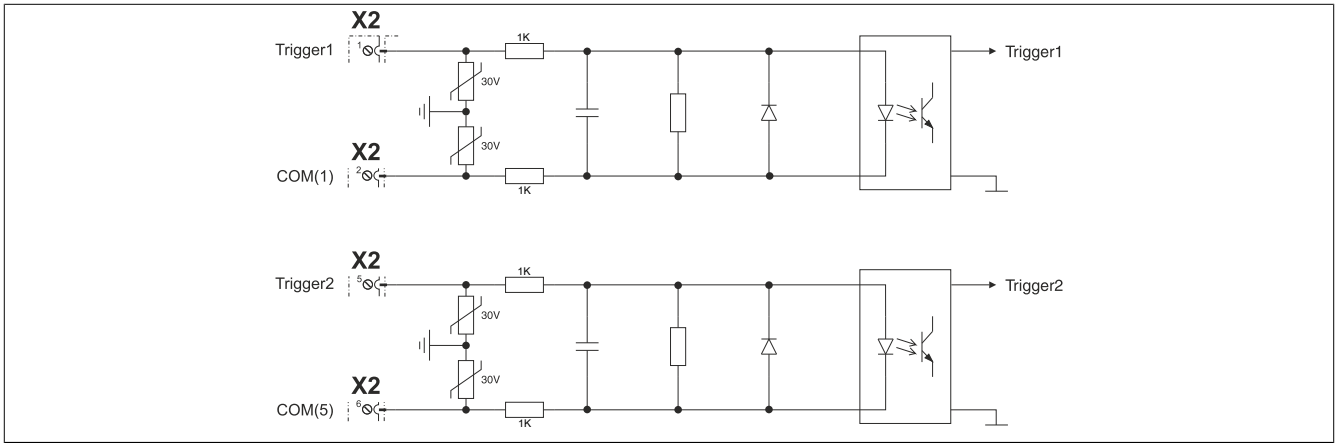


Figure 98: Trigger inputs

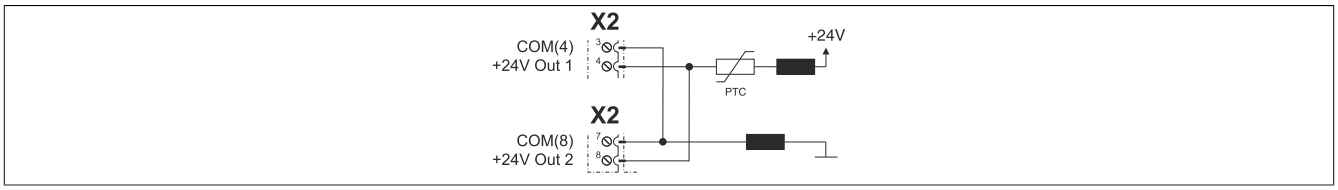


Figure 99: 24 VDC out

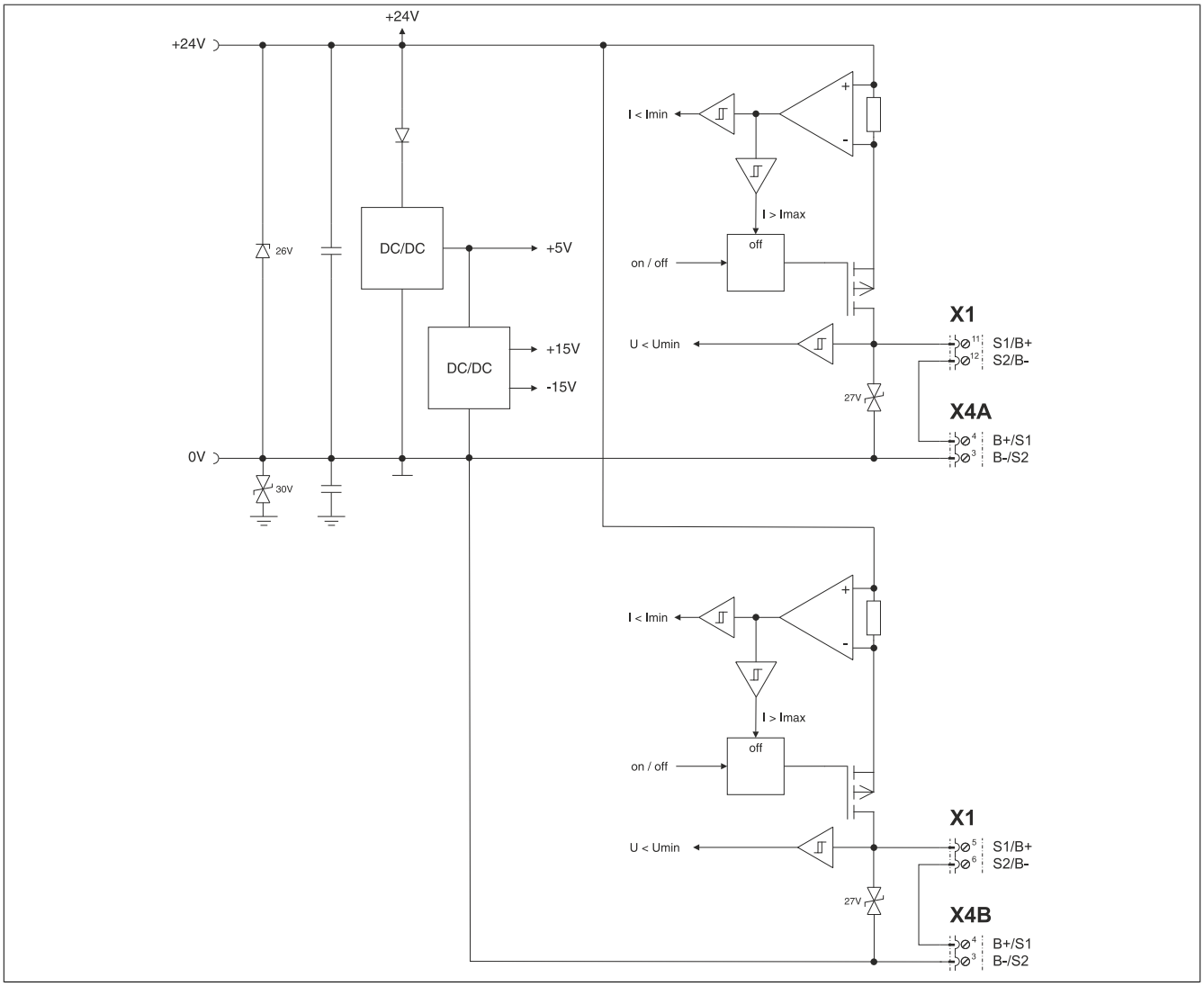


Figure 100: Holding brake

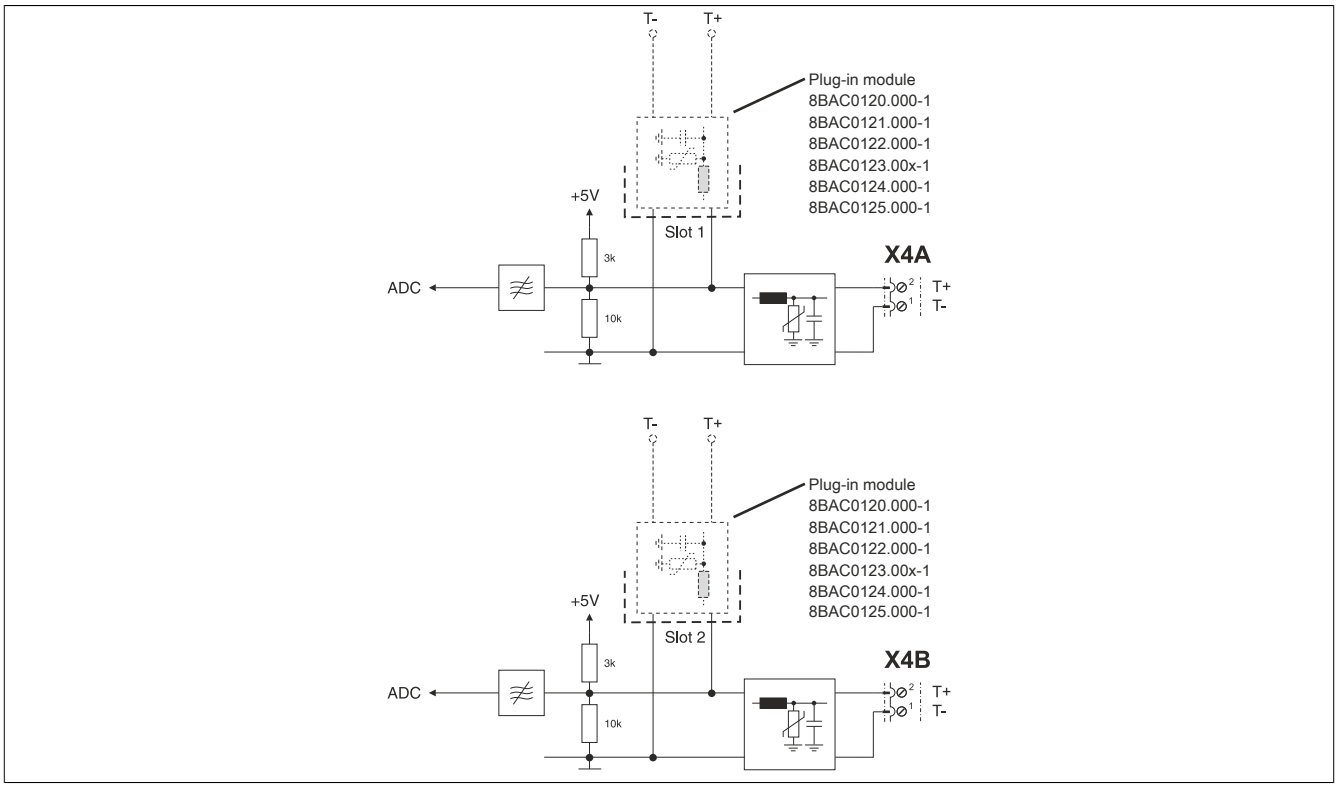


Figure 101: Temperature sensor

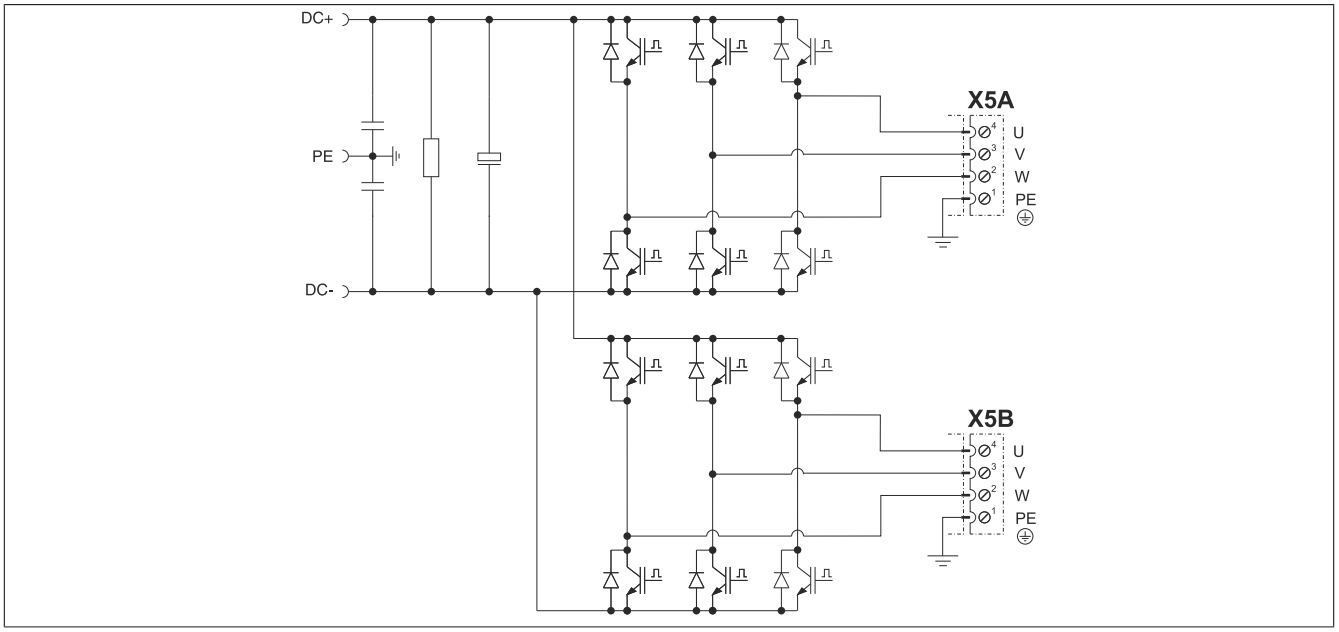


Figure 102: Motor

11.5 POWERLINK node number settings Inverter modules

The POWERLINK node number can be set using the two HEX rotary code switches located behind the black cover:

Figure		Switch	POWERLINK node number
		1	16s position (high)
Cover closed	Cover open	2	1s position (low)

Changed POWERLINK node numbers will not take effect until the ACOPOSmulti drive system is restarted.

Information:

In principle, node numbers between $01 and $FD are permitted.
However, node numbers between $F0 and $FD are intended for future system expansions. To ensure compatibility, these node numbers should be avoided.

Node numbers $00, $FE and $FF are reserved and may therefore not be set.

Table 179: Setting the POWERLINK node number

12 8BVE expansion modules

12.1 General information

8BVE expansion modules allow the DC bus and 24 VDC power supply of an ACOPOSmulti drive system to be distributed to multiple 8B0M mounting plates. This makes it possible to implement distributed units within an ACOPOSmulti drive system. The module is equipped with corresponding cable outlets for this. In addition, ACOPOSremote and ACOPOSmotor drive systems can be connected to an ACOPOSmulti drive system via 8BVE expansion modules.

Warning!

Do not use 8BVE expansion modules to supply power to devices from other manufacturers!
There is a risk of irreparable damage to these 3rd-party devices, 8BVE expansion modules or the ACOPOSmulti drive system!

Only the following B&R modules are permitted to be connected to connectors X4A and X4B on an 8BVE expansion module:

- **ACOPOSmulti 8BVE expansion modules**
- **ACOPOSremote 8CVE connection boxes**
- **ACOPOSremote 8CVI inverter modules**
- **ACOPOSmotor 8DI modules**
- **ACOPOS P3 8EI servo drive**

Fuse protection for cable outlets

Fuse protection must be provided for the cable outlets for the DC bus and 24 VDC connection from the 8BVE expansion modules. Fuse holders for fuses are thus installed in the 8BVE expansion modules accordingly. The fuses necessary for operation must be dimensioned based on the application and installed by the user in the 8BVE expansion modules before commissioning. Suitable fuses are available as 8BXS fuse sets.

Information:

Depending on the application, select exactly one 8BXS fuse set for the DC bus and exactly one 8BXS fuse set for the 24 VDC cable outlet for each 8BVE expansion module!

Monitoring

All fuse holders are thermally monitored. The monitoring status is indicated by LEDs. If the 8BVE expansion module is overloaded, this will be additionally indicated to the user over special relay contacts (ALARM) for additional evaluation.

Caution!

The monitoring status of 8BVE expansion modules must be evaluated in the application. An overload of expansion module 8BVE can result in irreparable damage to the fuse holders or damping resistors installed in the module!

12.2 Order data

Model number	Short description	Figure
	Wall mounting	
8BVE0500HW00.000-1	ACOPOSmulti expansion module 50 A, HV, wall mounting	
	Cold plate or feed-through mounting	
8BVE0500HC00.000-1	ACOPOSmulti expansion module 50 A, HV, cold plate or feed-through mounting	
	Required accessories	
	Fuse sets	
8BXS000.0000-00	ACOPOSmulti fuse set: 2x fuse 14x51 mm, 50 A, fast-acting	
8BXS001.0000-00	ACOPOSmulti fuse set: 2x fuse 14x51 mm, 20 A, fast-acting	
8BXS002.0000-00	ACOPOSmulti fuse set: 2x fuse 14x51 mm, 10 A, fast-acting	
8BXS003.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 30 A, fast-acting	
8BXS004.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 12 A, fast-acting	
8BXS005.0000-00	ACOPOSmulti fuse set: 2x fuse 14x51 mm, 25 A, fast-acting	
8BXS006.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 15 A, fast-acting	
	Terminal block sets	
8BZVE050000.000-1A	Screw clamp terminal block set for ACOPOSmulti 8BVE0500Hx00.000-1 modules: 2x 8TB3102.201C-11, 2x 8TB4103.203C-10, 1x 8TB2104.2010-00	
	Optional accessories	
	8BVE / 8CVI connection cables	
8CCH0002.11120-1	Hybrid cable for connecting 8BVE to 8CVI or 8DI, length 2 m, 2x 2x 0.34 mm² + 4x 0.75 mm² + 5x 2.5 mm², 1x 15-pin female TYCO connector, 1x RJ45 connector, integrated shield attachment, UL/CSA listed	
8CCH0005.11120-1	Hybrid cable for connecting 8BVE to 8CVI or 8DI, length 5 m, 2x 2x 0.34 mm² + 4x 0.75 mm² + 5x 2.5 mm², 1x 15-pin female TYCO connector, 1x RJ45 connector, integrated shield attachment, UL/CSA listed	
8CCH0007.11120-1	Hybrid cable for connecting 8BVE to 8CVI or 8DI, length 7 m, 2x 2x 0.34 mm² + 4x 0.75 mm² + 5x 2.5 mm², 1x 15-pin female TYCO connector, 1x RJ45 connector, integrated shield attachment, UL/CSA listed	
8CCH0009.11120-1	Hybrid cable for connecting 8BVE to 8CVI or 8DI, length 9 m, 2x 2x 0.34 mm² + 4x 0.75 mm² + 5x 2.5 mm², 1x 15-pin female TYCO connector, 1x RJ45 connector, integrated shield attachment, UL/CSA listed	
8CCH0010.11120-1	Hybrid cable for connecting 8BVE to 8CVI or 8DI, length 10 m, 2x 2x 0.34 mm² + 4x 0.75 mm² + 5x 2.5 mm², 1x 15-pin female TYCO connector, 1x RJ45 connector, integrated shield attachment, UL/CSA listed	
	Expansion cables	
8BCA0003.1111A-0	ACOPOSmulti expansion cable, length 3 m, 3x 1.5 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0003.1312A-0	ACOPOSmulti expansion cable, length 3 m, 3x 4 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0003.1513A-0	ACOPOSmulti expansion cable, length 3 m, 3x 10 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0005.1111A-0	ACOPOSmulti expansion cable, length 5 m, 3x 1.5 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0005.1312A-0	ACOPOSmulti expansion cable, length 5 m, 3x 4 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0005.1513A-0	ACOPOSmulti expansion cable, length 5 m, 3x 10 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA01X5.1111A-0	ACOPOSmulti expansion cable, length 1.5 m, 3x 1.5 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA01X5.1312A-0	ACOPOSmulti expansion cable, length 1.5 m, 3x 4 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA01X5.1513A-0	ACOPOSmulti expansion cable, length 1.5 m, 3x 10 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	

Table 180: 8BVE0500HW00.000-1, 8BVE0500HC00.000-1 - Order data

Model number	Short description	Figure
	Terminal blocks	
8TB2104.2010-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB3102.201C-11	2-pin screw clamp, single row, spacing: 7.62 mm, label 1: numbered serially, C keying: 10	
8TB4103.203C-10	3-pin screw clamp, single row, spacing: 10.16 mm, label 3: +DC -DC PE, keying C: 010	

Table 180: 8BVE0500HW00.000-1, 8BVE0500HC00.000-1 - Order data

12.3 Technical data

Model number	8BVE0500HW00.000-1	8BVE0500HC00.000-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
DC bus connection		
Voltage		
Nominal	750 VDC	
Continuous power depending on fuse [1]		
10 A	6 kW [2]	
20 A	12 kW [2]	
50 A	30 kW [2]	
Continuous current depending on fuse [1]		
10 A	8 A_{eff}	
20 A	16 A_{eff}	
50 A	40 A_{eff}	
Reduction of continuous power at ambient temperatures starting at 40°C	1.25% per °Kelvin	
Reduction of continuous power depending on installation elevation		
Starting at 500 m above sea level	10% per 1000 m	
Reduction of continuous power depending on cooling method	No reduction	
Peak current depending on fuse		
10 A	20 A	
20 A	40 A	
50 A	100 A	
Power dissipation with continuous power	200 W	
Design	ACOPOSmulti backplane	
24 VDC supply		
Input voltage	25 VDC ±1.6%	
Continuous power depending on fuse [1]		
12 A	240 W [2]	
30 A	600 W [2]	
Max. power consumption	5 W	
Reduction of continuous power at ambient temperatures starting at 40°C	1.25% per °Kelvin	
Design	ACOPOSmulti backplane	
DC bus cable outlet [3]		
Quantity	2	
Fuse protection		
Type	2x blow-out fuse Ø 14x51 mm	
Tripping characteristic	Ultra fast-acting	
Rated current [4]	10 / 20 / 50 A	
Protective measures		
Fuse-dependent overload protection		
10 A	No (overload indicated via LED, dry alarm contacts present)	
20 A	No (overload indicated via LED, dry alarm contacts present)	
50 A	No (overload indicated via LED, dry alarm contacts present)	
Short circuit and ground fault protection	Yes	
Max. distance between two expansion modules	5 m	
Design		
DC+, DC-, PE	Male connector	
Shield connection	Yes	

Table 181: 8BVE0500HW00.000-1, 8BVE0500HC00.000-1 - Technical data

Model number	8BVE0500HW00.000-1	8BVE0500HC00.000-1
Terminal connection cross section		
Flexible and fine wire lines		
With wire end sleeves	0.5 to 16 mm²	
Approbation data		
UL/C-UL-US	20 to 6 AWG	
CSA	20 to 6 AWG	
Terminal cable cross section dimension of shield connection	12 to 22 mm	
24 VDC auxiliary supply cable outlet		
Quantity	2	
Output voltage		
DC bus voltage (U_{DC}): 260 to 315 VDC	25 VDC * (DC bus voltage / 315)	
DC bus voltage (U_{DC}): 315 to 800 VDC	24 VDC ±6%	
Fuse protection		
Type [5)]	Blow-out fuse Ø 10x38 mm	
Tripping characteristic	Fast-acting	
Rated current	12 / 30 A	
Protective measures		
Overload protection	Yes	
Short circuit protection	Yes	
Max. distance between two expansion modules	5 m	
Design		
24 VDC, COM	Male connector	
Shield connection	No	
Terminal connection cross section		
Flexible and fine wire lines		
With wire end sleeves	0.25 to 6 mm²	
Approbation data		
UL/C-UL-US	22 to 10 AWG	
CSA	22 to 10 AWG	
Alarm contacts [6)]		
Quantity	2	
Type		
Alarm contact 1	Normally closed contact	
Alarm contact 2	N.O. contact	
Electrical isolation		
Alarm contact - ACOPOSmulti module	Yes	
Alarm contact - Alarm contact	Yes	
Nominal voltage	30 VDC	
Maximum current	1 A	
Switching delay	3 ms	
Max. number of switching cycles	100,000	
Protection		
Overload protection	No	
Short circuit protection	No	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [7)]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [8)]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	

Table 181: 8BVE0500HW00.000-1, 8BVE0500HC00.000-1 - Technical data

Model number	8BVE0500HW00.000-1	8BVE0500HC00.000-1
Mechanical characteristics		
Dimensions [9]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 3.1 kg	Approx. 2.6 kg
Module width	1	

Table 181: 8BVE0500HW00.000-1, 8BVE0500HC00.000-1 - Technical data

1) Valid in the following conditions: 750 VDC DC bus voltage, 5 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
2) The specified values take into consideration a reserve of 17% of the rated current (recommended by the fuse manufacturer).
3) Shielded cables must be used. B&R recommends the ACOPOSmulti 8BCA expansion cables.
4) For a 10 A rated current, type 5011806.10 fuses from Siba (www.sibafuses.com) must be used.
For a 20 A rated current, type 5011806.20 fuses from Siba (www.sibafuses.com) must be used.
For a 50 A rated current, type 5020106.50 fuses from Siba (www.sibafuses.com) must be used.
5) For example, a type KLKD0xx fuse from Littelfuse (www.littelfuse.com) may be used (xx is the rated current for the fuse; only fuses with a rated current of 30 A or less may be used).
6) The alarm contacts are only activated in situations that lead to components being overloaded inside the module. The alarm contacts must therefore be monitored externally.
Triggering the DC bus or 24 VDC circuit breaker does not result in components being overloaded inside the module, so an alarm contact is not activated!
The alarm contacts are triggered if:
- The load on the damping resistors is >100% (OLD LED lights up).
- The expansion module's outgoing 24 VDC circuit is thermally overloaded (OL24 LED is lit).
- The expansion module's outgoing DC bus circuit is thermally overloaded (OLDC LED is lit).
When activating the alarm contacts, the ACOPOSmulti drive system should be switched off in order to prevent damage to the expansion module.
7) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
8) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
9) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

12.4 Wiring

12.4.1 Pinout overview - 8BVE0500Hx00.000-1

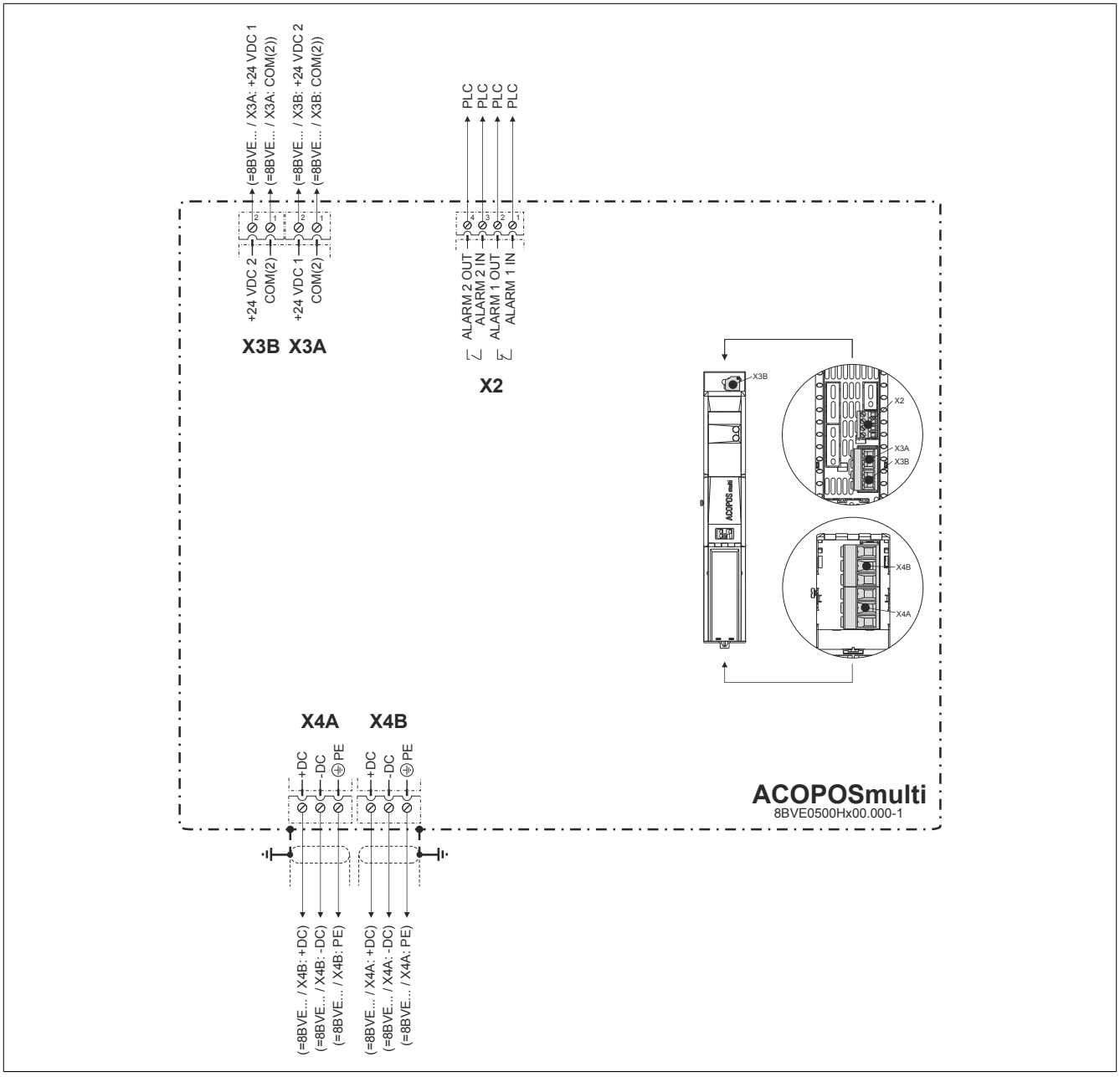


Figure 103: Pinout overview - 8BVE0500Hx00.000-1

12.4.1.1 Additional PE connection on 8BVE expansion modules

An additional PE connection must be made between two 8BVE expansion modules in order to meet the conditions necessary for the ACOPOSmulti drive systems mains connection on all 8B0M mounting plates that are connected using 8BVE expansion modules. This additional PE connection must be made with the same wire cross section as the PE wire used for the DC connection (at least 2.5 mm² with protected wiring or 4 mm² with unprotected wiring).

Information:

If the wiring of the X4 connectors between 8BVE expansion modules is carried out with a wire cross section 10 mm² copper or higher, an additional PE connection is not required.

The PE connection must always be made between the first and last 8BVE expansion modules in the ACOPOSmulti drive system.

DC connection between 2 8BVE expansion modules

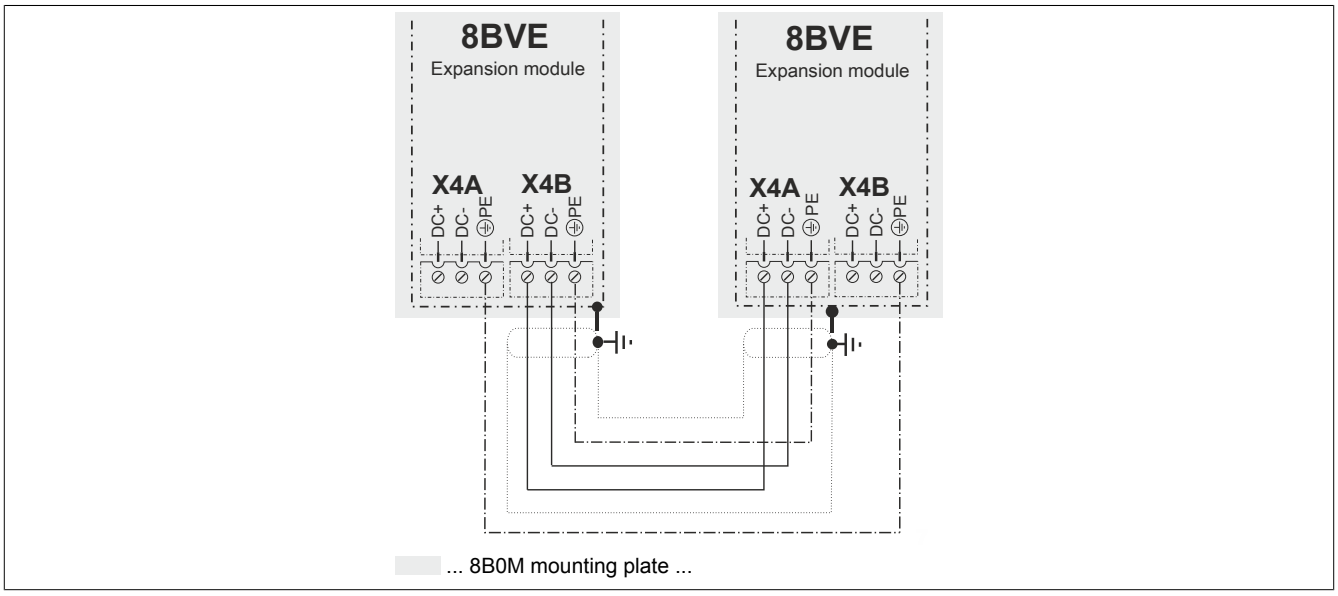


Figure 104: DC connection between 2 8BVE expansion modules

DC connection between 8BVE expansion modules

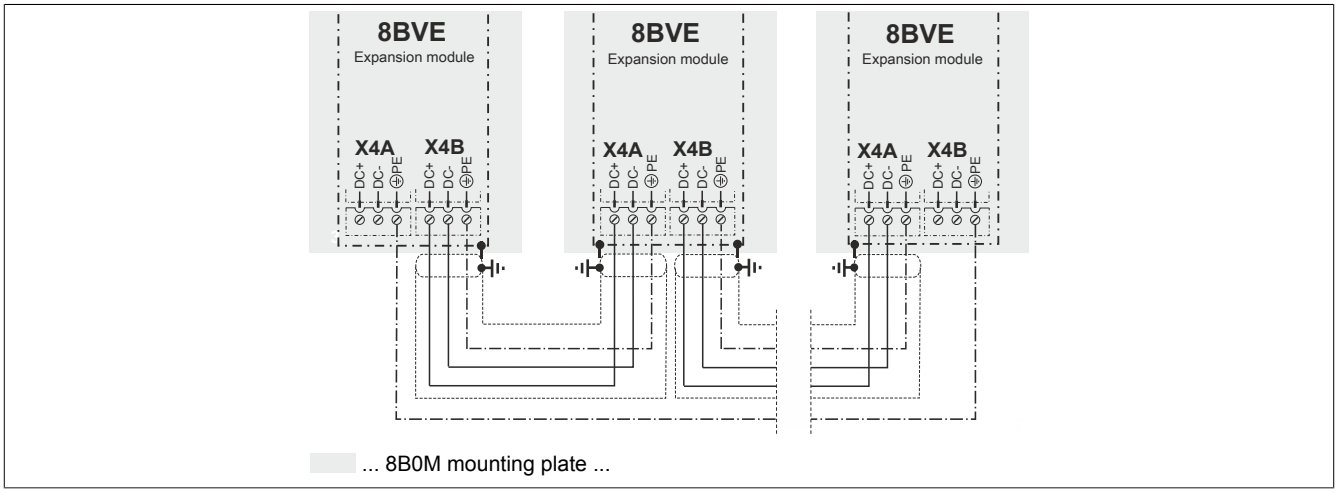


Figure 105: DC connection between 8BVE expansion modules

Connection between two 8BVE expansion modules in combination with 8CVI inverter modules

Variant 1: 8CVI inverter modules to both 8BVE expansion modules

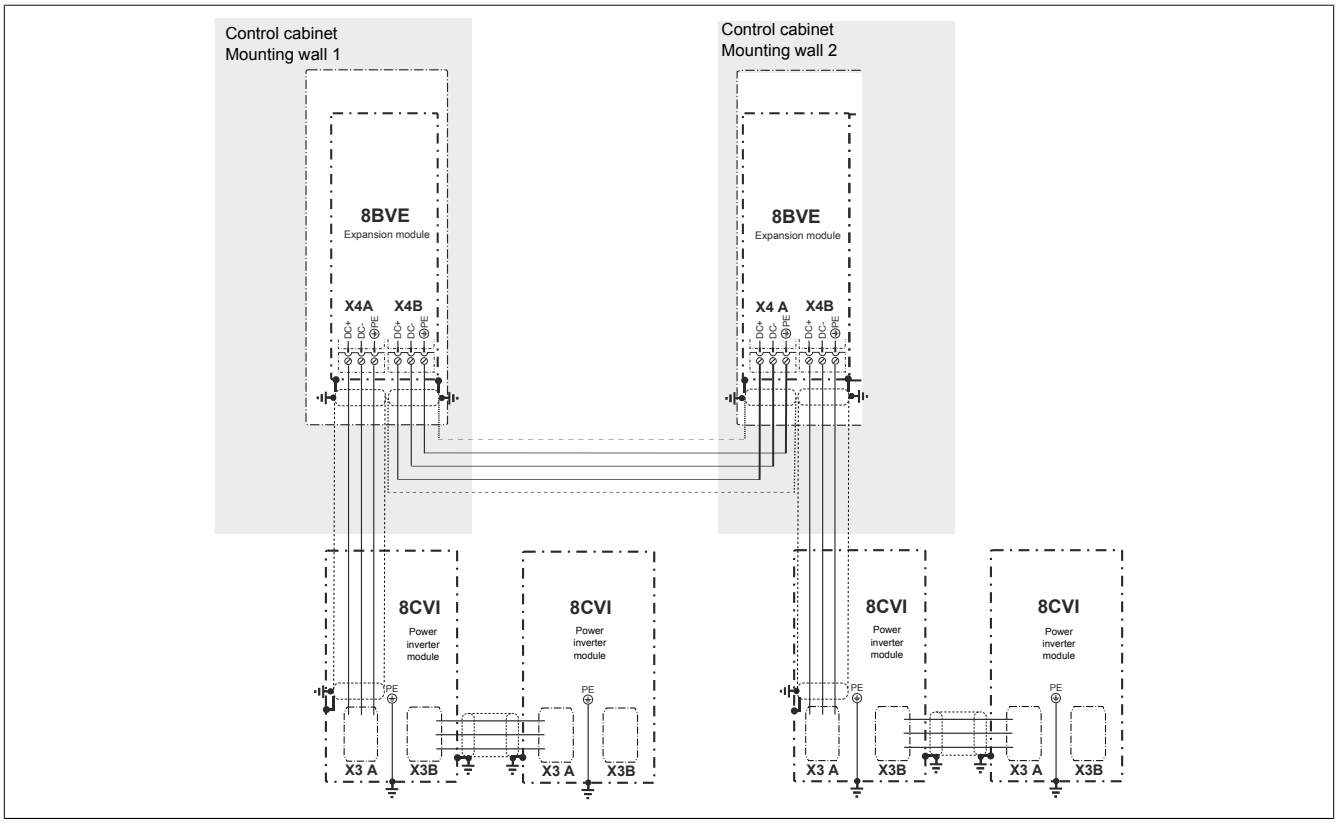


Figure 106: 8CVI inverter module to both 8BVE expansion modules

Variant 2: 8CVI inverter modules to the last 8BVE expansion module

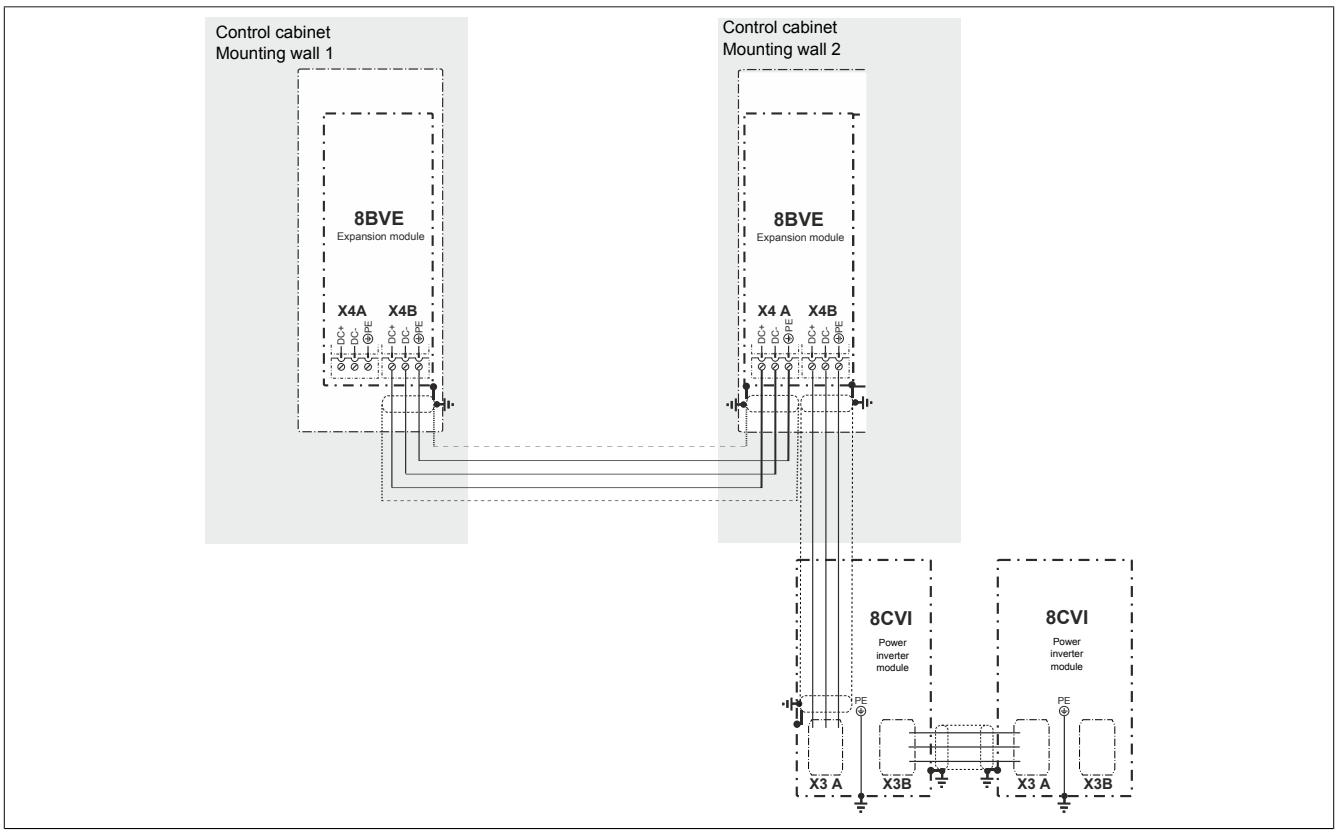


Figure 107: 8CVI inverter modules to the last 8BVE expansion module

12.4.1.2 X2 connector - Pinout

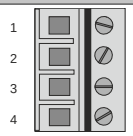
X2	Pin	Name	Function
	1	ALARM 1 IN	Alarm contact 1 IN (N.C.)
	2	ALARM 1 OUT	Alarm contact 1 OUT (N.C.)
	3	ALARM 2 IN	Alarm contact 2 IN (N.O.)
	4	ALARM 2 OUT	Alarm contact 2 OUT (N.O.)

Table 182: X2 connector - Pinout

12.4.1.3 X3A connector - Pinout

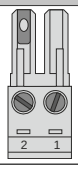
X3A	Pin	Name	Function
	1	COM(2)	+24 V output 1 0 V
	2	+24V VDC 1	+24 V output 1

Table 183: X3A connector - Pinout

12.4.1.4 X3B connector - Pinout

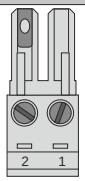
X3B	Pin	Name	Function
	1	COM(2)	+24 V output 2 0 V
	2	+24V VDC 2	+24 V output 2

Table 184: X3B connector - Pinout

12.4.1.5 X4A connector - Pinout

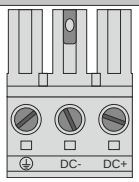
X4A	Name	Function
	+DC	U DC bus 1 +
	-DC	U DC bus 1 -
	PE	Protective ground conductor

Table 185: X4A connector - Pinout

Information:

Shielded cables must be used. B&R recommends the ACOPOSmulti 8BCA expansion cables.

12.4.1.6 Pinout - X4B plug

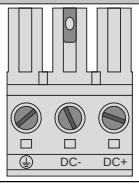
X4B	Name	Function
	+DC	U DC bus 2 +
	-DC	U DC bus 2 -
	PE	Protective ground conductor

Table 186: Pinout - X4B plug

Information:

Shielded cables must be used. B&R recommends the ACOPOSmulti 8BCA expansion cables.

12.4.1.7 Input/output circuit diagram

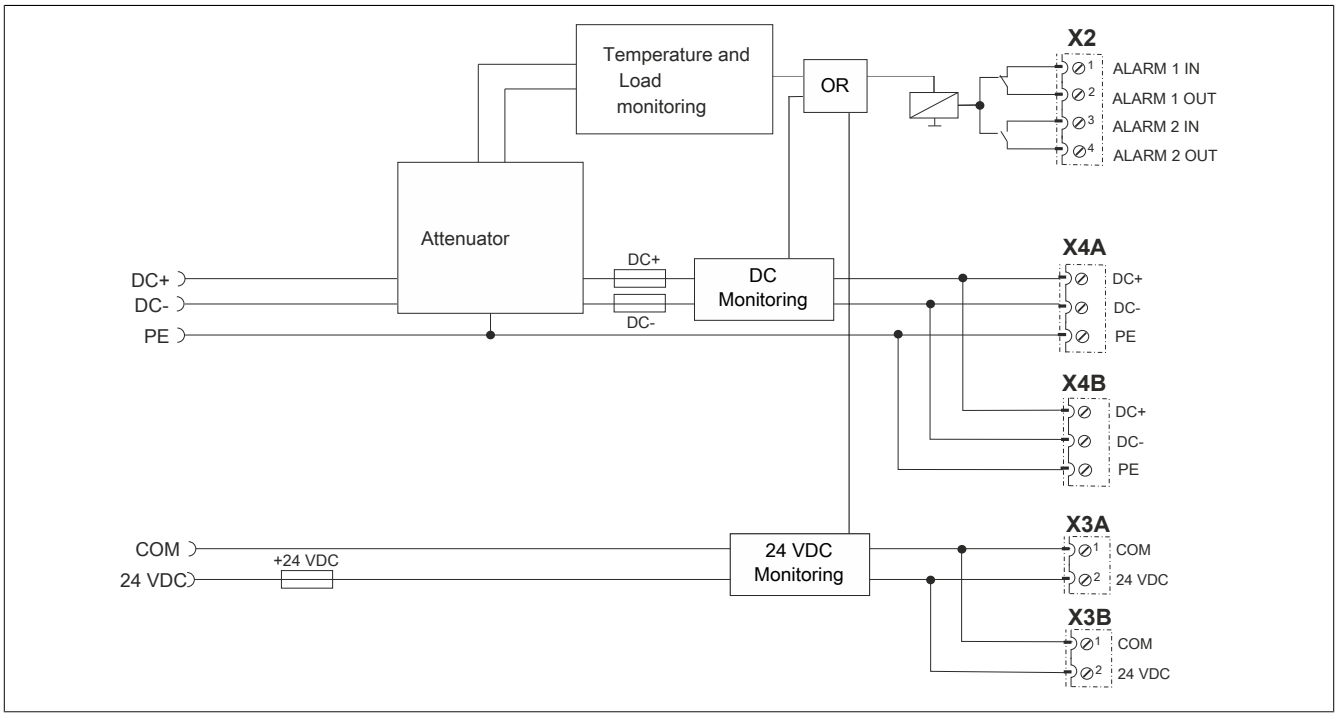


Figure 108: Input/output circuit diagram for 8BVE expansion modules

13 8B0K capacitor modules

13.1 8B0K1650Hx00.000-1

13.1.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0K1650HW00.000-1	ACOPOSmulti capacitor module 1650 µF, HV, wall mounting	
	Cold plate or feed-through mounting	
8B0K1650HC00.000-1	ACOPOSmulti capacitor module 1650 µF, HV, cold plate or feed-through mounting	
	Optional accessories	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	

Table 187: 8B0K1650HW00.000-1, 8B0K1650HC00.000-1 - Order data

13.1.2 Technical data

Model number	8B0K1650HW00.000-1	8B0K1650HC00.000-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
KC	Yes	
UL	cULus E225616 Power conversion equipment	
DC bus connection		
Voltage		
Nominal	750 VDC	
Power dissipation at max. device power	In preparation	
DC bus capacitance	1650 µF	
Design	ACOPOSmulti backplane	
24 VDC supply		
Input voltage	25 VDC +1.6% / -20%	
Max. power consumption	3 W	
Design	ACOPOSmulti backplane	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [1]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [2]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	

Table 188: 8B0K1650HW00.000-1, 8B0K1650HC00.000-1 - Technical data

Model number	8B0K1650HW00.000-1	8B0K1650HC00.000-1
Mechanical characteristics		
Dimensions [3]		
Width	53 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	Approx. 3.2 kg	Approx. 2.7 kg
Module width	1	

Table 188: 8B0K1650HW00.000-1, 8B0K1650HC00.000-1 - Technical data

1) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
2) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
3) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

13.2 8B0K3630Hx00.001-1

13.2.1 Order data

Model number	Short description	Figure
	Wall mounting	
8B0K3630HW00.001-1	ACOPOSmulti capacitor module 3630 µF, HV, wall mounting, charging circuit	
	Cold plate or feed-through mounting	
8B0K3630HC00.001-1	ACOPOSmulti capacitor module 3630 µF, HV, cold plate or feed-through mounting, charging circuit	
	Required accessories	
	Terminal block sets	
8BZ0K363000.001-1A	Screw clamp terminal block set for ACOPOSmulti modules 8B0K3630Hx00.001-1: 1x 8TB2112.2010-00	
	Optional accessories	
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	
	Terminal blocks	
8TB2112.2010-00	12-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	

Table 189: 8B0K3630HW00.001-1, 8B0K3630HC00.001-1 - Order data

13.2.2 Technical data

Model number	8B0K3630HW00.001-1	8B0K3630HC00.001-1
General information		
Cooling and mounting method	Wall mounting	Cold plate or feed-through mounting
Certifications		
CE	Yes	
UL	cULus E225616 Power conversion equipment	
Maximum number of modules depending on power supply module		
8B0P0xx0	In preparation	
8BVP0220	In preparation	
8BVP0440	In preparation	
8BVP0880	In preparation	
8BVP1650	In preparation	
Startup time (CR_OK In HIGH to CR_OK Out HIGH)	Typical 500 ms	
Cutoff delay (CR_OK In LOW to CR_OK Out LOW)	Typ. 3 ms	
Mains connection		
Switch-on interval		
Mains input voltage 3x 400 VAC	In preparation	
Mains input voltage 3x 480 VAC	In preparation	
DC bus connection		
Voltage		
Minimum	235 VDC	
Nominal	750 VDC	
Power dissipation at max. device power	In preparation	
DC bus capacitance	3630 µF [1)]	
Design	ACOPOSmulti backplane	
24 VDC supply		
Input voltage	25 VDC +1.6% / -20%	
Input capacitance	28.2 µF	
Max. power consumption	8 W	
Design	ACOPOSmulti backplane	
Alarm contacts [2)]		
Quantity	2	
Type		
Alarm contact 1	Normally closed contact	
Alarm contact 2	N.O. contact	
Electrical isolation		
Alarm contact - ACOPOSmulti module	Yes	
Alarm contact - Alarm contact	Yes	
Nominal voltage	30 VDC	
Maximum current	1 A	
Switching delay [3)]	Max. 5 ms	
Max. number of switching cycles	100,000	

Table 190: 8B0K3630HW00.001-1, 8B0K3630HC00.001-1 - Technical data

Model number	8B0K3630HW00.001-1	8B0K3630HC00.001-1
Protection		
Overload protection	No	
Short circuit protection	No	
Operating conditions		
Permissible mounting orientations		
Hanging vertically	Yes	
Lying horizontally	Yes	
Standing horizontally	No	
Installation at elevations above sea level		
Nominal	0 to 500 m	
Maximum [4]	4000 m	
Pollution degree per EN 61800-5-1	2 (non-conductive pollution)	
Overvoltage category per EN 61800-5-1	III	
Degree of protection per EN 60529	IP20	
Environmental conditions		
Temperature		
Operation		
Nominal	5 to 40°C	
Maximum [5]	55°C	
Storage	-25 to 55°C	
Transport	-25 to 70°C	
Relative humidity		
Operation	5 to 85%	
Storage	5 to 95%	
Transport	Max. 95% at 40°C	
Mechanical characteristics		
Dimensions [6]		
Width	106.5 mm	
Height	317 mm	
Depth		
Wall mounting	263 mm	-
Cold plate	-	212 mm
Feed-through mounting	-	209 mm
Weight	6.4 kg	5.1 kg
Module width	2	

Table 190: 8B0K3630HW00.001-1, 8B0K3630HC00.001-1 - Technical data

1) May not be taken into consideration when determining the maximum chargeable DC bus capacitance of ACOPOSmulti drive systems!
2) B&R recommends monitoring the alarm contacts. This way, if the module cannot be started up, it is possible to check whether it is functioning properly and is cabled correctly.
3) Switching delay after a change of state in CR_OK Out.
4) Continuous operation at elevations ranging from 500 m to 4000 m above sea level is possible (taking the specified continuous current reductions into consideration). Requirements that go above and beyond this must be arranged with B&R.
5) Continuous operation at ambient temperatures ranging from 40°C to max. 55°C is possible (taking the specified continuous current reductions into consideration), but this will result in a shorter service life.
6) These dimensions refer to the actual device dimensions including the respective mounting plate. Make sure to leave additional space above and below the devices for mounting, connections and air circulation.

13.2.3 8B0K3630Hx00.001-1 - Wiring

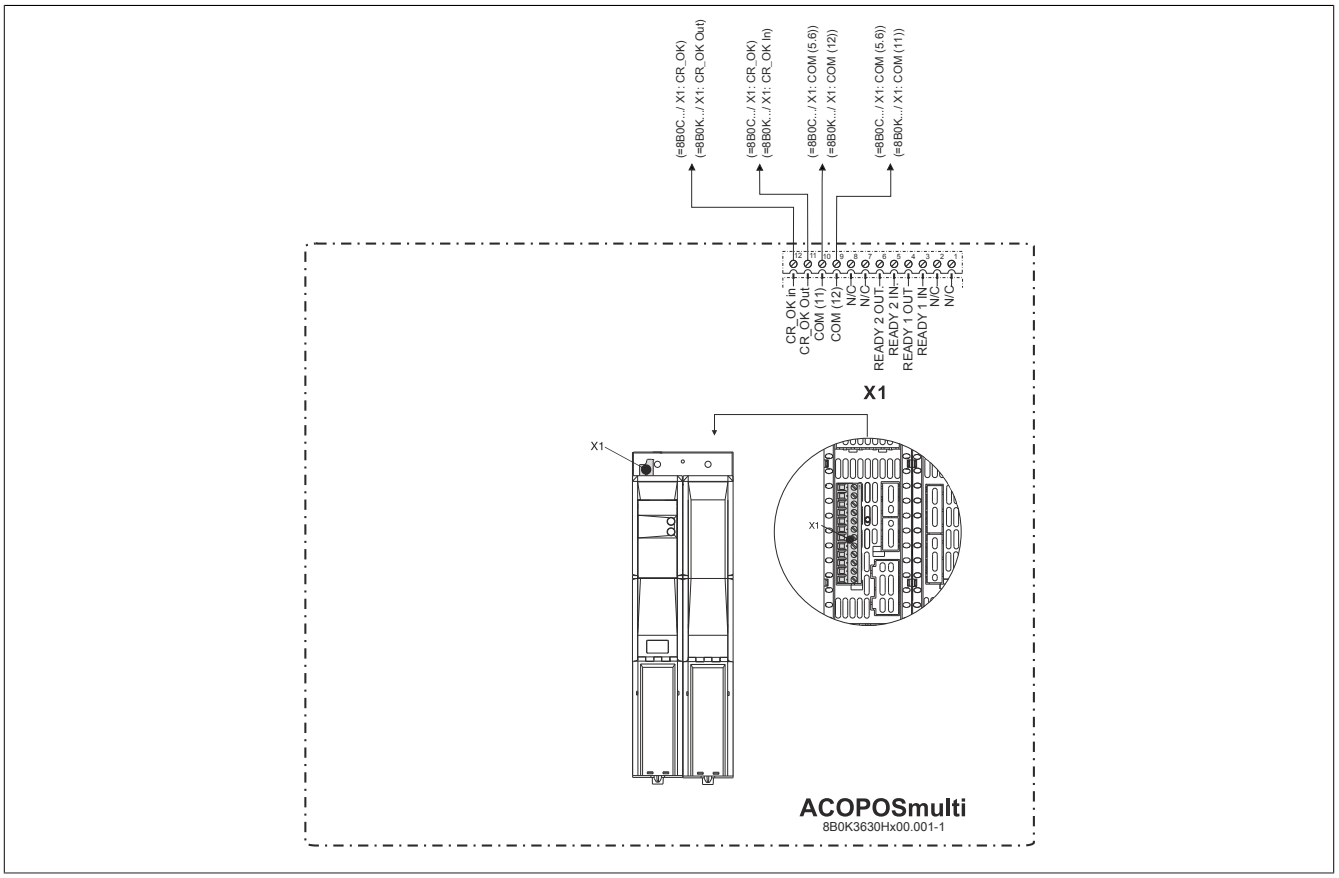


Figure 109: 8B0K3630Hx00.001-1 - Pinout overview

13.2.3.1 X1 connector - Pinout

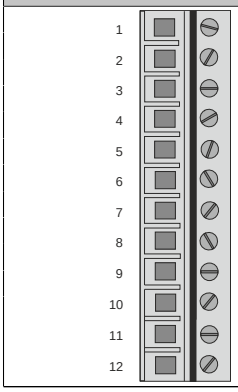
X1	Pin	Name	Function
	1	---	---
	2	---	---
	3	READY 1 IN	Alarm contact 1 IN (N.O.)
	4	READY 1 OUT	Alarm contact 1 OUT (N.O.)
	5	READY 2 IN	Alarm contact 2 IN (N.C.)
	6	READY 2 OUT	Alarm contact 2 OUT (N.C.)
	7	---	---
	8	---	---
	9	COM (12)	0 V
	10	COM (11)	0 V
	11	CR_OK Out	DC bus ready out [1]
	12	CR_OK in	DC bus ready in

Table 191: X1 connector - Pinout

1) Set if the module is ready - RDY LED is lit

13.2.3.2 Input/Output circuit diagram

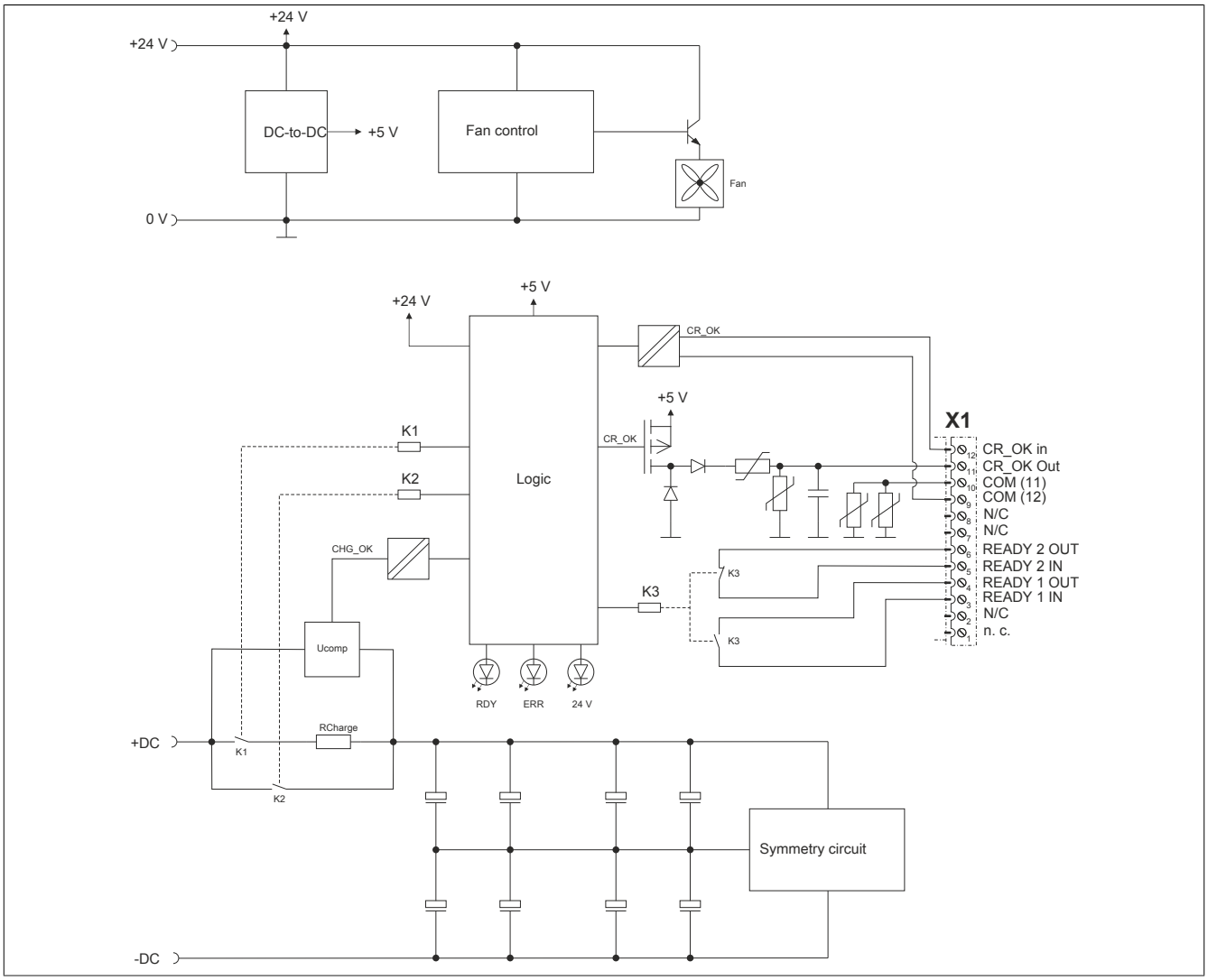


Figure 110: 8B0K3630Hx00.001-1 - Input/Output circuit diagram

14 8BAC plug-in modules

14.1 8BAC0120.000-1 EnDat 2.1 plug-in module

14.1.1 General information

The 8BAC0120.000-1 EnDat 2.1 plug-in module can be used in one ACOPOSmulti slot. The module is equipped with an EnDat 2.1 interface.

This module can be used to evaluate encoders installed in B&R servo motors as well as encoders for external axes (encoders that scan any machine movement). The input signals are monitored. This makes it possible to detect open or shorted lines as well as encoder supply failures.

EnDat 2.1 encoder:

EnDat is a standard developed by Johannes Heidenhain GmbH (www.heidenhain.de) that incorporates the advantages of absolute and incremental position measurement and also offers a read/write parameter memory in the encoder. With absolute position measurement (the absolute position is sampled serially), a homing procedure is usually not required. Where necessary, a multi-turn encoder (4096 revolutions) should be installed. To save costs, a single-turn encoder and a reference switch can also be used. In this case, a homing procedure must be carried out.

The incremental process allows the short delay times necessary for position measurement on drives with exceptional dynamic properties. With the sinusoidal incremental signal and the fine resolution in the EnDat 2.1 module, a very high positioning resolution is achieved in spite of the moderate signal frequencies used.

The parameter memory in the EnDat encoder is used by B&R to store information such as motor data. In this way, the ACOPOSmulti drive system is always automatically provided with the correct motor parameters and limit values. This is referred to as the "embedded parameter chip".

When turned on, the plug-in module is automatically identified, configured and its parameters set by the ACOPOSmulti drive system's operating system.

14.1.2 Order data

Model number	Short description	Figure
	Plug-in modules	
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	
	Optional accessories	
	EnDat 2.1 cables	
8BCE0005.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 5 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0007.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 7 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0010.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 10 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0015.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 15 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0020.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 20 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0025.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 25 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	

Table 192: 8BAC0120.000-1 - Order data

14.1.3 Technical data

Model number	8BAC0120.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0x22EF
Slot [1]	Slots 1 and 2

Table 193: 8BAC0120.000-1 - Technical data

Model number	8BAC0120.000-1
Power consumption	
Depends on connected encoder	Yes
E0 ... EnDat single-turn, 512 lines	Max. 4 W
E1 ... EnDat multi-turn, 512 lines	Max. 4 W
E2 ... EnDat single-turn, 32 lines (inductive)	Max. 4 W
E3 ... EnDat multi-turn, 32 lines (inductive)	Max. 4 W
E4 ... EnDat single-turn, 512 lines	Max. 4 W
E5 ... EnDat multi-turn, 512 lines	Max. 4 W
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder inputs [2]	
Quantity	1
Module-side connection	15-pin DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	No
Encoder monitoring	Yes
Max. encoder cable length	75 m
Sine/Cosine inputs	
Signal transmission	Differential signals, symmetrical
Signal frequency (-3 dB)	DC up to 300 kHz
Signal frequency (-5 dB)	DC up to 400 kHz
Common-mode voltage	Max. ±7 V
Terminating resistor	120 Ω
Resolution	12-bit
Encoder power supply	
Output voltage	5 V ±5%
Load capacity	250 mA [3]
Sense lines	2, compensation of max. 2x 0.7 V
Position	
Resolution @ 1 V_{SS} [4]	Number of encoder lines * 5700
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	781.25 kbit/s
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 193: 8BAC0120.000-1 - Technical data

1) The 8BAC0120.000-1 is a single encoder module. Up to two encoder modules can be inserted. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis, and the encoder module in the second slot serves as motor feedback for the second axis. The second slot can be used for other purposes if only one axis is being operated.
2) The EnDat encoder must be wired using a cable with a single shielding layer.
3) An additional reserve of 57 mA exists for terminating resistors.
4) This value does not correspond to the encoder resolution that must be configured in Automation Studio (16384 * number of encoder lines).

14.1.4 Wiring

14.1.4.1 Pinout

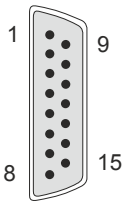
Figure	X11	Pin	Name	Function
		1	A	Channel A
		2	COM	Encoder supply 0 V
		3	B	Channel B
		4	+5 V	Encoder supply +5 V
		5	D	Data input
		6	---	---
		7	T+	Temperature sensor +
		8	T	Clock output
		9	A\	Channel A inverted
		10	Sense COM	Sense input 0 V
		11	B\	Channel B inverted
		12	Sense +5V	Sense input +5 V
		13	D\	Data inverted
		14	T-	Temperature sensor -
		15	T\	Clock output inverted

Table 194: 8BAC0120.000-1 EnDat 2.1 interface - Pinout

Danger!

The connections for the encoders are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation in accordance with IEC 60364-4-41 or EN 61800-5-1.

Warning!

Temperature sensors are only permitted to be connected to T+ and T- on an ACOPOSmulti plug-in module under the following conditions:

- **The ACOPOSmulti plug-in module is in SLOT1 on the ACOPOSmulti module and a temperature sensor is not connected to X4A/T+ and X4A/T- on this ACOPOSmulti module.**
- **Only for 8BVIxxxxHxD0.xxx-x inverter modules:**
  The ACOPOSmulti plug-in module is in SLOT2 on the ACOPOSmulti module and a temperature sensor is not connected to X4B/T+ and X4B/T- on this ACOPOSmulti module.

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

14.1.4.2 Input/Output circuit diagram

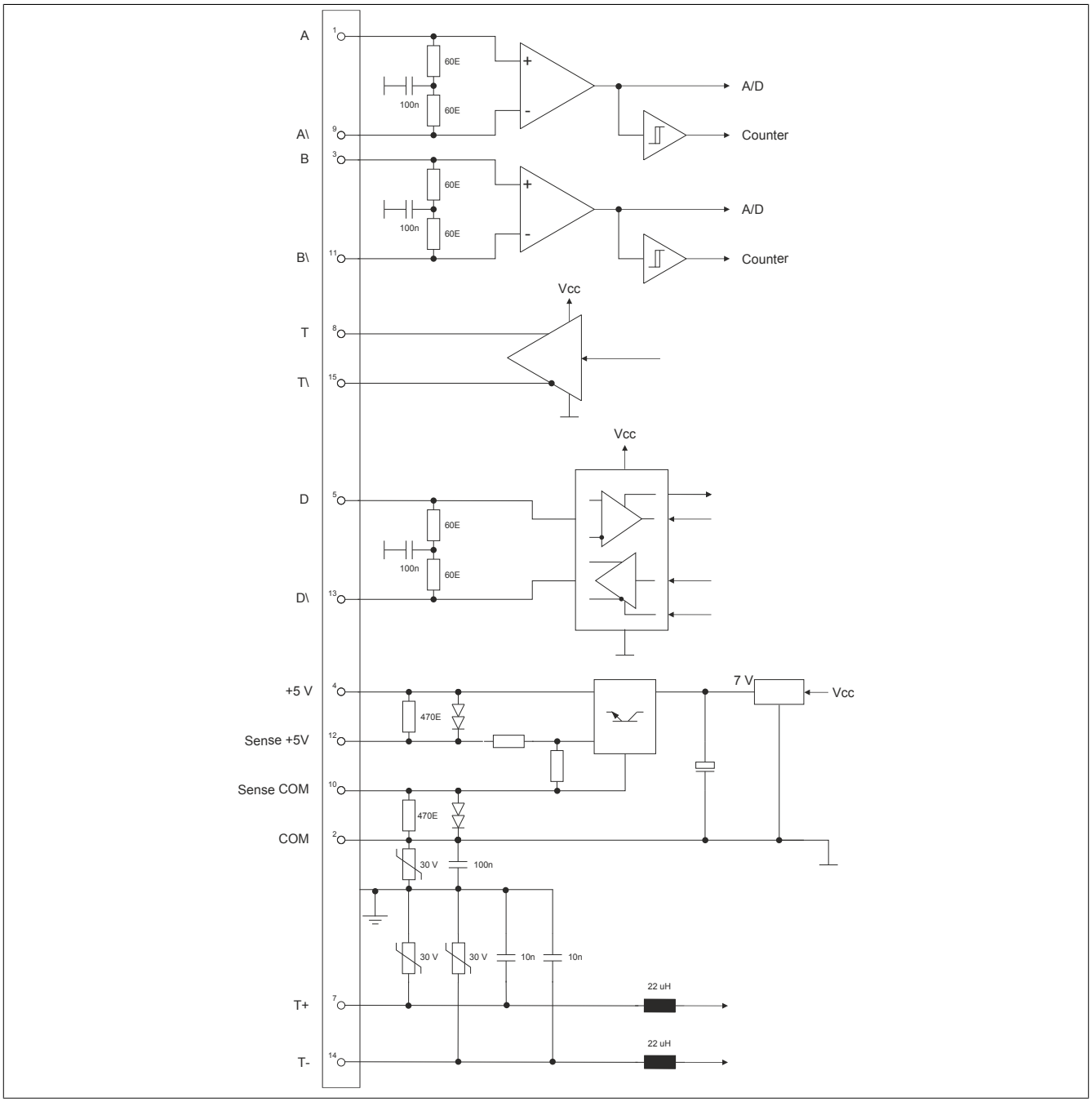


Figure 111: 8BAC0120.000-1 EnDat 2.1 interface - Input/Output circuit diagram

14.1.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder. [3)]

UP LED ... Indicates when the encoder position changes in the positive direction.
DN LED ... Indicates when the encoder position changes in the negative direction.

14.1.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

3) The count direction of the encoder can be configured in Automation Studio. However, changing the count direction in Automation Studio does not change the actual count direction of the encoder and therefore does not affect the UP/DN LEDs!

14.2 8BAC0120.001-2 EnDat 2.2 plug-in module

Information:

The 8BAC0120.001-2 EnDat 2.2 plug-in module is only permitted to be used in combination with B&R 8BCF EnDat 2.2 cables or B&R 8BCH hybrid motor cables!

14.2.1 General information

The EnDat 2.2 plug-in module can be used in one ACOPOSmulti slot. The module is equipped with an EnDat 2.2 interface.

This module can be used to evaluate encoders installed in B&R servo motors as well as encoders for external axes (encoders that scan any machine movement). The input signals are monitored. This makes it possible to detect open or shorted lines as well as encoder supply failures.

EnDat 2.2 encoder:

EnDat 2.2 is a standard developed by Johannes Heidenhain GmbH (www.heidenhain.de). An advancement of EnDat 2.1, it incorporates the advantages of a true digital, bidirectional interface and also offers a read/write parameter memory in the encoder. With absolute position measurement, the homing procedure is generally not required. Where necessary, a multi-turn encoder (4096 revolutions) should be installed. To save costs, a single-turn encoder and a reference switch can also be used. In this case, a homing procedure must be carried out.

Only 4 signal lines are needed because serial data transfer is used. Data is transferred synchronously to the clock signal defined by the subsequent electronics.

The parameter memory in the EnDat encoder is used by B&R to store information such as motor data. In this way, the ACOPOSmulti drive system is always automatically provided with the correct motor parameters and limit values. This is referred to as the "embedded parameter chip".

When turned on, the plug-in module is automatically identified, configured and its parameters set by the ACOPOSmulti drive system's operating system.

EnDat 2.2 encoders with battery-backed multi-turn functionality:

With optional accessory set 8BXB000.0000-0, the module also supports encoders with battery-backed multi-turn functionality. These multi-turn encoders do not keep track of position information in the event of power failure. Battery voltage monitoring is handled by the encoder itself and enabled automatically. [4)]

The battery compartment is located behind the black cover on the front of ACOPOSmulti 8BVP power supply modules and ACOPOSmulti 8BVI inverter modules.

Information:

The 8BAC0120.001-2 EnDat 2.2 plug-in module is only permitted to be used in combination with B&R 8BCF EnDat 2.2 cables or B&R 8BCH hybrid motor cables!

4) B&R motors with EnDat 2.2 encoders with battery-backed multi-turn functionality are available under model numbers 8xxxxx.B1....

14.2.2 Order data

Model number	Short description	Figure
	Plug-in modules	
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	
	Required accessories	
	EnDat 2.2 cables	
8BCF0005.1221B-0	EnDat 2.2 cable, length 5 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	

Table 195: 8BAC0120.001-2 - Order data

14.2.3 Technical data

Model number	8BAC0120.001-2
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xB0BF
Slot [1]	Slots 1 and 2
Max. power consumption	P_{Module} [mW] = 500 mW + 19 V * $I_{Encoder}$ [mA] [2]
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder connection [3]	
Module-side connection	9-pin male DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	No
Encoder monitoring	Yes
Max. encoder cable length	100 m Depends on the cross section of the power supply wires of the encoder cable [4]
Encoder power supply	
Output voltage	Typ. 12.5 V
Load capacity	350 mA
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Synchronous serial interface	
Signal transmission	RS485
Baud rate	6.25 Mbit/s
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 196: 8BAC0120.001-2 - Technical data

1) The 8BAC0120.001-2 is an encoder module. Two encoder modules can also be connected. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis; the encoder module in the second slot serves as motor feedback for the second axis. In single-axis mode, the second slot can be used for other purposes.
2) $I_{Encoder}$ ... Current consumption of the EnDat 2.2 encoder. The current consumption of the terminating resistors is already taken into account in the formula.
3) Only B&R 8BCF EnDat 2.2 cables are permitted to be used for cabling the module.

4) The maximum encoder cable length l_{max} can be calculated as follows (the maximum permissible encoder cable length of 100 m is not permitted to be exceeded):

$l_{max} = 7.9/I_G * A * 1/(2*\rho)$

I_G ... Max. current consumption of the encoder [A]
A ... Cross section of the power supply wires [mm²]
ρ ... Specific resistance [Ωmm²/m] (e.g. for copper: ρ = 0.0178)

14.2.4 Wiring

14.2.4.1 Pinout

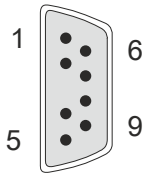
Figure	X11	Pin	Name	Function
		1	U+	Encoder supply +12.5 V
		2	VBATT	Battery supply
		3	---	Keying
		4	D	Data input
		5	T	Clock output
		6	COM (1)	Encoder supply 0 V
		7	COM (2)	Battery supply 0 V
		8	D\	Data input inverted
		9	T\	Clock output inverted

Table 197: 8BAC0120.001-2 EnDat 2.2 interface - Pinout

Danger!

The connections for the encoders are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation in accordance with IEC 60364-4-41 or EN 61800-5-1.

14.2.4.2 Input/Output circuit diagram

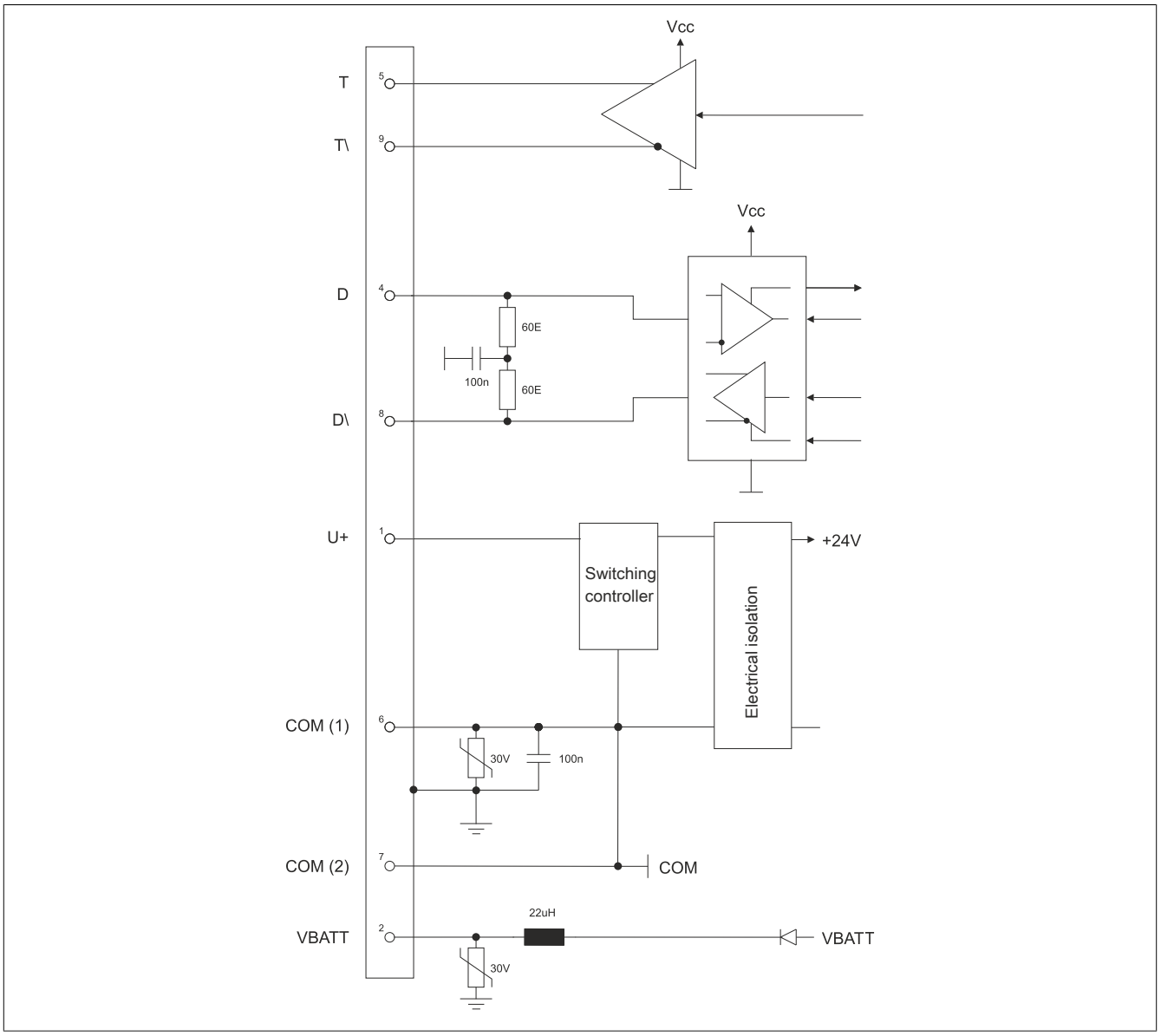


Figure 112: 8BAC0120.001-2 EnDat 2.2 interface - Input/Output circuit diagram

14.2.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder. [5)]

UP LED ... Indicates when the encoder position changes in the positive direction.
DN LED ... Indicates when the encoder position changes in the negative direction.

14.2.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

5) The count direction of the encoder can be configured in Automation Studio. However, changing the count direction in Automation Studio does not change the actual count direction of the encoder and therefore does not affect the UP/DN LEDs!

14.3 8BAC0121.000-1 HIPERFACE plug-in module

14.3.1 General information

The 8BAC0121.000-1 HIPERFACE plug-in module can be used in one ACOPOSmulti slot. The module is equipped with a HIPERFACE encoder interface.

This module can be used to evaluate encoders installed in motors from other manufacturers as well as encoders for external axes (encoders that scan any machine movement). The input signals are monitored, making it possible to detect open or shorted lines as well as encoder supply failures.

HIPERFACE is a standard developed by Max Stegmann GmbH (www.stegmann.de), which like EnDat incorporates the advantages of absolute and incremental position measurement while also offering a read/write parameter memory in the encoder. With absolute position measurement (the absolute position is sampled serially), a homing procedure is usually not required. Where necessary, a multi-turn encoder (4096 revolutions) should be installed. To save costs, a single-turn encoder and a reference switch can also be used. In this case, a homing procedure must be carried out.

The incremental process allows the short delay times necessary for position measurement on drives with exceptional dynamic properties. With the sinusoidal incremental signal and the fine resolution in the HIPERFACE module, a very high positioning resolution is achieved in spite of the moderate signal frequencies used.

The parameter memory in the HIPERFACE encoder is available starting with firmware version V1.221.

When turned on, the plug-in module is automatically identified, configured and its parameters set by the ACOPOSmulti drive system's operating system.

14.3.2 Order data

Model number	Short description	Figure
	Plug-in modules	
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	

Table 198: 8BAC0121.000-1 - Order data

14.3.3 Technical data

Model number	8BAC0121.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0x261D
Slot [1]	Slots 1 and 2
Max. power consumption	P_{Module} [mW] = 25 V * ($I_{Encoder}$ [mA] *0.48 + 50 mA)
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder connection [2]	
Module-side connection	15-pin DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	No
Encoder monitoring	Yes
Max. encoder cable length	75 m
Encoder inputs	
Quantity	1

Table 199: 8BAC0121.000-1 - Technical data

Model number	8BAC0121.000-1
Sine/Cosine inputs	
Signal transmission	Differential signal, asymmetrical
Signal frequency	DC up to 200 kHz
Common-mode voltage	Max. ±7 V
Terminating resistor	120 Ω
Resolution	12-bit
Encoder power supply	
Output voltage	Typ. 10 V
Load capacity	130 mA [3]
Sense lines	- [4]
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Position	
Resolution @ 1 V_{SS} [5]	Number of encoder lines * 5700
Asynchronous serial interface	
Signal transmission	RS485
Data transfer rate	9600 bit/s
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 199: 8BAC0121.000-1 - Technical data

1) The 8BAC0121.000-1 is an encoder module. Up to two encoder modules can be inserted. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis, and the encoder module in the second slot serves as motor feedback for the second axis. The second slot can be used for other purposes if only one axis is being operated.
2) The HIPERFACE encoder must be wired using a cable with a single shielding layer.
3) An additional reserve of 40 mA exists for terminating resistors.
4) No sense lines are present since the supply voltage for the HIPERFACE encoder is permitted to be between 7 and 12 V.
5) This value does not correspond to the encoder resolution that must be configured in Automation Studio (16384 * number of encoder lines).

14.3.4 Wiring

14.3.4.1 Pinout

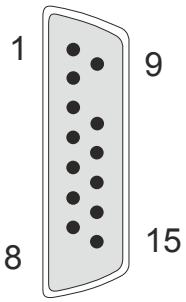
Figure	X11	Pin	Name	Function
		1	SIN	Channel SIN
		2	COM	Encoder supply 0 V
		3	COS	Channel COS
		4	+10 V	Encoder supply +10 V
		5	D	Data input
		6	---	---
		7	T+	Temperature sensor +
		8	---	Coding
		9	REF SIN	REF SIN channel
		10	---	Coding
		11	REF COS	REF COS channel
		12	---	---
		13	D\	Data input inverted
		14	T-	Temperature sensor -
		15	---	---

Table 200: 8BAC0121.000-1 HIPERFACE interface - Pinout

Danger!

The connections for the encoders are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation in accordance with IEC 60364-4-41 or EN 61800-5-1.

Warning!

Temperature sensors are only permitted to be connected to T+ and T- on an ACOPOSmulti plug-in module under the following conditions:

- **The ACOPOSmulti plug-in module is in SLOT1 on the ACOPOSmulti module and a temperature sensor is not connected to X4A/T+ and X4A/T- on this ACOPOSmulti module.**
- **Only for 8BVIxxxxHxD0.xxx-x inverter modules:**
  The ACOPOSmulti plug-in module is in SLOT2 on the ACOPOSmulti module and a temperature sensor is not connected to X4B/T+ and X4B/T- on this ACOPOSmulti module.

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

14.3.4.2 Input/Output circuit diagram

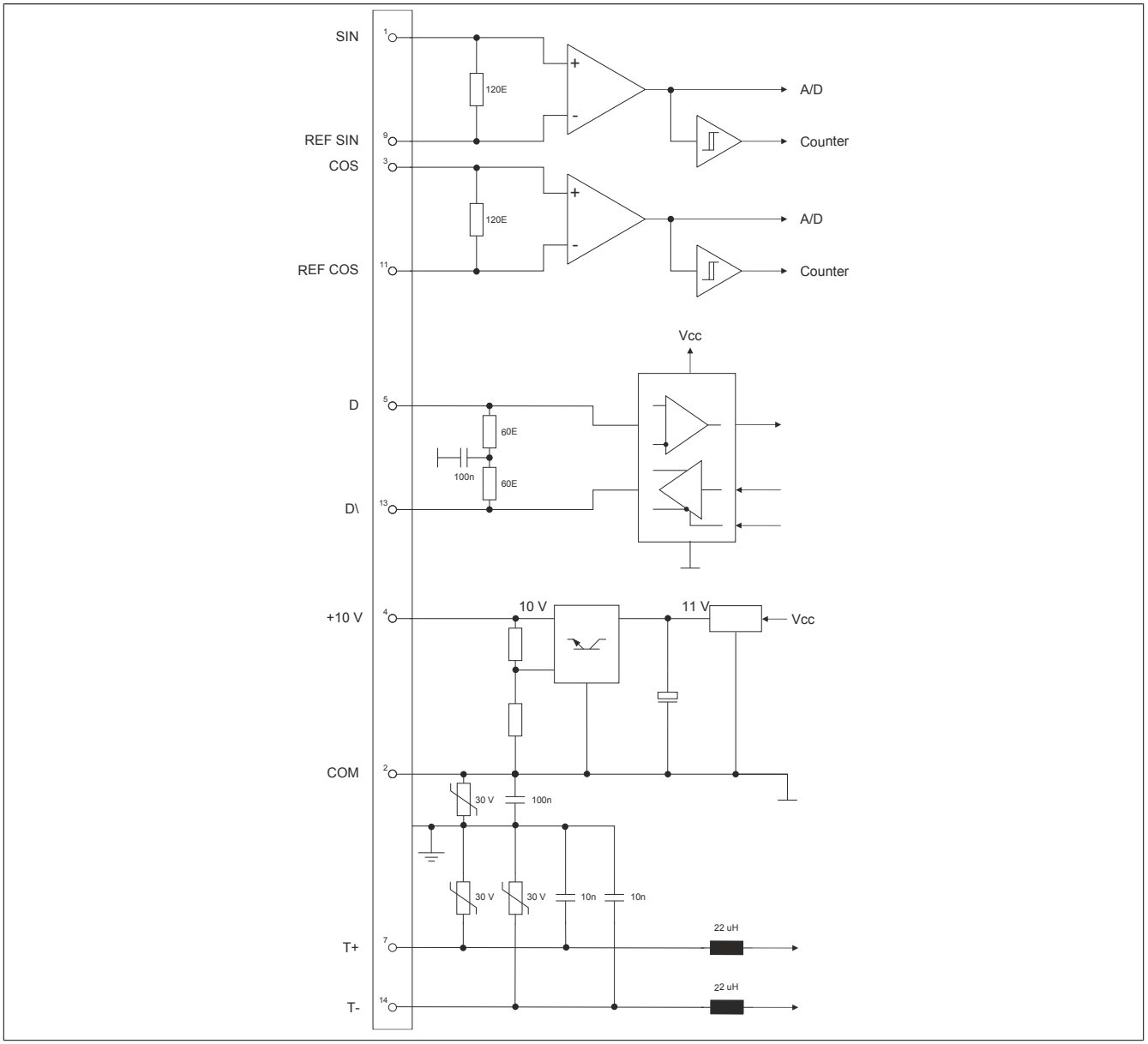


Figure 113: 8BAC0121.000-1 HIPERFACE interface - Input/Output circuit diagram

14.3.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder. [6)]

UP LED ... Indicates when the encoder position changes in the positive direction.
DN LED ... Indicates when the encoder position changes in the negative direction.

14.3.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

[6)] The count direction of the encoder can be configured in Automation Studio. However, changing the count direction in Automation Studio does not change the actual count direction of the encoder and therefore does not affect the UP/DN LEDs!

14.4 8BAC0122.000-1 resolver plug-in module

14.4.1 General information

The 8BAC0122.000-1 resolver plug-in module can be used in one ACOPOSmulti slot. This module has a resolver interface for evaluating BRX resolvers.

This plug-in module handles the output from resolvers that are built into B&R servo motors or used as an encoder for external axes. This resolver delivers the absolute position over one revolution. Normally, the movement path is longer than one revolution. In this case, a reference switch must be used and a homing procedure carried out.

The encoder input signals are monitored. This makes it possible to detect open or shorted lines as well as encoder supply (reference signal) failures.

When turned on, the plug-in module is automatically identified by the ACOPOSmulti drive system's operating system. Making automatic adjustments to the motor (resolution parameters) and reading motor parameters and limit values is not possible because the resolver does not have parameter memory like the EnDat encoder.

If the precision, resolution, bandwidth or ease of setting parameters is not sufficient with the resolver, the EnDat system should be used.

14.4.2 Order data

Model number	Short description	Figure
	Plug-in modules	
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	
	Optional accessories	
	Resolver cables	
8BCR0005.1111A-0	ACOPOSmulti resolver cable, length 5 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0007.1111A-0	ACOPOSmulti resolver cable, length 7 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0010.1111A-0	ACOPOSmulti resolver cable, length 10 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0015.1111A-0	ACOPOSmulti resolver cable, length 15 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0020.1111A-0	ACOPOSmulti resolver cable, length 20 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0025.1111A-0	ACOPOSmulti resolver cable, length 25 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	

Table 201: 8BAC0122.000-1 - Order data

14.4.3 Technical data

Model number	8BAC0122.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0x20B6
Slot [1]	Slots 1 and 2
Max. power consumption	1 W
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder connection [2]	
Module-side connection	9-pin DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	No
Encoder monitoring	Yes
Max. encoder cable length	100 m

Table 202: 8BAC0122.000-1 - Technical data

Model number	8BAC0122.000-1
Encoder power supply	
Output voltage	Typ. 3 V_{eff}
Output current	Max. 50 mA_{eff}
Frequency	10 kHz
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Position	
Resolution @ ü = 0.5 3)	Number of pole pairs * 22600
Analog inputs	
Digital converter resolution	14-bit
Input impedance	10.4 kΩ - j 11.1 kΩ
Input voltage	Resolver transformation ratio: 0.5 ±10% 4)
Common-mode voltage	Max. ±20 V
Signal transmission	Differential signals
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 202: 8BAC0122.000-1 - Technical data

1) The 8BAC0122.000-1 is an encoder module. Two encoder modules can also be inserted. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis, and the encoder module in the second slot serves as motor feedback for the second axis. The second slot can be used for other purposes if only one axis is being operated.
2) The resolver must be wired using a cable with a single shield and twisted pair signal lines.
3) This value does not correspond to the encoder resolution that must be configured in Automation Studio (65536).
4) Starting with firmware V2.040, the nominal gear ratio can be configured in the range 0.3 ... 0.5 (default value).
Starting with firmware V2.230, the nominal gear ratio can be configured in the range 0.2 ... 0.5 (default value).

14.4.4 Wiring

14.4.4.1 Pinout

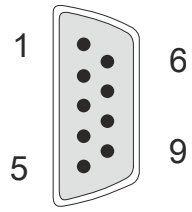
Figure	X11	Pin	Name 1)	Function	Typical wire colors for the resolver 2)
		1	T+	Temperature sensor +	---
		2	T-	Temperature sensor -	---
		3	P4	Sine input +	Blue
		4	S1	Cosine input -	Red
		5	R2	Reference output +	Black/White (or yellow/white)
		6	---	---	---
		7	S2	Sine input -	Yellow
		8	S3	Cosine input +	Black
		9	R1	Reference output -	Red/White

Table 203: 8BAC0122.000-1 resolver interface - Pinout

1) Names are identical to those used by leading manufacturers (Tanagawa, Tyco, LTN).
2) This refers to the wire colors of the line connected directly to the resolver and used universally by leading manufacturers (Tanagawa, Tyco, LTN). **It does not refer to the wire colors in the B&R resolver cables!**

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Warning!

Temperature sensors are only permitted to be connected to T+ and T- on an ACOPOSmulti plug-in module under the following conditions:

- **The ACOPOSmulti plug-in module is in SLOT1 on the ACOPOSmulti module and a temperature sensor is not connected to X4A/T+ and X4A/T- on this ACOPOSmulti module.**
- **Only for 8BVIxxxxHxD0.xxx-x inverter modules:**
  The ACOPOSmulti plug-in module is in SLOT2 on the ACOPOSmulti module and a temperature sensor is not connected to X4B/T+ and X4B/T- on this ACOPOSmulti module.

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

14.4.4.2 Input/Output circuit diagram

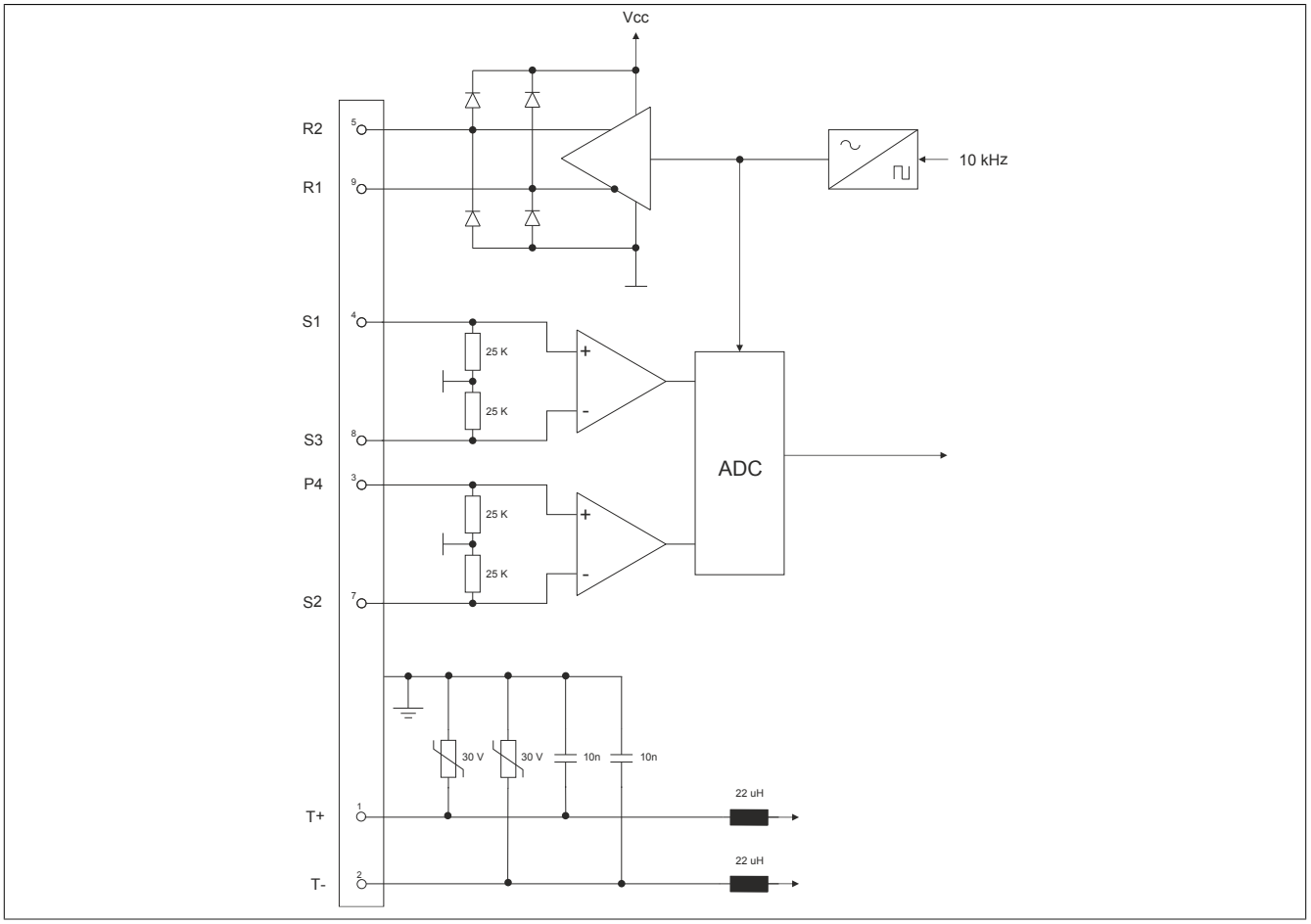


Figure 114: 8BAC0122.000-1 resolver interface - Input/Output circuit diagram

14.4.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder. [7)]

UP LED ... Indicates when the encoder position changes in the positive direction.
DN LED ... Indicates when the encoder position changes in the negative direction.

14.4.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

[7)] The count direction of the encoder can be configured in Automation Studio. However, changing the count direction in Automation Studio does not change the actual count direction of the encoder and therefore does not affect the UP/DN LEDs!

14.5 8BAC0123.000-1 incremental/SSI encoder plug-in module

14.5.1 General information

The 8BAC0123.000-1 incremental/SSI encoder plug-in module can be used in one ACOPOSmulti slot. The module has an incremental/SSI encoder interface for encoders with a +5 V or +24 V encoder supply.

The plug-in module is suitable for the following:

- Incremental encoder RS422 output signals
- SSI encoders (absolute encoders with synchronous serial interface)
- Tracer pins and similar face sensors with a digital output

This plug-in module mainly handles the evaluation of encoders built into motors from other manufacturers as well as the evaluation of encoders in external axes (encoders that evaluate any machine movement).

Information:

Only incremental encoders with square-wave signals with a 90° phase shift can be evaluated. Evaluation of incremental encoders with a sine/cosine output or pulse direction outputs is not possible!

B&R recommends using encoders with RS422 signals and a +5 V encoder supply. They provide the highest level of immunity to interference with the lowest power consumption and are best suited for high counter frequencies.

When used for tracer pins, this module is only used as a fast trigger input. Unlike trigger inputs on the ACOPOSmulti inverter and power supply modules, sensors with an RS422 output can be connected here. The necessary auxiliary inputs for tracer pins with infrared transfer are also available.

This plug-in module provides connections for a motor temperature sensor (T+, T-) so that motors from other manufacturers can be connected without problems. [8)]

When turned on, the plug-in module is automatically identified by the ACOPOSmulti drive system's operating system. Making automatic adjustments to the motor (resolution parameter) and reading motor parameters and limit values is not possible because incremental and SSI encoders do not have parameter memory like the EnDat encoder.

All 4 edges are always evaluated during incremental encoder operation; as a result, the counter frequency is 4x the input frequency.

This module is equipped with a configurable digital input filter. In this way, the filter effect and edge interval monitoring can be adjusted in 4 steps according to the maximum frequency required by the application. The lowest maximum frequency is set by default!

[8)] **ACOPOSmulti plug-in module in SLOT1:**
The temperature sensor connections (T+, T-) on the ACOPOSmulti plug-in module can be evaluated by all ACOPOSmulti power supply and inverter modules.

ACOPOSmulti plug-in module in SLOT2:
The temperature sensor connections (T+, T-) on the ACOPOSmulti plug-in module can only be evaluated by ACOPOSmulti dual-axis inverter modules (8BVIxxxxHxD0.000-1).

Monitoring functions

Incremental encoder operation

Errors that can be detected	Possible cause of the error	Notes
Cable disturbance AB	• Open line on channel A or B • Signal A, B not connected • Short circuit between the wires, to ground or to the encoder supply • Short circuit or open line on the encoder supply • Signal amplitude too low • Common-mode voltage too high	Monitoring can be switched off via software (for encoders with too few steep edges).
Line disturbance R	• Open line on channel R • Signal R not connected • Short circuit between the wires, to ground or to the encoder supply • Short circuit or open line on the encoder supply • Signal amplitude too low • Common-mode voltage too high	Monitoring can be switched off via software (for encoders with too few steep edges or without an R signal).
Signal disturbance	• A-B edge interval too small	The permitted edge interval is determined automatically according to the specified max. input frequency.
Counter error (the interval from reference pulse to reference pulse is incorrect)	• Shield, cabling or encoder defective • Interval from reference pulse to reference pulse configured incorrectly	It is not possible to monitor encoders without an R signal.
Encoder current requirements not normal	• Short circuit or open line on the encoder cable or in the encoder • Deterioration of the light source or dirt on the encoder disk	The currently valid power consumption requirements can be read, with monitoring taking place in the application program. If the value goes below the minimum value, an error bit is also set. This monitoring can be switched off.

Table 204: Monitoring functions during incremental encoder operation

SSI encoder operation

Errors that can be detected	Possible cause of the error	Notes
Cable disturbance D	• Open line on channel D • Signal D not connected • Short circuit between D and D\, to ground or to the encoder supply • Short circuit or open line on the encoder supply • Signal amplitude too low • Common-mode voltage too high	---
Parity error	• High level of disturbance • Parity monitoring incorrectly configured (odd, even, none)	Monitoring is only possible for encoders with a parity bit.
Plausibility errors	• High level of disturbance • Position and expected value unmatched 2x consecutively	Monitoring can be switched off.
Encoder current requirements not normal	• Short circuit or open line on the encoder cable or in the encoder • Deterioration of the light source or dirt on the encoder disk	The currently valid power consumption requirements can be read, with monitoring taking place in the application program. If the value goes below the minimum value, an error bit is also set. This monitoring can be switched off.

Table 205: Monitoring functions during SSI encoder operation

Sensing device operation

Errors that can be detected	Possible cause of the error	Notes
Cable disturbance AB	• Open line on channel A or B • Signal AB not connected • Short circuit between the wires, to ground or to the encoder supply • Short circuit or open line on the sensing device supply • Signal amplitude too low • Common-mode voltage too high	Monitoring can be switched off via software (for sensing devices with too few steep edges and those that do not require the A, B inputs)
Line disturbance R	• Open line on channel R • Signal R not connected • Short circuit between the wires, to ground or to the encoder supply • Short circuit or open line on the sensing device supply • Signal amplitude too low • Common-mode voltage too high	Monitoring can be switched off via software (for sensing devices with too few steep edges).
Encoder current requirements not normal	• Short circuit or open line on the connection cable or in the sensing device	The currently valid power consumption requirements can be read, with monitoring taking place in the application program. If the value goes below the minimum value, an error bit is also set. This monitoring can be switched off.

Table 206: Monitoring functions during sensing device operation

14.5.2 Order data

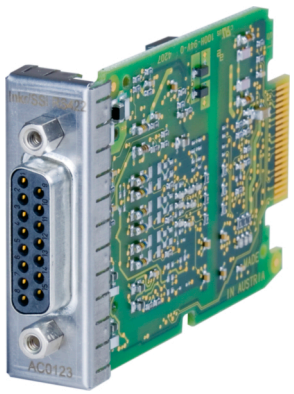
Model number	Short description	Figure
	Plug-in modules	
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	

Table 207: 8BAC0123.000-1 - Order data

14.5.3 Technical data

Model number	8BAC0123.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xA37D
Slot [1]	Slots 1 and 2
Max. power consumption	
Encoder power supply 5 V	P_{Module} [mW] = 25 V * (($I_{Encoder}$ [mA] * 0.42) + 0.45) [2]
Encoder power supply 24 V	P_{Module} [mW] = 25 V * ($I_{Encoder}$ [mA] + 0.45) [3]
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder connection [4]	
Module-side connection	15-pin DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	Yes
Encoder monitoring	Yes
Max. encoder cable length	100 m
Encoder power supply 5 V	
Output voltage	5 V ±5%
Load capacity	350 mA [5]

Table 208: 8BAC0123.000-1 - Technical data

Model number	8BAC0123.000-1
Sense lines	
Quantity	2
Max. compensation	2x 1.5 V
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Encoder power supply 24 V	
Output voltage	24 V ±10%
Load capacity	300 mA [6]
Sense lines	No
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R, D	
Signal transmission	RS422
Differential voltage	±0.5 V to ±7 V [7]
Common-mode voltage	-10 to +13 V
Terminating resistor	120 Ω (difference)
Incremental encoder operation	
Signal form	Square wave pulse
Evaluation	4x
Input frequency [8]	Max. 50 / 100 / 200 / 400 kHz
Counter frequency	Max. 200 / 400 / 800 / 1600 kHz
Reference frequency	Max. 50 / 100 / 200 / 400 kHz
Distance between edges [9]	Min. 1.3 / 0.7 / 0.4 / 0.2 µs
SSI absolute encoder operation	
Keying	Gray, binary
Baud rate	390 kbaud
Word size	Max. 31-bit
Differential voltage	Typ. 2.5 V
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 208: 8BAC0123.000-1 - Technical data

1) The 8BAC0123.000-1 is an encoder module. Two encoder modules can also be inserted. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis, and the encoder module in the second slot serves as motor feedback for the second axis. The second slot can be used for other purposes if only one axis is being operated.
2) $I_{Encoder}$ ... Current consumption of the incremental encoder The current consumption for the terminating resistors is already included in the formula. A voltage drop on the encoder cable of max. 2x 1.5 V is also taken into consideration.
3) $I_{Encoder}$ ... Current consumption of the incremental encoder The current consumption for the terminating resistors is already included in the formula.
4) The encoder must be wired using a cable with a single shield and twisted pair signal lines (e.g. 4x 2x 0.14 mm² + 2x 0.5 mm²).
5) An additional reserve of 60 mA is available for terminating resistors.
6) An additional reserve of 25 mA is available for terminating resistors.
7) With open line monitoring disabled, ±0.2 V is sufficient.
8) Input filter configurable using software.
9) Automatically adjusted to the selected input filter.

14.5.4 Wiring

14.5.4.1 Pinout

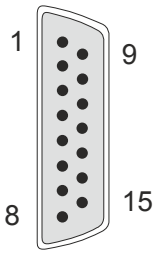
Figure	X11	Pin	Name	Function inIncremental mode	Function in SSI mode
		1	A	Channel A	---
		2	A\	Channel A inverted	---
		3	B	Channel B	---
		4	B\	Channel B inverted	---
		5	RD	Reference pulse	Data input
		6	RD\	Reference pulse inverted	Data input inverted
		7	T	---	Clock output
		8	T\	---	Clock output inverted
		9	+5V out	Encoder supply +5 V	
		10	Sense +5V	Sense input +5 V	
		11	Sense COM	Sense input 0 V	
		12	COM (1 - 9, 13)	Encoder supply 0 V	
		13	+24V out	Encoder supply +24 V	
		14	T+	Temperature sensor +	
		15	T-	Temperature sensor -	

Table 209: 8BAC0123.000-1 incremental/SSI encoder interface - Pinout

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

This plug-in module uses the same type of connection as EnDat 2.1 plug-in module 8BAC0120.000-1 (15-pin DSUB connector).

There is a possibility of confusion! EnDat 2.1 encoders will become irreparably damaged if connected to this plug-in module!

Warning!

Temperature sensors are only permitted to be connected to T+ and T- on an ACOPOSmulti plug-in module under the following conditions:

- **The ACOPOSmulti plug-in module is in SLOT1 on the ACOPOSmulti module and a temperature sensor is not connected to X4A/T+ and X4A/T- on this ACOPOSmulti module.**
- **Only for 8BVIxxxxHxD0.xxx-x inverter modules:**
  The ACOPOSmulti plug-in module is in SLOT2 on the ACOPOSmulti module and a temperature sensor is not connected to X4B/T+ and X4B/T- on this ACOPOSmulti module.

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

14.5.4.2 Input/Output circuit diagram

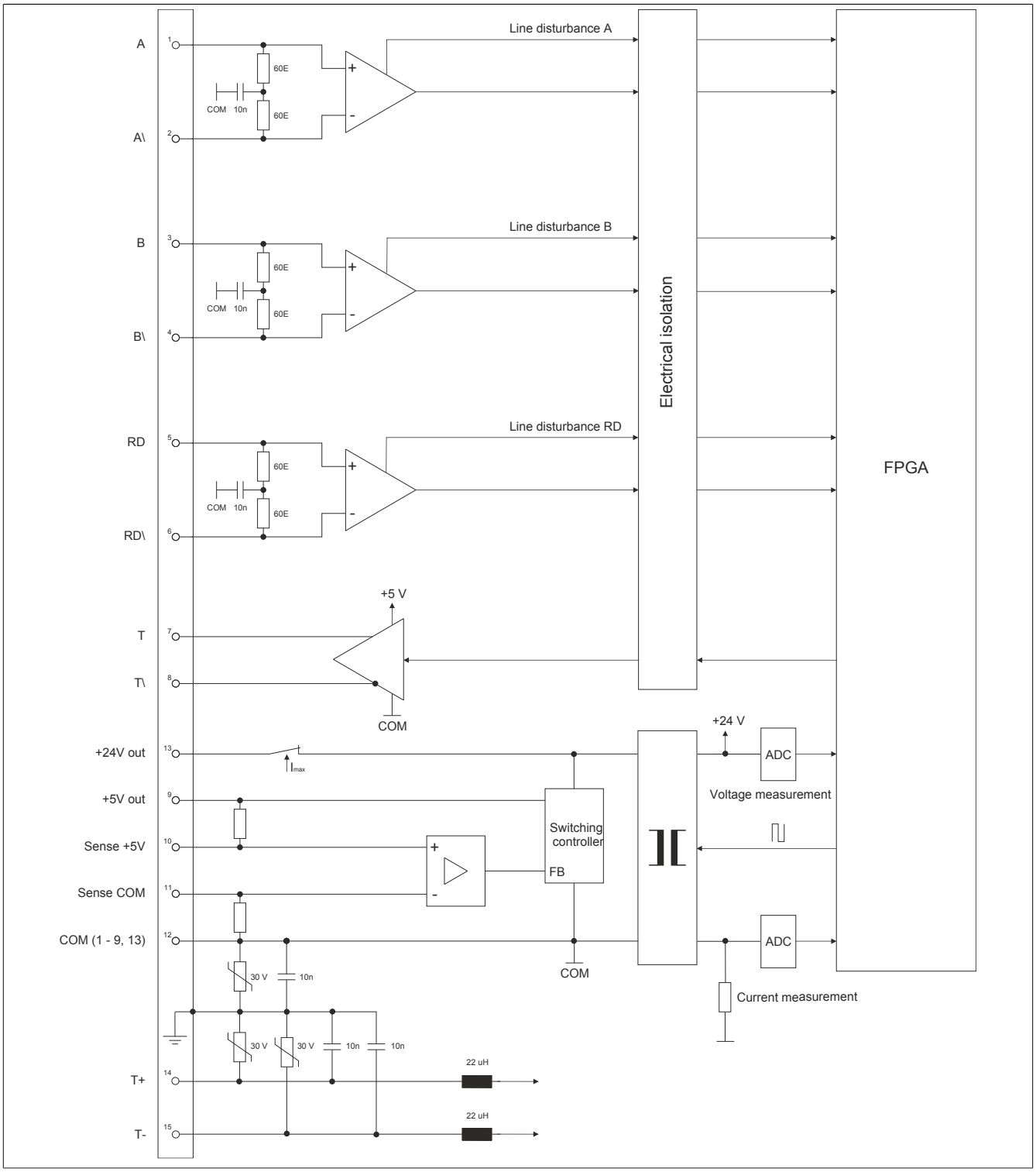


Figure 115: 8BAC0123.000-1 incremental/SSI encoder interface - Input/Output circuit diagram

14.5.4.3 Tracer pin connection (in preparation)

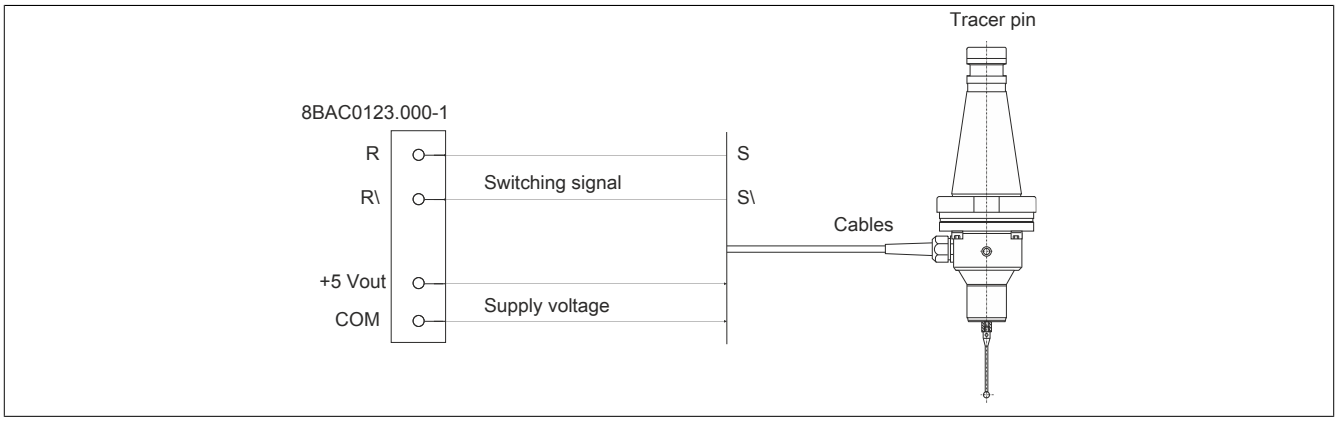


Figure 116: Connection example for cabled tracer pins with 5V supply and TTL output signals

The reference pulse input is used as an input for the switching signal for the tracer pins. Open line monitoring for channels A and B must be disabled.

14.5.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder. [9)]

UP LED ... Indicates when the encoder position changes in the positive direction.
DN LED ... Indicates when the encoder position changes in the negative direction.

14.5.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

[9)] The count direction of the encoder can be configured in Automation Studio. However, changing the count direction in Automation Studio does not change the actual count direction of the encoder and therefore does not affect the UP/DN LEDs!

14.6 8BAC0123.001-1 incremental encoder plug-in module

14.6.1 General information

The 8BAC0123.001-1 incremental encoder plug-in module can be used in an ACOPOSmulti slot. The module has an incremental encoder interface for encoders with a +5 V encoder supply.

The module is suitable for the following:

- Incremental encoders with push, pull or push-pull outputs with no complementary signal
- Incremental encoders with symmetrical push-pull outputs that cannot handle such high loads

This plug-in module mainly handles the evaluation of encoders built into motors from other manufacturers as well as the evaluation of encoders in external axes (encoders that evaluate any machine movement).

Information:

Only incremental encoders with square-wave signals with a 90° phase shift can be evaluated. Evaluation of incremental encoders with a sine/cosine output or pulse direction outputs is not possible!

B&R recommends using encoders with RS422 signals and a 5 V encoder supply. They provide the highest level of immunity to interference with the lowest power consumption and are best suited for high counter frequencies. The 8BAC0123.000-1 plug-in module should be used to evaluate these encoders!

This plug-in module does not have line terminating resistors. Encoders with low output current can therefore be connected. This module is only suitable for low counter frequencies or short encoder cables, however, because of the possibility of line reflections.

This plug-in module provides connections for a motor temperature sensor (T+, T-) so that motors from other manufacturers can be connected without problems. [10)]

This module is equipped with a configurable digital input filter. In this way, the filter effect and edge interval monitoring can be adjusted in 4 steps according to the maximum frequency required by the application. The lowest maximum frequency is set by default!

[10)] **ACOPOSmulti plug-in module in SLOT1:**
The temperature sensor connections (T+, T-) on the ACOPOSmulti plug-in module can be evaluated by all ACOPOSmulti power supply and inverter modules.

ACOPOSmulti plug-in module in SLOT2:
The temperature sensor connections (T+, T-) on the ACOPOSmulti plug-in module can only be evaluated by ACOPOSmulti dual-axis inverter modules (8BVIxxxxHxD0.000-1).

Monitoring functions

Incremental encoder operation

Errors that can be detected	Possible cause of the error	Notes
Cable disturbance AB	• Open line on channel A or B • Signal A, B not connected • Short circuit between the wires, to ground or to the encoder supply 1) • Short circuit or open line on the encoder supply • Signal amplitude too low • Common-mode voltage too high 1)	Monitoring can be switched off via software (for encoders with too few steep edges).
Line disturbance R	• Open line on channel R • Signal R not connected • Short circuit between the wires, to ground or to the encoder supply 1) • Short circuit or open line on the encoder supply • Signal amplitude too low • Common-mode voltage too high 1)	Monitoring can be switched off via software (for encoders with too few steep edges or without an R signal).
Signal disturbance	• A-B edge interval too small	The permitted edge interval is determined automatically according to the specified max. input frequency.
Counter error (the interval from reference pulse to reference pulse is incorrect)	• Shield, cabling or encoder defective • Interval from reference pulse to reference pulse configured incorrectly	It is not possible to monitor encoders without an R signal.
Encoder current requirements not normal	• Short circuit or open line on the encoder cable or in the encoder • Deterioration of the light source or dirt on the encoder disk	The currently valid power consumption requirements can be read, with monitoring taking place in the application program. If the value goes below the minimum value, an error bit is also set. This monitoring can be switched off.

Table 210: Monitoring functions during incremental encoder operation

1) Only relevant for encoders with differential signals.

14.6.2 Order data

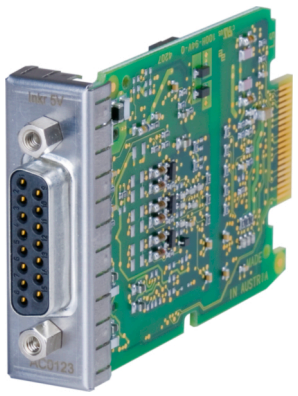
Model number	Short description	Figure
	Plug-in modules	
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	

Table 211: 8BAC0123.001-1 - Order data

14.6.3 Technical data

Model number	8BAC0123.001-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xA37E
Slot [1]	Slots 1 and 2
Max. power consumption [2]	P_{Module} [mW] = 25 V * ($I_{Encoder}$ [mA] * 0.42 + 48 mA)
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder connection [3]	
Module-side connection	15-pin DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	Yes
Max. encoder cable length	
Incremental encoder	25 m
Encoder power supply 5 V	
Output voltage	5 V ±5%
Load capacity	350 mA [4]
Sense lines	
Quantity	2
Max. compensation	2x 1.5 V
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Single-ended signals	
Input voltage for low	<1.0 V (to COM)
Input voltage for high	>2.4 V (to COM)
Maximum input voltage	-10 V / +13 V (to COM)
Differential signals	
Differential voltage	±0.8 V to ±23 V [5]
Maximum input voltage	-10 V / +13 V (to COM)
Input resistance	See block diagram
Incremental encoder operation	
Signal form	Square wave pulse
Evaluation	4x
Input frequency [6]	Max. 25 / 50 / 100 / 200 kHz
Counter frequency	Max. 100 / 200 / 400 / 800 kHz
Reference frequency	Max. 25 / 50 / 100 / 200 kHz
Distance between edges [7]	Min. 2.6 / 1.3 / 0.7 / 0.4 µs
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 212: 8BAC0123.001-1 - Technical data

1) The 8BAC0123.001-1 is an encoder module. Two encoder modules can also be inserted. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis, and the encoder module in the second slot serves as motor feedback for the second axis. The second slot can be used for other purposes if only one axis is being operated.
2) $I_{Encoder}$ ... Current consumption of the incremental encoder The current consumption for the terminating resistors is already included in the formula. A voltage drop on the encoder channel of max. 2x 1.5 V is also taken into consideration.
3) The encoder must be wired using a cable with a single shield and twisted pair signal lines (e.g. 4x 2x 0.14 mm² + 2x 0.5 mm²).
4) An additional reserve of 60 mA is available for terminating resistors.
5) With open line monitoring disabled, ±0.5 V is sufficient.
6) Input filter configurable using software.
7) Automatically adjusted to the selected input filter.

14.6.4 Wiring

14.6.4.1 Pinout

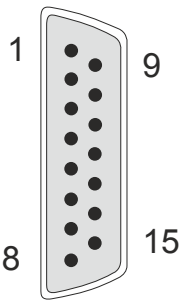
Figure	X11	Pin	Name	Function
		1	A	Channel A
		2	A\	Channel A inverted
		3	B	Channel B
		4	B\	Channel B inverted
		5	RD	Reference pulse
		6	RD\	Reference pulse inverted
		7	n.c.	---
		8	n.c.	---
		9	+5V out	Encoder supply +5 V
		10	Sense +5V	Sense input +5 V
		11	Sense COM	Sense input 0 V
		12	COM (1 - 6, 9)	Encoder supply 0 V
		13	n.c.	---
		14	T+	Temperature sensor +
		15	T-	Temperature sensor -

Table 213: 8BAC0123.001-1 incremental encoder interface - Pinout

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Warning!

Temperature sensors are only permitted to be connected to T+ and T- on an ACOPOSmulti plug-in module under the following conditions:

- **The ACOPOSmulti plug-in module is in SLOT1 on the ACOPOSmulti module and a temperature sensor is not connected to X4A/T+ and X4A/T- on this ACOPOSmulti module.**
- **Only for 8BVIxxxxHxD0.xxx-x inverter modules:**
  The ACOPOSmulti plug-in module is in SLOT2 on the ACOPOSmulti module and a temperature sensor is not connected to X4B/T+ and X4B/T- on this ACOPOSmulti module.

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

14.6.4.2 Input/Output circuit diagram

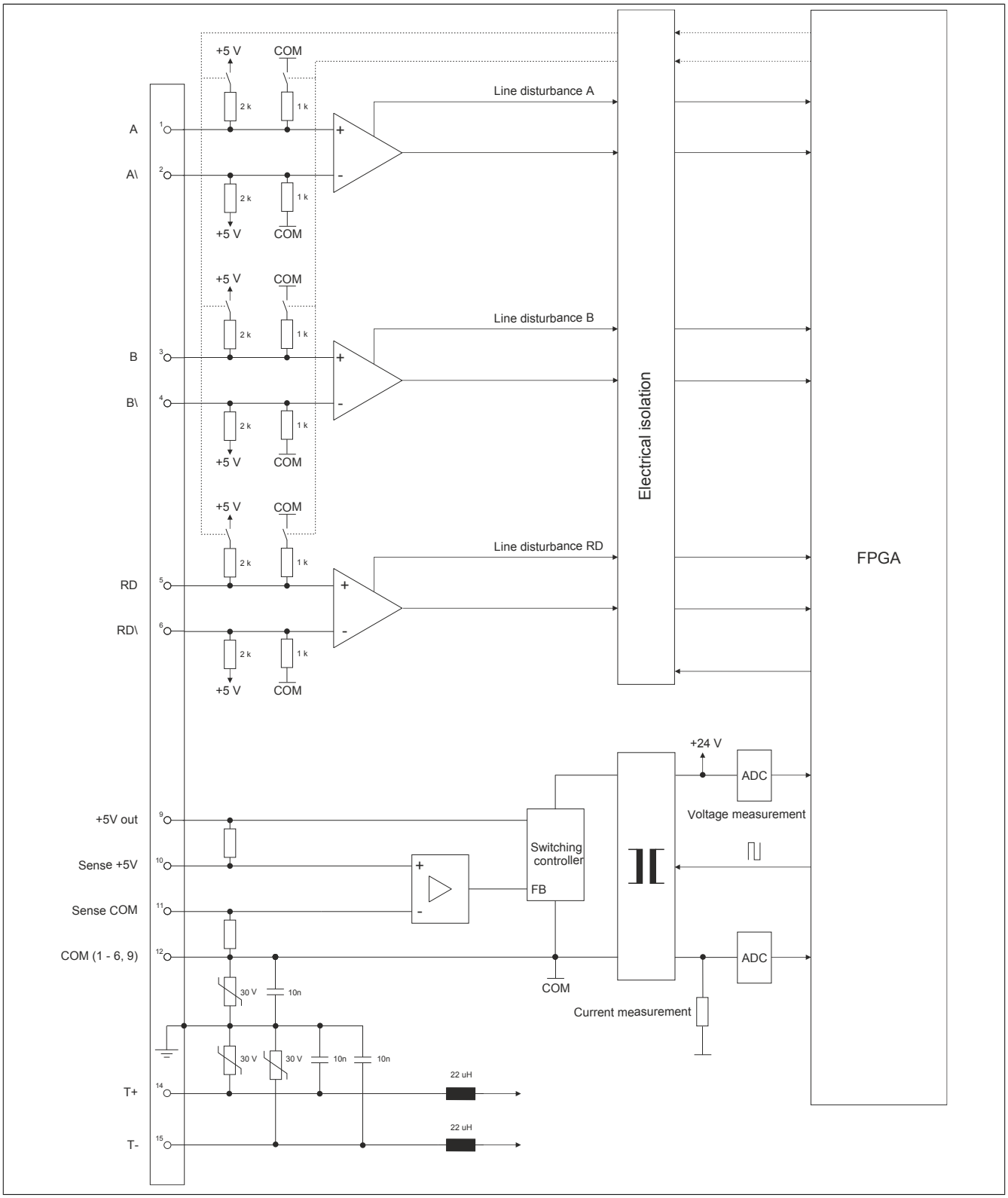


Figure 117: 8BAC0123.001-1 incremental encoder interface - Input/Output circuit diagram

14.6.4.3 Configuration of the pull-up and pull-down resistances in the module

The pull-up and pull-down resistances in the module can be switched using software so that encoders with different output designs can be connected. By default, the module is configured for encoders with push-pull outputs.

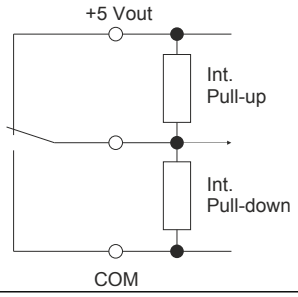
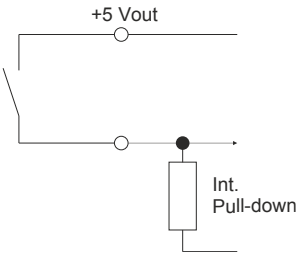
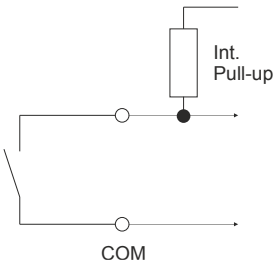
Encoders with push-pull outputs (default)	Encoders with push outputs	Encoders with pull outputs
The pull-up and pull-down resistances in the module are activated at the same time: 	Only the pull-down resistance in the module is activated: 	Only the pull-up resistance in the module is activated: 

Table 214: Possible configurations of the pull-up and pull-down resistances in the module

14.6.4.4 Configuration of open line monitoring

Encoders with push-pull outputs

Open line monitoring is possible by default.

Encoders with push or pull outputs

Open line monitoring is only possible if the encoder itself is equipped with pull-up or pull-down resistances (pull-up: max. 2 kΩ, pull-down: max. 560 Ω) and the module is configured for encoders with push-pull outputs.

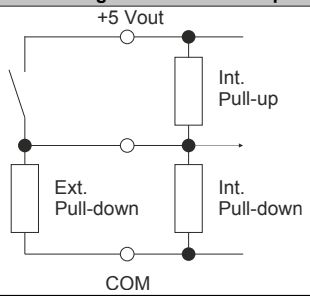
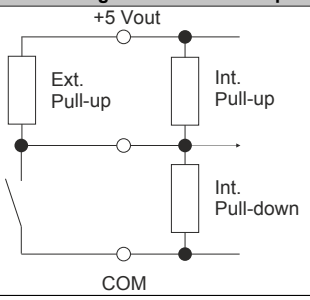
Open line monitoring for encoders with push outputs	Open line monitoring for encoders with pull outputs
	

Table 215: Configuration of open line monitoring for encoders with push or pull outputs

14.6.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder. [11)]

UP LED ... Indicates when the encoder position changes in the positive direction.
DN LED ... Indicates when the encoder position changes in the negative direction.

14.6.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

11) The count direction of the encoder can be configured in Automation Studio. However, changing the count direction in Automation Studio does not change the actual count direction of the encoder and therefore does not affect the UP/DN LEDs!

14.7 8BAC0123.002-1 incremental encoder plug-in module

14.7.1 General information

The 8BAC0123.002-1 incremental encoder plug-in module can be used in an ACOPOSmulti slot. The module has an incremental encoder interface for encoders with a +24 V encoder supply.

The module is suitable for the following:

- Incremental encoders with push, pull or push-pull outputs with no complementary signal
- Incremental encoders with symmetrical push-pull outputs
- Tracer pins and similar face sensors with a digital output

This plug-in module mainly handles the evaluation of encoders built into motors from other manufacturers as well as the evaluation of encoders in external axes (encoders that evaluate any machine movement).

Information:

Only incremental encoders with square-wave signals with a 90° phase shift can be evaluated. Evaluation of incremental encoders with a sine/cosine output or pulse direction outputs is not possible!

B&R recommends using encoders with RS422 signals and a 5 V encoder supply. They provide the highest level of immunity to interference with the lowest power consumption and are best suited for high counter frequencies. The 8BAC0123.000-1 plug-in module should be used to evaluate these encoders!

This plug-in module does not have line terminating resistors. Encoders with low output current can therefore be connected. This module is only suitable for low counter frequencies or short encoder cables, however, because of the possibility of line reflections.

When used for tracer pins, this module is only used as a fast trigger input. The necessary auxiliary inputs for tracer pins with infrared transfer are available.

This plug-in module provides connections for a motor temperature sensor (T+, T-) so that motors from other manufacturers can be connected without problems. [12)]

When turned on, the plug-in module is automatically identified by the ACOPOSmulti drive system's operating system. Making automatic adjustments to the motor (resolution parameter) and reading the motor parameters and limit values is not possible because incremental encoders do not have parameter memory like the EnDat encoder.

All 4 edges are always evaluated, therefore the counter frequency is 4x the input frequency.

This module is equipped with a configurable digital input filter. In this way, the filter effect and edge interval monitoring can be adjusted in 4 steps according to the maximum frequency required by the application. The lowest maximum frequency is set by default!

[12)] **ACOPOSmulti plug-in module in SLOT1:**
The temperature sensor connections (T+, T-) on the ACOPOSmulti plug-in module can be evaluated by all ACOPOSmulti power supply and inverter modules.

ACOPOSmulti plug-in module in SLOT2:
The temperature sensor connections (T+, T-) on the ACOPOSmulti plug-in module can only be evaluated by ACOPOSmulti dual-axis inverter modules (8BV0014HxD0.000-1, 8BVI0028HxD0.000-1, 8BVI0055HxD0.000-1).

Monitoring functions

Incremental encoder operation

Errors that can be detected	Possible cause of the error	Notes
Cable disturbance AB	• Open line on channel A or B • Signal A, B not connected • Short circuit between the wires, to ground or to the encoder supply 1) • Short circuit or open line on the encoder supply • Signal amplitude too low • Common-mode voltage too high 1)	Monitoring can be switched off via software (for encoders with too few steep edges).
Line disturbance R	• Open line on channel R • Signal R not connected • Short circuit between the wires, to ground or to the encoder supply 1) • Short circuit or open line on the encoder supply • Signal amplitude too low • Common-mode voltage too high 1)	Monitoring can be switched off via software (for encoders with too few steep edges or without an R signal).
Signal disturbance	• A-B edge interval too small	The permitted edge interval is determined automatically according to the specified max. input frequency.
Counter error (the interval from reference pulse to reference pulse is incorrect)	• Shield, cabling or encoder defective • Interval from reference pulse to reference pulse configured incorrectly	It is not possible to monitor encoders without an R signal.
Encoder current requirements not normal	• Short circuit or open line on the encoder cable or in the encoder • Deterioration of the light source or dirt on the encoder disk	The currently valid power consumption requirements can be read, with monitoring taking place in the application program. If the value goes below the minimum value, an error bit is also set. This monitoring can be switched off.

Table 216: Monitoring functions during incremental encoder operation

1) Only relevant for encoders with differential signals.

Sensing device operation

Errors that can be detected	Possible cause of the error	Notes
Cable disturbance AB	• Open line on channel A or B • Short circuit between the wires, to ground or to the encoder supply 1) • Short circuit or open line on the sensing device supply • Signal amplitude too low • Common-mode voltage too high 1)	Monitoring can be switched off via software (for sensing devices with too few steep edges and those that do not require the A, B inputs)
Line disturbance R	• Open line on channel R • Short circuit between the wires, to ground or to the encoder supply 1) • Short circuit or open line on the sensing device supply • Signal amplitude too low • Common-mode voltage too high 1) • Signal R not connected	Monitoring can be switched off via software (for sensing devices with too few steep edges).
Encoder current requirements not normal	• Short circuit or open connection on the connection cable or in the sensing device	The currently valid power consumption requirements can be read, with monitoring taking place in the application program. If the value goes below the minimum value, an error bit is also set. This monitoring can be switched off.

Table 217: Monitoring functions during sensing device operation

1) Only relevant for encoders with differential signals.

14.7.2 Order data

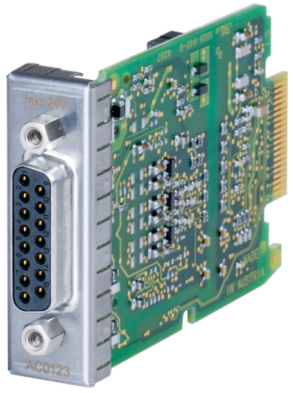
Model number	Short description	Figure
	Plug-in modules	
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	

Table 218: 8BAC0123.002-1 - Order data

14.7.3 Technical data

Model number	8BAC0123.002-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xA37F
Slot [1]	Slots 1 and 2
Max. power consumption [2]	P_{Module} [mW] = 25 V * ($I_{Encoder}$ [mA] + 60 mA)
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder connection [3]	
Module-side connection	15-pin DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	Yes
Max. encoder cable length	25 m
Encoder power supply 24 V	
Output voltage	24 V ±10%
Load capacity	300 mA [4]
Sense lines	-
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Inputs A, B, R	
Single-ended signals	
Input voltage for low	<5.5 V (to COM)
Input voltage for high	>14 V (to COM)
Maximum input voltage	-15 V / +30 V (to COM)
Differential signals	
Differential voltage	±4 V to ±30 V [5]
Maximum input voltage	-15 V / +30 V (to COM)
Input resistance	See block diagram
Incremental encoder operation	
Signal form	Square wave pulse
Evaluation	4x
Input frequency [6]	Max. 25 / 50 / 100 / 200 kHz
Counter frequency	Max. 100 / 200 / 400 / 800 kHz
Reference frequency	Max. 25 / 50 / 100 / 200 kHz
Distance between edges [7]	Min. 2.6 / 1.3 / 0.7 / 0.4 µs
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C

Table 219: 8BAC0123.002-1 - Technical data

Model number	8BAC0123.002-1
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 219: 8BAC0123.002-1 - Technical data

1) The 8BAC0123.002-1 is an encoder module. Two encoder modules can also be inserted. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis, and the encoder module in the second slot serves as motor feedback for the second axis. The second slot can be used for other purposes if only one axis is being operated.
2) $I_{Encoder}$ ... Current consumption of the incremental encoder The current consumption for the terminating resistors is already included in the formula.
3) The encoder must be wired using a cable with a single shield and twisted pair signal lines (e.g. 4x 2x 0.14 mm² + 2x 0.5 mm²).
4) An additional reserve of 25 mA is available for terminating resistors.
5) With open line monitoring disabled, ±2.5 V is sufficient.
6) Input filter configurable using software.
7) Automatically adjusted to the selected input filter.

14.7.4 Wiring

14.7.4.1 Pinout

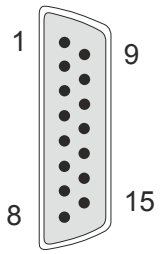
Figure	X11	Pin	Name	Function
		1	A	Channel A
		2	A\	Channel A inverted
		3	B	Channel B
		4	B\	Channel B inverted
		5	RD	Reference pulse
		6	RD\	Reference pulse inverted
		7	n.c.	---
		8	n.c.	---
		9	n.c.	---
		10	n.c.	---
		11	n.c.	---
		12	COM (1 - 6, 13)	Encoder supply 0 V
		13	+24V out	Encoder supply +24 V
		14	T+	Temperature sensor +
		15	T-	Temperature sensor -

Table 220: 8BAC0123.002-1 incremental encoder interface - Pinout

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Caution!

This plug-in module uses the same type of connection as EnDat 2.1 plug-in module 8BAC0120.000-1 (15-pin DSUB connector).

There is a possibility of confusion! EnDat 2.1 encoders will become irreparably damaged if connected to this plug-in module!

Warning!

Temperature sensors are only permitted to be connected to T+ and T- on an ACOPOSmulti plug-in module under the following conditions:

- **The ACOPOSmulti plug-in module is in SLOT1 on the ACOPOSmulti module and a temperature sensor is not connected to X4A/T+ and X4A/T- on this ACOPOSmulti module.**
- **Only for 8BVIxxxxHxD0.xxx-x inverter modules:**
  The ACOPOSmulti plug-in module is in SLOT2 on the ACOPOSmulti module and a temperature sensor is not connected to X4B/T+ and X4B/T- on this ACOPOSmulti module.

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

14.7.4.2 Input/Output circuit diagram

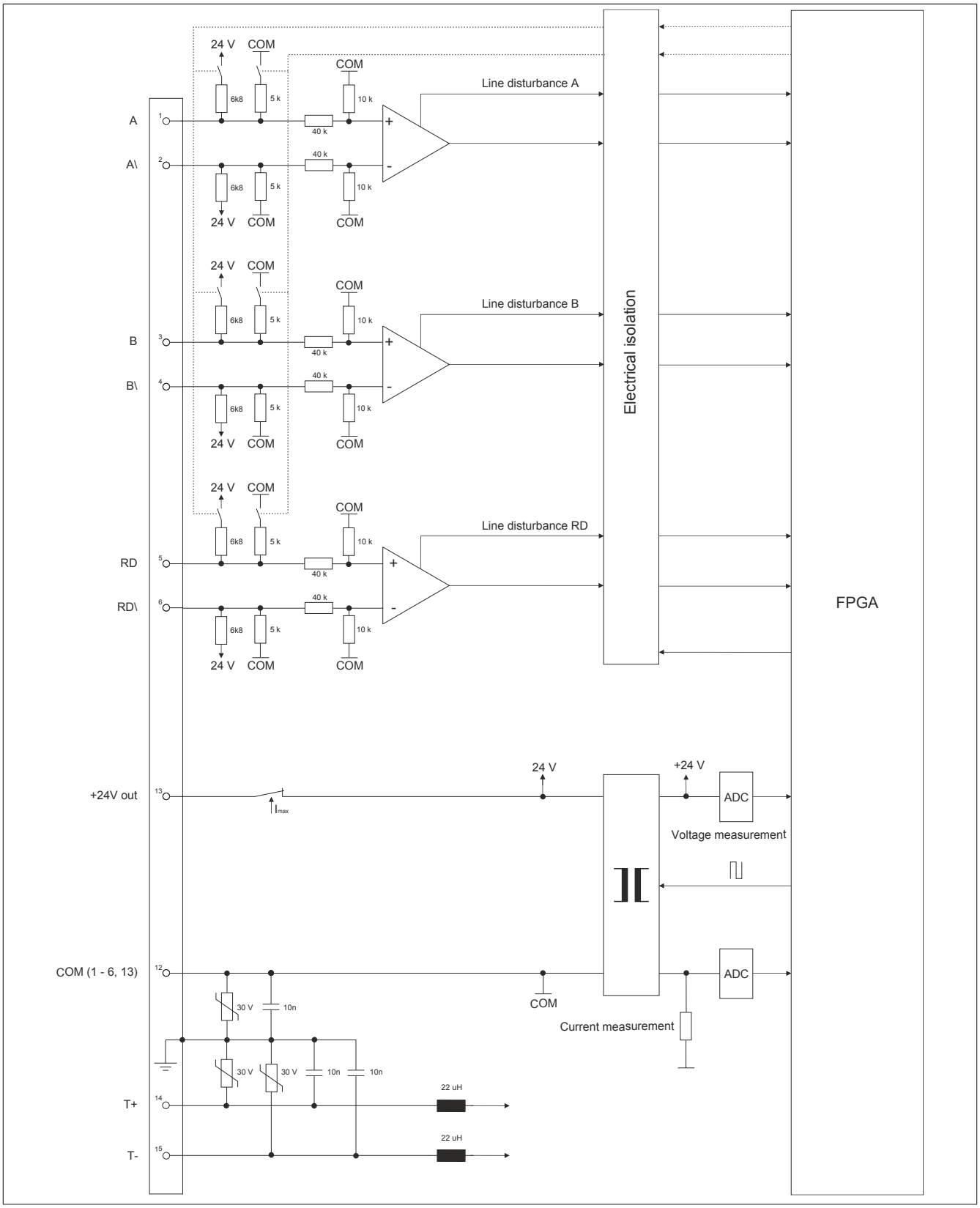


Figure 118: 8BAC0123.002-1 incremental encoder interface - Input/Output circuit diagram

14.7.4.3 Tracer pin connection (in preparation)

Cabled tracer pins

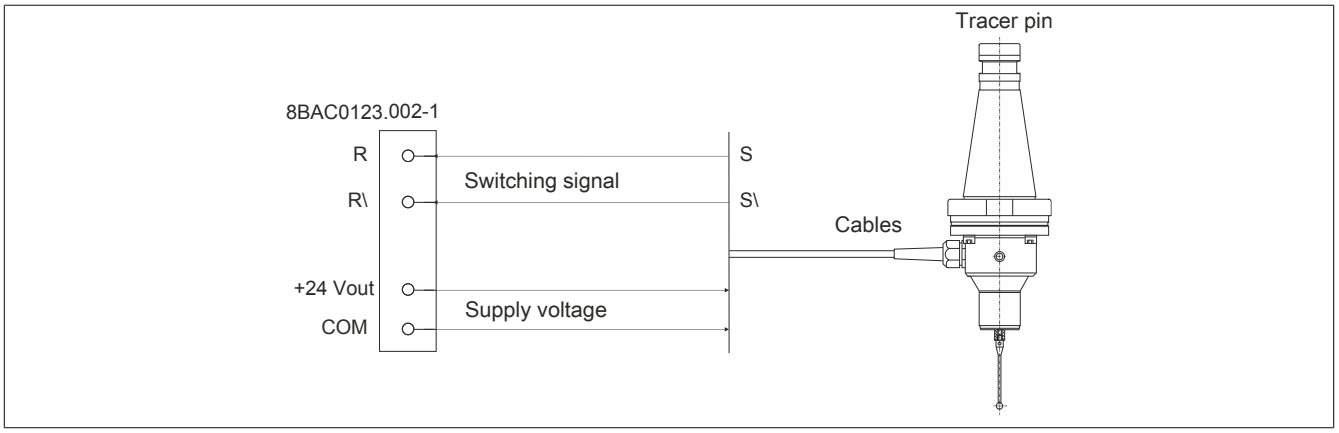


Figure 119: Connection example for cabled tracer pins with 24V supply and HTL output signals

The reference pulse input is used as an input for the switching signal for the tracer pins. Open line monitoring for channels A and B must be disabled.

Cable-free (IR) tracer pins

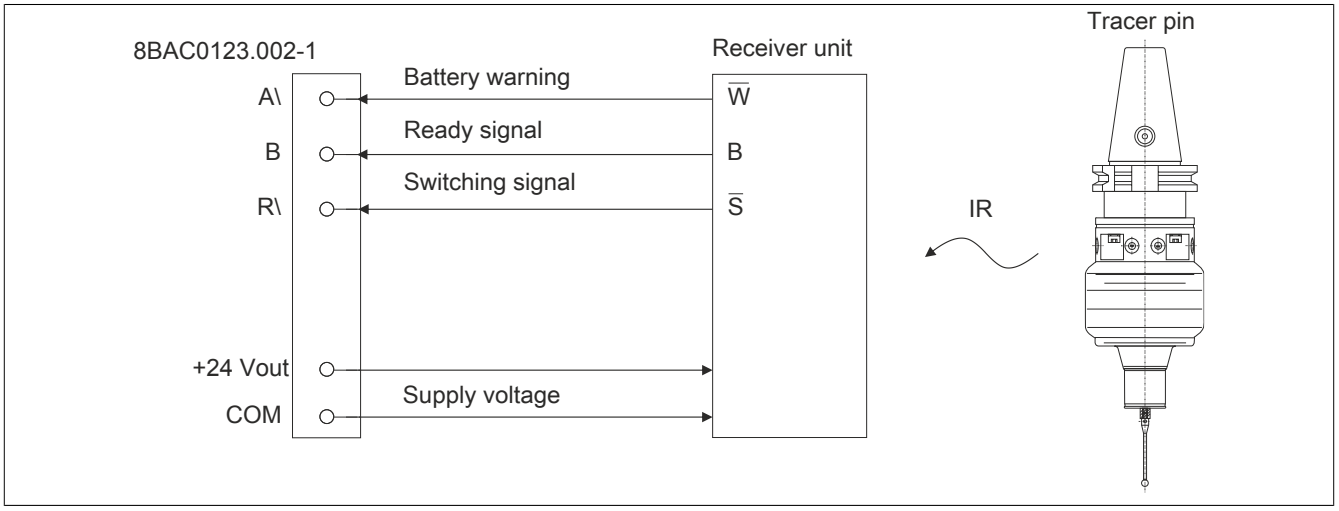


Figure 120: Connection example for cable-free (IR) tracer pins with 24V supply and HTL output signals

The reference pulse input is used as an input for the switching signal for the tracer pins. In addition, channels A and B are used for the battery warning and the ready signal.

14.7.4.4 Configuration of the pull-up and pull-down resistances in the module

The pull-up and pull-down resistances in the module can be switched using software so that encoders with different output designs can be connected. By default, the module is configured for encoders with push-pull outputs.

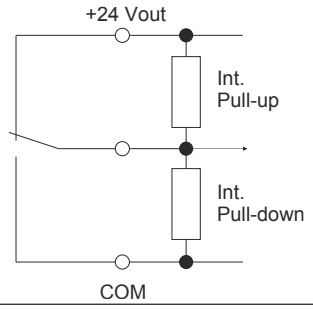
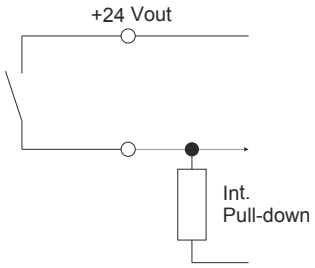
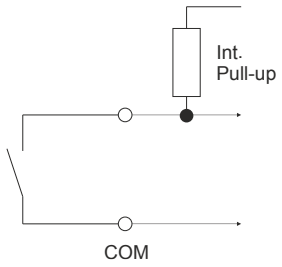
Encoders with push-pull outputs (default)	Encoders with push outputs	Encoders with pull outputs
The pull-up and pull-down resistances in the module are activated at the same time: 	Only the pull-down resistance in the module is activated: 	Only the pull-up resistance in the module is activated: 

Table 221: Possible configurations of the pull-up and pull-down resistances in the module

14.7.4.5 Configuration of open line monitoring

Encoders with push-pull outputs

Open line monitoring is possible by default.

Encoders with push or pull outputs

Open line monitoring is only possible if the encoder itself is equipped with pull-up or pull-down resistances (pull-up: max. 5.6 kΩ, pull-down: max. 3.9 kΩ) and the module is configured for encoders with push-pull outputs.

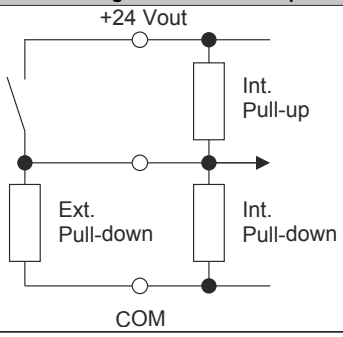
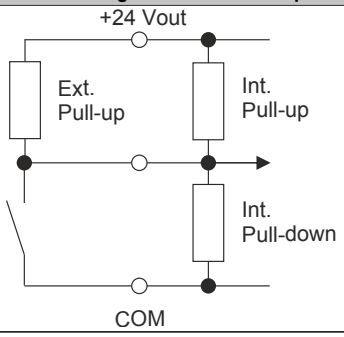
Open line monitoring for encoders with push outputs	Open line monitoring for encoders with pull outputs
	

Table 222: Configuration of open line monitoring for encoders with push or pull outputs

14.7.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder. [13)]

UP LED ... Indicates when the encoder position changes in the positive direction.
DN LED ... Indicates when the encoder position changes in the negative direction.

14.7.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

[13)] The count direction of the encoder can be configured in Automation Studio. However, changing the count direction in Automation Studio does not change the actual count direction of the encoder and therefore does not affect the UP/DN LEDs!

14.8 8BAC0124.000-1 SinCos plug-in module

14.8.1 General information

The 8BAC0124.000-1 SinCos plug-in module can be used in one ACOPOSmulti slot. This module has an interface for evaluating incremental encoders with a sinusoidal output signal. Limit switches can be connected.

The input signals are monitored, This makes it possible to detect open or shorted lines as well as encoder supply failures. The encoder power supply has overload and short circuit protection.

14.8.2 Order data

Model number	Short description	Figure
	Plug-in modules	
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	
	Optional accessories	
	SinCos cables	
8BCS0005.1111A-0	ACOPOSmulti SinCos cable, length 5 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0007.1111A-0	ACOPOSmulti SinCos cable, length 7 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0010.1111A-0	ACOPOSmulti SinCos cable, length 10 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0015.1111A-0	ACOPOSmulti SinCos cable, length 15 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0020.1111A-0	ACOPOSmulti SinCos cable, length 20 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0025.1111A-0	ACOPOSmulti SinCos cable, length 25 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	

Table 223: 8BAC0124.000-1 - Order data

14.8.3 Technical data

Model number	8BAC0124.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0x258A
Slot [1)]	Slots 1 and 2
Max. power consumption	P_{Module} [mW] = 25 V * ($I_{Encoder}$ [mA] * 0.37 + 32 mA)
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder connection [2)]	
Module-side connection	15-pin DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	No
Encoder monitoring	Yes
Max. encoder cable length	75 m
Encoder inputs	
Quantity	1
Sine/Cosine inputs	
Signal transmission	Differential signals, symmetrical
Signal frequency (-3 dB)	DC up to 300 kHz
Signal frequency (-5 dB)	DC up to 400 kHz
Common-mode voltage	Max. ±7 V
Terminating resistor	120 Ω
Resolution	12-bit
Encoder power supply	
Output voltage	5 V ±5%

Table 224: 8BAC0124.000-1 - Technical data

Model number	8BAC0124.000-1
Load capacity	300 mA [3]
Sense lines	2, compensation of max. 2x 0.7 V
Protective measures	
Overload protection	Yes
Short circuit protection	Yes
Reference input	
Signal transmission	Differential signal, symmetrical
Differential voltage for low	≤ -0.2 V
Differential voltage for high	≥ +0.2 V
Common-mode voltage	Max. ±7 V
Terminating resistor	120 Ω
Position	
Resolution @ 1 V_{SS} [4]	Number of encoder lines * 5700
Limit switch inputs [5]	
Quantity	2
Wiring	Source
Input resistance	1470 Ω
Electrical isolation	
Input - ACOPOSmulti	No
Input - Input	No
Input voltage	
Minimum	-12 V
Nominal	+5 V
Maximum	+20 V
Switching threshold	
Low	<0.8 V
High	>2 V
Switching delay	Max. 100 µs
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 224: 8BAC0124.000-1 - Technical data

1) The 8BAC0124.000-1 is an encoder module. Up to two encoder modules can be inserted. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis, and the encoder module in the second slot serves as motor feedback for the second axis. The second slot can be used for other purposes if only one axis is being operated.
2) The encoder must be wired using a cable with a single shield and twisted pair signal lines.
3) An additional reserve of 12 mA exists for terminating resistors and limit switch inputs.
4) This value does not correspond to the encoder resolution that must be configured in Automation Studio (16384 * number of encoder lines).
5) The measurement system offered by Heidenhain with limit switch outputs LIDA 47x, LIDA 48x and LIF4x1 was tested for compatibility. In practice, the cable length is limited by the encoder.

14.8.4 Wiring

14.8.4.1 Pinout

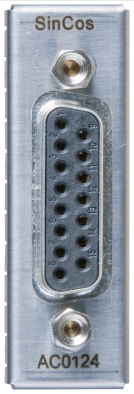
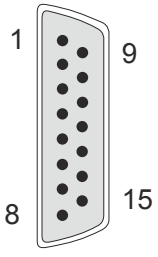
Figure	X11	Pin	Name	Function
		1	A	Channel A
		2	COM	Encoder supply 0 V
		3	B	Channel B
		4	+5 V	Encoder supply +5 V
		5	T+	Temperature sensor +
		6	Limit -	Negative limit (L2)
		7	R\	Reference pulse inverted
		8	Limit +	Positive limit (L1)
		9	A\	Channel A inverted
		10	Sense COM	Sense input 0 V
		11	B\	Channel B inverted
		12	Sense +5V	Sense input +5 V
		13	T-	Temperature sensor -
		14	R	Reference pulse
		15	---	---

Table 225: 8BAC0124.000-1 SinCos interface - Pinout

Danger!

The connections for the motor temperature sensor and encoder are safely isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation per IEC 60364-4-41 or EN 61800-5-1.

Warning!

Temperature sensors are only permitted to be connected to T+ and T- on an ACOPOSmulti plug-in module under the following conditions:

- **The ACOPOSmulti plug-in module is in SLOT1 on the ACOPOSmulti module and a temperature sensor is not connected to X4A/T+ and X4A/T- on this ACOPOSmulti module.**
- **Only for 8BVIxxxxHxD0.xxx-x inverter modules:**
  The ACOPOSmulti plug-in module is in SLOT2 on the ACOPOSmulti module and a temperature sensor is not connected to X4B/T+ and X4B/T- on this ACOPOSmulti module.

Otherwise, the temperature monitoring functions on the ACOPOSmulti module may become ineffective, which in extreme cases can cause the hardware (e.g. motors) connected to the ACOPOSmulti module to be destroyed!

14.8.4.2 Input/Output circuit diagram

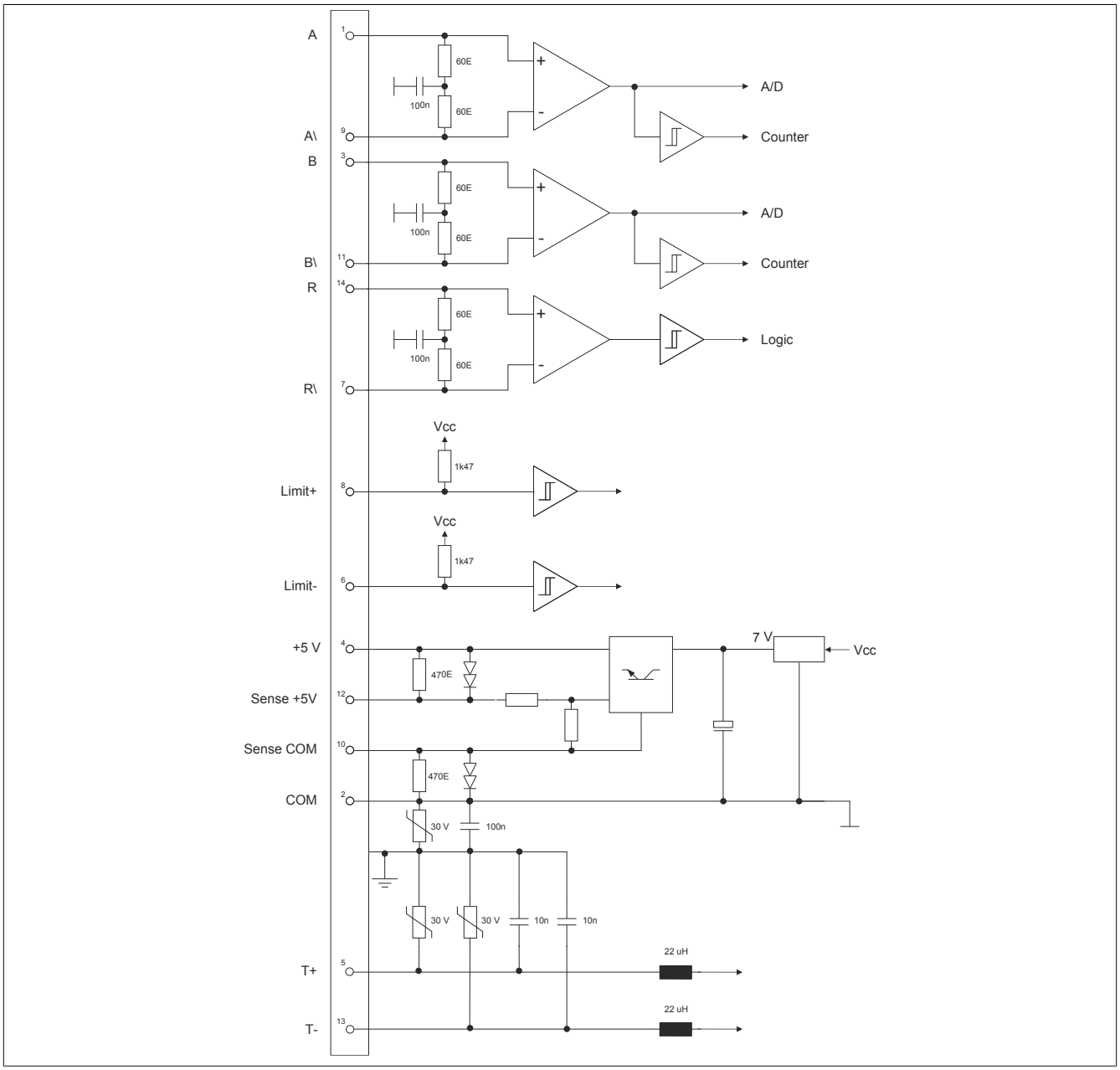


Figure 121: 8BAC0124.000-1 SinCos interface - Input/Output circuit diagram

14.8.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs are lit depending on the rotational direction and the speed of the connected encoder. [14)]

UP LED ... Indicates when the encoder position changes in the positive direction.
DN LED ... Indicates when the encoder position changes in the negative direction.

14.8.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

14) The count direction of the encoder can be configured in Automation Studio. However, changing the count direction in Automation Studio does not change the actual count direction of the encoder and therefore does not affect the UP/DN LEDs!

14.9 8BAC0125.000-1 plug-in module

14.9.1 General information

The plug-in module 8BAC0125.000-1 can be used in an ACOPOSmulti slot. This module includes a serial RS485 interface and an interface for evaluating sinusoidal output signals.

The following functions and protocols can be selected by configuring the appropriate parameters (using a higher-level controller).

- SSI, serial
- SSI SinCos, serial with evaluation of sinusoidal output signals
- EnDat 2.1, serial with evaluation of sinusoidal output signals
- BiSS (MODE C), serial [15)]

Material	BiSS functionality for 8BAC0125.000-1 available starting with revision
8BVI0014HxD0.000-1	K0
8BVI0014HCS0.000-1	K0
8BVI0014HWS0.000-1	J0
8BVI0028HxD0.000-1	K0
8BVI0028HxS0.000-1	K0
8BVI0055HCD0.000-1	N0
8BVI0055HWD0.000-1	M0
8BVI0055HxS0.000-1	L0
8BVI0110HxD0.000-1	H0
8BVI0110HxS0.000-1	L0
8BVI0220HxD0.000-1	H0
8BVI0220HxS0.000-1	N0
8BVI0330HxS0.000-1	F0
8BVI0440HxS0.000-1	N0
8BVI0660HxS0.000-1	D0
8BVI0880HxS0.004-1	G0
8BVI1650HxS0.000-1	C0
8BVP0220Hx00.000-1	J0
8BVP0440Hx00.000-1	N0
8BVP0880Hx00.004-1	G0
8BVP1650Hx00.000-1	C0

Table 226: BiSS functionality with 8BAC0125.000-1 - Minimum revision of the ACOPOSmulti modules

This module can be used to evaluate encoders installed in B&R servo motors as well as encoders for external axes (encoders that scan any machine movement). The input signals are monitored. This makes it possible to detect open or shorted lines as well as encoder supply failures. [16)]

[15)] Starting with ACP10 firmware V2.370.

[16)] Not for SSI functionality.

14.9.2 Order data

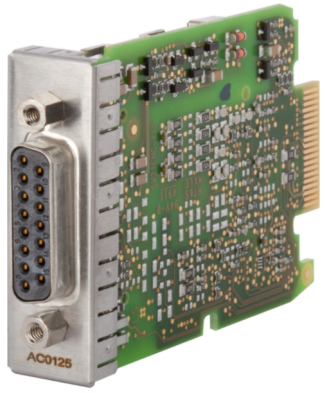
Model number	Short description	Figure
	Plug-in modules	
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	
	Optional accessories	
	EnDat 2.1 cables	
8BCE0005.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 5 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0007.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 7 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0010.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 10 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0015.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 15 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0020.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 20 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCE0025.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 25 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	

Table 227: 8BAC0125.000-1 - Order data

14.9.3 Technical data

Model number	8BAC0125.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xD59E
Slot [1]	Slots 1 and 2
Max. power consumption	P_{Module} [mW] = 25 V * ($I_{Encoder}$ [mA] * 0.4 + 25 mA)
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Encoder inputs [2]	
Quantity	1
Module-side connection	15-pin male DSUB connector
Status indicators	UP/DN LEDs
Electrical isolation	
Encoder - ACOPOSmulti	No
Encoder monitoring	Yes
Max. encoder cable length	75 m
Sine/Cosine inputs	
Signal transmission	Differential signals, symmetrical
Signal frequency (-3 dB)	DC up to 300 kHz
Signal frequency (-5 dB)	DC up to 400 kHz
Common-mode voltage	Max. ±7 V
Terminating resistor	120 Ω
Resolution	12-bit
Encoder power supply	
Output voltage	5 V ±5%
Load capacity	250 mA [3]
Sense lines	2, compensation of max. 2 x 0.7 V
Position	
Resolution @ 1 V_{SS}	Number of encoder lines * 5700
Synchronous serial interface	
Signal transmission	RS485
Data transfer rate	Depends on the configured functionality [4]

Table 228: 8BAC0125.000-1 - Technical data

Model number	8BAC0125.000-1
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85% 5)
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 228: 8BAC0125.000-1 - Technical data

1) The 8BAC0125.000-1 is an encoder module. Up to two encoder modules can be connected. In this case, the encoder module in the first slot automatically serves as motor feedback for the first axis; the encoder module in the second slot serves as motor feedback for the second axis. In single-axis mode, the second slot can be used for other purposes.
2) The encoder must be wired with a single shielded cable.
3) An additional reserve of 57 mA is available for terminating resistors.
4) EnDat 2.1 ... 781.25 kbit/s, SSI ... 100 to 400 kbit/s, BiSS ... 1560 kbit/s.
5) ACOPOSmulti plug-in modules can only be used in an ACOPOSmulti power inverter or power supply module; for the corresponding values, see the technical data of the respective ACOPOSmulti power inverter or power supply module.

14.9.4 Wiring

14.9.4.1 Pinout

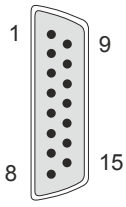
Figure	X11	Pin	Name	Function			
				SSI SinCos	EnDat 2.1	BiSS	SSI
		1	A	Channel A		---	
		2	COM	Encoder supply 0 V			
		3	B	Channel B		---	
		4	+5 V	Encoder supply +5 V			
		5	D	Data input			
		6	---	---			
		7	T+	Temperature sensor +			
		8	T	Clock output			
		9	A\	Channel A inverted		---	
		10	Sense COM	Sense input 0 V			
		11	B\	Channel B inverted		---	
		12	Sense +5V	Sense input +5 V			
		13	D\	Data input inverted			
		14	T-	Temperature sensor -			
		15	T\	Clock output inverted			

Table 229: Pinout - SinCos EnDat 2.1/SSI/BiSS interface 8BAC0125.000-1

Danger!

The connections for the encoders are isolated circuits. These connections are therefore only permitted to be connected to devices or components that have sufficient isolation in accordance with IEC 60364-4-41 or EN 61800-5-1.

14.9.4.2 Input/Output circuit diagram

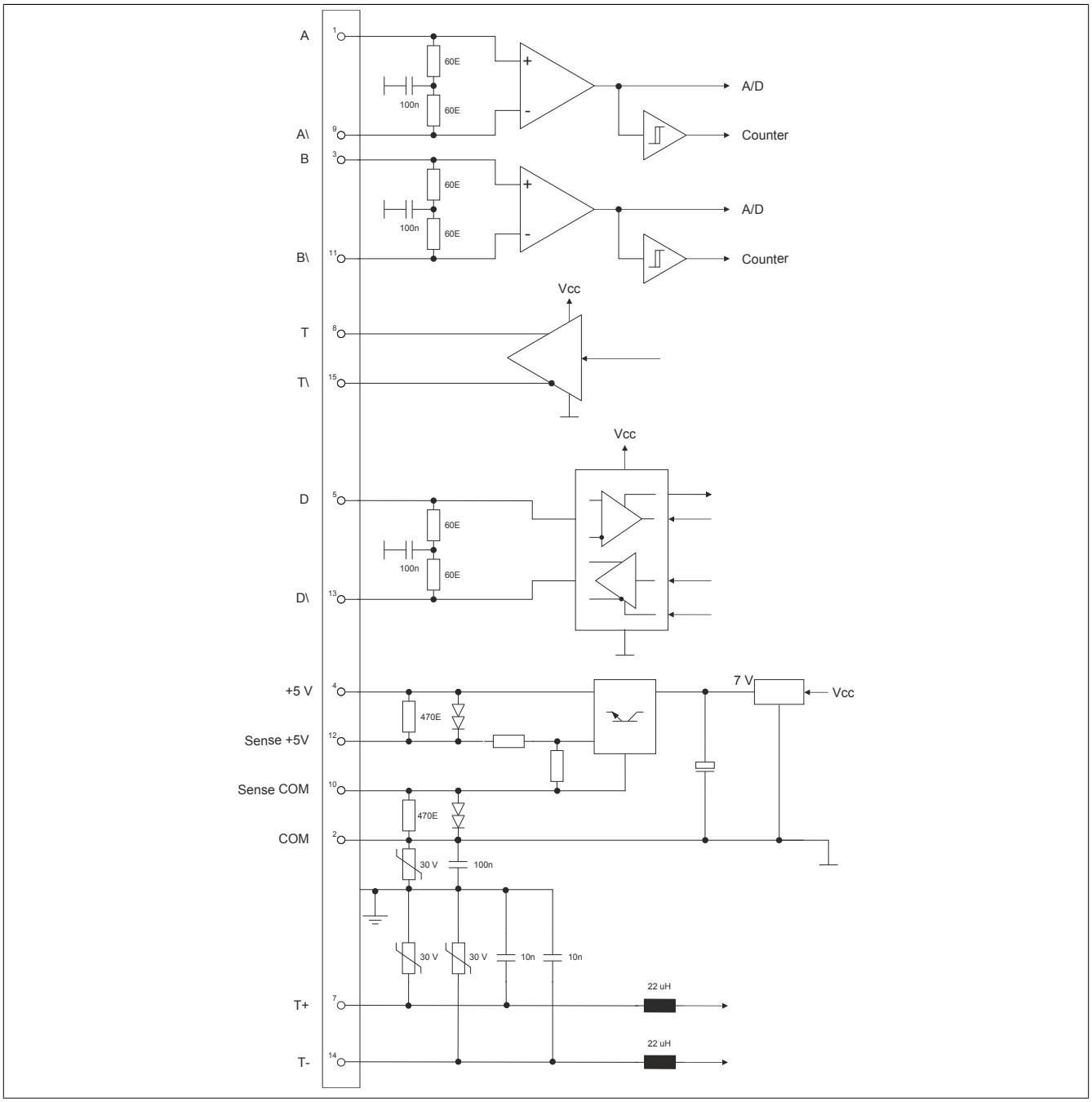


Figure 122: Input/Output circuit diagram - SinCos EnDat 2.1/SSI/BiSS interface 8BAC0125.000-1

14.10 8BAC0130.000-1 digital I/O plug-in module

14.10.1 General information

The 8BAC0130.000-1 digital I/O plug-in module can be used in SLOT2 of an ACOPOSmulti module.

The following +24 VDC inputs and output are available:

- Two digital inputs (sink)
- 2 high-speed outputs with a maximum continuous current of 50 mA.
  These are designed for a maximum switching frequency of 62.5 kHz (resistive load).
- Two readable standard outputs with a maximum continuous current of 500 mA
  These are designed for a maximum switching frequency of 1.25 kHz (resistive load).

14.10.2 Order data

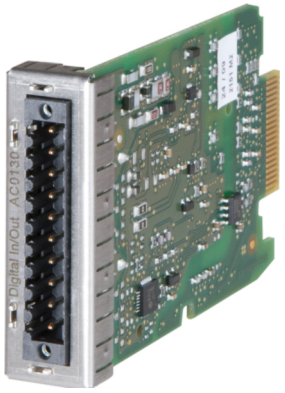
Model number	Short description	Figure
	Plug-in modules	
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	
	Required accessories	
	Terminal blocks	
8TB1110.20D-00	Screw clamp terminal block 10-pin, single-row, pitch: 3.5 mm, numbered consecutively, coding D: 1100110011	
8TB1110.21D-00	Cage clamp terminal block 10-pin, single-row, pitch: 3.5 mm, coding D: 1100110011	

Table 230: 8BAC0130.000-1 - Order data

14.10.3 Technical data

Model number	8BAC0130.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xA9D6
Slot	Slot 2
Max. power consumption	800 mW
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Module connection	
Module-side connection	10-pin connector
Status indicators	UP LED (module OK) and DN LED (module NOT OK)
Digital inputs	
Quantity	2
Modulation compared to ground potential	Max. 30 V
Wiring	Sink
Input current at nominal voltage	Approx. 11 mA
Input voltage	
Nominal	24 VDC
Maximum	30 VDC
Electrical isolation	
Input - Input	No
Input - ACOPOSmulti	Yes
Digital outputs [1)]	
Quantity	4
Readable outputs	Yes
Continuous current	
Outputs 1 - 2	Max. 50 mA
Outputs 3 - 4	Max. 500 mA

Table 231: 8BAC0130.000-1 - Technical data

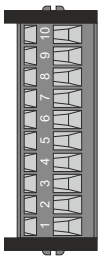
Model number	8BAC0130.000-1
Short circuit current at 24 V (until cutoff)	
Outputs 1 - 2	Approx. 0.2 A
Outputs 3 - 4	Approx. 1.2 A
Electrical isolation	
Output - ACOPOSmulti	Yes
Output - Output	No
Switching frequency (resistive load)	
Outputs 1 - 2	Max. 62.5 kHz
Outputs 3 - 4	Max. 1.25 kHz
Switching voltage	
Minimum	18 VDC
Nominal	24 VDC
Maximum	30 VDC
Switching delay 0 → 1 and 1 → 0	
Outputs 1 - 2	Max. 1 µs
Outputs 3 - 4	Max. 50 µs
Type	
Outputs 1 - 2	Push-pull
Outputs 3 - 4	High-side
Protective measures	
Short circuit protection	Yes
Overload protection	Yes
Modulation compared to ground potential	
Outputs 3 - 4	Max. 30 V
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 231: 8BAC0130.000-1 - Technical data

1) Shielded cables must be used for outputs 1 and 2.

14.10.4 Wiring

14.10.4.1 Pinout

Figure	X11	Pin	Name	Function
		1	Digital O 1	Digital output 1
		2	n.c.	---
		3	Digital O 2	Digital output 2
		4	n.c.	---
		5	Digital O 3	Digital output 3
		6	Digital O 4	Digital output 4
		7	Digital I 1	Digital input 1
		8	Digital I 2	Digital input 2
		9	+24V In	+24 V supply
		10	COM (1,3,5 - 9)	0 V supply

Terminal cross sections	[mm²]	[AWG]
Solid core / multiple-conductor lines	0.2 - 1.5	28 - 14
Flexible, multiple wire line Without wire end sleeves With wire end sleeves	 0.2 - 1.5 0.2 - 1.5	 28 - 14 28 - 14
Approbation data UL/C-UL-US CSA	 --- ---	 28 - 14 28 - 14
Tightening torque for the terminal screws [Nm]	0.2 to 0.25	

Table 232: 8BAC0130.000-1 digital I/O interface - Pinout

Caution!

The two high-speed digital outputs (X11/1 and X11/3) must be wired using shielded lines.

The 8SCS002.0000-00 shield set must be used on ACOPOSmulti power supply modules and inverter modules! The shield must be attached as close to the terminal as possible.

14.10.4.2 Input/Output circuit diagram

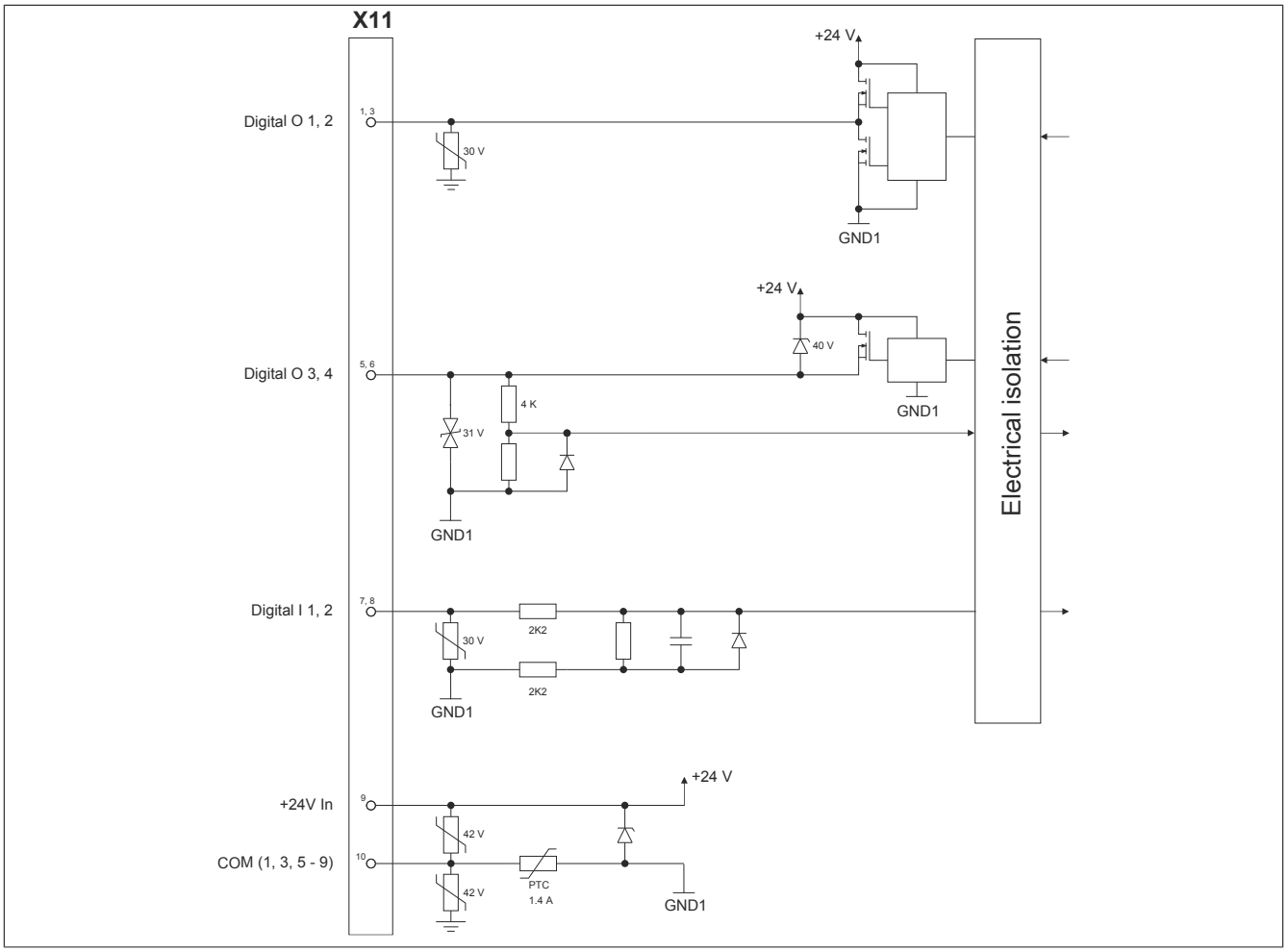


Figure 123: 8BAC0130.000-1 digital I/O interface - Input/Output circuit diagram

14.10.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs light up according to the module state.

UP-LED ... lit, if the module is functioning properly (green).
DN-LED ... lit, if the module is not (yet) functioning properly (red).

14.10.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

14.11 8BAC0130.001-1 digital Out plug-in module

14.11.1 General information

The 8BAC0130.001-1 digital Out plug-in module can be used in SLOT2 of an ACOPOSmulti module.

Six digital +24 VDC outputs are available:

- 2 high-speed outputs with a maximum continuous current of 50 mA.
  These are designed for a maximum switching frequency of 62.5 kHz (resistive load).
- Four readable standard outputs with a maximum continuous current of 500 mA.
  These are designed for a maximum switching frequency of 1.25 kHz (resistive load).

14.11.2 Order data

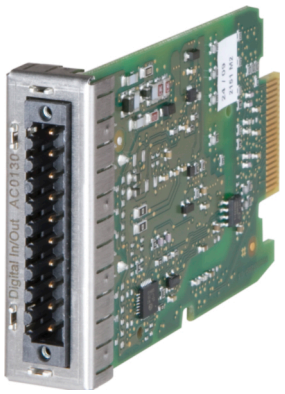
Model number	Short description	Figure
	Plug-in modules	
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	
	Required accessories	
	Terminal blocks	
8TB1110.20C-00	Screw clamp terminal block 10-pin, single-row, pitch: 3.5 mm, numbered consecutively, coding C: 1001111001	
8TB1110.21C-00	Cage clamp terminal block 10-pin, single-row, pitch: 3.5 mm, coding C: 1001111001	

Table 233: 8BAC0130.001-1 - Order data

14.11.3 Technical data

Model number	8BAC0130.001-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xA8D5
Slot	Slot 2
Max. power consumption	800 mW
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Module connection	
Module-side connection	10-pin multipoint connector
Status indicators	UP LED (module OK) and DN LED (module NOT OK)
Digital outputs [1]	
Quantity	6
Readable outputs	Yes
Continuous current	
Outputs 1 - 2	Max. 50 mA
Outputs 3 - 6	Max. 500 mA
Short circuit current at 24 V (until cutoff)	
Outputs 1 - 2	Approx. 0.2 A
Outputs 3 - 6	Approx. 1.2 A
Electrical isolation	
Output - ACOPOSmulti	Yes
Output - Output	No
Switching frequency (resistive load)	
Outputs 1 - 2	Max. 62.5 kHz
Outputs 3 - 6	Max. 1.25 kHz
Switching voltage	
Minimum	18 VDC
Nominal	24 VDC
Maximum	30 VDC

Table 234: 8BAC0130.001-1 - Technical data

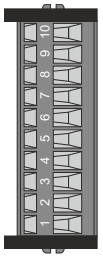
Model number	8BAC0130.001-1
Switching delay 0 → 1 and 1 → 0	
Outputs 1 - 2	Max. 1 µs
Outputs 3 - 6	Max. 50 µs
Type	
Outputs 1 - 2	Push-Pull
Outputs 3 - 6	High-side
Protective measures	
Short circuit protection	Yes
Overload protection	Yes
Modulation compared to ground potential	
Outputs 3 - 6	Max. 30 V
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 234: 8BAC0130.001-1 - Technical data

1) Shielded cables must be used for outputs 1 and 2.

14.11.4 Wiring

14.11.4.1 Pinout

Figure	X11	Pin	Name	Function
		1	Digital O 1	Digital output 1
		2	n.c.	---
		3	Digital O 2	Digital output 2
		4	n.c.	---
		5	Digital O 3	Digital output 3
		6	Digital O 4	Digital output 4
		7	Digital O 5	Digital output 5
		8	Digital O 6	Digital output 6
		9	+24V In	+24 V supply
		10	COM (1,3,5 - 9)	0 V supply

Terminal cross sections	[mm²]	[AWG]
Solid core / multiple-conductor lines	0.2 - 1.5	28 - 14
Flexible, multiple wire line Without wire end sleeves With wire end sleeves	 0.2 - 1.5 0.2 - 1.5	 28 - 14 28 - 14
Approbation data UL/C-UL-US CSA	 --- ---	 28 - 14 28 - 14
Tightening torque for the terminal screws [Nm]	0.2 to 0.25	

Table 235: 8BAC0130.001-1 digital Out interface - Pinout

Caution!

The two high-speed digital outputs (X11/1 and X11/3) must be wired using shielded lines.

The 8SCS002.0000-00 shield set must be used on ACOPOSmulti power supply modules and inverter modules! The shield must be attached as close to the terminal as possible.

14.11.4.2 Input/Output circuit diagram

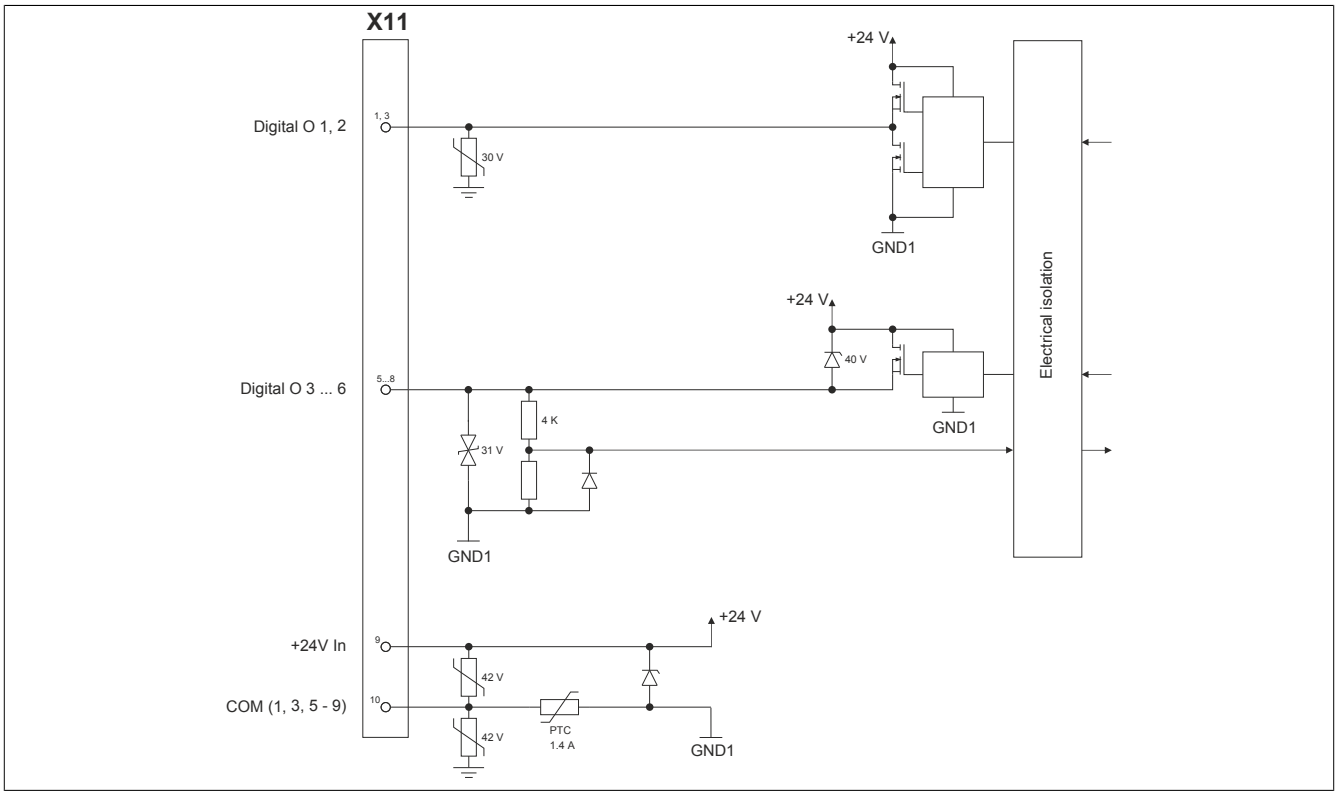


Figure 124: 8BAC0130.001-1 digital Out interface - Input/Output circuit diagram

14.11.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs light up according to the module state.

UP-LED ... lit, if the module is functioning properly (green).
DN-LED ... lit, if the module is not (yet) functioning properly (red).

14.11.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

14.12 8BAC0132.000-1 analog In plug-in module

14.12.1 General information

The 8BAC0132.000-1 analog In plug-in module can be used in an ACOPOSmulti slot. Four analog inputs are available (±10 V differential inputs).

The analog inputs have a resolution of 14 bits and are sampled synchronously using the 50 µs clock for the ACOPOSmulti inverter or power supply module. The analog inputs have a 30 kHz analog input filter (3rd-order low pass).

14.12.2 Order data

Model number	Short description	Figure
	Plug-in modules	
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	
	Required accessories	
	Terminal blocks	
8TB1110.20B-00	Screw clamp terminal block 10-pin, single-row, pitch: 3.5 mm, numbered consecutively, coding B: 0011111100	
8TB1110.21B-00	Cage clamp terminal block 10-pin, single-row, pitch: 3.5 mm, coding B: 0011111100	

Table 236: 8BAC0132.000-1 - Order data

14.12.3 Technical data

Model number	8BAC0132.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xA5CB
Slot	Slots 1 and 2
Max. power consumption	1.2 W
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Module connection	
Module-side connection	10-pin connector
Status indicators	UP LED (module OK) and DN LED (module NOT OK)
Analog inputs	
Quantity	4
Digital converter resolution	14-bit
Conversion time	<10 µs
Design	Differential input
Electrical isolation	
Input - ACOPOSmulti	Yes
Input - Input	No
Input signal	
Nominal	-10 to +10 V
Maximum	-15 to +15 V
Operating modes	Cyclic measurement synchronous to 50 µs clock
Conversion procedure	Successive approximation
Input filter	Analog 3rd order low pass / cutoff frequency: 30 kHz
Common-mode rejection	
DC	80 dB
50 Hz	80 dB
Nonlinearity	±1 LSB
Differential input impedance	>10 MΩ

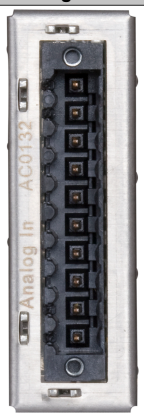
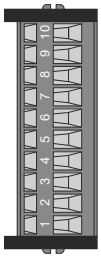
Table 237: 8BAC0132.000-1 - Technical data

Model number	8BAC0132.000-1
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 237: 8BAC0132.000-1 - Technical data

14.12.4 Wiring

14.12.4.1 Pinout

Figure	X11	Pin	Name	Function
		1	Analog I 1 +	Analog input 1 plus
		2	Analog I 1 -	Analog input 1 minus
		3	Shield (1,2,4,5)	Shield connection
		4	Analog I 2 +	Analog input 2 plus
		5	Analog I 2 -	Analog input 2 minus
		6	Analog I 3 +	Analog input 3 plus
		7	Analog I 3 -	Analog input 3 minus
		8	Shield (6,7,9,10)	Shield connection
		9	Analog I 4 +	Analog input 4 plus
		10	Analog I 4 -	Analog input 4 minus

Terminal cross sections	[mm²]	[AWG]
Solid core / multiple-conductor lines	0.2 - 1.5	28 - 14
Flexible, multiple wire line Without wire end sleeves With wire end sleeves	 0.2 - 1.5 0.2 - 1.5	 28 - 14 28 - 14
Approbation data UL/C-UL-US CSA	 --- ---	 28 - 14 28 - 14
Tightening torque for the terminal screws [Nm]	0.2 to 0.25	

Table 238: 8BAC0132.000-1 analog interface - Pinout

14.12.4.2 Input/Output circuit diagram

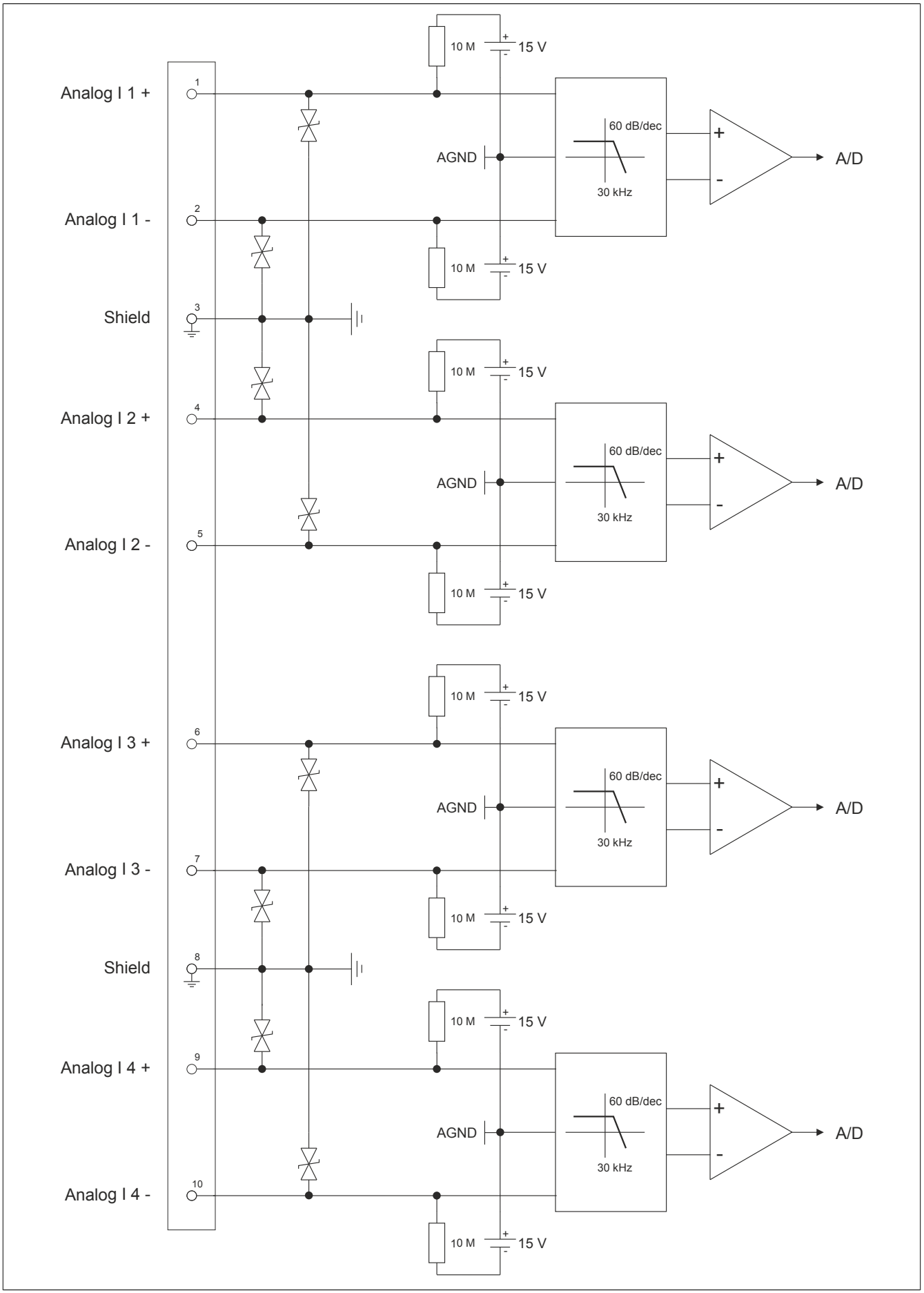


Figure 125: 8BAC0132.000-1 analog interface - Input/Output circuit diagram

14.12.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs light up according to the module state.

UP-LED ... lit, if the module is functioning properly (green).
DN-LED ... lit, if the module is not (yet) functioning properly (red).

14.12.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

14.13 8BAC0133.000-1 encoder emulation module

14.13.1 General information

The module is designed for use in an ACOPOSmulti slot and provides 3 RS422 outputs for encoder emulation with up to 1 MHz signal frequency.

The outputs are electrically isolated from the ACOPOSmulti module. Power is supplied internally from the device. In order to establish a ground reference with a remote station, a ground wire must be supplied from the outside.

14.13.2 Order data

Model number	Short description	Figure
	Plug-in modules	
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	

Table 239: 8BAC0133.000-1 - Order data

14.13.3 Technical data

Model number	8BAC0133.000-1
General information	
Module type	ACOPOSmulti plug-in module
B&R ID code	0xB37F
Slot	Slot 2
Power consumption	Max. 2 W
Certifications	
CE	Yes
KC	Yes
UL	cULus E225616 Power conversion equipment
Module connection	
Module-side connection	9-pin DSUB connector, keyed
Status indicators	UP LED (module OK) and DN LED (module NOT OK)
Max. cable length	75 m
Terminating resistor	120 Ω
Digital outputs	
Quantity	3
Peak short circuit current	250 mA
Switching delay	
0 → 1	Max. 50 ns
1 → 0	Max. 50 ns
Switching frequency	Max. 1 MHz
Type	RS422 (differential)
Output voltage	
Minimum	2 V
Nominal	2.1 V
Maximum	5.1 V
Output status dependent on operating state	High resistance, until the software is initialized
Electrical isolation	
Output - ACOPOSmulti	Yes
Output - Output	No
Protective measures	
Short circuit protection	Yes
Overload protection	Yes

Table 240: 8BAC0133.000-1 - Technical data

Model number	8BAC0133.000-1
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C

Table 240: 8BAC0133.000-1 - Technical data

14.13.4 Wiring

14.13.4.1 Pinout

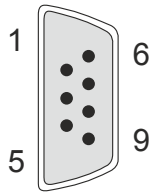
Figure	X11	Pin	Name	Function
		1	---	Keying
		2	A	Channel A
		3	A\	Channel A inverted
		4	B	Channel B
		5	---	Keying
		6	COM (2, 3, 4, 7, 8, 9)	Ground reference for the signals
		7	R\	Reference pulse inverted
		8	R	Reference pulse
		9	B\	Channel B inverted

Table 241: Encoder emulation interface 8BAC0133.000-1 - Pinout

Information:

The outputs must be terminated at the remote stations (on the receiver) with 120 Ω resistance. Cables with 120 Ω wave impedance must be used.

Only shielded cables are permitted to be used. The cable shield must be applied to both ends!

The ground reference must be included in the same cable as the signal lines. The ground reference of the remote station (receiver) should generally be used.

14.13.4.2 Input/Output circuit diagram

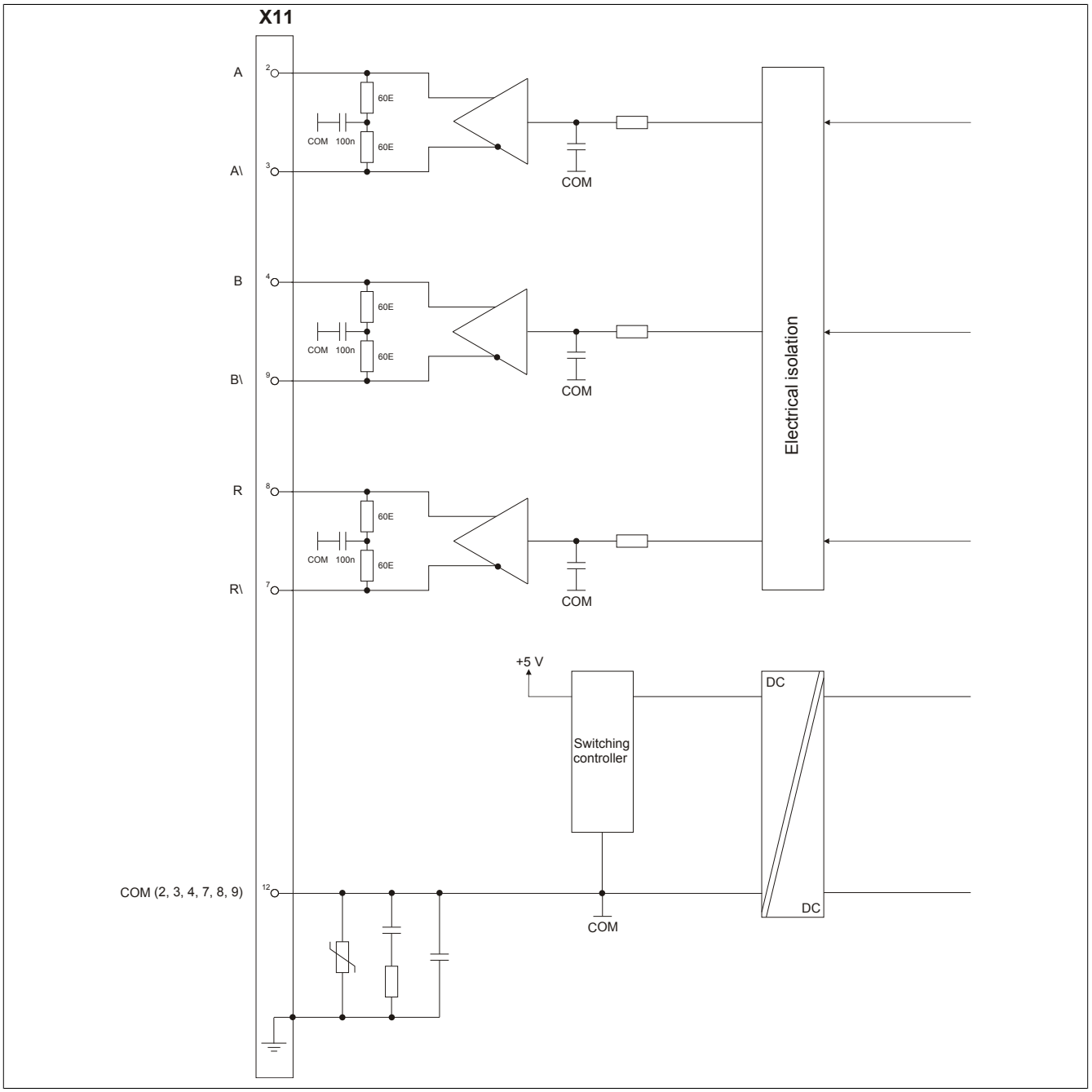


Figure 126: 8BAC0133.000-1 encoder emulation interface - Input/Output circuit diagram

14.13.5 Status indicators

Status indicators (UP/DN LEDs) are located on the front of the ACOPOSmulti drive or power supply module where this plug-in module is installed.

The UP/DN LEDs light up according to the module state.

UP-LED ... lit, if the module is functioning properly (green).
DN-LED ... lit, if the module is not (yet) functioning properly (red).

14.13.6 Firmware

The firmware is part of the operating system for the ACOPOSmulti drive system. Firmware is updated by updating the ACOPOSmulti operating system.

15 8B0W external braking resistors

8B0W external braking resistors can be used to dissipate braking energy on 8B0P passive ACOPOSmultipower supply modules.

15.1 Order data

Model number	Short description	Figure
	Braking resistors	
8B0W0045H000.000-1	Braking resistor, 450 W, 50 R, IP20, terminals	
8B0W0045H000.001-1	Braking resistor, 450 W, 50 R, IP65, terminals	
8B0W0079H000.000-1	Braking resistor, 790 W, 33 R, IP20, terminals	
8B0W0079H000.001-1	Braking resistor, 790 W, 33 R, IP65, terminals	

Table 242: 8B0W0045H000.000-1, 8B0W0045H000.001-1, 8B0W0079H000.000-1, 8B0W0079H000.001-1 - Order data

15.2 Technical data

Model number	8B0W0045H000.000-1	8B0W0045H000.001-1	8B0W0079H000.000-1	8B0W0079H000.001-1
General information				
RoHS-compliant	Yes			
Cooling and mounting method	Wall mounting			
Certifications				
CE	Yes			
KC	Yes			
Braking resistor				
Continuous power depending on mounting orientation				
Standing horizontally	388 W		636 W	
Hanging vertically	424 W		701 W	
Reduction of continuous power depending on ambient temperature	7.5 W/K (from 40°C)		13.2 W/K (from 40°C)	
Ohmic resistance	50 Ω ±10%		33 Ω ±10%	
Max. operating voltage	850 VDC			
Isolation voltage type test	4000 VAC			
Intrinsically safe	Yes [1)]			
Design				
RB1, RB2	Terminals with tension spring technology			
PE	M5 threaded bolt	M4 threaded bolt	M5 threaded bolt	M4 threaded bolt
Shield connection	Yes, on the terminal box via high-strength cable gland			
Terminal connection cross section				
Flexible and fine wire lines				
With wire end sleeves	1.5 to 10 mm²			
Approbation data				
UL/C-UL-US	24 to 6 AWG			
CSA	22 to 6 AWG			
Terminal cable outer cross section dimension of attachment cable	9 to 16.6 mm			
Temperature model data				
Thermal resistance between braking resistor and environment depending on mounting orientation				
Standing horizontally	1.657 K/W		0.9395 K/W	
Hanging vertically	1.517 K/W		0.852 K/W	
Thermal capacity	30.88 Ws/K		40.68 Ws/K	
Max. permissible overtemperature	683°C		637°C	
Operating conditions				
Permissible mounting orientations				
Standing horizontally	Yes			
Hanging vertically				
Connection box, bottom	Yes			
Connection box, top	No			
Degree of protection per EN 60529				
Standing horizontally	IP20	IP65	IP20	IP65
Hanging vertically				
Connection box, bottom	IP21	IP65	IP21	IP65
Connection box, top	-			
Environmental conditions				
Temperature				
Operation	-40 to 90°C			

Table 243: 8B0W0045H000.000-1, 8B0W0045H000.001-1, 8B0W0079H000.000-1, 8B0W0079H000.001-1 - Technical data

Model number	8B0W0045H000.000-1	8B0W0045H000.001-1	8B0W0079H000.000-1	8B0W0079H000.001-1
Relative humidity				
Operation	5 to 95%			
Mechanical characteristics				
Dimensions				
Width	124 mm			
Height	121 mm			
Depth	403 mm	332 mm	603 mm	532 mm
Weight	2.4 kg		3.9 kg	

Table 243: 8B0W0045H000.000-1, 8B0W0045H000.001-1, 8B0W0079H000.000-1, 8B0W0079H000.001-1 - Technical data

1) 8B0W external braking resistors can be considered intrinsically safe if they are connected to a 8B0P passive power supply module operated with a mains supply voltage of 3x 380 - 500 VAC. The maximum time until the 8B0W external braking resistors are damaged is approximately 5.5 min in this case; a maximum surface temperature of approximately 480°C is achieved when this happens.
A lower mains supply voltage on the 8B0P passive power supply module allows a longer maximum time before the 8B0W external braking resistor is damaged, which also results in higher temperatures.
8B0W external braking resistors can be considered intrinsically safe if they are connected to an ACOPOS P3 8EIxxxH... servo drive operated with a mains voltage of at least 3x 480 VAC.

15.3 Wiring

15.3.1 8B0W braking resistors - Pinout

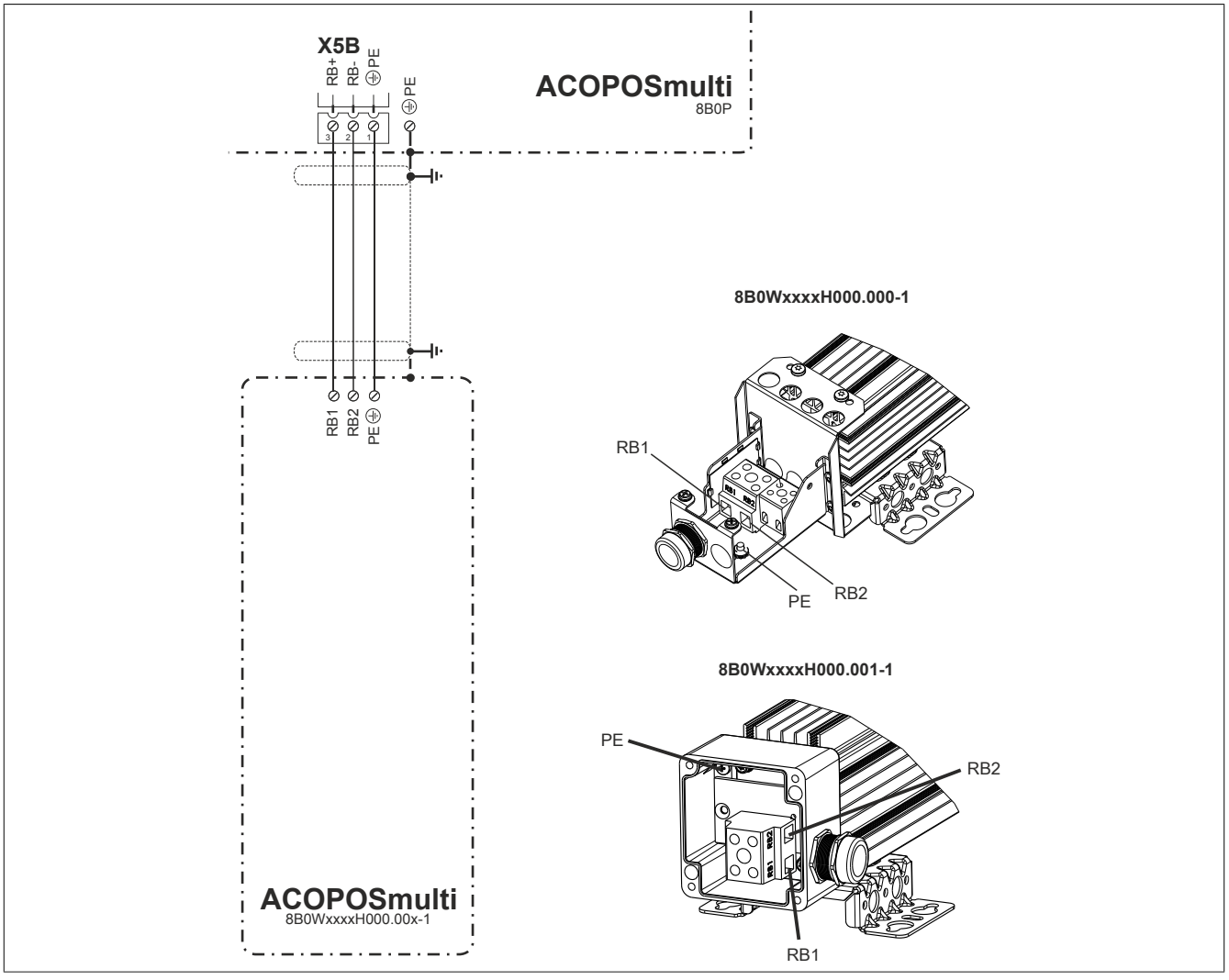


Figure 127: 8B0W - Pinout overview

Information:

8B0W external braking resistors must be wired using connection cables that are suited for maximum line temperatures >90°C.

Shielded cables must be used for wiring!

16 Fan modules

16.1 8B0M0040HFF0.000-1

16.1.1 General information

This fan module is used to cool the ACOPOSmulti drive systems and can be mounted on 8B0MxxxxHFxx.xxx-x mounting plates.

Information:

ACOPOSmulti 8B0MxxxxHF00.xxx-x mounting plates can only be used together with 8B0M0040HF-F0.000-1 fan modules!

For optimal availability of the ACOPOSmulti drive system, the 8B0M0040HFF0.000-1 fan modules must be switched on at all times.

16.1.2 Order data

Model number	Short description	Figure
	Fan modules	
8B0M0040HFF0.000-1	ACOPOSmulti fan module for mounting plate 8B0MxxxxH-F00.xxx-x and 8EMFxxxx000.0000-1	

Table 244: 8B0M0040HFF0.000-1 - Order data

Model number	Number of slots	Number of fan modules
8B0M0040HF00.000-1	4	1
8B0M0080HF00.000-1	8	2
8B0M0120HF00.000-1	12	3
8B0M0160HF00.000-1	16	4
8B0M0200HF00.000-1	20	5

Table 245: Number of required 8B0M0040HFF0.000-1 fan modules depending on mounting plate 8B0M

Information:

X67CA0P10 and X67CA0P20/X67CA0P30 I/O power supply cables can be used to cable 8B0M0040HF-F0.000-1 fan modules. For details, see section "Wiring".

16.1.3 Technical data

Model number	8B0M0040HFF0.000-1
General information	
Short description	ACOPOSmulti fan module for mounting plate 8B0MxxxxHF00.xxx-x
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
24 VDC supply	
Input voltage	24 VDC +15% / -25%
Connection	1x 4-pin female M8 connector 1x 4-pin male M8 connector
Power consumption	32 W
Operating conditions	
Degree of protection per EN 60529	IP54 when connected
Environmental conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C
Storage	-25 to 55°C
Transport	-25 to 70°C
Relative humidity	
Operation	5 to 85%
Storage	5 to 95%
Transport	Max. 95% at 40°C
Mechanical characteristics	
Volume flow	325 m³/h @ 0 Pa 210 Pa @ 0 m³/h 275 m³/h @ 120 Pa
Operating noise	61 dB(A)
Service life	
At 40°C	80,000 h
Dimensions	
Width	200 mm
Height	200 mm
Depth	90 mm
Weight	1.2 kg

Table 246: 8B0M0040HFF0.000-1 - Technical data

16.1.4 Wiring

16.1.4.1 8B0M0040HFF0.000-1

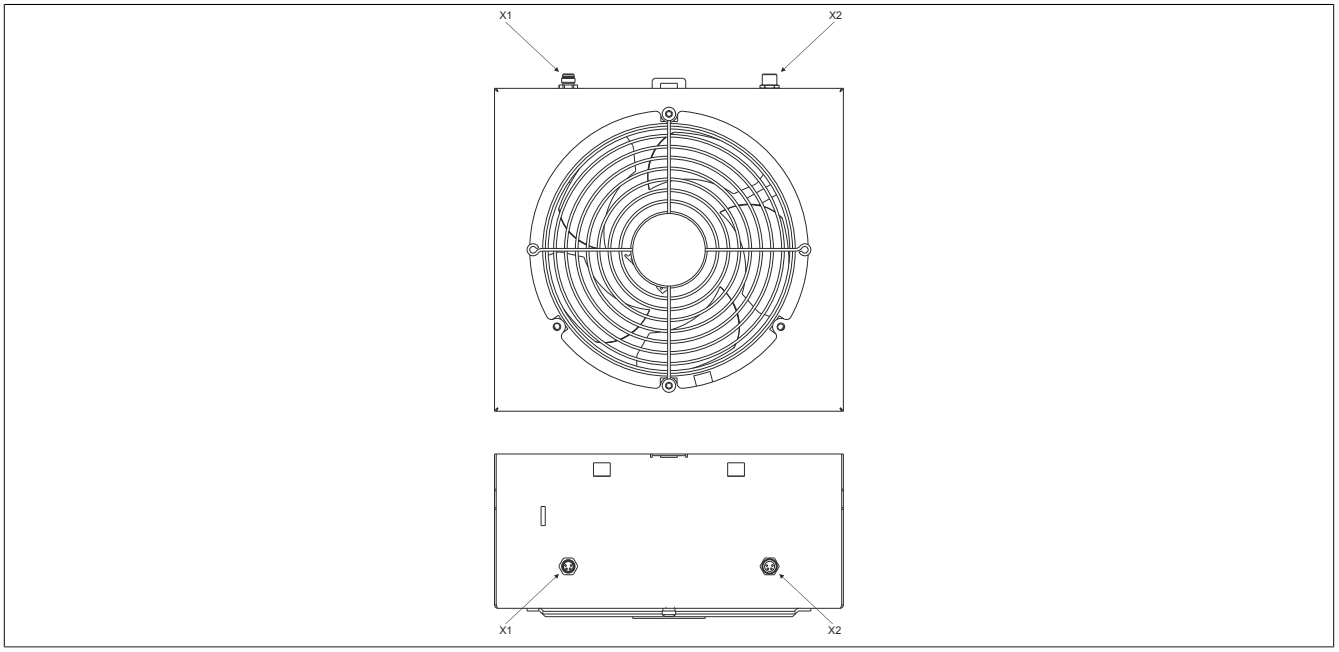


Figure 128: 8B0M0040HFF0.000-1 - Pinout overview

16.1.4.1.1 X1 connector - Pinout

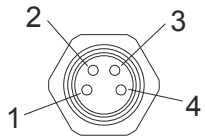
X1	Pin	Name	Function
	1	24 V	Fan supply +24 VDC
	2	24 V	Fan supply +24 VDC
	3	GND	Fan supply GND
	4	GND	Fan supply GND

Table 247: X1 connector - Pinout

16.1.4.1.2 X2 connector - Pinout

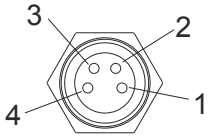
X2	Pin	Name	Function
	1	24 V	Fan supply +24 VDC
	2	24 V	Fan supply +24 VDC
	3	GND	Fan supply GND
	4	GND	Fan supply GND

Table 248: X2 connector - Pinout

16.1.4.1.3 Wiring example

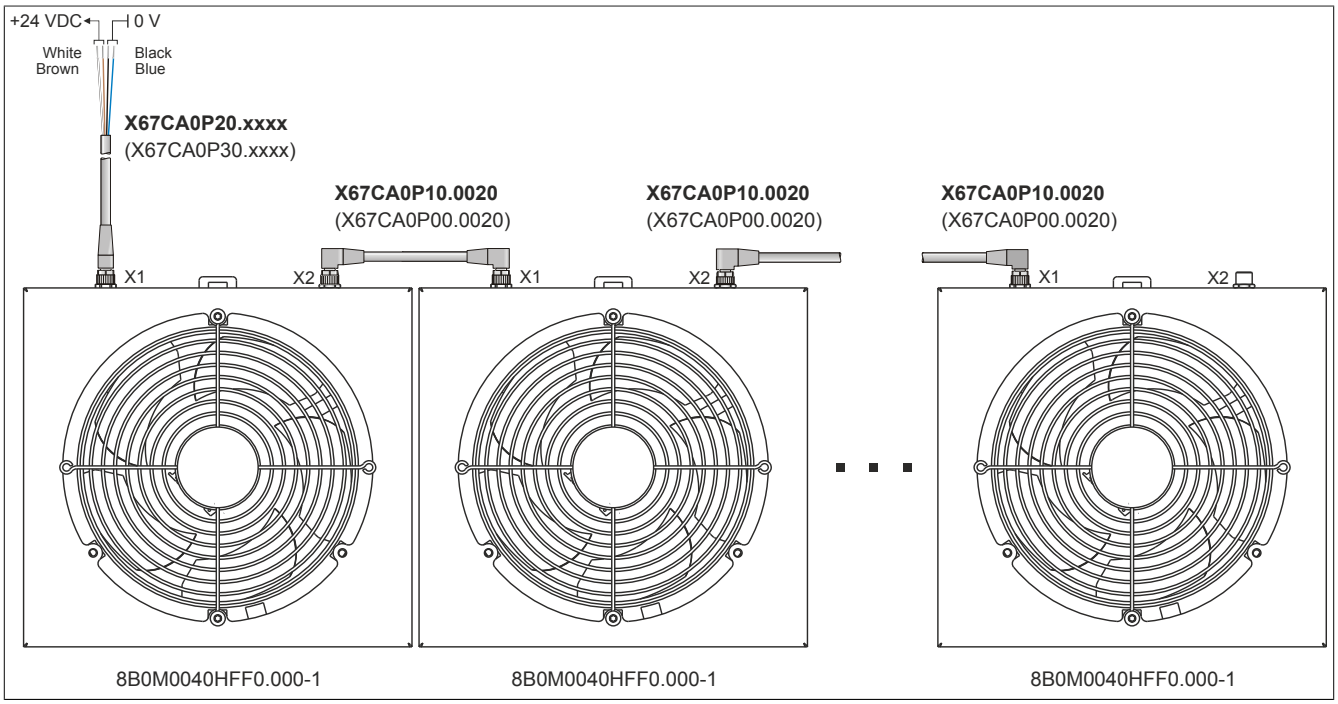


Figure 129: 8B0M0040HFF0.000-1 - Wiring example

Information:

Up to 5 8B0M0040HFF0.000-1 fan modules are permitted to be connected in parallel.

Information:

The 24 VDC power supply for 8B0M0040HFF0.000-1 fan modules can be supplied via the X3 connector on an 8B0C ACOPOSmulti auxiliary supply module.

16.2 8BXF001.0000-00

16.2.1 Order data

Model number	Short description	Figure
	Fan modules	
8BXF001.0000-00	ACOPOSmulti fan module, replacement fan for ACOPOSmulti modules (8BxP / 8B0C / 8BVI / 8BVE / 8B0K)	

Table 249: 8BXF001.0000-00 - Order data

Number of 8BXF001.0000-00 fan modules depending on the module width of the ACOPOSmulti module

ACOPOSmulti module width	Number of 8BXF001.0000-00 fan modules required
1x width	1
2x width	1
4x width	2
8x width	4

Table 250: Number of 8BXF001.0000-00 fan modules depending on the module width of the ACOPOSmulti module

16.2.2 Technical data

Model number	8BXF001.0000-00
General information	
Short description	ACOPOSmulti fan module, replacement fan for ACOPOS-multi modules (8BVP / 8B0C / 8BVI / 8BVE / 8B0K)
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
Mechanical characteristics	
Dimensions	
Width	53 mm
Height	60 mm
Depth	23 mm
Weight	36 g

Table 251: 8BXF001.0000-00 - Technical data

Note:

The 8BXF001.0000-00 fan module is supplied via the respective ACOPOSmulti module.

16.3 8BXF002.0000-00

16.3.1 Order data

Model number	Short description	Figure
	Fan modules	
8BXF002.0000-00	ACOPOSmulti fan module, replacement fan for mounting plate with backplane module, wall mounting (8B0MxxxxHWxx.xxx-x)	

Table 252: 8BXF002.0000-00 - Order data

Number of 8BXF002.0000-00 fan modules depending on the number of slots on the mounting plate

Model number	Number of slots	Number of fan modules
8B0M0020HW00.000-1	2	1
8B0M0030HW00.000-1	3	2
8B0M0040HW00.000-1	4	3
8B0M0050HW00.000-1	5	3
8B0M0060HW00.000-1	6	4
8B0M0070HW00.000-1	7	5
8B0M0080HW00.000-1	8	6
8B0M0090HW00.000-1	9	6
8B0M0100HW00.000-1	10	7
8B0M0110HW00.000-1	11	8
8B0M0120HW00.000-1	12	9
8B0M0130HW00.000-1	13	9
8B0M0140HW00.000-1	14	10
8B0M0150HW00.000-1	15	11
8B0M0160HW00.000-1	16	12
8B0M0170HW00.000-1	17	12
8B0M0180HW00.000-1	18	13
8B0M0190HW00.000-1	19	14
8B0M0200HW00.000-1	20	15
8B0M0210HW00.000-1	21	15
8B0M0220HW00.000-1	22	16
8B0M0230HW00.000-1	23	17
8B0M0240HW00.000-1	24	18
8B0M0250HW00.000-1	25	18
8B0M0260HW00.000-1	26	19
8B0M0270HW00.000-1	27	20

Table 253: Number of 8BXF002.0000-00 fan modules depending on mounting plate 8B0M

16.3.2 Technical data

Model number	8BXF002.0000-00
General information	
Short description	ACOPOSmulti fan module, replacement fan for mounting plate with backplane module, wall mounting (8B0MxxxxHWxx.xxx-x)
Certifications	
CE	Yes
UL	cULus E225616 Power conversion equipment
Mechanical characteristics	
Dimensions	
Width	72 mm
Height	80 mm
Depth	54 mm
Weight	130 g

Table 254: 8BXF002.0000-00 - Technical data

Note:

The 8BXF002.0000-00 fan module is supplied via the 24 VDC rail on the respective 8B0M mounting plate.

17 Cables

17.1 General information

B&R offers the cables for the ACOPOSmulti drive system in up to six different lengths. [17)]

To prevent disturbances to encoder signals, the holding brake and temperature sensor wires are in the motor cable and not in the encoder cable.

17.1.1 Pre-assembled cables

Using B&R cables guarantees that the EMC limits are not exceeded. The cables are assembled in the EU and are therefore subject to the strictest quality standards.

> **Information:**
>
> **When using cables from other manufacturers, B&R cannot guarantee adherence to EMC limit values! The connectors on the cables as well as on the motors are part of a properly functioning EMC concept!**

17.2 8BCM motor cables

17.2.1 0.75 mm² motor cables

> **Information:**
>
> **A shield plate is attached to ACOPOSmulti motor cables. No extra shielding is required if this shield plate is correctly installed on the ACOPOSmulti 8BVI inverter module.**

17.2.1.1 For use in cable drag chains

17.2.1.1.1 Order data

Model number	Short description	Figure
	0.75 mm² motor cables	
8BCM0005.1011A-0	ACOPOSmulti motor cable, length 5 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0007.1011A-0	ACOPOSmulti motor cable, length 7 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0010.1011A-0	ACOPOSmulti motor cable, length 10 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0015.1011A-0	ACOPOSmulti motor cable, length 15 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0020.1011A-0	ACOPOSmulti motor cable, length 20 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0025.1011A-0	ACOPOSmulti motor cable, length 25 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	

Table 255: 8BCM0005.1011A-0, 8BCM0007.1011A-0, 8BCM0010.1011A-0, 8BCM0015.1011A-0, 8BCM0020.1011A-0, 8BCM0025.1011A-0 - Order data

[17)] Custom assembly available upon request. For custom assembly of motor cables, the connector size must be matched to the motor being used!

17.2.1.1.2 Technical data

Model number	8BCM0005.1011A-0	8BCM0007.1011A-0	8BCM0010.1011A-0	8BCM0015.1011A-0	8BCM0020.1011A-0	8BCM0025.1011A-0
General information						
Cable cross section	4x 0.75 mm² + 2x 2x 0.34 mm²					
Durability	Oil resistance per HD 22.10 appendix A, DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	0.34 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil banding					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil banding					
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film					
Outer jacket						
Material	PUR					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 0.75 + 2 x (2x0.34)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 production order number [1]					
Connector						
Type	8-pin female speedtec motor connector, size 1					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	Max. 1000 V AC (UL)					
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤26.7 Ω/km					
Signal lines	≤56 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	13 A					
Installed in conduit or cable duct	11.5 A					
Installed in cable tray	13.5 A					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	10.1 mm ± 0.3 mm					
Bend radius						
Single bend	>32 mm					
Moving	>78 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≤5,000,000					
Speed	Max. 300 m/min					
Weight	0.45 kg	0.62 kg	0.89 kg	1.34 kg	1.78 kg	2.23 kg

Table 256: 8BCM0005.1011A-0, 8BCM0007.1011A-0, 8BCM0010.1011A-0, 8BCM0015.1011A-0, 8BCM0020.1011A-0, 8BCM0025.1011A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

17.2.1.2 Not for use in cable drag chains

17.2.1.2.1 Order data

Model number	Short description	Figure
	0.75 mm² motor cables	
8BCM0005.3011A-0	ACOPOSmulti motor cable, length 5 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0007.3011A-0	ACOPOSmulti motor cable, length 7 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0010.3011A-0	ACOPOSmulti motor cable, length 10 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0015.3011A-0	ACOPOSmulti motor cable, length 15 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0020.3011A-0	ACOPOSmulti motor cable, length 20 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0025.3011A-0	ACOPOSmulti motor cable, length 25 m, 4x 0.75 mm² + 2x 2x 0.34 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	

Table 257: 8BCM0005.3011A-0, 8BCM0007.3011A-0, 8BCM0010.3011A-0, 8BCM0015.3011A-0, 8BCM0020.3011A-0, 8BCM0025.3011A-0 - Order data

17.2.1.2.2 Technical data

Model number	8BCM0005. 3011A-0	8BCM0007. 3011A-0	8BCM0010. 3011A-0	8BCM0015. 3011A-0	8BCM0020. 3011A-0	8BCM0025. 3011A-0
General information						
Cable cross section	4x 0.75 mm² + 2x 2x 0.34 mm²					
Durability	Oil resistance TM5 per VDE 0281 Part 1 / HD21.1 Flame resistance per IEC 60332-1-2 / UL 2556 (VW-1) / CSA C22.2 No. 210.2 (FT-1) [1]					
Certification	UL Style 2570 80°C 1000 V VW-1 E130266 and cUL AWM I/II A/B 80°C 1000 V FT-1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	0.34 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Complete shielding	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	PVC					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4x0,75+2x2x0,34 XX/YYYY E130266 cURus AWM STYLE 2570 I/II A/B 80°C 1000 V FT-1 [1][2]					
Connector						
Type	8-pin female speedtec motor connector, size 1					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	3 kV					

Table 258: 8BCM0005.3011A-0, 8BCM0007.3011A-0, 8BCM0010.3011A-0, 8BCM0015.3011A-0, 8BCM0020.3011A-0, 8BCM0025.3011A-0 - Technical data

Model number	8BCM0005.3011A-0	8BCM0007.3011A-0	8BCM0010.3011A-0	8BCM0015.3011A-0	8BCM0020.3011A-0	8BCM0025.3011A-0
Conductor resistance						
Power lines	≤58.3 Ω/km					
Signal lines	≤26.7 Ω/km					
Insulation resistance	≥100 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	9.8 A					
Installed in conduit or cable duct	8.5 A					
Installed in cable tray	10.4 A					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	10.6 mm ± 0.4 mm					
Bend radius						
Single bend	>55 mm					
Moving	≥165 mm					
Weight	0.5 kg	0.6 kg	0.9 kg	1.3 kg	1.8 kg	2.2 kg

Table 258: 8BCM0005.3011A-0, 8BCM0007.3011A-0, 8BCM0010.3011A-0, 8BCM0015.3011A-0, 8BCM0020.3011A-0, 8BCM0025.3011A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) XX ... Week of manufacture, YYYY ... Year of manufacture

17.2.2 1.5 mm² motor cables

Information:

A shield plate is attached to ACOPOSmulti motor cables. No extra shielding is required if this shield plate is correctly installed on the ACOPOSmulti 8BVI inverter module.

17.2.2.1 For use in cable drag chains

17.2.2.1.1 Order data

Model number	Short description	Figure
	1.5 mm² motor cables	
8BCM0005.1111A-0	ACOPOSmulti motor cable, length 5 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0007.1111A-0	ACOPOSmulti motor cable, length 7 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0010.1111A-0	ACOPOSmulti motor cable, length 10 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0015.1111A-0	ACOPOSmulti motor cable, length 15 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0020.1111A-0	ACOPOSmulti motor cable, length 20 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0025.1111A-0	ACOPOSmulti motor cable, length 25 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	

Table 259: 8BCM0005.1111A-0, 8BCM0007.1111A-0, 8BCM0010.1111A-0, 8BCM0015.1111A-0, 8BCM0020.1111A-0, 8BCM0025.1111A-0 - Order data

17.2.2.1.2 Technical data

Model number	8BCM0005. 1111A-0	8BCM0007. 1111A-0	8BCM0010. 1111A-0	8BCM0015. 1111A-0	8BCM0020. 1111A-0	8BCM0025. 1111A-0
General information						
Cable cross section	4x 1.5 mm² + 2x 2x 0.75 mm²					
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	1.5 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil banding					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil banding					
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 1.5 + 2 x (2x0,75)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 production order number [1]					
Connector						
Type	8-pin female speedtec motor connector, size 1					

Table 260: 8BCM0005.1111A-0, 8BCM0007.1111A-0, 8BCM0010.1111A-0, 8BCM0015.1111A-0, 8BCM0020.1111A-0, 8BCM0025.1111A-0 - Technical data

Model number	8BCM0005.1111A-0	8BCM0007.1111A-0	8BCM0010.1111A-0	8BCM0015.1111A-0	8BCM0020.1111A-0	8BCM0025.1111A-0
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	Max. 1000 V AC (UL)					
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤13.7 Ω/km					
Signal lines	≤26.7 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	20 A					
Installed in conduit or cable duct	17.8 A					
Installed in cable tray	20.9 A					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	12.2 mm ± 0.3 mm					
Bend radius						
Single bend	>38 mm					
Moving	>94 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≤5,000,000					
Speed	Max. 300 m/min					
Weight	0.7 kg	1.04 kg	1.5 kg	2.2 kg	2.9 kg	3.7 kg

Table 260: 8BCM0005.1111A-0, 8BCM0007.1111A-0, 8BCM0010.1111A-0, 8BCM0015.1111A-0, 8BCM0020.1111A-0, 8BCM0025.1111A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

17.2.2.2 Not for use in cable drag chains

17.2.2.2.1 Order data

Model number	Short description	Figure
	Motor cables 1,5 mm²	
8BCM0005.3111A-0	ACOPOSmulti motor cable, length 5 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0007.3111A-0	ACOPOSmulti motor cable, length 7 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0010.3111A-0	ACOPOSmulti motor cable, length 10 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0015.3111A-0	ACOPOSmulti motor cable, length 15 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0020.3111A-0	ACOPOSmulti motor cable, length 20 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0025.3111A-0	ACOPOSmulti motor cable, length 25 m, 4x 1.5 mm² + 2x 2x 0.75 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	

Table 261: 8BCM0005.3111A-0, 8BCM0007.3111A-0, 8BCM0010.3111A-0, 8BCM0015.3111A-0, 8BCM0020.3111A-0, 8BCM0025.3111A-0 - Order data

17.2.2.2.2 Technical data

Model number	8BCM0005. 3111A-0	8BCM0007. 3111A-0	8BCM0010. 3111A-0	8BCM0015. 3111A-0	8BCM0020. 3111A-0	8BCM0025. 3111A-0
General information						
Cable cross section	4x 1.5 mm² + 2x 2x 0.75 mm²					
Durability	Oil resistance TM5 per VDE 0281 Part 1 / HD21.1 Flame resistance per IEC 60332-1-2 / UL 2556 (VW-1) / CSA C22.2 No. 2556 (FT-1) [1]					
Certification	E130266 cRUus AWM STYLE 2570 I/II A/B 80°C 1000 V FT-1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	1.5 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Complete shielding	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	PVC					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4x1.5+2x2x0.75 XX/YYYY E130266 cURus AWM STYLE 2570 I/II A/B 80°C 1000 V FT-1 [1][2]					
Connector						
Type	8-pin female speedtec motor connector, size 1					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	3 kV					

Table 262: 8BCM0005.3111A-0, 8BCM0007.3111A-0, 8BCM0010.3111A-0, 8BCM0015.3111A-0, 8BCM0020.3111A-0, 8BCM0025.3111A-0 - Technical data

Model number	8BCM0005.3111A-0	8BCM0007.3111A-0	8BCM0010.3111A-0	8BCM0015.3111A-0	8BCM0020.3111A-0	8BCM0025.3111A-0
Conductor resistance						
Power lines	≤13.7 Ω/km					
Signal lines	≤26.7 Ω/km					
Insulation resistance	≥100 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	15.2 A					
Installed in conduit or cable duct	13.1 A					
Installed in cable tray	16.1 A					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	12.3 mm ± 0.4 mm					
Bend radius						
Single bend	>64 mm					
Moving	≥190 mm					
Weight	1.2 kg	1.6 kg	2.3 kg	3.5 kg	4.6 kg	5.8 kg

Table 262: 8BCM0005.3111A-0, 8BCM0007.3111A-0, 8BCM0010.3111A-0, 8BCM0015.3111A-0, 8BCM0020.3111A-0, 8BCM0025.3111A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) XX ... Week of manufacture, YYYY ... Year of manufacture

17.2.3 4 mm² motor cables

Information:

A shield plate is attached to ACOPOSmulti motor cables. No extra shielding is required if this shield plate is correctly installed on the ACOPOSmulti 8BVI inverter module.

17.2.3.1 For use in cable drag chains

17.2.3.1.1 Order data

Model number	Short description	Figure
	4 mm² motor cables	
8BCM0005.1312A-0	ACOPOSmulti motor cable, length 5 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0007.1312A-0	ACOPOSmulti motor cable, length 7 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0010.1312A-0	ACOPOSmulti motor cable, length 10 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0015.1312A-0	ACOPOSmulti motor cable, length 15 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0020.1312A-0	ACOPOSmulti motor cable, length 20 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0025.1312A-0	ACOPOSmulti motor cable, length 25 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, can be used in cable drag chains, UL/CSA listed	

Table 263: 8BCM0005.1312A-0, 8BCM0007.1312A-0, 8BCM0010.1312A-0, 8BCM0015.1312A-0, 8BCM0020.1312A-0, 8BCM0025.1312A-0 - Order data

17.2.3.1.2 Technical data

Model number	8BCM0005.1312A-0	8BCM0007.1312A-0	8BCM0010.1312A-0	8BCM0015.1312A-0	8BCM0020.1312A-0	8BCM0025.1312A-0
General information						
Cable cross section	4 x 4.0 mm² + 2 x 0.75 mm² + 2 x 1.0 mm²					
Durability	Oil resistance per HD 22.10 appendix A and DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	4 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	2 x 0.75 mm² + 2 x 1.0 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil banding					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil banding					
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film					

Table 264: 8BCM0005.1312A-0, 8BCM0007.1312A-0, 8BCM0010.1312A-0, 8BCM0015.1312A-0, 8BCM0020.1312A-0, 8BCM0025.1312A-0 - Technical data

Model number	8BCM0005.1312A-0	8BCM0007.1312A-0	8BCM0010.1312A-0	8BCM0015.1312A-0	8BCM0020.1312A-0	8BCM0025.1312A-0
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 4 + (2x0.75)C + (2x1)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	8-pin female speedtec motor connector, size 1					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	Max. 1000 V AC (UL)					
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤5.1 Ω/km					
Signal lines	0.75 mm²: ≤26.7 Ω/km, 1 mm²: ≤20 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	30 A [2]					
Installed in conduit or cable duct	30 A [2]					
Installed in cable tray	30 A [2]					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	15.4 mm ± 0.4 mm					
Bend radius						
Single bend	>48 mm					
Moving	>119 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [3]	≤5,000,000					
Speed	Max. 300 m/min					
Weight	1.4 kg	1.9 kg	2.8 kg	4.2 kg	5.5 kg	6.9 kg

Table 264: 8BCM0005.1312A-0, 8BCM0007.1312A-0, 8BCM0010.1312A-0, 8BCM0015.1312A-0, 8BCM0020.1312A-0, 8BCM0025.1312A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Limited to 30 A by the motor connector.
3) At an ambient temperature from -20°C to +60°C.

17.2.3.2 Not for use in cable drag chains

17.2.3.2.1 Order data

Model number	Short description	Figure
	4 mm² motor cables	
8BCM0005.3312A-0	ACOPOSmulti motor cable, length 5 m, 4x 4 mm² + 2x 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0007.3312A-0	ACOPOSmulti motor cable, length 7 m, 4x 4 mm² + 2x 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0010.3312A-0	ACOPOSmulti motor cable, length 10 m, 4x 4 mm² + 2x 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	
8BCM0015.3312A-0	ACOPOSmulti motor cable, length 15 m, 4x 4 mm² + 2x 2x 1 mm², 8-pin female speedtec motor connector, size 1, integrated shield plate, UL/CSA listed	

Table 265: 8BCM0005.3312A-0, 8BCM0007.3312A-0, 8BCM0010.3312A-0, 8BCM0015.3312A-0 - Order data

17.2.3.2.2 Technical data

Model number	8BCM0005.3312A-0	8BCM0007.3312A-0	8BCM0010.3312A-0	8BCM0015.3312A-0
General information				
Cable cross section	4x 4 mm² + 2x 2x 1 mm² VZN (C)			
Durability	Oil resistance TM5 per VDE 0281 Part 1 / HD21.1 Flame resistance per IEC 60332-1-2 / UL 2556 (VW-1) / CSA C22.2 No. 2556 (FT-1) [1]			
Certification	E130266 cRUus AWM STYLE I/II A/B 80°C 1000 V FT1 [1]			
Certifications				
CE	Yes			
UL	cULus E225616 Power conversion equipment			
Cable construction				
Power lines				
Quantity	4			
Wire insulation	PP			
Wire colors	Black, brown, blue, yellow/green			
Design	Tinned copper stranded wire			
Cross section	4 mm²			
Shield	No			
Stranding	No			
Signal lines				
Quantity	4			
Wire insulation	PP			
Wire colors	White, white/red, white/blue, white/green			
Design	Tinned copper stranded wire			
Cross section	1 mm²			
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil banding			
Stranding	White with white/red and white/blue with white/green			
Cable stranding	With filler elements and foil banding			
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film			
Outer jacket				
Material	PVC			
Color	Orange, similar to RAL 2003 flat			
Labeling	B&R 4x4,0+2x2x1,0 XX/YYYY E130266 cURus AWM STYLE 2570 I/II A/B 80°C 1000 V FT-1 [2]			
Connector				
Type	8-pin female speedtec motor connector, size 1			
Connection cycles	<500			
Contacts	8 (4 power and 4 signal contacts)			
Degree of protection per EN 60529	IP66/67 when connected			
Electrical characteristics [1]				
Test voltage				
Wire/Wire	4 kV			
Wire/Shield	3 kV			
Conductor resistance				
Power lines	≤5.1 Ω/km			
Signal lines	≤20 Ω/km			
Insulation resistance	≥100 MΩ*km			
Current-carrying capacity per DIN VDE 0298 part 4, table 11				
Wall mounting	28 A			
Installed in conduit or cable duct	23 A			
Installed in cable tray	30 A			
Environmental conditions [1]				
Temperature				
Moving	-20°C to +80°C			
Static	-20°C to +90°C			
Mechanical characteristics [1]				
Dimensions				
Length	5 m	7 m	10 m	15 m
Diameter	15.6 mm ± 0.6 mm			
Bend radius				
Single bend	>81 mm			
Moving	≥243 mm			
Weight	2 kg	2.8 kg	4 kg	6 kg

Table 266: 8BCM0005.3312A-0, 8BCM0007.3312A-0, 8BCM0010.3312A-0, 8BCM0015.3312A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) XX ... Week of manufacture; YYYY ... Year of manufacture

17.2.4 4 mm² motor cables with motor plug, size 1.5

Information:

A shield plate is attached to ACOPOSmulti motor cables. No extra shielding is required if this shield plate is correctly installed on the ACOPOSmulti 8BVI inverter module.

17.2.4.1 Order data

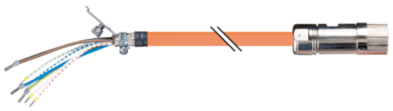
Model number	Short description	Figure
	4 mm² motor cables with motor plug, size 1.5	
8BCM0005.1322A-0	ACOPOSmulti motor cable, length 5 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0007.1322A-0	ACOPOSmulti motor cable, length 7 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0010.1322A-0	ACOPOSmulti motor cable, length 10 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0015.1322A-0	ACOPOSmulti motor cable, length 15 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0020.1322A-0	ACOPOSmulti motor cable, length 20 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0025.1322A-0	ACOPOSmulti motor cable, length 25 m, 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	

Table 267: 8BCM0005.1322A-0, 8BCM0007.1322A-0, 8BCM0010.1322A-0, 8BCM0015.1322A-0, 8BCM0020.1322A-0, 8BCM0025.1322A-0 - Order data

17.2.4.2 Technical data

Model number	8BCM0005. 1322A-0	8BCM0007. 1322A-0	8BCM0010. 1322A-0	8BCM0015. 1322A-0	8BCM0020. 1322A-0	8BCM0025. 1322A-0
General information						
Cable cross section	4 x 4.0 mm² + 2 x 0.75 mm² + 2 x 1.0 mm²					
Durability	Oil resistance per HD 22.10 appendix A and DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	4 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	2 x 0.75 mm² + 2 x 1.0 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Complete shielding	Tinned copper braiding, optical coverage >85% with foil shield					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 4 + (2x0.75)C + (2x1)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					

Table 268: 8BCM0005.1322A-0, 8BCM0007.1322A-0, 8BCM0010.1322A-0, 8BCM0015.1322A-0, 8BCM0020.1322A-0, 8BCM0025.1322A-0 - Technical data

Model number	8BCM0005.1322A-0	8BCM0007.1322A-0	8BCM0010.1322A-0	8BCM0015.1322A-0	8BCM0020.1322A-0	8BCM0025.1322A-0
Connector						
Type	8-pin female speedtec motor connector, size 1.5					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	Max. 1000 V AC (UL)					
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤5.1 Ω/km					
Signal lines	0.75 mm²: ≤26.7 Ω/km, 1 mm²: ≤20 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	30 A [2]					
Installed in conduit or cable duct	30 A [2]					
Installed in cable tray	30 A [2]					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	15.4 mm ± 0.4 mm					
Bend radius						
Single bend	>48 mm					
Moving	>119 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [3]	≤5,000,000					
Speed	Max. 300 m/min					
Weight	1.4 kg	1.9 kg	2.8 kg	4.2 kg	5.5 kg	6.9 kg

Table 268: 8BCM0005.1322A-0, 8BCM0007.1322A-0, 8BCM0010.1322A-0, 8BCM0015.1322A-0, 8BCM0020.1322A-0, 8BCM0025.1322A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Limited to 30 A by the motor connector.
3) At an ambient temperature from -20°C to +60°C.

17.2.5 10 mm² motor cables

Information:

A shield plate is attached to ACOPOSmulti motor cables. No extra shielding is required if this shield plate is correctly installed on the ACOPOSmulti 8BVI inverter module.

Information:

An 8SCS007.0000-00 shield set is required to mount 10 mm² motor cables!

17.2.5.1 Order data

Model number	Short description	Figure
	10 mm² motor cables	
8BCM0005.1523A-0	ACOPOSmulti motor cable, length 5 m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0007.1523A-0	ACOPOSmulti motor cable, length 7 m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0010.1523A-0	ACOPOSmulti motor cable, length 10 m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0015.1523A-0	ACOPOSmulti motor cable, length 15 m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0020.1523A-0	ACOPOSmulti motor cable, length 20 m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCM0025.1523A-0	ACOPOSmulti motor cable, length 25 m, 4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm², 8-pin female speedtec motor connector, size 1.5, integrated shield plate, can be used in cable drag chains, UL/CSA listed	

Table 269: 8BCM0005.1523A-0, 8BCM0007.1523A-0, 8BCM0010.1523A-0, 8BCM0015.1523A-0, 8BCM0020.1523A-0, 8BCM0025.1523A-0 - Order data

17.2.5.2 Technical data

Model number	8BCM0005. 1523A-0	8BCM0007. 1523A-0	8BCM0010. 1523A-0	8BCM0015. 1523A-0	8BCM0020. 1523A-0	8BCM0025. 1523A-0
General information						
Cable cross section	4x 10 mm² + (2x 0.75 mm²)C + (2x 1.5 mm²)C					
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1)]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1)]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	10 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	2x 0.75 mm² + 2x 1.5 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					

Table 270: 8BCM0005.1523A-0, 8BCM0007.1523A-0, 8BCM0010.1523A-0, 8BCM0015.1523A-0, 8BCM0020.1523A-0, 8BCM0025.1523A-0 - Technical data

Model number	8BCM0005.1523A-0	8BCM0007.1523A-0	8BCM0010.1523A-0	8BCM0015.1523A-0	8BCM0020.1523A-0	8BCM0025.1523A-0
Complete shielding	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 10 + (2x0.75)C + (2x1.5)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	8-pin female speedtec motor connector, size 1.5					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	Max. 1000 V AC (UL)					
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤2 Ω/km					
Signal lines	0.75 mm²: ≤26.7 Ω/km, 1.5 mm²: ≤13.7 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	64.6 A					
Installed in conduit or cable duct	54.6 A					
Installed in cable tray	68.3 A					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	20.1 mm ± 0.4 mm					
Bend radius						
Single bend	>62 mm					
Moving	>154 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≤5,000,000					
Speed	Max. 300 m/min					
Weight	2.7 kg	3.8 kg	5.4 kg	8.1 kg	10.8 kg	13.5 kg

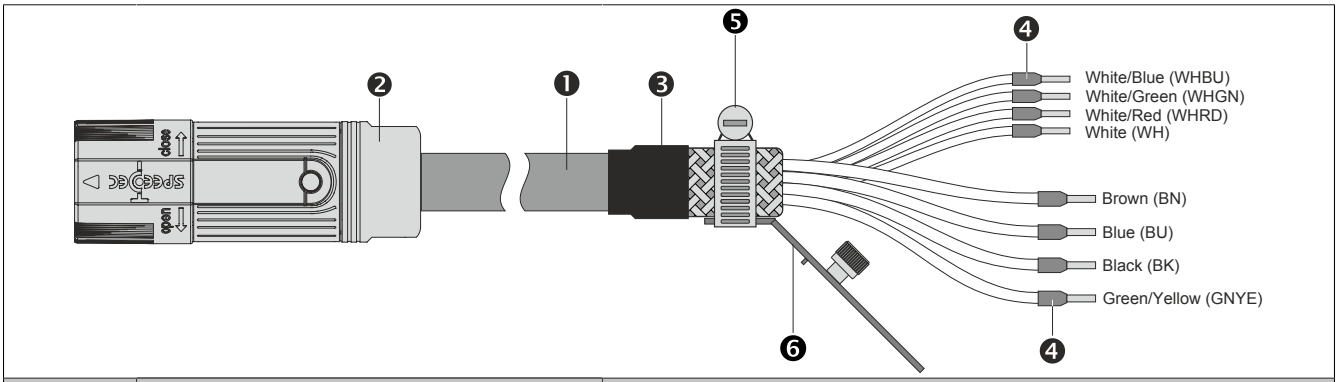
Table 270: 8BCM0005.1523A-0, 8BCM0007.1523A-0, 8BCM0010.1523A-0, 8BCM0015.1523A-0, 8BCM0020.1523A-0, 8BCM0025.1523A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

17.2.6 Wiring

17.2.6.1 0.75 mm² - 4 mm² motor cables

Construction



Pos.	Name	Note
1	Motor line	4x 0.75 mm² + 2x 2x 0.34 mm² (8BCMxxxx.1011A-0) 4x 1.5 mm² + 2x 2x 0.75 mm² (8BCMxxxx.1111A-0) 4x 4 mm² + 2x 0.75 mm² + 2x 1 mm² (8BCMxxxx.1312A-0)
2	8-pin female circular connector	
3	Heat shrink tubing	
4	Wire end sleeves	
5	Cable clamp	
6	Shield plate	

Table 271: 0.75 mm² - 4 mm² motor cables - Construction

Pinout

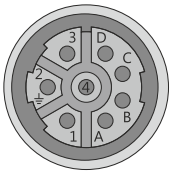
Circular connector	Pin	Name	Function
	1	U	Motor connection U
	4	V	Motor connection V
	3	W	Motor connection W
	2	PE	Protective ground conductor
	A	T+	Temperature +
	B	T-	Temperature -
	C	B+	Brake +
	D	B-	Brake -

Table 272: 0.75 mm² - 4 mm² motor cables - Pinout

Cable diagram

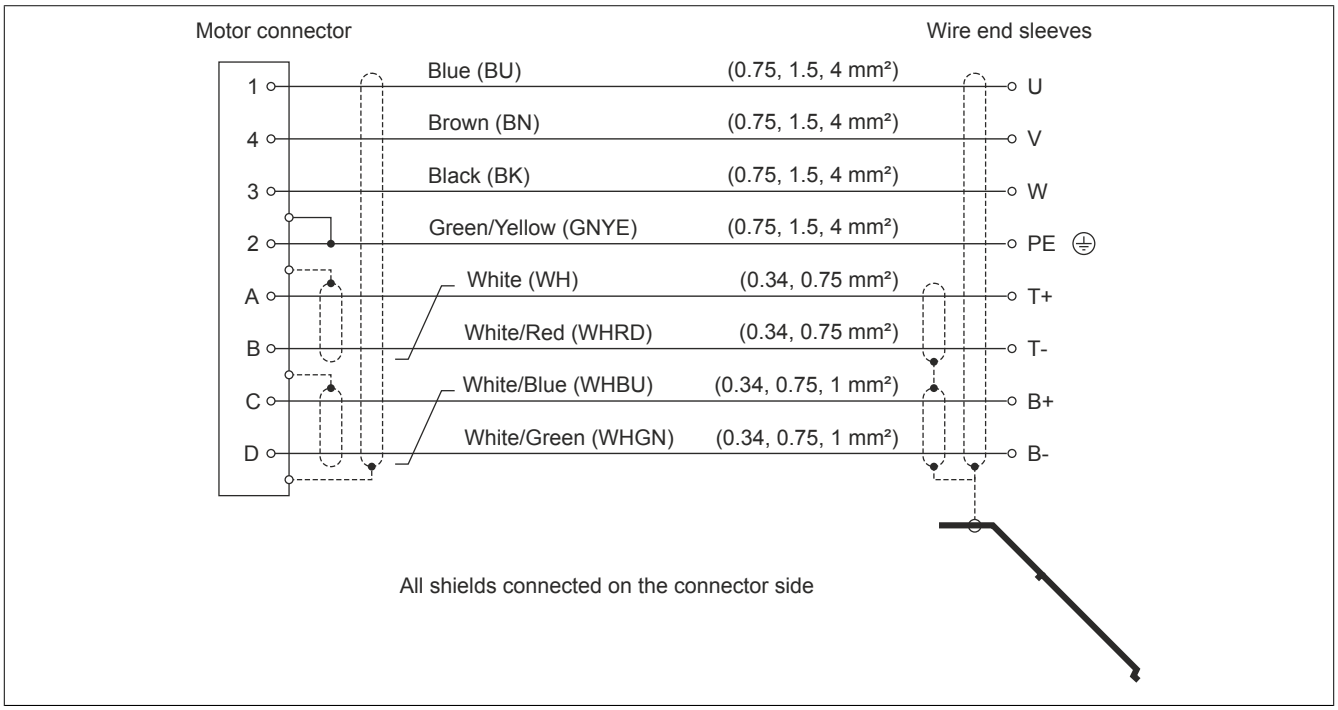
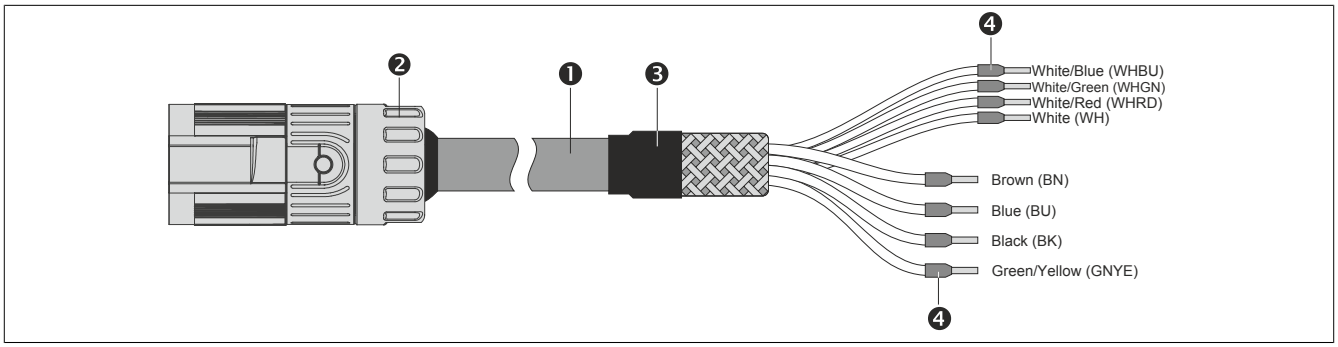


Figure 130: 0.75 mm² - 4 mm² motor cables - Cable diagram

17.2.6.2 Motor cable, 0.75 mm² male springtec connector

17.2.6.2.1 Cable construction



Pos.	Name	Note
1	Motor cable	4x 0.75 mm² + 2x 2x 034 mm²
2	8-pin female motor connector	
3	Heat shrink tubing	
4	Wire end sleeves	

Table 273: 0.75 mm² motor cables - Cable construction

17.2.6.2.2 Pinout

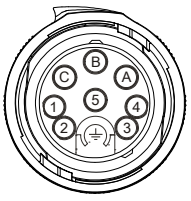
Male connector	Pin	Name	Function
	A	U	Motor connection U
	B	V	Motor connection V
	C	W	Motor connection W
	D	PE	Protective ground conductor
	1	T+	Temperature +
	2	T-	Temperature -
	3	B+	Brake +
	4	B-	Brake -
	5	---	---

Table 274: 0.75 mm² motor cables - Pinout

17.2.6.2.3 Cable diagram

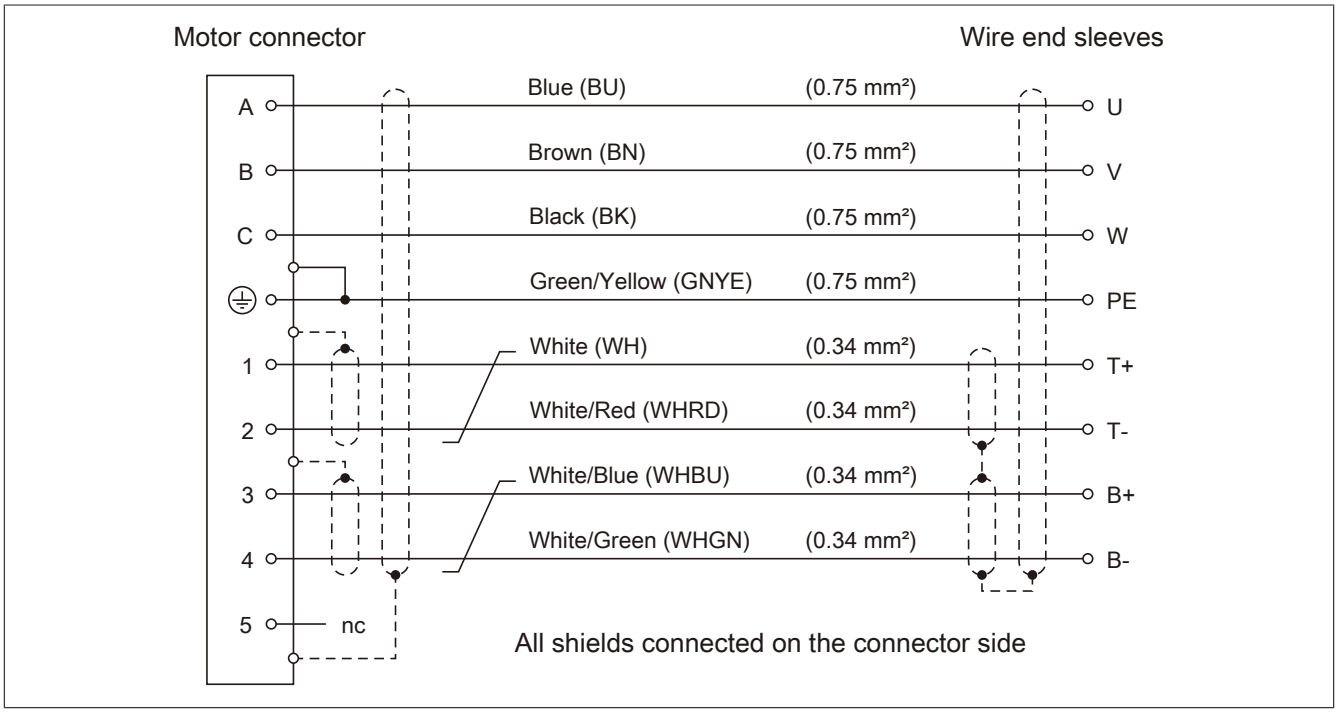
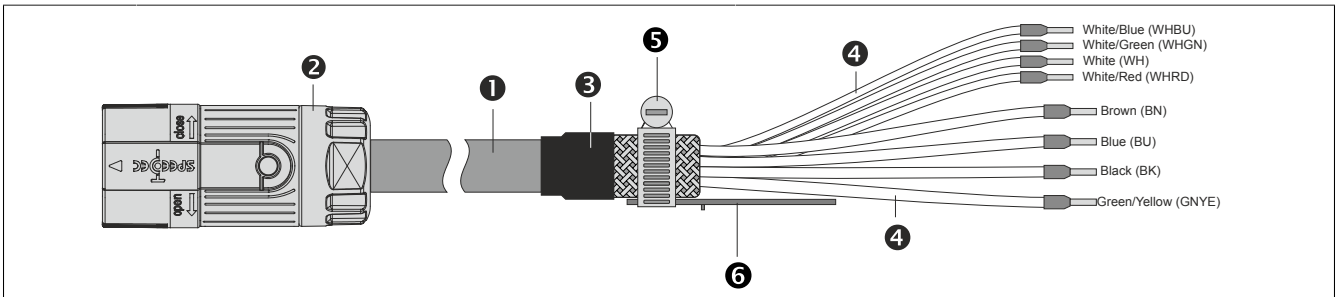


Figure 131: 0.75 mm² motor cables - Cable diagram

17.2.6.3 10 mm² motor cables

Design



Pos.	Name	Note
1	Motor line	4x 10 mm² + 2x 0.75 mm² + 2x 1.5 mm²
2	8-pin female circular connector	
3	Heat shrink tubing	
4	Wire end sleeves	
5	Cable clamp	
6	Shield plate	

Table 275: 10 mm² motor cables - Construction

Pinout

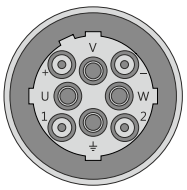
Circular connector	Pin	Name	Function
	U	U	Motor connection U
	⏚	PE	Protective ground conductor
	W	W	Motor connection W
	V	V	Motor connection V
	1	T+	Temperature +
	2	T-	Temperature -
	+	B+	Brake +
	-	B-	Brake -

Table 276: 10 mm² motor cables - Pinout

Cable diagram

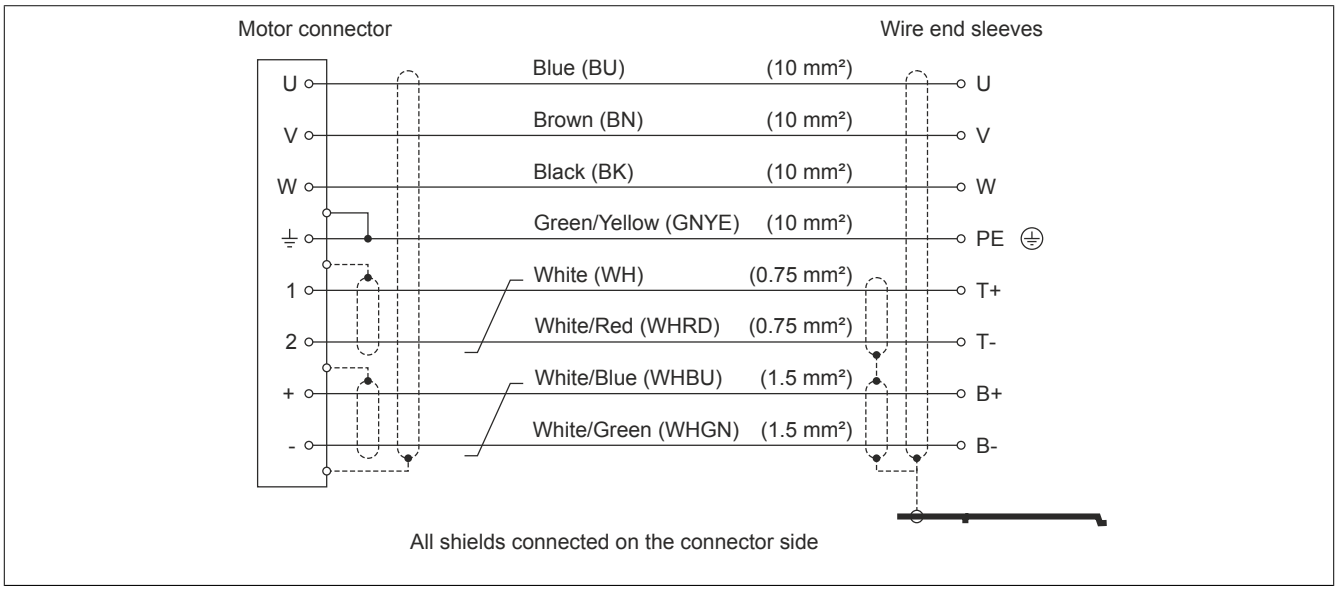


Figure 132: 10 mm² motor cables - Cable diagram

17.3 8BCH hybrid motor cables

17.3.1 1.5 mm² hybrid motor cable

- UL/CSA certified
- Can be used in cable drag chains
- Motor and encoder lines in one cable
- Assembled specifically for use with ACOPOSmulti drive systems and B&R servo motors with option "Single-cable solution (hybrid)"
- speedtec - Innovative connector system for secure connections
- Integrated shield plate

Information:

A shield plate is attached to ACOPOSmulti 8BCH hybrid motor cables. No extra shielding is required if this shield plate is correctly installed on the ACOPOSmulti 8BVI inverter module.

17.3.1.1 Order data

Model number	Short description	Figure
	1.5 mm² hybrid motor cable	
8BCH0005.1111A-0	ACOPOSmulti hybrid motor cable, length 5 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0007.1111A-0	ACOPOSmulti hybrid motor cable, length 7 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0010.1111A-0	ACOPOSmulti hybrid motor cable, length 10 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0015.1111A-0	ACOPOSmulti hybrid motor cable, length 15 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0020.1111A-0	ACOPOSmulti hybrid motor cable, length 20 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0025.1111A-0	ACOPOSmulti hybrid motor cable, length 25 m, 4x 1.5 mm² + 2x 0.75 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	

Table 277: 8BCH0005.1111A-0, 8BCH0007.1111A-0, 8BCH0010.1111A-0, 8BCH0015.1111A-0, 8BCH0020.1111A-0, 8BCH0025.1111A-0 - Order data

17.3.1.2 Technical data

Model number	8BCH0005. 1111A-0	8BCH0007. 1111A-0	8BCH0010. 1111A-0	8BCH0015. 1111A-0	8BCH0020. 1111A-0	8BCH0025. 1111A-0
General information						
Cable cross section	4x 1.5 mm² + 2x 0.75 mm² + (2x 1x 0.30 mm² + 2x 2x 0.15 mm²)					
Durability	Oil resistance per EN 60811-2-1 [1)]					
Certification	UL AWM Style 21223, 80°C, 1000 V as well as CSA C22.2 No. 210 I/II A/B FT1 [1)]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Copper stranded wire					
Cross section	1.5 mm²					
Shield	No					
Stranding	No					

Table 278: 8BCH0005.1111A-0, 8BCH0007.1111A-0, 8BCH0010.1111A-0, 8BCH0015.1111A-0, 8BCH0020.1111A-0, 8BCH0025.1111A-0 - Technical data

Model number	8BCH0005. 1111A-0	8BCH0007. 1111A-0	8BCH0010. 1111A-0	8BCH0015. 1111A-0	8BCH0020. 1111A-0	8BCH0025. 1111A-0
Supply lines						
Quantity	2					
Wire insulation	PP					
Wire colors	White/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	6					
Wire insulation	PP					
Wire colors	Brown/Green, white/green, gray/pink, yellow/violet					
Design	2x copper stranded wire, 4x tinned copper stranded wire					
Cross section	2x 0.30 mm², 4x 0.15 mm²					
Shield	Tinned copper braiding, optical coverage >85% and wrapped in foil shield					
Stranding	Brown/green with white/green, pink with gray and yellow with violet					
Cable stranding	With filler elements and foil banding					
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film					
Outer jacket						
Material	PUR					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4x1.5 + 2x0.75 + (2x2xAWG26 + 2x1xAWG23) * E130266 * cRUus AWM STYLE 21223 * AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	13-pin female speedtec hybrid motor connector					
Connection cycles	<500					
Contacts	13					
Additional connectors	9-pin male DSUB connector Connection cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤13.3 Ω/km					
Supply lines	≤26 Ω/km					
Signal lines	0.30 mm²: ≤68 Ω/km, 0.15 mm²: ≤140 Ω/km					
Insulation resistance	≥200 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	20.2 A					
Installed in conduit or cable duct	17.8 A					
Installed in cable tray	20.9 A					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +90°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	13 mm ± 0.4 mm					
Bend radius						
Single bend	>54 mm					
Moving	≥100 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles	≤3,000,000					
Speed	Max. 300 m/min					
Weight	1.2 kg	1.7 kg	2.4 kg	3.6 kg	4.8 kg	6 kg

Table 278: 8BCH0005.1111A-0, 8BCH0007.1111A-0, 8BCH0010.1111A-0, 8BCH0015.1111A-0, 8BCH0020.1111A-0, 8BCH0025.1111A-0 - Technical data

1) Specified values refer to the raw cable being used.

17.3.2 4 mm² hybrid motor cable

17.3.2.1 Order data

Model number	Short description	Figure
	4 mm² hybrid motor cable	
8BCH0005.1312A-0	ACOPOSmulti hybrid motor cable, length 5 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0007.1312A-0	ACOPOSmulti hybrid motor cable, length 7 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0010.1312A-0	ACOPOSmulti hybrid motor cable, length 10 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0015.1312A-0	ACOPOSmulti hybrid motor cable, length 15 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0020.1312A-0	ACOPOSmulti hybrid motor cable, length 20 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	
8BCH0025.1312A-0	ACOPOSmulti hybrid motor cable, length 25 m, 4x 4 mm² + 2x 1 mm² + 2x 0.30 mm² + 2x 2x 0.15 mm², 13-pin female speedtec hybrid motor connector, integrated shield plate, can be used in cable drag chains, UL/CSA-listed	

Table 279: 8BCH0005.1312A-0, 8BCH0007.1312A-0, 8BCH0010.1312A-0, 8BCH0015.1312A-0, 8BCH0020.1312A-0, 8BCH0025.1312A-0 - Order data

17.3.2.2 Technical data

Model number	8BCH0005. 1312A-0	8BCH0007. 1312A-0	8BCH0010. 1312A-0	8BCH0015. 1312A-0	8BCH0020. 1312A-0	8BCH0025. 1312A-0
General information						
Cable cross section	4x 4 mm² + 2x 1 mm² + (2x 1x 0.30 mm² + 2x 2x 0.15 mm²)					
Durability	Oil resistance per EN 60811-2-1 [1)]					
Certification	E130266 cRUus AWM style 21223, 80°C, 1000 V and CSA C22.2 no. 210 I/II A/B FT1 [1)]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Copper stranded wire					
Cross section	4 mm²					
Shield	No					
Stranding	No					
Supply lines						
Quantity	2					
Wire insulation	PP					
Wire colors	White/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	1 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	6					
Wire insulation	PP					
Wire colors	Brown/Green, white/green, gray/pink, yellow/violet					
Design	2x copper stranded wire, 4x tinned copper stranded wire					
Cross section	2x 0.30 mm², 4x 0.15 mm²					
Shield	Tinned copper braiding, optical coverage >85% and wrapped in foil shield					
Stranding	Brown/green with white/green, pink with gray and yellow with violet					
Cable stranding	With filler elements and foil banding					
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film					

Table 280: 8BCH0005.1312A-0, 8BCH0007.1312A-0, 8BCH0010.1312A-0, 8BCH0015.1312A-0, 8BCH0020.1312A-0, 8BCH0025.1312A-0 - Technical data

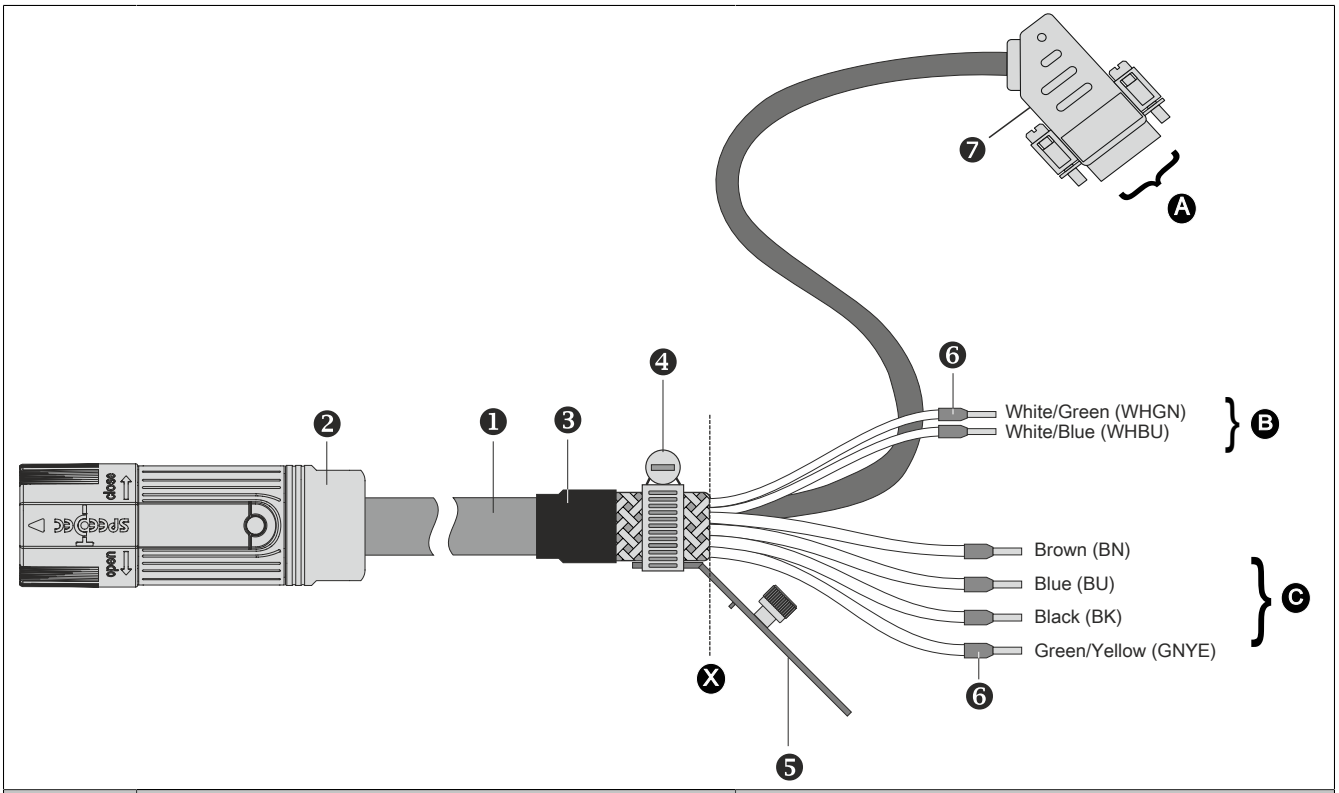
Model number	8BCH0005.1312A-0	8BCH0007.1312A-0	8BCH0010.1312A-0	8BCH0015.1312A-0	8BCH0020.1312A-0	8BCH0025.1312A-0
Outer jacket						
Material	PUR					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4x4 + 2x1 + (2x2 AWG26 + 2x1x AWG23) *E130266* cRU-us AWM STYLE 21223* AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	13-pin female speedtec hybrid motor connector					
Connection cycles	<500					
Contacts	13					
Additional connectors	9-pin male DSUB connector Connection cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤5 Ω/km					
Supply lines	≤19.5 Ω/km					
Signal lines	0.30 mm²: ≤68 Ω/km, 0.15 mm²: ≤140 Ω/km					
Insulation resistance	≥200 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	30 A [2]					
Installed in conduit or cable duct	30 A [2]					
Installed in cable tray	30 A [2]					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +90°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	15.7 mm ± 0.4 mm					
Bend radius						
Single bend	>65 mm					
Moving	≥121 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles	≤3,000,000					
Speed	Max. 300 m/min					
Weight	1.9 kg	2.7 kg	3.9 kg	5.8 kg	7.7 kg	9.6 kg

Table 280: 8BCH0005.1312A-0, 8BCH0007.1312A-0, 8BCH0010.1312A-0, 8BCH0015.1312A-0, 8BCH0020.1312A-0, 8BCH0025.1312A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Limited to 30 A by the hybrid motor connector.

17.3.3 Wiring

17.3.3.1 Cable construction



Pos.	Name	Note
1	Hybrid cable	For 8BCHxxxx.1111A-0: 4x 1.5 mm² + 2x 0.75 mm² + (2x 0.30 mm² + 2x 2x 0.15 mm²) For 8BCHxxxx.1312A-0: 4x 4 mm² + 2x 1 mm² + (2x 0.30 mm² + 2x 2x 0.15 mm²)
2	13-pin female speedtec hybrid motor connector	
3	Heat shrink tubing	
4	Cable clamp	
5	Shield mounting	
6	Wire end sleeves	
7	DSUB housing	

Table 281: Hybrid motor cables - Cable construction

Custom cable length from point x		
A	1	480 mm
B	2	135 mm
C	4	140 mm

17.3.3.2 Pinout

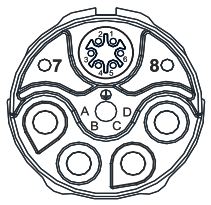
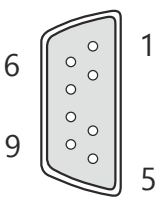
Circular connector	Pin	Name	Function	Pin	DSUB connector
	6	T\	Clock output inverted	9	
	1	U+	Encoder power supply +12 V	1	
	2	COM	Encoder power supply 0 V	6	
	3	D	Data	4	
	4	D\	Data inverted	8	
	5	T	Clock output	5	
	7	B-	Brake 0 V	-	
	8	B+	Brake +24 V	-	
	A	U	Motor connection U	-	
	B	V	Motor connection V	-	
	C	W	Motor connection W	-	
	D	-	-	-	
	⏚	PE	Protective ground conductor	-	

Table 282: Hybrid motor cables - Pinout

17.3.3.3 Cable diagram

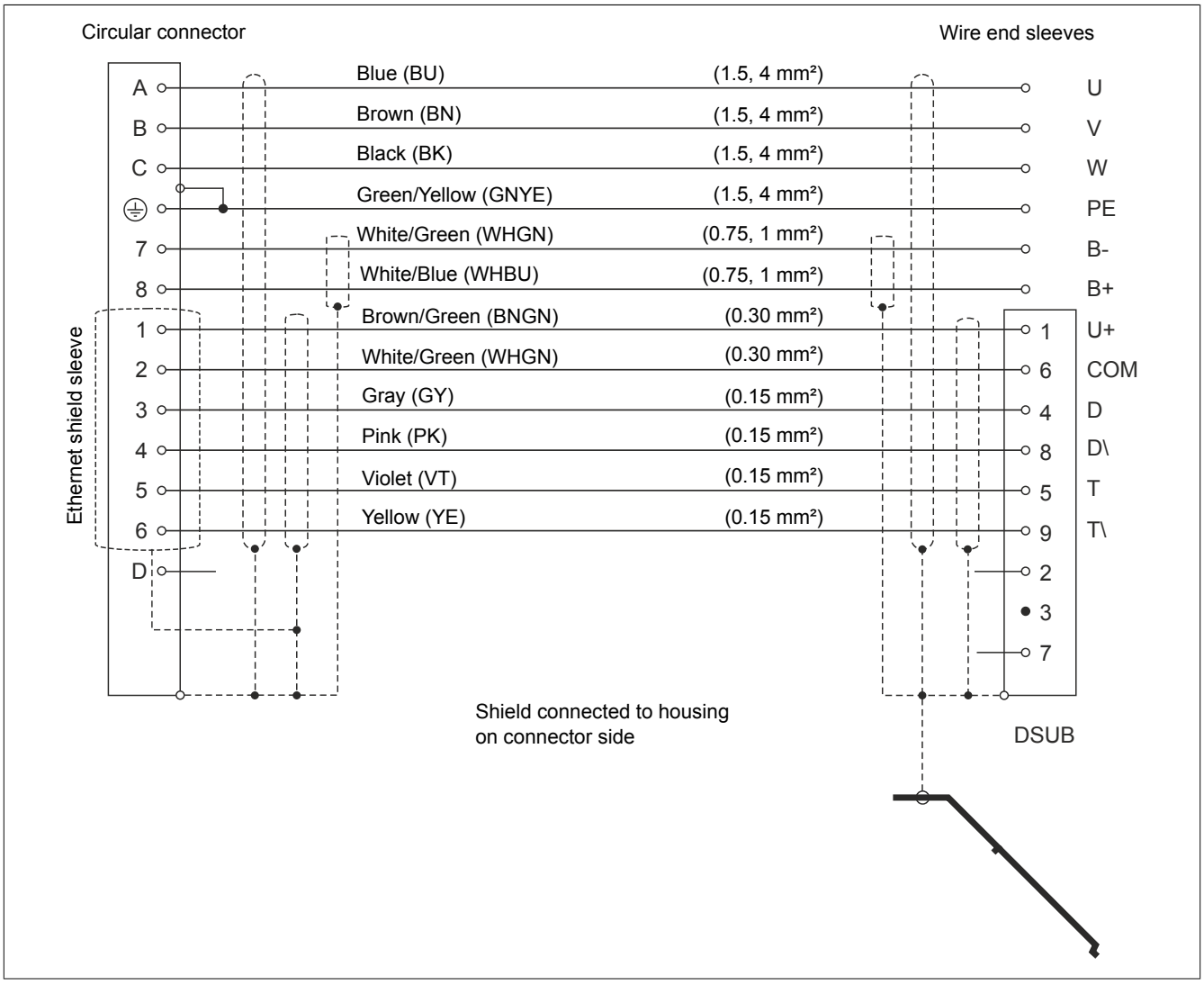


Figure 133: Hybrid motor cables - Cable diagram

17.4 8BCE EnDat 2.1 cables

17.4.1 For use in cable drag chains

17.4.1.1 Order data

Model number	Short description	Figure
	EnDat 2.1 cables	
8BCE0005.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 5 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCE0007.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 7 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCE0010.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 10 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCE0015.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 15 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCE0020.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 20 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCE0025.1111A-0	ACOPOSmulti EnDat 2.1 cable, length 25 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	

Table 283: 8BCE0005.1111A-0, 8BCE0007.1111A-0, 8BCE0010.1111A-0, 8BCE0015.1111A-0, 8BCE0020.1111A-0, 8BCE0025.1111A-0 - Order data

17.4.1.2 Technical data

Model number	8BCE0005. 1111A-0	8BCE0007. 1111A-0	8BCE0010. 1111A-0	8BCE0015. 1111A-0	8BCE0020. 1111A-0	8BCE0025. 1111A-0
General information						
Cable cross section	5x 2x 0.14 mm² + 1x 2x 0.50 mm²					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certification	UL AWM style 20963, 80°C, 30 V, E63216 and CSA AWM I/II A/B, 90°C, 30 V, FT1 LL46064 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Supply lines						
Quantity	2					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, white/red					
Design	Tinned copper stranded wire					
Cross section	0.5 mm²					
Shield	No					
Stranding	White/Red with white/green and filler elements					
Signal lines						
Quantity	10					
Wire insulation	Special thermoplastic material					
Wire colors	Blue, brown, yellow, gray, green, pink, red, black, violet, white					
Design	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	Green with brown, gray with yellow, white with violet, black with red, pink with blue					
Cable stranding	With foil shield					
Complete shielding	Copper braiding, optical coverage >85% with foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Labeling	BERNECKER + RAINER 5x2x0.14+2x0.50 FLEX UL AWM STYLE 20963 80°C 30 V E63216 CSA AWM I/II A/B 90°C 30 V FT1 LL46064 [1]					
Connector						
Type	17-pin female speedtec EnDat connector					
Connection cycles	<500					

Table 284: 8BCE0005.1111A-0, 8BCE0007.1111A-0, 8BCE0010.1111A-0, 8BCE0015.1111A-0, 8BCE0020.1111A-0, 8BCE0025.1111A-0 - Technical data

Model number	8BCE0005.1111A-0	8BCE0007.1111A-0	8BCE0010.1111A-0	8BCE0015.1111A-0	8BCE0020.1111A-0	8BCE0025.1111A-0
Contacts	17					
Additional connectors	15-pin male DSUB servo connector Connection cycles: <200 Contacts: 15 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire/Wire	1 kV					
Wire/Shield	0.8 kV					
Conductor resistance						
Supply lines	≤40 Ω/km					
Signal lines	≤140 Ω/km					
Insulation resistance	>200 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	7.85 mm ± 0.2 mm					
Bend radius						
Single bend	≥24 mm					
Moving	≥60 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	>3,000,000					
Speed	≤4 m/s					
Weight	0.4 kg	0.6 kg	0.8 kg	1.2 kg	1.6 kg	2 kg

Table 284: 8BCE0005.1111A-0, 8BCE0007.1111A-0, 8BCE0010.1111A-0, 8BCE0015.1111A-0, 8BCE0020.1111A-0, 8BCE0025.1111A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

17.4.2 Not for use in cable drag chains

17.4.2.1 Order data

Model number	Short description	Figure
	EnDat 2.1 cables	
8BCE0005.3111A-0	ACOPOSmulti EnDat 2.1 cable, length 5 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, UL/CSA listed	
8BCE0007.3111A-0	ACOPOSmulti EnDat 2.1 cable, length 7 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, UL/CSA listed	
8BCE0010.3111A-0	ACOPOSmulti EnDat 2.1 cable, length 10 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, UL/CSA listed	
8BCE0015.3111A-0	ACOPOSmulti EnDat 2.1 cable, length 15 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, UL/CSA listed	
8BCE0020.3111A-0	ACOPOSmulti EnDat 2.1 cable, length 20 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, UL/CSA listed	
8BCE0025.3111A-0	ACOPOSmulti EnDat 2.1 cable, length 25 m, 10x 0.14 mm² + 2x 0.5 mm², 17-pin female speedtec EnDat connector, 15-pin male DSUB servo connector, UL/CSA listed	

Table 285: 8BCE0005.3111A-0, 8BCE0007.3111A-0, 8BCE0010.3111A-0, 8BCE0015.3111A-0, 8BCE0020.3111A-0, 8BCE0025.3111A-0 - Order data

17.4.2.2 Technical data

Model number	8BCE0005. 3111A-0	8BCE0007. 3111A-0	8BCE0010. 3111A-0	8BCE0015. 3111A-0	8BCE0020. 3111A-0	8BCE0025. 3111A-0
General information						
Cable cross section	5x 2x 0.14 mm² + 1x 2x 0.50 mm²					
Durability	Oil resistance per DIN VDE 0281-1 (TM5) (HD 21.1 / DIN EN 60811-1-1/2-1) Flame resistance per IEC 60332-1-2 [1]					
Certification	E130266 cRUus AWM STYLE 2637 and AWM I/II A/B 90°C 30 V FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Supply lines						
Quantity	2					
Wire insulation	PVC					
Wire colors	White/Green, white/red					
Design	Tinned copper stranded wire					
Cross section	0.5 mm²					
Shield	No					
Stranding	White/Red with white/green and filler elements					
Signal lines						
Quantity	10					
Wire insulation	PVC					
Wire colors	Blue, brown, yellow, gray, green, pink, red, black, violet, white					
Design	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	Green with brown, gray with yellow, white with violet, black with red, pink with blue					
Cable stranding	With foil shield					
Complete shielding	Copper braiding, optical coverage >85% and wrapped in foil shield					
Outer jacket						
Material	PVC					
Color	Green					
Labeling	B&R 5x2x0.14 + 1x2x0.5 * E130266 cURus AWM STYLE 2637 * AWM I/II A/B 90°C 30 V FT1 * <Batch number> [1]					
Connector						
Type	17-pin female speedtec EnDat connector					
Connection cycles	<500					
Contacts	17					
Additional connectors	15-pin male DSUB servo connector Connection cycles: <200 Contacts: 15 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP66/67 when connected					

Table 286: 8BCE0005.3111A-0, 8BCE0007.3111A-0, 8BCE0010.3111A-0, 8BCE0015.3111A-0, 8BCE0020.3111A-0, 8BCE0025.3111A-0 - Technical data

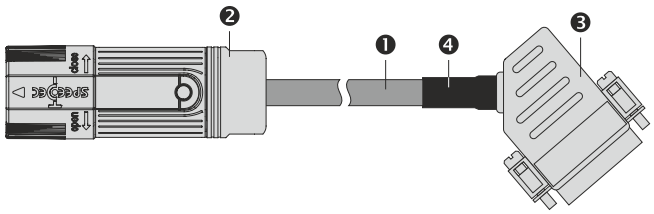
Model number	8BCE0005. 3111A-0	8BCE0007. 3111A-0	8BCE0010. 3111A-0	8BCE0015. 3111A-0	8BCE0020. 3111A-0	8BCE0025. 3111A-0
Electrical characteristics [1]						
Test voltage						
Wire/Wire	1 kV					
Wire/Shield	0.8 kV					
Conductor resistance						
Supply lines	≤40 Ω/km					
Signal lines	≤140 Ω/km					
Insulation resistance	≥20 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	7.6 mm ± 0.2 mm					
Bend radius						
Single bend	≥31 mm					
Moving	≥62 mm					
Weight	0.4 kg	0.6 kg	0.84 kg	1.3 kg	1.7 kg	2.1 kg

Table 286: 8BCE0005.3111A-0, 8BCE0007.3111A-0, 8BCE0010.3111A-0, 8BCE0015.3111A-0, 8BCE0020.3111A-0, 8BCE0025.3111A-0 - Technical data

1) Specified values refer to the raw cable being used.

17.4.3 Wiring

17.4.3.1 Construction



Pos.	Name	Note
1	Encoder line	5x 2x 0.14 mm² + 2x 0.5 mm²
2	17-pin female circular connector	
3	DSUB housing 45°, metal-plated, 15-pin	
4	Heat shrink tubing	

Table 287: 8BCE EnDat 2.1 cables - Construction

17.4.3.2 Pinout

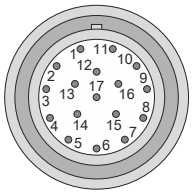
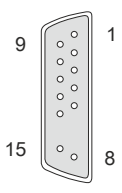
Circular connector	Pin	Name	Function	Pin	DSUB connector
	15	A	Channel A	1	
	10	COM (1, 3 - 9, 11, 13 - 15)	Encoder power supply 0 V	2	
	12	B	Channel B	3	
	7	+5 V out / 0.25 A	Encoder power supply +5 V	4	
	14	D	Data input	5	
	8	T	Clock output	8	
	16	A\	Channel A inverted	9	
	4	Sense COM	Sense input 0 V	10	
	13	B\	Channel B inverted	11	
	1	Sense +5V	Sense input +5 V	12	
	17	D\	Data inverted	13	
	9	T\	Clock output inverted	15	

Table 288: 8BCE EnDat 2.1 cables - Pinout

17.4.3.3 Cable diagram

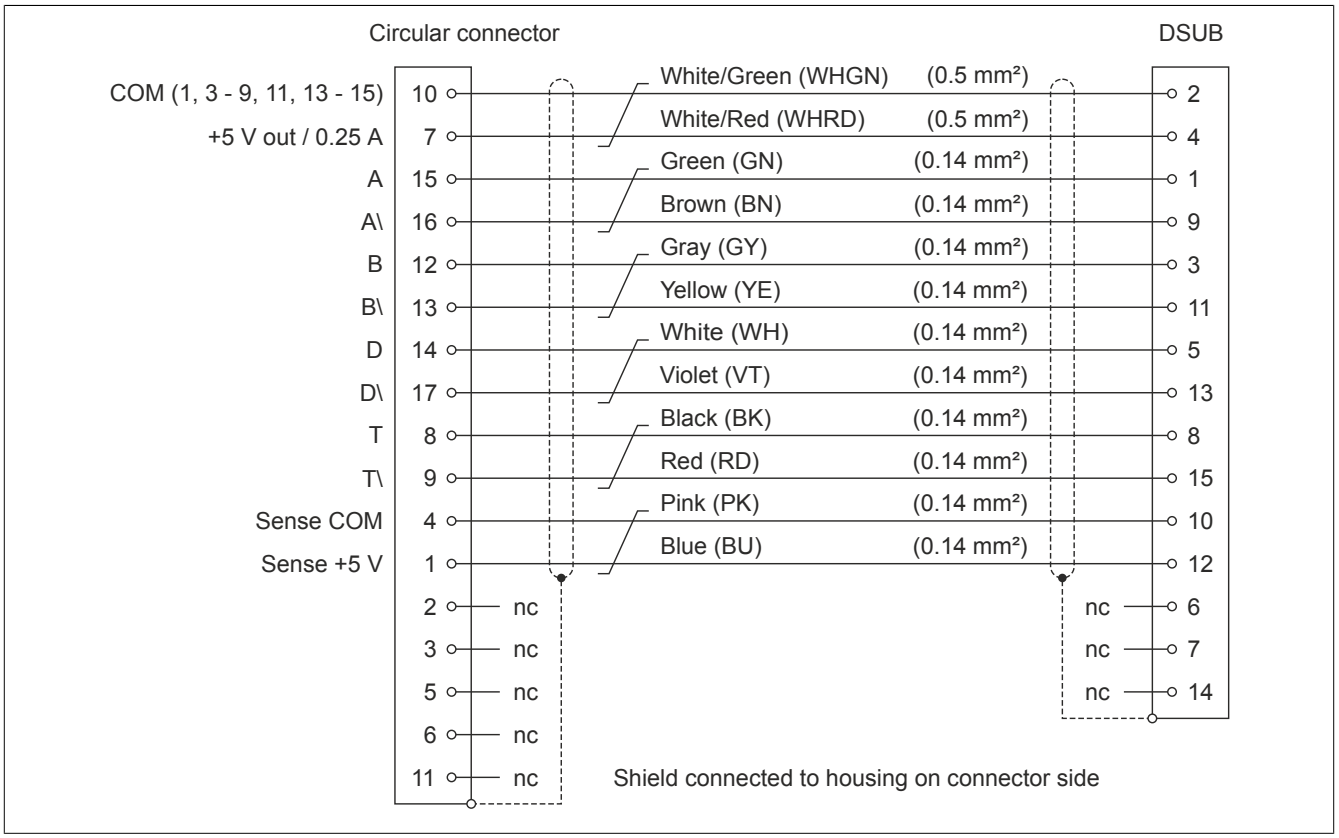


Figure 134: 8BCE EnDat 2.1 cables - Cable diagram

17.5 8BCF EnDat 2.2 cable

17.5.1 Order data

Model number	Short description	Figure
	EnDat 2.2 cables	
8BCF0005.1221B-0	EnDat 2.2 cable, length 5 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0007.1221B-0	EnDat 2.2 cable, length 7 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0010.1221B-0	EnDat 2.2 cable, length 10 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0015.1221B-0	EnDat 2.2 cable, length 15 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0020.1221B-0	EnDat 2.2 cable, length 20 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCF0025.1221B-0	EnDat 2.2 cable, length 25 m, 4x 0.14 mm² + 4x 0.35 mm², 12-pin female springtec EnDat connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	

Table 289: 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Order data

17.5.2 Technical data

Model number	8BCF0005. 1221B-0	8BCF0007. 1221B-0	8BCF0010. 1221B-0	8BCF0015. 1221B-0	8BCF0020. 1221B-0	8BCF0025. 1221B-0
General information						
Cable cross section	4x 0.14 mm² + 4x 0.35 mm²					
Durability	Oil resistance per DIN EN 50363-10-2 (VDE 0207-363-10-2) as well as standard cleaning agents and hydraulic oil [1)]					
Certification	UL AWM style 20963, 80°C, 30 V, E63216 [1)]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Supply lines						
Quantity	4					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, brown/green, blue, white					
Design	Tinned copper stranded wire					
Cross section	0.35 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	Polyolefin foam					
Wire colors	Yellow, gray, pink, violet					
Design	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	All 4 wires together					
Cable stranding	With foil shield					
Complete shielding	Copper/Tin braiding, optical coverage ≥ 85%					
Outer jacket						
Material	PUR					
Color	Green flat					
Labeling	B&R 4x0.14 + 4x0.35 FLEX (UL) AWM STYLE 20963 80°C 30 V E63216 [1)]					
Connector						
Type	EnDat 12-pin female springtec connector					
Connection cycles	<500					
Contacts	12					
Additional connectors	9-pin male DSUB servo connector Connection cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1)]						
Operating voltage	≤30 V					

Table 290: 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Technical data

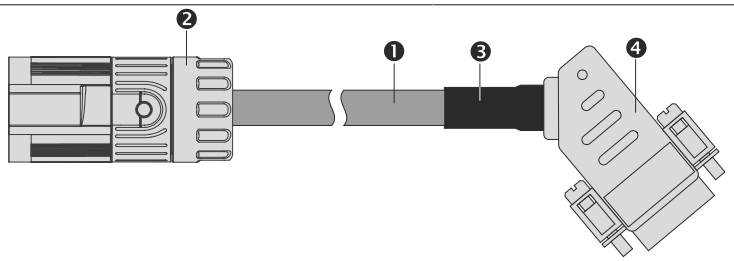
Model number	8BCF0005. 1221B-0	8BCF0007. 1221B-0	8BCF0010. 1221B-0	8BCF0015. 1221B-0	8BCF0020. 1221B-0	8BCF0025. 1221B-0
Test voltage						
Wire/Wire	1 kV					
Wire/Shield	0.5 kV					
Conductor resistance						
Supply lines	≤55 Ω/km					
Signal lines	≤134 Ω/km					
Insulation resistance	>200 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +80°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6 mm ± 0.2 mm					
Bend radius						
Single bend	≥19 mm					
Moving	≥47 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3,000,000					
Speed	≤4 m/s					
Weight	0.3 kg	0.41 kg	0.6 kg	0.9 kg	1.2 kg	1.5 kg

Table 290: 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 78 mm.

17.5.3 Wiring

17.5.3.1 Construction



Pos.	Name	Note
1	Encoder line	4x 0.14 mm² + 4x 0.35 mm²
2	12-pin female circular connector	
3	Heat shrink tubing	
4	DSUB housing 45°, metal-plated, 9-pin connector	

Table 291: 8BCF EnDat 2.2 cables - Construction

17.5.3.2 Pinout

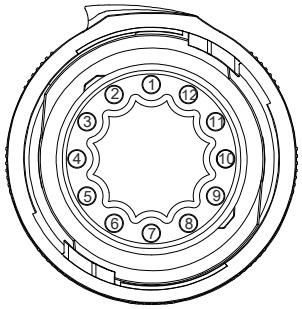
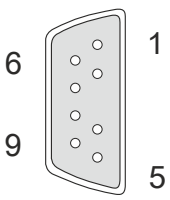
Circular connector	Pin	Name	Function	Pin	DSUB connector
	1	+12 V out	Encoder power supply +12 V	1	
	2	D	Data input	4	
	3	D\	Data inverted	8	
	4	T	Clock output	5	
	5	T\	Clock output inverted	9	
	6	Batt COM	Battery buffer 0 V	7	
	7	COM	Encoder power supply 0 V	6	
	8	---	Coding contact		
	9	---			
	10	---			
	11	---			
	12	VBatt	Backup battery power supply	2	

Table 292: 8BCF EnDat 2.2 cables - Pinout

17.5.3.3 Cable diagram

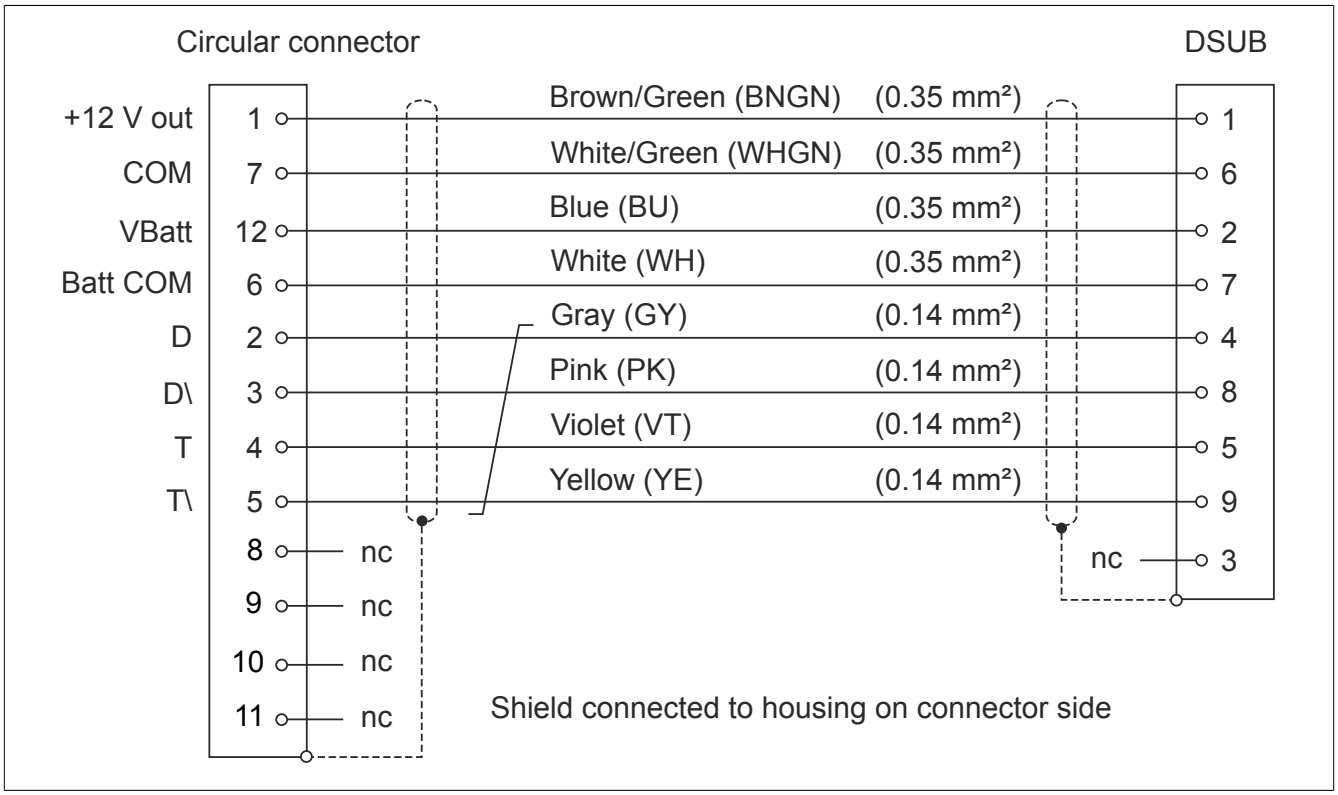


Figure 135: 8BCF EnDat 2.2 cables - Cable diagram

17.6 EnDat 2.2 8BCFxxxx.1231B-0

17.6.1 Order data

Model number	Short description	Figure
	EnDat 2.2 cables	
8BCF0005.1231B-0	EnDat 2.2 cable, length 5 m, 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-keyed, 9-pin male DSUB connector, can be used in cable drag chains, UL/CSA listed	
8BCF0007.1231B-0	EnDat 2.2 cable, length 7 m, 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-keyed, 9-pin male DSUB connector, can be used in cable drag chains, UL/CSA listed	
8BCF0010.1231B-0	EnDat 2.2 cable, length 10 m, 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-keyed, 9-pin male DSUB connector, can be used in cable drag chains, UL/CSA listed	
8BCF0015.1231B-0	EnDat 2.2 cable, length 15 m, 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-keyed, 9-pin male DSUB connector, can be used in cable drag chains, UL/CSA listed	
8BCF0020.1231B-0	EnDat 2.2 cable, length 20 m, 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-keyed, 9-pin male DSUB connector, can be used in cable drag chains, UL/CSA listed	
8BCF0025.1231B-0	EnDat 2.2 cable, length 25 m, 4x 0.14 mm² + 4x 0.35 mm², M12 circular connector, 8-pin, A-keyed, 9-pin male DSUB connector, can be used in cable drag chains, UL/CSA listed	

Table 293: 8BCF0005.1231B-0, 8BCF0007.1231B-0, 8BCF0010.1231B-0, 8BCF0015.1231B-0, 8BCF0020.1231B-0, 8BCF0025.1231B-0 - Order data

17.6.2 Technical data

Model number	8BCF0005. 1231B-0	8BCF0007. 1231B-0	8BCF0010. 1231B-0	8BCF0015. 1231B-0	8BCF0020. 1231B-0	8BCF0025. 1231B-0
General information						
Cable cross section	4x 0.14 mm² + 4x 0.35 mm²					
Durability	Oil resistance per DIN EN 50363-10-2 (VDE 0207-363-10-2) as well as standard cleaning agents and hydraulic oil [1]					
Certification	UL AWM style 20963, 80°C, 30 V, E63216 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Supply lines						
Quantity	4					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, brown/green, blue, white					
Design	Tinned copper stranded wire					
Cross section	0.35 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	Polyolefin foam					
Wire colors	Yellow, gray, pink, violet					
Design	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	All 4 wires together					
Cable stranding	With foil shield					
Complete shielding	Copper/Tin braiding, optical coverage ≥85%					
Outer jacket						
Material	PUR					
Color	Green flat					
Labeling	B&R 4x0.14 + 4x0.35 FLEX (UL) AWM STYLE 20963 80°C 30 V E63216 [1]					
Connector						
Type	8-pin female M12 circular connector, A-keyed					
Connection cycles	<500					
Contacts	8					
Additional connectors	9-pin male DSUB servo connector Connection cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP65/67 when connected					
Electrical characteristics [1]						
Operating voltage	≤30 V					

Table 294: 8BCF0005.1231B-0, 8BCF0007.1231B-0, 8BCF0010.1231B-0, 8BCF0015.1231B-0, 8BCF0020.1231B-0, 8BCF0025.1231B-0 - Technical data

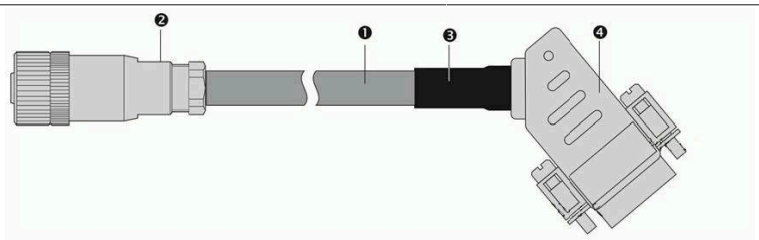
Model number	8BCF0005. 1231B-0	8BCF0007. 1231B-0	8BCF0010. 1231B-0	8BCF0015. 1231B-0	8BCF0020. 1231B-0	8BCF0025. 1231B-0
Test voltage						
Wire/Wire	1 kV					
Wire/Shield	0.5 kV					
Conductor resistance						
Supply lines	≤55 Ω/km					
Signal lines	≤134 Ω/km					
Insulation resistance	>200 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-40°C to +80°C					
Static	-40°C to +80°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6 mm ± 0.2 mm					
Bend radius						
Single bend	≥19 mm					
Moving	≥47 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3,000,000					
Speed	≤4 m/s					
Weight	0.3 kg	0.41 kg	0.6 kg	0.8 kg	1.2 kg	1.5 kg

Table 294: 8BCF0005.1231B-0, 8BCF0007.1231B-0, 8BCF0010.1231B-0, 8BCF0015.1231B-0, 8BCF0020.1231B-0, 8BCF0025.1231B-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 78 mm.

17.6.3 Wiring

17.6.3.1 Cable construction



Pos.	Name	Note
1	Encoder line	4 x 0.14 + 4 x 0.35 mm²
2	8-pin circular connector, A-keyed Contact connector	It must be possible to establish a shield connection over a wide area.
3	Heat shrink tubing	
4	DSUB housing 45°, metal plated, 9-pin connector Contact pins	

Table 295: 8BCFxxxx.1231B-0 - Cable construction

17.6.3.2 Pinout

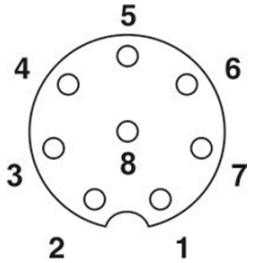
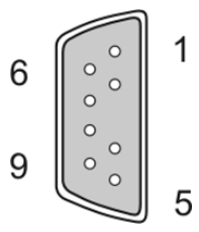
Circular connector	Pin	Name	Function	Pin	DSUB connector
	8	+12 V out	Encoder power supply +12 V	1	
	3	D	Data input	4	
	4	D\	Data inverted	8	
	7	T	Clock output	5	
	6	T\	Clock output inverted	9	
	1	Batt COM	Battery-backed 0 V	7	
	5	COM	Encoder power supply 0 V	6	
		---	Coded contact		
	2	VBatt	Backup battery supply	2	

Table 296: 8BCFxxxx.1231B-0 - Pinout

17.6.3.3 Cable diagram

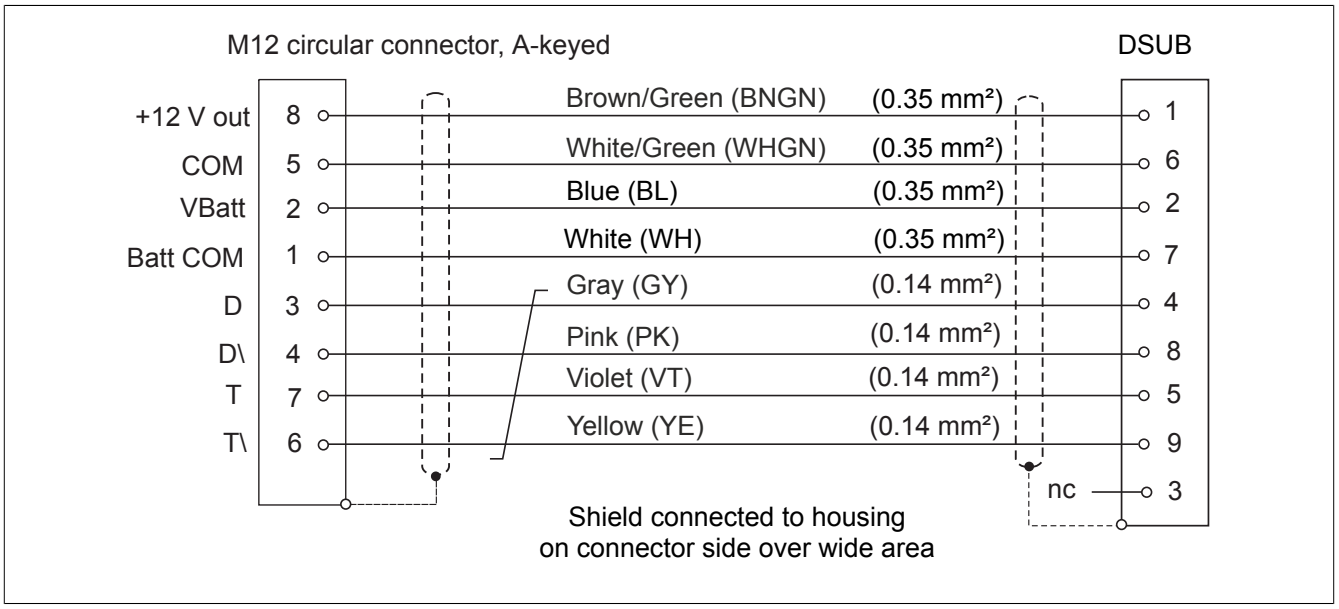


Figure 136: 8BCFxxxx.1231B-0 - Cable diagram

17.7 Resolver cable - 8BCR

17.7.1 For use in cable drag chains

17.7.1.1 Order data

Model number	Short description	Figure
	Resolver cables	
8BCR0005.1111A-0	ACOPOSmulti resolver cable, length 5 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0007.1111A-0	ACOPOSmulti resolver cable, length 7 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0010.1111A-0	ACOPOSmulti resolver cable, length 10 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0015.1111A-0	ACOPOSmulti resolver cable, length 15 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0020.1111A-0	ACOPOSmulti resolver cable, length 20 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	
8BCR0025.1111A-0	ACOPOSmulti resolver cable, length 25 m, 3x 2x AWG 24 (19x 0.127), 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, can be used in cable drag chains, UL/ CSA listed	

Table 297: 8BCR0005.1111A-0, 8BCR0007.1111A-0, 8BCR0010.1111A-0, 8BCR0015.1111A-0, 8BCR0020.1111A-0, 8BCR0025.1111A-0 - Order data

17.7.1.2 Technical data

Model number	8BCR0005. 1111A-0	8BCR0007. 1111A-0	8BCR0010. 1111A-0	8BCR0015. 1111A-0	8BCR0020. 1111A-0	8BCR0025. 1111A-0
General information						
Cable cross section	3x 2x 24 19 AWG					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certification	UL AWM style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Signal lines						
Quantity	6					
Wire insulation	Special thermoplastic material					
Wire colors	White/Brown, green/yellow, gray/pink					
Design	Tinned copper stranded wire					
Cross section	AWG 24 / AWG 19					
Shield	No					
Stranding	White with brown, green with yellow, gray with pink					
Cable stranding	The 3 pairs together covered by foil shield					
Complete shielding	Copper braiding, optical coverage ≥90% with foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Labeling	BERNECKER + RAINER 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064 [1]					
Connector						
Type	12-pin female speedtec resolver connector					
Connection cycles	<500					
Contacts	12					
Additional connectors	9-pin male DSUB servo connector Connection cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	≤30 V_{eff}					

Table 298: 8BCR0005.1111A-0, 8BCR0007.1111A-0, 8BCR0010.1111A-0, 8BCR0015.1111A-0, 8BCR0020.1111A-0, 8BCR0025.1111A-0 - Technical data

Model number	8BCR0005.1111A-0	8BCR0007.1111A-0	8BCR0010.1111A-0	8BCR0015.1111A-0	8BCR0020.1111A-0	8BCR0025.1111A-0
Test voltage						
Wire/Wire	1.5 kV					
Wire/Shield	0.8 kV					
Conductor resistance						
Signal lines	≤86 Ω/km					
Insulation resistance	>200 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ± 0.2 mm					
Bend radius						
Single bend	≥20 mm					
Moving	≥50 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3,000,000					
Speed	≤4 m/s					
Weight	0.4 kg	0.49 kg	0.7 kg	1.1 kg	1.4 kg	1.8 kg

Table 298: 8BCR0005.1111A-0, 8BCR0007.1111A-0, 8BCR0010.1111A-0, 8BCR0015.1111A-0, 8BCR0020.1111A-0, 8BCR0025.1111A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

17.7.2 Not for use in cable drag chains

17.7.2.1 Order data

Model number	Short description	Figure
	Resolver cables	
8BCR0005.3111A-0	ACOPOSmulti resolver cable, length 5 m, 3x 2x 0.22, 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0007.3111A-0	ACOPOSmulti resolver cable, length 7 m, 3x 2x 0.22, 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0010.3111A-0	ACOPOSmulti resolver cable, length 10 m, 3x 2x 0.22, 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0015.3111A-0	ACOPOSmulti resolver cable, length 15 m, 3x 2x 0.22, 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0020.3111A-0	ACOPOSmulti resolver cable, length 20 m, 3x 2x 0.22, 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	
8BCR0025.3111A-0	ACOPOSmulti resolver cable, length 25 m, 3x 2x 0.22, 12-pin female speedtec resolver connector, 9-pin male DSUB servo connector, UL/CSA listed	

Table 299: 8BCR0005.3111A-0, 8BCR0007.3111A-0, 8BCR0010.3111A-0, 8BCR0015.3111A-0, 8BCR0020.3111A-0, 8BCR0025.3111A-0 - Order data

17.7.2.2 Technical data

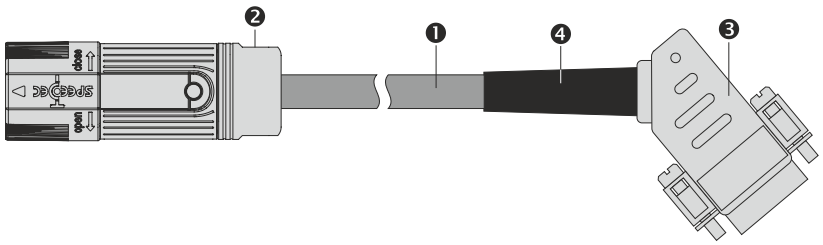
Model number	8BCR0005.3111A-0	8BCR0007.3111A-0	8BCR0010.3111A-0	8BCR0015.3111A-0	8BCR0020.3111A-0	8BCR0025.3111A-0
General information						
Cable cross section	3x 2x 0.22 GN					
Durability	Oil resistance per DIN VDE 0281-1 (TM5) (HD 21.1 / DIN EN 60811-1-1/2-1), flame resistance per IEC 60332-1-2 [1]					
Certification	E130266 cRUus AWM style 2637 90°C 30 V and CSA AWM I/II A/B 90°C 30 V, FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Signal lines						
Quantity	6					
Wire insulation	PVC					
Wire colors	White/Brown, green/yellow, gray/pink					
Design	Tinned copper stranded wire					
Cross section	0.22 mm					
Shield	No					
Stranding	White with brown, green with yellow, gray with pink					
Cable stranding	The 3 pairs together covered by foil banding					
Complete shielding	Copper braiding, optical coverage ≥90% and wrapped in isolating film					
Outer jacket						
Material	PVC					
Color	Green					
Labeling	B&R 3x2x0.22 * E130266 cURus AWM STYLE 2637 * AWM I/II A/B 90°C 30 V FT1 * <Batch number> [1]					
Connector						
Type	12-pin female speedtec resolver connector					
Connection cycles	<500					
Contacts	12					
Additional connectors	9-pin male DSUB servo connector Connection cycles: <200 Contacts: 9 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Test voltage						
Wire/Wire	1.5 kV					
Wire/Shield	0.8 kV					
Conductor resistance						
Signal lines	≤86 Ω/km					
Insulation resistance	≥20 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.3 mm ± 0.2 mm					
Bend radius						
Single bend	≥26 mm					
Moving	≥52 mm					
Weight	0.3 kg	0.4 kg	0.6 kg	0.9 kg	1.1 kg	1.4 kg

Table 300: 8BCR0005.3111A-0, 8BCR0007.3111A-0, 8BCR0010.3111A-0, 8BCR0015.3111A-0, 8BCR0020.3111A-0, 8BCR0025.3111A-0 - Technical data

1) Specified values refer to the raw cable being used.

17.7.3 Wiring

17.7.3.1 Design



Pos.	Name	Note
1	Encoder line	3x 2x 24 AWG
2	12-pin female circular connector	
3	DSUB housing 45°, metal-plated, 9-pin	
4	Kink protection	

Table 301: 8BCR resolver cables - Construction

17.7.3.2 Pinout

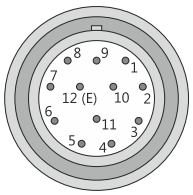
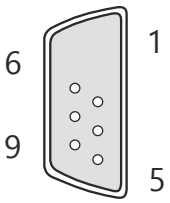
Circular connector	Pin	Name	Function	Pin	DSUB connector
	1	---			
	2	---			
	3	S4	Sine input +	3	
	4	S1	Cosine input -	4	
	5	R2	Reference output +	5	
	6	---			
	7	S2	Sine input -	7	
	8	S3	Cosine input +	8	
	9	R1	Reference output -	9	
	10	---			
	11	---			
	12	---			

Table 302: 8BCR resolver cables - Pinout

17.7.3.3 Cable diagram

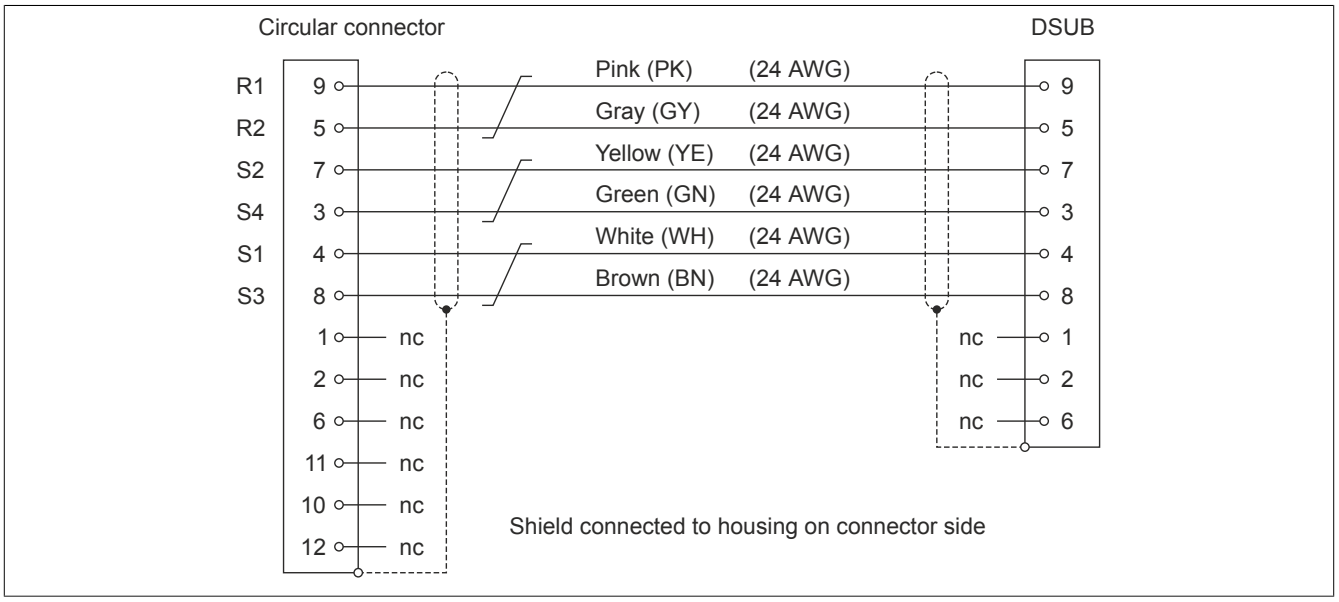


Figure 137: 8BCR resolver cables - Cable diagram

17.8 8BCS SinCos cables

17.8.1 Order data

Model number	Short description	Figure
	SinCos cables	
8BCS0005.1111A-0	ACOPOSmulti SinCos cable, length 5 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0007.1111A-0	ACOPOSmulti SinCos cable, length 7 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0010.1111A-0	ACOPOSmulti SinCos cable, length 10 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0015.1111A-0	ACOPOSmulti SinCos cable, length 15 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0020.1111A-0	ACOPOSmulti SinCos cable, length 20 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	
8BCS0025.1111A-0	ACOPOSmulti SinCos cable, length 25 m, 10x 0.14 mm² + 2x 0.5 mm², 12-pin female SpeedTec SinCos connector, 15-pin male DSUB servo connector, can be used in cable drag chains, UL/CSA listed	

Table 303: 8BCS0005.1111A-0, 8BCS0007.1111A-0, 8BCS0010.1111A-0, 8BCS0015.1111A-0, 8BCS0020.1111A-0, 8BCS0025.1111A-0 - Order data

17.8.2 Technical data

Model number	8BCS0005. 1111A-0	8BCS0007. 1111A-0	8BCS0010. 1111A-0	8BCS0015. 1111A-0	8BCS0020. 1111A-0	8BCS0025. 1111A-0
General information						
Cable cross section	5x 2x 0.14 mm² + 1x 2x 0.50 mm²					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1)]					
Certification	UL AWM Style 20963, 80°C, 30 V, E63216 and CSA AWM I/II A/B, 90°C, 30 V, FT1 LL46064 [1)]					
Certifications						
CE	Yes					
Cable construction						
Supply lines						
Quantity	2					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, white/red					
Design	Tinned copper litz wire					
Cross section	0.5 mm²					
Shield	No					
Stranding	White/Red with white/green and filler elements					
Signal lines						
Quantity	10					
Wire insulation	Special thermoplastic material					
Wire colors	Blue, brown, yellow, gray, green, pink, red, black, violet, white					
Design	Tinned copper litz wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	Green with brown, gray with yellow, white with violet, black with red, pink with blue					
Cable stranding	With foil banding					
Complete shielding	Copper mesh, optical coverage >85% and wrapped in isolating film					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Labeling	BERNECKER + RAINER 5x2x0.14+2x0.50 FLEX UL AWM STYLE 20963 80°C 30 V E63216 CSA AWM I/II A/B 90°C 30 V FT1 LL46064 [1)]					
Connector						
Type	12-pin female speedtec SinCos connector					
Connection cycles	<500					
Contacts	12					

Table 304: 8BCS0005.1111A-0, 8BCS0007.1111A-0, 8BCS0010.1111A-0, 8BCS0015.1111A-0, 8BCS0020.1111A-0, 8BCS0025.1111A-0 - Technical data

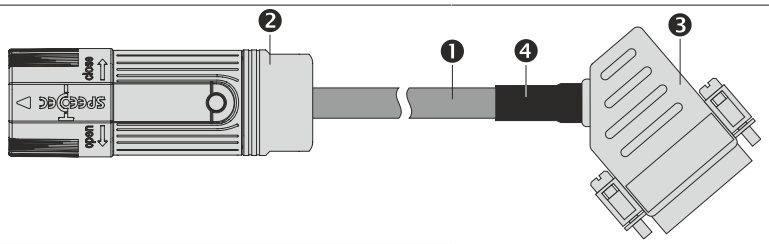
Model number	8BCS0005. 1111A-0	8BCS0007. 1111A-0	8BCS0010. 1111A-0	8BCS0015. 1111A-0	8BCS0020. 1111A-0	8BCS0025. 1111A-0
Additional connectors	15-pin male DSUB servo connector Connection cycles: <200 Contacts: 15 Degree of protection per EN 60529: IP20 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire/Wire	1 kV					
Wire/Shield	0.8 kV					
Conductor resistance						
Supply lines	≤40 Ω/km					
Signal lines	≤140 Ω/km					
Insulation resistance	>200 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	7.85 mm ± 0.2 mm					
Bend radius						
Single bend	≥24 mm					
Moving	≥60 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	>3,000,000					
Speed	≤4 m/s					
Weight	0.4 kg	0.6 kg	0.8 kg	1.2 kg	1.6 kg	2 kg

Table 304: 8BCS0005.1111A-0, 8BCS0007.1111A-0, 8BCS0010.1111A-0, 8BCS0015.1111A-0, 8BCS0020.1111A-0, 8BCS0025.1111A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature of 20°C and a flex radius of 65 mm.

17.8.3 Wiring

17.8.3.1 Design



Pos.	Name	Note
1	Encoder cable	10x 0.14 mm² + 2x 0.50 mm²
2	12-pin female SinCos connector	
3	DSUB housing 45°, metal plated, 15-pin male connector	
4	Heat shrink tubing	

Table 305: Construction - 8BCS SinCos cable

17.8.3.2 Pinout

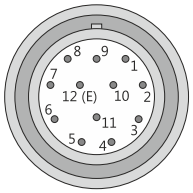
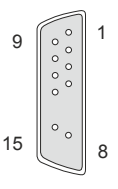
Male circular connector	Pin	Name	Function	Pin	DSUB connector
	5	A	Channel A	1	
	10	COM	Encoder supply 0 V	2	
	8	B	Channel B	3	
	12	+5 V out / 0.3 A	Encoder supply +5 V	4	
	4	R\	Reference pulse inverted	7	
	6	A\	Channel A inverted	9	
	11	Sense COM	Sense input 0 V	10	
	1	B\	Channel B inverted	11	
	2	Sense +5V	Sense input +5 V	12	
	3	R	Reference pulse	14	

Table 306: Pinout - 8BCS SinCos cable

17.8.3.3 Cable schematic

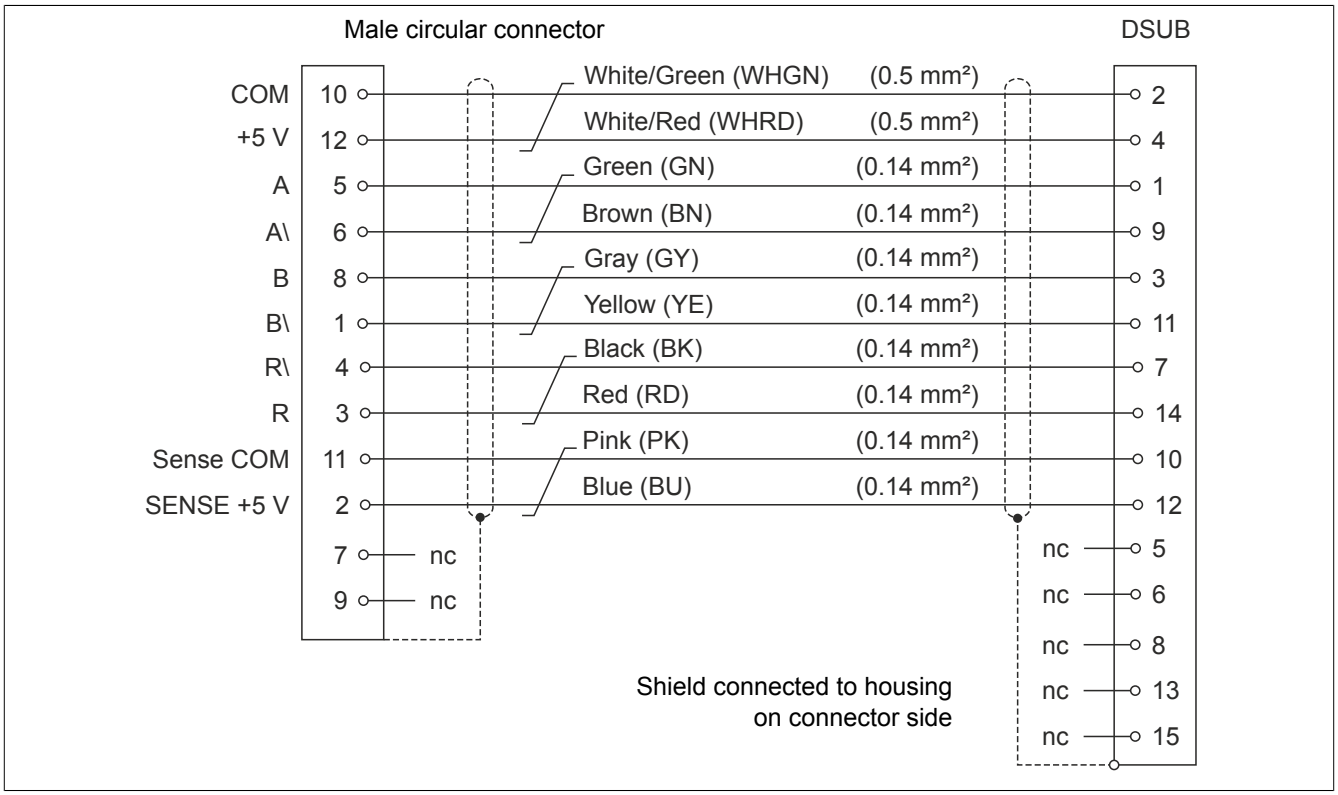


Figure 138: Cable schematic - 8BCS SinCos cable

17.9 8BCA expansion cables

ACOPOSmulti 8BCA expansion cables are intended for connecting two ACOPOSmulti 8BVE expansion modules.

Information:

A shield plate is attached to each end of an ACOPOSmulti 8BCA expansion cable. No extra shielding is required if this shield plate is correctly installed on the ACOPOSmulti 8BVE expansion module.

17.9.1 Expansion cables 1.5 mm²

17.9.1.1 Order data

Model number	Short description	Figure
	Expansion cables	
8BCA01X5.1111A-0	ACOPOSmulti expansion cable, length 1.5 m, 3x 1.5 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0003.1111A-0	ACOPOSmulti expansion cable, length 3 m, 3x 1.5 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0005.1111A-0	ACOPOSmulti expansion cable, length 5 m, 3x 1.5 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	

Table 307: 8BCA01X5.1111A-0, 8BCA0003.1111A-0, 8BCA0005.1111A-0 - Order data

17.9.1.2 Technical data

Model number	8BCA01X5.1111A-0	8BCA0003.1111A-0	8BCA0005.1111A-0
General information			
Cable cross section	3x 1.5 mm²		
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1]		
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]		
Certifications			
CE	Yes		
UL	cULus E225616 Power conversion equipment		
Cable construction			
Power lines			
Quantity	3		
Wire insulation	PP		
Wire colors	Black, brown, yellow/green		
Design	Tinned copper stranded wire		
Cross section	1.5 mm²		
Shield	No		
Stranding	No		
Cable stranding	With filler elements and foil banding		
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film		
Outer jacket			
Material	TPU		
Color	Orange, similar to RAL 2003 flat		
Labeling	B&R 3 G 1.5 C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 production order number [1]		
Electrical characteristics [1]			
Operating voltage	Max. 1000 V AC (UL)		
Test voltage			
Wire/Wire	4 kV		
Wire/Shield	4 kV		
Conductor resistance			
Power lines	≤13.7 Ω/km		
Insulation resistance	≥500 MΩ*km		
Current-carrying capacity per DIN VDE 0298 part 4, table 11			
Wall mounting	20 A		
Installed in conduit or cable duct	17.8 A		
Installed in cable tray	20.9 A		
Environmental conditions [1]			
Temperature			
Moving	-20°C to +80°C		
Static	-20°C to +90°C		

Table 308: 8BCA01X5.1111A-0, 8BCA0003.1111A-0, 8BCA0005.1111A-0 - Technical data

Model number	8BCA01X5.1111A-0	8BCA0003.1111A-0	8BCA0005.1111A-0
Mechanical characteristics [1]			
Dimensions			
Length	1.5 m	3 m	5 m
Diameter	12.2 mm ± 0.3 mm		
Bend radius			
Single bend	>38 mm		
Moving	>94 mm		
Drag chain data			
Acceleration	Max. 50 m/s² (depends on the length of the travel path)		
Flex cycles [2]	≤5,000,000		
Speed	Max. 300 m/min		
Weight	0.2 kg	0.4 kg	0.7 kg

Table 308: 8BCA01X5.1111A-0, 8BCA0003.1111A-0, 8BCA0005.1111A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

17.9.2 Expansion cables 4 mm²

17.9.2.1 Order data

Model number	Short description	Figure
	Expansion cables	
8BCA01X5.1312A-0	ACOPOSmulti expansion cable, length 1.5 m, 3x 4 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0003.1312A-0	ACOPOSmulti expansion cable, length 3 m, 3x 4 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0005.1312A-0	ACOPOSmulti expansion cable, length 5 m, 3x 4 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	

Table 309: 8BCA01X5.1312A-0, 8BCA0003.1312A-0, 8BCA0005.1312A-0 - Order data

17.9.2.2 Technical data

Model number	8BCA01X5.1312A-0	8BCA0003.1312A-0	8BCA0005.1312A-0
General information			
Cable cross section	3x 4 mm²		
Durability	Oil resistance per HD 22.10 appendix A and DIN EN 60811-404 [1]		
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]		
Certifications			
CE	Yes		
UL	cULus E225616 Power conversion equipment		
Cable construction			
Power lines			
Quantity	3		
Wire insulation	PP		
Wire colors	Black, brown, yellow/green		
Design	Tinned copper stranded wire		
Cross section	4 mm²		
Shield	No		
Stranding	No		
Cable stranding	With filler elements and foil banding		
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film		
Outer jacket			
Material	TPU		
Color	Orange, similar to RAL 2003 flat		
Labeling	B&R 3 G 4 C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]		
Electrical characteristics [1]			
Operating voltage	Max. 1000 V AC (UL)		
Test voltage			
Wire/Wire	4 kV		
Wire/Shield	4 kV		
Conductor resistance			
Power lines	≤5.1 Ω/km		
Insulation resistance	≥500 MΩ*km		
Current-carrying capacity per DIN VDE 0298 part 4, table 11			
Wall mounting	30 A [2]		
Installed in conduit or cable duct	30 A [2]		
Installed in cable tray	30 A [2]		
Environmental conditions [1]			
Temperature			
Moving	-20°C to +80°C		
Static	-20°C to +90°C		
Mechanical characteristics [1]			
Dimensions			
Length	1.5 m	3 m	5 m
Diameter	15.4 mm ± 0.4 mm		
Bend radius			
Single bend	>48 mm		
Moving	>119 mm		

Table 310: 8BCA01X5.1312A-0, 8BCA0003.1312A-0, 8BCA0005.1312A-0 - Technical data

Model number	8BCA01X5.1312A-0	8BCA0003.1312A-0	8BCA0005.1312A-0
Drag chain data			
Acceleration	Max. 50 m/s² (depends on the length of the travel path)		
Flex cycles 3)	≤5,000,000		
Speed	Max. 300 m/min		
Weight	0.4 kg	0.8 kg	1.4 kg

Table 310: 8BCA01X5.1312A-0, 8BCA0003.1312A-0, 8BCA0005.1312A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Limited to 30 A by the motor connector.
3) At an ambient temperature from -20°C to +60°C.

17.9.3 Expansion cables 10 mm²

17.9.3.1 Order data

Model number	Short description	Figure
	Expansion cables	
8BCA01X5.1513A-0	ACOPOSmulti expansion cable, length 1.5 m, 3x 10 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0003.1513A-0	ACOPOSmulti expansion cable, length 3 m, 3x 10 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	
8BCA0005.1513A-0	ACOPOSmulti expansion cable, length 5 m, 3x 10 mm², integrated shield plate, can be used in cable drag chains, UL/CSA listed	

Table 311: 8BCA01X5.1513A-0, 8BCA0003.1513A-0, 8BCA0005.1513A-0 - Order data

17.9.3.2 Technical data

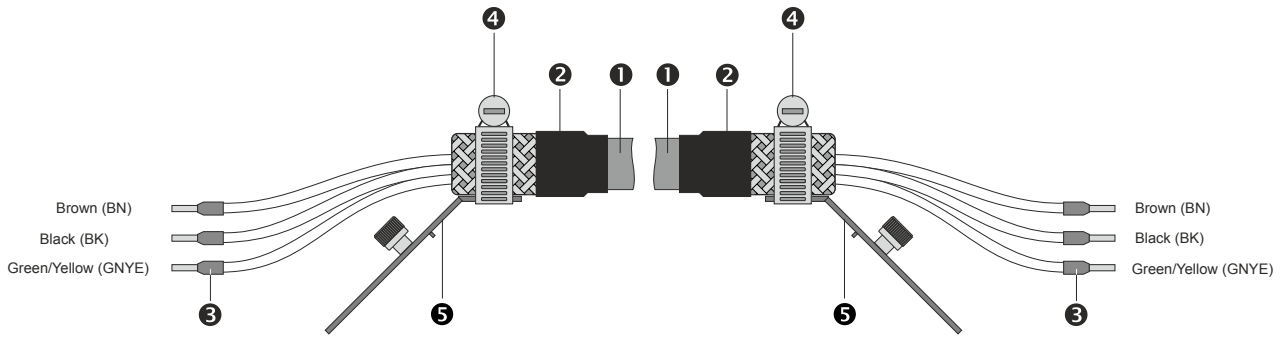
Model number	8BCA01X5.1513A-0	8BCA0003.1513A-0	8BCA0005.1513A-0
General information			
Cable cross section	3x 10 mm²		
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1]		
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]		
Certifications			
CE	Yes		
UL	cULus E225616 Power conversion equipment		
Cable construction			
Power lines			
Quantity	3		
Wire insulation	PP		
Wire colors	Black, brown, yellow/green		
Design	Tinned copper stranded wire		
Cross section	10 mm²		
Shield	No		
Stranding	No		
Cable stranding	With filler elements and foil shield		
Complete shielding	Tinned copper braiding, optical coverage >85% and foil shield		
Outer jacket			
Material	TPU		
Color	Orange, similar to RAL 2003 flat		
Labeling	B&R 3 G 10 C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]		
Electrical characteristics [1]			
Operating voltage	Max. 1000 V AC (UL)		
Test voltage			
Wire/Wire	4 kV		
Wire/Shield	4 kV		
Conductor resistance			
Power lines	≤2 Ω/km		
Insulation resistance	≥500 MΩ*km		
Current-carrying capacity per DIN VDE 0298 part 4, table 11			
Wall mounting	64.6 A		
Installed in conduit or cable duct	54.6 A		
Installed in cable tray	68.3 A		
Environmental conditions [1]			
Temperature			
Moving	-20°C to +80°C		
Static	-20°C to +90°C		
Mechanical characteristics [1]			
Dimensions			
Length	1.5 m	3 m	5 m
Diameter	20.1 mm ± 0.4 mm		
Bend radius			
Single bend	>62 mm		
Moving	>154 mm		
Drag chain data			
Acceleration	Max. 50 m/s² (depends on the length of the travel path)		
Flex cycles [2]	≤5,000,000		
Speed	Max. 300 m/min		
Weight	0.8 kg	1.6 kg	2.7 kg

Table 312: 8BCA01X5.1513A-0, 8BCA0003.1513A-0, 8BCA0005.1513A-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

17.9.4 Wiring

17.9.4.1 Construction



Pos.	Name	Note
1	Expansion wire	3x 1.5 mm² (for 8BCAxxxx.1111A-0) 3x 4 mm² (for 8BCAxxxx.1312A-0) 3x 10 mm² (for 8BCAxxxx.1513A-0)
2	Heat shrink tubing	
3	Wire end sleeves	
4	Cable clamp	
5	Shield plate	

Table 313: Construction - 8BCA expansion cable

17.9.4.2 Cable diagram

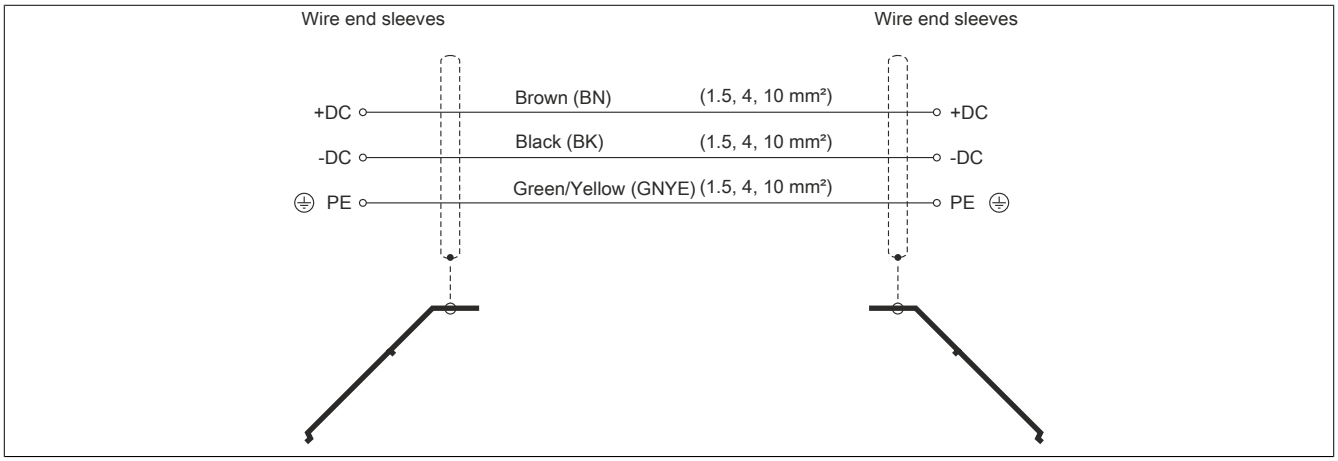


Figure 139: Cable schematic - 8BCA expansion cable

18 Cable extensions

18.1 1.5 mm² motor cables

18.1.1 Order data

Model number	Short description	Figure
	Motor cables 1.5 mm²	
8BCM0005.11140-0	Cable extension for 1.5 mm² motor cable with speedtec or standard connector, length 5 m, can be used in cable drag chains, UL/CSA listed	
8BCM0007.11140-0	Cable extension for 1.5 mm² motor cable with speedtec or standard connector, length 7 m, can be used in cable drag chains, UL/CSA listed	
8BCM0010.11140-0	Cable extension for 1.5 mm² motor cable with speedtec or standard connector, length 10 m, can be used in cable drag chains, UL/CSA listed	
8BCM0015.11140-0	Cable extension for 1.5 mm² motor cable with speedtec or standard connector, length 15 m, can be used in cable drag chains, UL/CSA listed	
8BCM0020.11140-0	Cable extension for 1.5 mm² motor cable with speedtec or standard connector, length 20 m, can be used in cable drag chains, UL/CSA listed	
8BCM0025.11140-0	Cable extension for 1.5 mm² motor cable with speedtec or standard connector, length 25 m, can be used in cable drag chains, UL/CSA listed	

Table 314: 8BCM0005.11140-0, 8BCM0007.11140-0, 8BCM0010.11140-0, 8BCM0015.11140-0, 8BCM0020.11140-0, 8BCM0025.11140-0 - Order data

18.1.2 Technical data

Model number	8BCM0005.11140-0	8BCM0007.11140-0	8BCM0010.11140-0	8BCM0015.11140-0	8BCM0020.11140-0	8BCM0025.11140-0
General information						
Cable cross section	4x 1.5 mm² + 2x 2x 0.75 mm²					
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	1.5 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	0.75 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Complete shielding	Tinned copper braiding, optical coverage >85% and foil shield					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 1.5 + 2 x (2x0,75)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 production order number [1]					
Connector						
Type	8-pin female speedtec motor connector					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Additional connectors	8-pin male coupling Connection cycles: <500 Contacts: 8 Degree of protection per EN 60529: IP66/67 when connected					

Table 315: 8BCM0005.11140-0, 8BCM0007.11140-0, 8BCM0010.11140-0, 8BCM0015.11140-0, 8BCM0020.11140-0, 8BCM0025.11140-0 - Technical data

Model number	8BCM0005.11140-0	8BCM0007.11140-0	8BCM0010.11140-0	8BCM0015.11140-0	8BCM0020.11140-0	8BCM0025.11140-0
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	Max. 1000 V AC (UL)					
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤13.7 Ω/km					
Signal lines	≤26.7 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	20 A					
Installed in conduit or cable duct	17.8 A					
Installed in cable tray	20.9 A					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	12.2 mm ± 0.3 mm					
Bend radius						
Single bend	>38 mm					
Moving	>94 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≤5,000,000					
Speed	Max. 300 m/min					
Weight	0.7 kg	1 kg	1.5 kg	2.2 kg	2.9 kg	3.7 kg

Table 315: 8BCM0005.11140-0, 8BCM0007.11140-0, 8BCM0010.11140-0, 8BCM0015.11140-0, 8BCM0020.11140-0, 8BCM0025.11140-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

18.2 4 mm² motor cables

18.2.1 Order data

Model number	Short description	Figure
	Motor cables 4 mm²	
8BCM0005.13140-0	Cable extension for 4 mm² motor cable with speedtec or standard connector, length 5 m, can be used in cable drag chains, UL/CSA listed	
8BCM0007.13140-0	Cable extension for 4 mm² motor cable with speedtec or standard connector, length 7 m, can be used in cable drag chains, UL/CSA listed	
8BCM0010.13140-0	Cable extension for 4 mm² motor cable with speedtec or standard connector, length 10 m, can be used in cable drag chains, UL/CSA listed	
8BCM0015.13140-0	Cable extension for 4 mm² motor cable with speedtec or standard connector, length 15 m, can be used in cable drag chains, UL/CSA listed	
8BCM0020.13140-0	Cable extension for 4 mm² motor cable with speedtec or standard connector, length 20 m, can be used in cable drag chains, UL/CSA listed	
8BCM0025.13140-0	Cable extension for 4 mm² motor cable with speedtec or standard connector, length 25 m, can be used in cable drag chains, UL/CSA listed	

Table 316: 8BCM0005.13140-0, 8BCM0007.13140-0, 8BCM0010.13140-0, 8BCM0015.13140-0, 8BCM0020.13140-0, 8BCM0025.13140-0 - Order data

18.2.2 Technical data

Model number	8BCM0005.13140-0	8BCM0007.13140-0	8BCM0010.13140-0	8BCM0015.13140-0	8BCM0020.13140-0	8BCM0025.13140-0
General information						
Cable cross section	4x 4 mm² + 2x 0.75 mm² + 2x 1 mm²					
Durability	Oil resistance per HD 22.10 appendix A and DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	4 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	2x 0.75 mm² + 2x 1 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil shield					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil shield					
Complete shielding	Tinned copper braiding, optical coverage >85% with foil shield					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 4 + (2x0.75)C + (2x1)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	8-pin female speedtec motor connector					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Additional connectors	8-pin male coupling Connection cycles: <500 Contacts: 8 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	Max. 1000 V AC (UL)					

Table 317: 8BCM0005.13140-0, 8BCM0007.13140-0, 8BCM0010.13140-0, 8BCM0015.13140-0, 8BCM0020.13140-0, 8BCM0025.13140-0 - Technical data

Model number	8BCM0005.13140-0	8BCM0007.13140-0	8BCM0010.13140-0	8BCM0015.13140-0	8BCM0020.13140-0	8BCM0025.13140-0
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤5.1 Ω/km					
Signal lines	0.75 mm²: ≤26.7 Ω/km, 1 mm²: ≤20 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	30 A [2]					
Installed in conduit or cable duct	30 A [2]					
Installed in cable tray	30 A [2]					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	15.4 mm ± 0.4 mm					
Bend radius						
Single bend	>48 mm					
Moving	>119 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [3]	≤5,000,000					
Speed	Max. 300 m/min					
Weight	1.4 kg	1.9 kg	2.8 kg	4.2 kg	5.5 kg	6.9 kg

Table 317: 8BCM0005.13140-0, 8BCM0007.13140-0, 8BCM0010.13140-0, 8BCM0015.13140-0, 8BCM0020.13140-0, 8BCM0025.13140-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Limited to 30 A by the motor connector.
3) At an ambient temperature from -20°C to +60°C.

18.3 10 mm² motor cables

18.3.1 Order data

Model number	Short description	Figure
	Motor cables 10 mm²	
8BCM0005.15250-0	Cable extension for 10 mm² motor cable with speedtec or standard connector, size 1.5, length 5 m, can be used in cable drag chains, UL/CSA listed	
8BCM0007.15250-0	Cable extension for 10 mm² motor cable with speedtec or standard connector, size 1.5, length 7 m, can be used in cable drag chains, UL/CSA listed	
8BCM0010.15250-0	Cable extension for 10 mm² motor cable with speedtec or standard connector, size 1.5, length 10 m, can be used in cable drag chains, UL/CSA listed	
8BCM0015.15250-0	Cable extension for 10 mm² motor cable with speedtec or standard connector, size 1.5, length 15 m, can be used in cable drag chains, UL/CSA listed	
8BCM0020.15250-0	Cable extension for 10 mm² motor cable with speedtec or standard connector, size 1.5, length 20 m, can be used in cable drag chains, UL/CSA listed	
8BCM0025.15250-0	Cable extension for 10 mm² motor cable with speedtec or standard connector, size 1.5, length 25 m, can be used in cable drag chains, UL/CSA listed	

Table 318: 8BCM0005.15250-0, 8BCM0007.15250-0, 8BCM0010.15250-0, 8BCM0015.15250-0, 8BCM0020.15250-0, 8BCM0025.15250-0 - Order data

18.3.2 Technical data

Model number	8BCM0005.15250-0	8BCM0007.15250-0	8BCM0010.15250-0	8BCM0015.15250-0	8BCM0020.15250-0	8BCM0025.15250-0
General information						
Cable cross section	4x 10 mm² + (2x 0.75 mm²)C + (2x 1.5 mm²)C					
Durability	Oil resistance per HD 22.10 appendix A DIN EN 60811-404 [1]					
Certification	E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Power lines						
Quantity	4					
Wire insulation	PP					
Wire colors	Black, brown, blue, yellow/green					
Design	Tinned copper stranded wire					
Cross section	10 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	PP					
Wire colors	White, white/red, white/blue, white/green					
Design	Tinned copper stranded wire					
Cross section	2x 0.75 mm² + 2x 1.5 mm²					
Shield	Separate shielding for pairs, tinned copper braiding, optical coverage >85% and foil banding					
Stranding	White with white/red and white/blue with white/green					
Cable stranding	With filler elements and foil banding					
Complete shielding	Tinned copper braiding, optical coverage >85% and wrapped in isolating film					
Outer jacket						
Material	TPU					
Color	Orange, similar to RAL 2003 flat					
Labeling	B&R 4 G 10 + (2x0.75)C + (2x1.5)C C E170315 cRUus AWM STYLE 21223 AWM I/II A/B 80°C 1000 V FT1 [1]					
Connector						
Type	8-pin female speedtec motor connector, size 1.5					
Connection cycles	<500					
Contacts	8 (4 power and 4 signal contacts)					
Additional connectors	8-pin male coupling Connection cycles: <500 Contacts: 8 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	Max. 1000 V AC (UL)					

Table 319: 8BCM0005.15250-0, 8BCM0007.15250-0, 8BCM0010.15250-0, 8BCM0015.15250-0, 8BCM0020.15250-0, 8BCM0025.15250-0 - Technical data

Model number	8BCM0005.15250-0	8BCM0007.15250-0	8BCM0010.15250-0	8BCM0015.15250-0	8BCM0020.15250-0	8BCM0025.15250-0
Test voltage						
Wire/Wire	4 kV					
Wire/Shield	4 kV					
Conductor resistance						
Power lines	≤2 Ω/km					
Signal lines	0.75 mm²: ≤26.7 Ω/km, 1.5 mm²: ≤13.7 Ω/km					
Insulation resistance	≥500 MΩ*km					
Current-carrying capacity per DIN VDE 0298 part 4, table 11						
Wall mounting	64.6 A					
Installed in conduit or cable duct	54.6 A					
Installed in cable tray	68.3 A					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	20.1 mm ± 0.4 mm					
Bend radius						
Single bend	>62 mm					
Moving	>154 mm					
Drag chain data						
Acceleration	Max. 50 m/s² (depends on the length of the travel path)					
Flex cycles [2]	≤5,000,000					
Speed	Max. 300 m/min					
Weight	2.7 kg	3.8 kg	5.4 kg	8.1 kg	10.8 kg	13.5 kg

Table 319: 8BCM0005.15250-0, 8BCM0007.15250-0, 8BCM0010.15250-0, 8BCM0015.15250-0, 8BCM0020.15250-0, 8BCM0025.15250-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature from -20°C to +60°C.

18.4 EnDat 2.1 cables

18.4.1 Order data

Model number	Short description	Figure
	EnDat 2.1 cables	
8BCE0005.11120-0	Cable extension for EnDat 2.1 cable with speedtec or standard connector, length 5 m, can be used in cable drag chains, UL/CSA listed	
8BCE0007.11120-0	Cable extension for EnDat 2.1 cable with speedtec or standard connector, length 7 m, can be used in cable drag chains, UL/CSA listed	
8BCE0010.11120-0	Cable extension for EnDat 2.1 cable with speedtec or standard connector, length 10 m, can be used in cable drag chains, UL/CSA listed	
8BCE0015.11120-0	Cable extension for EnDat 2.1 cable with speedtec or standard connector, length 15 m, can be used in cable drag chains, UL/CSA listed	
8BCE0020.11120-0	Cable extension for EnDat 2.1 cable with speedtec or standard connector, length 20 m, can be used in cable drag chains, UL/CSA listed	
8BCE0025.11120-0	Cable extension for EnDat 2.1 cable with speedtec or standard connector, length 25 m, can be used in cable drag chains, UL/CSA listed	

Table 320: 8BCE0005.11120-0, 8BCE0007.11120-0, 8BCE0010.11120-0, 8BCE0015.11120-0, 8BCE0020.11120-0, 8BCE0025.11120-0 - Order data

18.4.2 Technical data

Model number	8BCE0005.11120-0	8BCE0007.11120-0	8BCE0010.11120-0	8BCE0015.11120-0	8BCE0020.11120-0	8BCE0025.11120-0
General information						
Cable cross section	5x 2x 0.14 mm² + 1x 2x 0.50 mm²					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certification	UL AWM Style 20963, 80°C, 30 V, E63216 and CSA AWM I/II A/B, 90°C, 30 V, FT1 LL46064 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Supply lines						
Quantity	2					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, white/red					
Design	Tinned copper stranded wire					
Cross section	0.5 mm²					
Shield	No					
Stranding	White/Red with white/green and filler elements					
Signal lines						
Quantity	10					
Wire insulation	Special thermoplastic material					
Wire colors	Blue, brown, yellow, gray, green, pink, red, black, violet, white					
Design	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	Green with brown, gray with yellow, white with violet, black with red, pink with blue					
Cable stranding	With foil shield					
Complete shielding	Copper braiding, optical coverage >85% and wrapped in foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Labeling	BERNECKER + RAINER 5x2x0.14+2x0.50 FLEX UL AWM STYLE 20963 80°C 30 V E63216 CSA AWM I/II A/B 90°C 30 V FT1 LL46064 [1]					
Connector						
Type	17-pin female speedtec circular connector					
Connection cycles	<500					
Contacts	17					
Additional connectors	17-pin male coupling Connection cycles: <500 Contacts: 17 Degree of protection per EN 60529: IP67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					

Table 321: 8BCE0005.11120-0, 8BCE0007.11120-0, 8BCE0010.11120-0, 8BCE0015.11120-0, 8BCE0020.11120-0, 8BCE0025.11120-0 - Technical data

Model number	8BCE0005. 11120-0	8BCE0007. 11120-0	8BCE0010. 11120-0	8BCE0015. 11120-0	8BCE0020. 11120-0	8BCE0025. 11120-0
Electrical characteristics [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire/Wire	1 kV					
Wire/Shield	0.8 kV					
Conductor resistance						
Supply lines	≤40 Ω/km					
Signal lines	≤140 Ω/km					
Insulation resistance	>200 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	7.85 mm ± 0.2 mm					
Bend radius						
Single bend	≥24 mm					
Moving	≥60 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	>3,000,000					
Speed	≤4 m/s					
Weight	0.4 kg	0.6 kg	0.8 kg	1.2 kg	1.6 kg	2 kg

Table 321: 8BCE0005.11120-0, 8BCE0007.11120-0, 8BCE0010.11120-0, 8BCE0015.11120-0, 8BCE0020.11120-0, 8BCE0025.11120-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature of 20°C and a flex radius of 65 mm.

18.5 EnDat 2.2 cables

18.5.1 Order data

Model number	Short description	Figure
	EnDat 2.2 cables	
8BCF0005.12230-0	Cable extension for EnDat 2.2 cable with springtec connector, length 5 m, can be used in cable drag chains, UL/CSA listed	
8BCF0007.12230-0	Cable extension for EnDat 2.2 cable with springtec connector, length 7 m, can be used in cable drag chains, UL/CSA listed	
8BCF0010.12230-0	Cable extension for EnDat 2.2 cable with springtec connector, length 10 m, can be used in cable drag chains, UL/CSA listed	
8BCF0015.12230-0	Cable extension for EnDat 2.2 cable with springtec connector, length 15 m, can be used in cable drag chains, UL/CSA listed	
8BCF0020.12230-0	Cable extension for EnDat 2.2 cable with springtec connector, length 20 m, can be used in cable drag chains, UL/CSA listed	
8BCF0025.12230-0	Cable extension for EnDat 2.2 cable with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed	

Table 322: 8BCF0005.12230-0, 8BCF0007.12230-0, 8BCF0010.12230-0, 8BCF0015.12230-0, 8BCF0020.12230-0, 8BCF0025.12230-0 - Order data

18.5.2 Technical data

Model number	8BCF0005. 12230-0	8BCF0007. 12230-0	8BCF0010. 12230-0	8BCF0015. 12230-0	8BCF0020. 12230-0	8BCF0025. 12230-0
General information						
Cable cross section	4x 0.14 mm² + 4x 0.35 mm²					
Durability	Oil resistance per DIN EN 50363-10-2 (VDE 0207-363-10-2) as well as standard cleaning agents and hydraulic oil [1]					
Certification	UL AWM style 20963, 80°C, 30 V, E63216 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Supply lines						
Quantity	4					
Wire insulation	Special thermoplastic material					
Wire colors	White/Green, brown/green, blue, white					
Design	Tinned copper stranded wire					
Cross section	0.35 mm²					
Shield	No					
Stranding	No					
Signal lines						
Quantity	4					
Wire insulation	Polyolefin foam					
Wire colors	Yellow, gray, pink, violet					
Design	Tinned copper stranded wire					
Cross section	0.14 mm²					
Shield	No					
Stranding	All 4 wires together					
Cable stranding	With foil shield					
Complete shielding	Copper/Tin braiding, optical coverage ≥85%					
Outer jacket						
Material	PUR					
Color	Green flat					
Labeling	B&R 4x0.14 + 4x0.35 FLEX (UL) AWM STYLE 20963 80°C 30 V E63216 [1]					
Connector						
Type	12-pin female springtec circular connector					
Connection cycles	<500					
Contacts	12					
Additional connectors	12-pin male coupling Connection cycles: <500 Contacts: 12 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	≤30 V					
Test voltage						
Wire/Wire	1 kV					
Wire/Shield	0.5 kV					

Table 323: 8BCF0005.12230-0, 8BCF0007.12230-0, 8BCF0010.12230-0, 8BCF0015.12230-0, 8BCF0020.12230-0, 8BCF0025.12230-0 - Technical data

Model number	8BCF0005.12230-0	8BCF0007.12230-0	8BCF0010.12230-0	8BCF0015.12230-0	8BCF0020.12230-0	8BCF0025.12230-0
Conductor resistance						
Supply lines	≤55 Ω/km					
Signal lines	≤134 Ω/km					
Insulation resistance	>200 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +80°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6 mm ± 0.2 mm					
Bend radius						
Single bend	≥19 mm					
Moving	≥47 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3,000,000					
Speed	≤4 m/s					
Weight	0.33 kg	0.41 kg	0.6 kg	0.9 kg	1.2 kg	1.5 kg

Table 323: 8BCF0005.12230-0, 8BCF0007.12230-0, 8BCF0010.12230-0, 8BCF0015.12230-0, 8BCF0020.12230-0, 8BCF0025.12230-0 - Technical data

1) Specified values refer to the raw cable being used.
2) Valid at an ambient temperature of 20°C and bend radius of 78 mm.

18.6 Resolver cables

18.6.1 Order data

Model number	Short description	Figure
	Resolver cables	
8BCR0005.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 5 m, can be used in cable drag chains, UL/CSA listed	
8BCR0007.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 7 m, can be used in cable drag chains, UL/CSA listed	
8BCR0010.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 10 m, can be used in cable drag chains, UL/CSA listed	
8BCR0015.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 15 m, can be used in cable drag chains, UL/CSA listed	
8BCR0020.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 20 m, can be used in cable drag chains, UL/CSA listed	
8BCR0025.11120-0	Cable extension for resolver cable with speedtec or standard connector, length 25 m, can be used in cable drag chains, UL/CSA listed	

Table 324: 8BCR0005.11120-0, 8BCR0007.11120-0, 8BCR0010.11120-0, 8BCR0015.11120-0, 8BCR0020.11120-0, 8BCR0025.11120-0 - Order data

18.6.2 Technical data

Model number	8BCR0005.11120-0	8BCR0007.11120-0	8BCR0010.11120-0	8BCR0015.11120-0	8BCR0020.11120-0	8BCR0025.11120-0
General information						
Cable cross section	3x 2x 24 19 AWG					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certification	UL AWM style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Signal lines						
Quantity	6					
Wire insulation	Special thermoplastic material					
Wire colors	White/Brown, green/yellow, gray/pink					
Design	Tinned copper stranded wire					
Cross section	AWG 24 / AWG 19					
Shield	No					
Stranding	White with brown, green with yellow, gray with pink					
Cable stranding	The 3 pairs together covered by foil shield					
Complete shielding	Copper braiding, optical coverage ≥90% with foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Labeling	BERNECKER + RAINER 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064 [1]					
Connector						
Type	12-pin female speedtec circular connector					
Connection cycles	<500					
Contacts	12					
Additional connectors	12-pin male coupling Connection cycles: <500 Contacts: 12 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire/Wire	1.5 kV					
Wire/Shield	0.8 kV					
Conductor resistance						
Signal lines	≤86 Ω/km					
Insulation resistance	>200 MΩ*km					

Table 325: 8BCR0005.11120-0, 8BCR0007.11120-0, 8BCR0010.11120-0, 8BCR0015.11120-0, 8BCR0020.11120-0, 8BCR0025.11120-0 - Technical data

Model number	8BCR0005. 11120-0	8BCR0007. 11120-0	8BCR0010. 11120-0	8BCR0015. 11120-0	8BCR0020. 11120-0	8BCR0025. 11120-0
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ± 0.2 mm					
Bend radius						
Single bend	≥20 mm					
Moving	≥50 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3,000,000					
Speed	≤4 m/s					
Weight	0.4 kg	0.5 kg	0.7 kg	1.1 kg	1.4 kg	1.8 kg

Table 325: 8BCR0005.11120-0, 8BCR0007.11120-0, 8BCR0010.11120-0, 8BCR0015.11120-0, 8BCR0020.11120-0, 8BCR0025.11120-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

18.7 Resolver cables with springtec connector

18.7.1 Order data

Model number	Short description	Figure
	Resolver Cables SpringTec connector	
8BCR0005.11230-0	Cable extension for resolver cable with springtec connector, length 5 m, can be used in cable drag chains, UL/CSA listed	
8BCR0007.11230-0	Cable extension for resolver cable with springtec connector, length 7 m, can be used in cable drag chains, UL/CSA listed	
8BCR0010.11230-0	Cable extension for resolver cable with springtec connector, length 10 m, can be used in cable drag chains, UL/CSA listed	
8BCR0015.11230-0	Cable extension for resolver cable with springtec connector, length 15 m, can be used in cable drag chains, UL/CSA listed	
8BCR0020.11230-0	Cable extension for resolver cable with springtec connector, length 20 m, can be used in cable drag chains, UL/CSA listed	
8BCR0025.11230-0	Cable extension for resolver cable with springtec connector, length 25 m, can be used in cable drag chains, UL/CSA listed	

Table 326: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Order data

18.7.2 Technical data

Model number	8BCR0005. 11230-0	8BCR0007. 11230-0	8BCR0010. 11230-0	8BCR0015. 11230-0	8BCR0020. 11230-0	8BCR0025. 11230-0
General information						
Cable cross section	3x 2x 24 19 AWG					
Durability	Oil resistance per VDE 0472 Part 803 as well as standard hydraulic oils [1]					
Certification	UL AWM style 20671, 90°C, 30 V, E63216 and CSA AWM, 90°C, 30 V, I/II A/B FT1 LL46064 [1]					
Certifications						
CE	Yes					
UL	cULus E225616 Power conversion equipment					
Cable construction						
Signal lines						
Quantity	6					
Wire insulation	Special thermoplastic material					
Wire colors	White/Brown, green/yellow, gray/pink					
Design	Tinned copper stranded wire					
Cross section	AWG 24 / AWG 19					
Shield	No					
Stranding	White with brown, green with yellow, gray with pink					
Cable stranding	The 3 pairs together covered by foil shield					
Complete shielding	Copper braiding, optical coverage ≥90% with foil shield					
Outer jacket						
Material	PUR					
Color	Green, similar to RAL 6018 flat					
Labeling	BERNECKER + RAINER 3x2x24 AWG FLEX UL AWM STYLE 20671 90°C 30 V E63216 CSA AWM 90°C 30 V I/II A/B FT1 LL46064 [1]					
Connector						
Type	12-pin female springtec circular connector					
Connection cycles	<500					
Contacts	12					
Additional connectors	12-pin male coupling Connection cycles: <500 Contacts: 12 Degree of protection per EN 60529: IP66/67 when connected					
Degree of protection per EN 60529	IP66/67 when connected					
Electrical characteristics [1]						
Operating voltage	≤30 V_{eff}					
Test voltage						
Wire/Wire	1.5 kV					
Wire/Shield	0.8 kV					
Conductor resistance						
Signal lines	≤86 Ω/km					
Insulation resistance	>200 MΩ*km					
Environmental conditions [1]						
Temperature						
Moving	-20°C to +80°C					
Static	-20°C to +90°C					

Table 327: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data

Model number	8BCR0005.11230-0	8BCR0007.11230-0	8BCR0010.11230-0	8BCR0015.11230-0	8BCR0020.11230-0	8BCR0025.11230-0
Mechanical characteristics [1]						
Dimensions						
Length	5 m	7 m	10 m	15 m	20 m	25 m
Diameter	6.5 mm ± 0.2 mm					
Bend radius						
Single bend	≥20 mm					
Moving	≥50 mm					
Drag chain data						
Acceleration	≤6 g					
Flex cycles [2]	≥3,000,000					
Speed	≤4 m/s					
Weight	0.4 kg	0.49 kg	0.7 kg	1.1 kg	1.4 kg	1.8 kg

Table 327: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data

1) Specified values refer to the raw cable being used.
2) At an ambient temperature of 20°C and bend radius of 65 mm.

19 Terminal blocks

19.1 PC5

19.1.1 Order data

Model number	Short description	Figure
	Terminal blocks	
8TB3104.201M-11	Screw clamp 4-pin, single-row, spacing: 7.62 mm, label 1: numbered serially, M keying: 1011	
8TB3104.201H-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 1: numbered serially, H keying: 1110	
8TB3104.204G-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, G keying: 0110	
8TB3104.204K-11	4-pin screw clamp, single row, spacing: 7.62 mm, label 4: PE W V U, K keying: 1001	
8TB3102.201C-11	2-pin screw clamp, single row, spacing: 7.62 mm, label 1: numbered serially, C keying: 10	

Table 328: 8TB3104.201M-11, 8TB3104.201H-11, 8TB3104.204G-11, 8TB3104.204K-11, 8TB3102.201C-11 - Order data

19.1.2 Technical data

Model number	8TB3104.201M-11	8TB3104.201H-11	8TB3104.204G-11	8TB3104.204K-11	8TB3102.201C-11
Terminal block					
Note	Label 1: numbered consecutively M keying: 1011 1-row	Label 1: numbered consecutively H keying: 1110 1-row	Label 4: PE W V U G keying: 0110 1-row	Label 4: PE W V U K keying: 1001 1-row	Label 1: Numbered consecutively C keying: 10 1-row
Number of pins	4				2
Type of terminal block	Screw clamp terminal block				
Cable type	Only copper wires (no aluminum wires!)				
Keying	M	H	G	K	C
Spacing	7.62 mm				
Wire stripping length	10 mm				
Connection cross section					
AWG wire	24 to 8 AWG				
Wire end sleeves with plastic covering	0.25 to 4 mm²				
Solid wires	0.2 to 6 mm²				
Fine strand wires	0.2 to 4 mm²				
With wire end sleeves	0.25 to 6 mm²				
Tightening torque	0.7 to 0.8 Nm				
Electrical characteristics					
Nominal voltage	1000 V (IEC) / 600 V (UL)				
Nominal current	41 A (IEC/UL)				
Mechanical characteristics					
Dimensions					
Width	30.4 mm				15.2 mm
Height	19.7 mm				
Depth	35.3 mm				
Weight	3.3 g				9.4 g

Table 329: 8TB3104.201M-11, 8TB3104.201H-11, 8TB3104.204G-11, 8TB3104.204K-11, 8TB3102.201C-11 - Technical data

19.2 PC6

19.2.1 Order data

Model number	Short description	Figure
	Terminal blocks	
8TB4103.202A-00	Screw clamp terminal block 3-pin, single-row, pitch: 10.16 mm, labeling 2: PE RB- RB+, coding A: 000	
8TB4104.202N-00	Screw clamp terminal block 4-pin, single-row, pitch: 10.16 mm, labeling 2: L1 L2 L3 PE, coding N: 1100	

Table 330: 8TB4103.202A-00, 8TB4104.202N-00 - Order data

19.2.2 Technical data

Model number	8TB4103.202A-00	8TB4104.202N-00
Terminal block		
Note	Label 2: PE RB- RB+ A keying: 000 1-row	Label 2: L1 L2 L3 P3 N keying: 1100 1-row
Number of pins	3	4
Type of terminal block	Screw clamps	
Cable type	Only copper wires (no aluminum wires!)	
Keying	A	N
Spacing	10.16 mm	
Wire stripping length	12 mm	
Connection cross section		
AWG wire	20 to 8 AWG	
Wire end sleeves with plastic covering	0.5 to 6 mm²	
Solid wires	0.75 to 6 mm²	
Fine strand wires	0.75 to 6 mm²	
With wire end sleeves	0.5 to 6 mm²	
Tightening torque	1.2 to 1.5 Nm	
Electrical characteristics		
Nominal voltage	1000 V (IEC) / 600 V (UL)	
Nominal current	41 A (IEC) / 50 A (UL)	
Mechanical characteristics		
Dimensions		
Width	29.5 mm	39.7 mm
Height	27.6 mm	
Depth	39 mm	
Weight	25.2 g	33.2 g

Table 331: 8TB4103.202A-00, 8TB4104.202N-00 - Technical data

19.3 PC16

19.3.1 Order data

Model number	Short description	Figure
	Terminal blocks	
8TB4104.206D-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 6: L1´ L2´ L3´ PE, D keying: 0011	
8TB4104.202L-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 2: PE L3 L2 L1, keying L: 1010	
8TB4104.204G-10	4-pin screw clamp, single row, spacing: 10.16 mm, label 4: PE W V U, G keying: 0110	
8TB4104.204G-00	4-pin screw clamp, single row, spacing: 10.16 mm, label 4: PE W V U, G keying: 0110	

Table 332: 8TB4104.206D-10, 8TB4104.202L-10, 8TB4104.204G-10, 8TB4104.204G-00 - Order data

19.3.2 Technical data

Model number	8TB4104.206D-10	8TB4104.202L-10	8TB4104.204G-10	8TB4104.204G-00
Terminal block				
Note	Label 6: L1` L2` L3` PE D keying: 0011 1-row	Label 2: L1 L2 L3 PE L keying: 1010 1-row	Label 4: PE W V U G keying: 0110 1-row	
Number of pins	4			
Type of terminal block	Screw clamp terminal block			
Cable type	Only copper wires (no aluminum wires!)			
Keying	D	L	G	
Spacing	10.16 mm			
Wire stripping length	12 mm			
Connection cross section				
AWG wire	20 to 6 AWG			20 to 8 AWG
Wire end sleeves with plastic covering	0.5 to 10 mm²			0.5 to 6 mm²
Solid wires	0.75 to 16 mm²			0.75 to 6 mm²
Fine strand wires	0.75 to 6 mm²			
With wire end sleeves	0.5 to 16 mm²			0.5 to 6 mm²
Tightening torque	1.7 to 1.8 Nm			1.2 to 1.5 Nm
Electrical characteristics				
Nominal voltage	1000 V (IEC) / 600 V (UL)			
Nominal current	76 A (IEC) / 55 A (UL)			41 A (IEC) / 50 A (UL)
Mechanical characteristics				
Dimensions				
Width	40.5 mm			39.7 mm
Height	27.8 mm			27.6 mm
Depth	41.5 mm			39 mm
Weight	13.5 g	34.9 g		33.2 g

Table 333: 8TB4104.206D-10, 8TB4104.202L-10, 8TB4104.204G-10, 8TB4104.204G-00 - Technical data

19.4 MSTB

19.4.1 Order data

Model number	Short description	Figure
	Terminal blocks	
8TB2104.2010-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2106.2010-00	6-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2108.2010-00	8-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2112.2010-00	12-pin screw clamp, single row, spacing: 5.08 mm, label 1: numbered serially	
8TB2104.204A-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 4: T- T + F- F+, A keying: 0000	
8TB2104.203L-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, L keying: 1010	
8TB2104.203F-00	4-pin screw clamp, single row, spacing: 5.08 mm, label 3: T- T + B- B+, F keying: 0101	

Table 334: 8TB2104.2010-00, 8TB2106.2010-00, 8TB2108.2010-00, 8TB2112.2010-00, 8TB2104.204A-00, 8TB2104.203L-00, 8TB2104.203F-00 - Order data

19.4.2 Technical data

Model number	8TB2104.2010-00	8TB2106.2010-00	8TB2108.2010-00	8TB2112.2010-00	8TB2104.204A-00	8TB2104.203L-00	8TB2104.203F-00
Terminal block							
Note	Label 1: numbered consecutively 0 keying: None 1-row				Label 4: T- T+ F- F+ A keying: 0000 1-row	Label 3: T- T+ B- B+ L keying: 1010 1-row	Label 3: T- T+ B- B+ F keying: 0101 1-row
Number of pins	4	6	8	12	4		
Type of terminal block	Screw clamp terminal block						
Cable type	Only copper wires (no aluminum wires!)						
Keying	0				A	L	F
Spacing	5.08 mm						
Wire stripping length	10 mm						
Connection cross section							
AWG wire	30 to 12 AWG						
Wire end sleeves with plastic covering	0.25 to 2.5 mm²						
Solid wires	0.2 to 2.5 mm²						
Fine strand wires	0.2 to 1.5 mm²						
With wire end sleeves	0.25 to 2.5 mm²						
Tightening torque	0.5 to 0.6 Nm						
Electrical characteristics							
Nominal voltage	250 V (IEC) / 300 V (UL)						
Nominal current	12 A (IEC) / 15 A (UL)						
Mechanical characteristics							
Dimensions							
Width	20 mm	30.5 mm	40.6 mm	61 mm	20.3 mm		
Height	15 mm						
Depth	27.2 mm				18.3 mm		
Weight	11.5 g	18.1 g	23.9 g	35.2 g	3.6 g		

Table 335: 8TB2104.2010-00, 8TB2106.2010-00, 8TB2108.2010-00, 8TB2112.2010-00, 8TB2104.204A-00, 8TB2104.203L-00, 8TB2104.203F-00 - Technical data

20 Connectors

20.1 General information

B&R offers various motor/encoder connectors for B&R motors so users can assemble their own cables. All connectors have IP67 protection. The metallic housing provides a protective ground connection on the housing in accordance with VDE 0627. All plastic used in the connector is UL94/V0 listed. High quality, gold-plated cage connector contacts guarantee a high level of contact stability even when reinserted many times.

Information:

Using B&R connectors guarantees that the EMC limits for the connection are not exceeded. Make sure that connectors are assembled correctly and include a proper shield connection.

20.2 8BPM motor connectors

20.2.1 Order data

Model number	Short description	Figure
	Accessories	
8BPM0001.0000-00	8-pin motor connector, SpeedTec, IP67, crimp contact included in delivery: 4x 0.35-2.5 mm² + 4x 0.14-1.0 mm², cable terminal size range: 9.5-14.5 mm, UL/CSA listed	
8BPM0002.0000-00	8-pin motor connector, SpeedTec, IP67, crimp contact included in delivery: 4x 2.5-4.0 mm² + 4x 0.14-1.0 mm², cable terminal size range: 14.0-17.0 mm, UL/CSA listed	
8BPM0003.0000-00	8-pin motor connector, SpeedTec, IP67, crimp contact included in delivery: 4x 1.5-10.0 mm² + 4x 0.35-2.5 mm², cable terminal size range: 16.5-25.0 mm, UL/CSA listed	

Table 336: 8BPM0001.0000-00, 8BPM0002.0000-00, 8BPM0003.0000-00 - Order data

20.2.2 Technical data

Model number	8BPM0001.0000-00	8BPM0002.0000-00	8BPM0003.0000-00
General information			
Insulator	PA 6.6 mod., UL 94/V0		
Contacts	Brass / nickel-plated		Brass / gold-plated
Protective ground connection on housing	According to VDE 0627		
Certification	UL / CSA		
Connector size	Size 1		Size 15
Number and type of contacts	8 (4 power and 4 signal contacts)		
Pollution degree	3		
Installation elevation	Up to 2000 m		
Protection per DIN 40050	IP66/67 when connected	IP67 when connected	
Electrical characteristics			
Overvoltage category	III		
Power contacts			
Contact resistance	<3 mΩ		<1 mΩ
Nominal voltage	630 V (AC/DC)		
Nominal current	Max. 30 A		Max. 75 A
Test voltage (L - L)	6000 V		
Signal contacts			
Contact resistance	<5 mΩ		<3 mΩ
Nominal voltage	250 V (AC/DC)		250 V
Nominal current	Max. 7 A		Max. 30 A
Test voltage (L - L)	2500 V		4000 V
Mechanical characteristics			
Housing			
Material	Zinc casting / nickel plated		
Dimensions			
Length	78 mm		99 mm
Diameter	28 mm		46 mm
Weight	56 g		

Table 337: 8BPM0001.0000-00, 8BPM0002.0000-00, 8BPM0003.0000-00 - Technical data

Model number	8BPM0001.0000-00	8BPM0002.0000-00	8BPM0003.0000-00
Crimp range	4x 0.5 - 2.5 mm² + 4x 0.06 - 1 mm²	4x 2.5 - 4 mm² + 4x 0.06 - 1 mm²	4x 1.5 - 10 mm² + 4x 0.5 - 2.5 mm²
Gasket	FKM	FPM	
Connection cycles	>500		
Cable terminals	9.5 - 14.5 mm	14 - 17 mm	16.5 - 25 mm
Temperature range	-20°C to +130°C		

Table 337: 8BPM0001.0000-00, 8BPM0002.0000-00, 8BPM0003.0000-00 - Technical data

20.3 8BPE EnDat connectors

20.3.1 Order data

Model number	Short description	Figure
	Accessories	
8BPE0001.0000-00	17-pin EnDat connector, SpeedTec, IP67, crimp contact included in delivery: 17x 0.14-1.0 mm², cable terminal size range: 6.0-10.0 mm, UL/CSA listed	

Table 338: 8BPE0001.0000-00 - Order data

20.3.2 Technical data

Model number	8BPE0001.0000-00
General information	
Insulator	PBT, UL 94 / V0
Contacts	Brass / nickel-plated
Protective ground connection on housing	Per VDE 0110/EN 61984, section 6.19.2.2
Certification	UL / CSA
Connector size	Size 1
Number and type of contacts	17 signal contacts
Pollution degree	3
Installation elevation	Up to 2000 m
Protection per DIN 40050	IP66/67 when connected
Electrical characteristics	
Overvoltage category	III
Signal contacts	
Contact resistance	<5 mΩ
Nominal voltage	125 V (AC/DC)
Nominal current	Max. 7 A
Test voltage (L - L)	2000 V
Mechanical characteristics	
Housing	
Material	Zinc casting / nickel plated
Dimensions	
Length	58 mm
Diameter	26 mm
Weight	56 g
Crimp range	17 x 0.06 - 1 mm²
Gasket	FKM
Connection cycles	>500
Cable terminals	6 - 10 mm
Temperature range	-20°C to +130°C

Table 339: 8BPE0001.0000-00 - Technical data

20.4 8BPR resolver connectors

20.4.1 Order data

Model number	Short description	Figure
	Accessories	
8BPR0001.0000-00	12-pin resolver connector, SpeedTec, IP67, crimp contacts included in delivery: 12x 0.14-1.0 mm², cable terminals: 6.0 - 10.0 mm, UL/CSA listed	

Table 340: 8BPR0001.0000-00 - Order data

20.4.2 Technical data

Model number	8BPR0001.0000-00
General information	
Insulator	PBT, UL 94 / V0
Contacts	Brass / nickel-plated
Protective ground connection on housing	Per VDE 0110/EN 61984, section 6.19.2.2
Certification	UL / CSA
Connector size	Size 1
Number and type of contacts	12 signal contacts
Pollution degree	3
Installation elevation	Up to 2000 m
Protection per DIN 40050	IP66/67 when connected
Electrical characteristics	
Overvoltage category	III
Signal contacts	
Contact resistance	<5 mΩ
Nominal voltage	160 V (AC/DC)
Nominal current	Max. 7 A
Test voltage (L - L)	2500 V
Mechanical characteristics	
Housing	
Material	Zinc casting / nickel plated
Dimensions	
Length	58 mm
Diameter	26 mm
Weight	56 g
Crimp range	12 x 0.06 - 1 mm²
Gasket	FKM
Connection cycles	>500
Cable terminals	6 - 10 mm
Temperature range	-20°C to +130°C

Table 341: 8BPR0001.0000-00 - Technical data

20.5 springtec encoder connector

20.5.1 Order data

Model number	Short description	Figure
	Accessories	
8BPR0002.0000-00	12-pin encoder connector, SpringTec, IP67, crimp contact included in delivery: 12x 0.14 - 1.0 mm², 1x keyed contact, cable terminal size range: 6-7.5 mm, UL/CSA listed	

Table 342: 8BPR0002.0000-00 - Order data

20.5.2 Technical data

Model number	8BPR0002.0000-00
General information	
Insulator	PA, PBT, UL94 / V0 listed
Contacts	Brass / nickel-plated
Protective ground connection on housing	Per VDE 0110/EN 61984, section 6.19.2.2
Certification	UL / CSA
Connector size	Size 1
Number and type of contacts	12 signal contacts
Pollution degree	3
Installation elevation	Up to 2000 m
Protection per DIN 40050	IP66/67 when connected
Electrical characteristics	
Overvoltage category	III
Signal contacts	
Contact resistance	<5 mΩ
Nominal voltage	63 V (AC/DC)
Nominal current	Max. 5 A
Test voltage (L - L)	1500 V
Mechanical characteristics	
Housing	
Material	Zink casting / plastic
Dimensions	
Length	42.7 mm
Diameter	18.6 mm
Weight	30 g
Crimp range	12 x 0.14 - 1 mm²
Gasket	FKM
Connection cycles	>500
Cable terminals	4.5 - 6.5 mm
Temperature range	-20°C to +130°C

Table 343: 8BPR0002.0000-00 - Technical data

20.6 springtec motor connector

20.6.1 Order data

Model number	Short description	Figure
	Accessories	
8BPM0004.0000-00	9-pin motor connector, SpringTec, IP67, crimp contact included in delivery: 4 x 0.5-1.5 mm² + 5 x 0.14-1.0 mm², cable terminal size range: 10.5-12 mm, UL/CSA listed	

Table 344: 8BPM0004.0000-00 - Order data

20.6.2 Technical data

Model number	8BPM0004.0000-00
General information	
Insulator	PTB, PA, UL94 / V0 listed
Protective ground connection on housing	According to VDE 0627
Certification	UL / CSA
Connector size	Size 15
Number and type of contacts	9 (4 power and 5 signal contacts)
Pollution degree	3
Installation elevation	Up to 2000 m
Protection per DIN 40050	IP66/67 when connected
Electrical characteristics	
Overvoltage category	III
Power contacts	
Contact resistance	<5 mΩ
Nominal voltage	630 V (AC/DC)
Nominal current	Max. 14 A
Test voltage (L - L)	6000 V
Signal contacts	
Contact resistance	<5 mΩ
Nominal voltage	63 V (AC/DC)
Nominal current	Max. 3.6 A
Test voltage (L - L)	1500 V
Mechanical characteristics	
Housing	
Material	Zink casting / plastic
Dimensions	
Length	42.7 mm
Diameter	18.6 mm
Weight	30 g
Crimp range	4x 0.5 - 1.5 mm² + 5x 0.14 - 1.0 mm²
Gasket	FKM
Connection cycles	>500
Cable terminals	10.5 - 12 mm
Temperature range	-20°C to +130°C

Table 345: 8BPM0004.0000-00 - Technical data

21 Signal connectors

21.1 Order data

Model number	Short description	Figure
	Thru-bulkhead receptacles	
8BXC000.0000-00	Signal connector, 8-pin, for motor cables with speedtec or standard connector, UL/CSA listed	
8BXC001.0000-00	Signal connector, 8-pin, for motor cables with speedtec or standard connector size 1.5, UL/CSA listed	
8BXC002.0000-00	Signal connector, 12-pin, for encoder cables with speedtec or standard connector, UL/CSA listed	
8BXC003.0000-00	Signal connector, 17-pin, for encoder cables with speedtec or standard connector, UL/CSA listed	
8BXC004.0000-00	Signal connector, 9-pin, for motor cables with springtec connector, UL/CSA listed	
8BXC005.0000-00	Signal connector, 12-pin, for resolver cables with springtec connector, UL/CSA listed	
8BXC009.0000-00	Signal connector, 12-pin, for encoder cables with springtec connector, UL/CSA listed	

Table 346: 8BXC000.0000-00, 8BXC001.0000-00, 8BXC002.0000-00, 8BXC003.0000-00, 8BXC004.0000-00, 8BXC005.0000-00, 8BXC009.0000-00 - Order data

21.2 Technical data

Model number	8BXC000. 0000-00	8BXC001. 0000-00	8BXC002. 0000-00	8BXC003. 0000-00	8BXC004. 0000-00	8BXC005. 0000-00	8BXC009. 0000-00
General information							
Short description	Signal connector, 8-pin, for motor cables with speedtec or standard connector, UL/CSA listed	Signal connector, 8-pin, for motor cables with speedtec or standard connector size 1.5, UL/CSA listed	Signal connector, 12-pin, for encoder cables with speedtec or standard connector, UL/CSA listed	Signal connector, 17-pin, for encoder cables with speedtec or standard connector, UL/CSA listed	Signal connector, 9-pin, for motor cables with springtec connector, UL/CSA listed	Signal connector, 12-pin, for resolver cables with springtec connector, UL/CSA listed	Signal connector, 12-pin, for encoder cables with springtec connector, UL/CSA listed
Certification	UL / CSA						
Mechanical characteristics							
Dimensions							
Length	78 mm	109.5 mm	75 mm		51 mm		
Diameter	ø 28 mm	ø 48 mm	ø 26 mm		ø 21 mm		
Weight	148 g	548 g	128 g	132 g	56 g	52 g	54 g

Table 347: 8BXC000.0000-00, 8BXC001.0000-00, 8BXC002.0000-00, 8BXC003.0000-00, 8BXC004.0000-00, 8BXC005.0000-00, 8BXC009.0000-00 - Technical data

22 Shield component sets

22.1 8SCS000.0000-00

22.1.1 Order data

Model number	Short description	Figure
	Shield component sets	
8SCS000.0000-00	ACOPOSmulti shield component set: 1 shield plate 1x type 0, 1 hose clamp, B 9 mm, D 12-22 mm	

Table 348: 8SCS000.0000-00 - Order data

22.1.2 Technical data

Model number	8SCS000.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 shield plate 1x type 0; 1 hose clamp, B 9 mm, D 12-22 mm
Certifications	
CE	Yes
Mechanical characteristics	
Weight	32 g

Table 349: 8SCS000.0000-00 - Technical data

22.2 8SCS001.0000-00

22.2.1 Order data

Model number	Short description	Figure
	Shield component sets	
8SCS001.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 1, 1 hose clamp, B 9 mm, D 12-22 mm	

Table 350: 8SCS001.0000-00 - Order data

22.2.2 Technical data

Model number	8SCS001.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 shield plate 4x type 1; 1 hose clamp, B 9 mm, D 12-22 mm
Certifications	
CE	Yes
Mechanical characteristics	
Weight	32 g

Table 351: 8SCS001.0000-00 - Technical data

22.3 8SCS002.0000-00

22.3.1 Order data

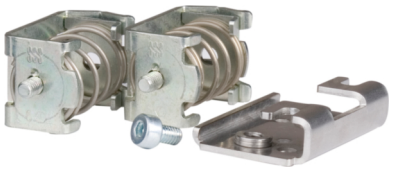
Model number	Short description	Figure
	Shield component sets	
8SCS002.0000-00	ACOPOSmulti shield component set: 1x clamping plate; 2x clamps D 4-13.5 mm; 4x screws	

Table 352: 8SCS002.0000-00 - Order data

22.3.2 Technical data

Model number	8SCS002.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 clamping plate; 2 clamps D 4-13.5 mm; 2 screws
Certifications	
CE	Yes
Mechanical characteristics	
Weight	57.7 g

Table 353: 8SCS002.0000-00 - Technical data

22.4 8SCS003.0000-00

22.4.1 Order data

Model number	Short description	Figure
	Shield component sets	
8SCS003.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 4x 45°; 8x screws	

Table 354: 8SCS003.0000-00 - Order data

22.4.2 Technical data

Model number	8SCS003.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 shield mounting plate 4x 45°; 8 screws
Certifications	
CE	Yes
Mechanical characteristics	
Weight	330 g

Table 355: 8SCS003.0000-00 - Technical data

22.5 8SCS004.0000-00

22.5.1 Order data

Model number	Short description	Figure
	Shield component sets	
8SCS004.0000-00	ACOPOSmulti shield component set: 1 shield plate 4x type 0, 2 hose clamps, B 9 mm, D 32-50 mm	

Table 356: 8SCS004.0000-00 - Order data

22.5.2 Technical data

Model number	8SCS004.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 shield plate 4x type 0; 2 hose clamps, B 9 mm, D 32-50 mm
Certifications	
CE	Yes
Mechanical characteristics	
Weight	58.1 g

Table 357: 8SCS004.0000-00 - Technical data

22.6 8SCS005.0000-00

22.6.1 Order data

Model number	Short description	Figure
	Shield component sets	
8SCS005.0000-00	ACOPOSmulti shield component set: 1x slot cover/shield plate	

Table 358: 8SCS005.0000-00 - Order data

22.6.2 Technical data

Model number	8SCS005.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 slot cover / shield plate
Certifications	
CE	Yes
Mechanical characteristics	
Weight	6 g

Table 359: 8SCS005.0000-00 - Technical data

22.7 8SCS007.0000-00

22.7.1 Order data

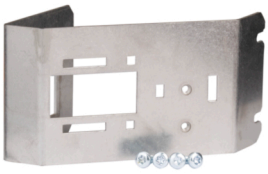
Model number	Short description	Figure
	Shield component sets	
8SCS007.0000-00	ACOPOSmulti shield component set: 1x shield mounting plate 2x 45°; 4x screws	

Table 360: 8SCS007.0000-00 - Order data

22.7.2 Technical data

Model number	8SCS007.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 shield mounting plate 2x 45°; 4 screws
Certifications	
CE	Yes
Mechanical characteristics	
Weight	130 g

Table 361: 8SCS007.0000-00 - Technical data

22.8 8SCS008.0000-00

22.8.1 Order data

Model number	Short description	Figure
	Shield component sets	
8SCS008.0000-00	ACOPOSmulti shield component set: 1 shield plate 2x type 0, 1 hose clamp, B 9 mm, D 23-35 mm	

Table 362: 8SCS008.0000-00 - Order data

22.8.2 Technical data

Model number	8SCS008.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 shield plate 2x type 0; 1 hose clamp, B 9 mm, D 23-35 mm
Certifications	
CE	Yes
Mechanical characteristics	
Weight	32 g

Table 363: 8SCS008.0000-00 - Technical data

22.9 8SCS009.0000-00

22.9.1 Order data

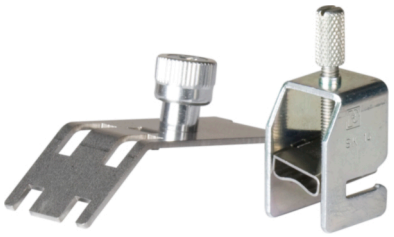
Model number	Short description	Figure
	Shield component sets	
8SCS009.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK8-14; 1x shield terminal SK14	

Table 364: 8SCS009.0000-00 - Order data

22.9.2 Technical data

Model number	8SCS009.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 ACOPOSmulti holding plate SK8-14; 1 shield terminal SK14
Certifications	
CE	Yes
Mechanical characteristics	
Weight	40.5 g

Table 365: 8SCS009.0000-00 - Technical data

22.10 8SCS010.0000-00

22.10.1 Order data

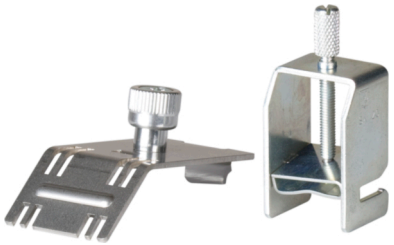
Model number	Short description	Figure
	Shield component sets	
8SCS010.0000-00	ACOPOSmulti shield component set: 1x ACOPOSmulti holding plate SK14-20; 1x shield terminal SK20	

Table 366: 8SCS010.0000-00 - Order data

22.10.2 Technical data

Model number	8SCS010.0000-00
General information	
Short description	ACOPOSmulti shield component set: 1 ACOPOSmulti holding plate SK14-20; 1 shield terminal SK20
Certifications	
CE	Yes
Mechanical characteristics	
Weight	55.4 g

Table 367: 8SCS010.0000-00 - Technical data

23 Screw clamp terminal block sets

23.1 8BZ0C

23.1.1 Order data

Model number	Short description	Figure
	Terminal block sets	
8BZ0C016000.001-1A	Screw clamp set for ACOPOSmulti modules 8B0C0160Hx00.001-1: 1x 8TB3104.201M-11, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	
8BZ0C016000.A01-1A	Screw clamp terminal block set for ACOPOSmulti 8B0C0160Hx00.A01-1 modules: 1x 8TB3104.201H-11, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	
8BZ0C032000.000-1A	Screw clamp set for ACOPOSmulti 8B0C0xx0Hx00.000-1 modules: 1x 8TB2106.2010-00	
8BZ0C032000.002-1A	Screw clamp set for ACOPOSmulti 8B0C0320Hx00.002-1 modules: 1x 8TB3104.201M-11, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	
8BZ0C032000.00A-1A	Screw clamp set for ACOPOSmulti 8B0C0320Hx00.00A-1 modules: 1x 8TB3104.201M-11, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	

Table 368: 8BZ0C016000.001-1A, 8BZ0C016000.A01-1A, 8BZ0C032000.000-1A, 8BZ0C032000.002-1A, 8BZ0C032000.00A-1A - Order data

23.1.2 Technical data

Model number	8BZ0C016000.001-1A	8BZ0C016000.A01-1A	8BZ0C032000.000-1A	8BZ0C032000.002-1A	8BZ0C032000.00A-1A
General information					
Short description	Screw clamp set for ACOPOSmulti modules 8B0C0160Hx00.001-1: 1x 8TB3104.201M-10, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	Screw clamp terminal block set for ACOPOSmulti 8B0C0160Hx00.A01-1 modules: 1x 8TB3104.201H-10, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	Screw clamp set for ACOPOSmulti 8B0C0xx0Hx00.000-1 modules: 1x 8TB2106.2010-00	Screw clamp set for ACOPOSmulti 8B0C0320Hx00.002-1 modules: 1x 8TB3104.201M-10, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00	Screw clamp set for ACOPOSmulti 8B0C0320Hx00.00A-1 modules: 1x 8TB3104.201M-10, 1x 8TB2104.2010-00, 1x 8TB2106.2010-00
Certifications					
CE	Yes				
UL	cULus E225616 Power conversion equipment				
Mechanical characteristics					
Weight	52 g		19 g	52 g	

Table 369: 8BZ0C016000.001-1A, 8BZ0C016000.A01-1A, 8BZ0C032000.000-1A, 8BZ0C032000.002-1A, 8BZ0C032000.00A-1A - Technical data

23.2 8BZ0P, 8BZVE and 8BZVF

23.2.1 Order data

Model number	Short description	Figure
	Terminal block sets	
8BZ0P044000.000-1A	Screw clamp set for ACOPOSmulti modules 8B0P0220Hx00.00x-1 and 8B0P0440Hx00.00x-1: 1x 8TB4104.202L-10, 1x 8TB4103.202A-00, 1x 8TB2106.2010-00	
8BZVE050000.000-1A	Screw clamp terminal block set for ACOPOSmulti 8BVE0500Hx00.000-1 modules: 2x 8TB3102.201C-11, 2x 8TB4103.203C-10, 1x 8TB2104.2010-00	
8BZVF088000.000-1A	Screw clamp set for ACOPOSmulti 8BVF0880H000.000-1 modules: 1x 8TB2104.204A-00	
8BZVF044000.001-2A	Screw clamp set for ACOPOSmulti modules 8BVF0220H000.000-1 and 8BVF0440H000.001-2: 1x 8TB4104.202N-10, 1x 8TB4104.206D-10, 1x 8TB2104.204A-00	

Table 370: 8BZ0P044000.000-1A, 8BZVE050000.000-1A, 8BZVF088000.000-1A, 8BZVF044000.001-2A - Order data

23.2.2 Technical data

Model number	8BZ0P044000.000-1A	8BZVE050000.000-1A	8BZVF088000.000-1A	8BZVF044000.001-2A
General information				
Short description	Screw clamp set for ACOPOSmulti modules 8B0P0220Hx00.00x-1 and 8B0P0440Hx00.00x-1: 1x 8TB4104.202L-10, 1x 8TB4103.202A-00, 1x 8TB2106.2010-00	Screw clamp terminal block set for ACOPOSmulti 8BVE0500Hx00.000-1 modules: 2x 8TB3102.201C-10, 2x 8TB4103.203C-10, 1x 8TB2104.2010-00	Screw clamp set for ACOPOSmulti 8BVF0880H000.000-1 modules: 1x 8TB2104.204A-00	Screw clamp set for ACOPOSmulti modules 8BVF0220H000.000-1 and 8BVF0440H000.001-2: 1x 8TB4104.202N-10, 1x 8TB4104.206D-10, 1x 8TB2104.204A-00
Certifications				
CE	Yes			
UL	cULus E225616 Power conversion equipment			
Mechanical characteristics				
Weight	80 g	88 g	8 g	80 g

Table 371: 8BZ0P044000.000-1A, 8BZVE050000.000-1A, 8BZVF088000.000-1A, 8BZVF044000.001-2A - Technical data

23.3 8BZVI

23.3.1 Order data

Model number	Short description	Figure
	Terminal block sets	
8BZVI0055D0.000-1A	Screw clamp set for ACOPOSmulti 8BVI00xxHxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	
8BZVI0055DS.000-1A	Screw clamp set for ACOPOSmulti 8BVI00xxHxDS modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	
8BZVI0055S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI00xxHxS0 modules: 1x 8TB3104.204G-11, 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
8BZVI0055SS.000-1A	Screw clamp set for ACOPOSmulti 8BVI00xxHxSS and 8BVI00xxHxSA modules: 1x 8TB3104.204G-11, 1x 8TB2104.203L-00, 1x 8TB2108.2010-00	

Table 372: 8BZVI0055D0.000-1A, 8BZVI0055DS.000-1A, 8BZVI0055S0.000-1A, 8BZVI0055SS.000-1A - Order data

23.3.2 Technical data

Model number	8BZVI0055D0.000-1A	8BZVI0055DS.000-1A	8BZVI0055S0.000-1A	8BZVI0055SS.000-1A
General information				
Short description	Screw clamp set for ACOPOSmulti 8BVI00xxHxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-00, 1x 8TB3104.204K-00	Screw clamp set for ACOPOSmulti 8BVI00xxHxDS modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-00, 1x 8TB3104.204K-00	Screw clamp set for ACOPOSmulti 8BVI00xxHxS0 modules: 1x 8TB3104.204G-00, 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	Screw clamp set for ACOPOSmulti 8BVI00xxHxSS modules: 1x 8TB3104.204G-00, 1x 8TB2104.203L-00, 1x 8TB2108.2010-00
Certifications				
CE	Yes			
UL	cULus E225616 Power conversion equipment			
Mechanical characteristics				
Weight	110 g	75 g	68 g	51 g

Table 373: 8BZVI0055D0.000-1A, 8BZVI0055DS.000-1A, 8BZVI0055S0.000-1A, 8BZVI0055SS.000-1A - Technical data

23.3.3 Order data

Model number	Short description	Figure
	Terminal block sets	
8BZVI0110SS.000-1A	Screw clamp set for ACOPOSmulti 8BVI0110HxSS and 8BVI0110HxSA modules: 1x 8TB3104.204G-11, 1x 8TB2104.203L-00, 1x 8TB2108.2010-00	
8BZVI0110S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0110HxS0 modules: 1x 8TB3104.204G-11, 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
8BZVI0110DS.000-1A	Screw clamp set for ACOPOSmulti 8BVI0110HxDS modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	
8BZVI0110D0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0110HxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	

Table 374: 8BZVI0110SS.000-1A, 8BZVI0110S0.000-1A, 8BZVI0110DS.000-1A, 8BZVI0110D0.000-1A - Order data

23.3.4 Technical data

Model number	8BZVI0110SS.000-1A	8BZVI0110S0.000-1A	8BZVI0110DS.000-1A	8BZVI0110D0.000-1A
General information				
Short description	Screw clamp set for ACOPOSmulti 8BVI0110HxSS modules: 1x 8TB3104.204G-00, 1x 8TB2104.203L-00, 1x 8TB2108.2010-00	Screw clamp set for ACOPOSmulti 8BVI0110HxS0 modules: 1x 8TB3104.204G-00, 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	Screw clamp set for ACOPOSmulti 8BVI0110HxDS modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-00, 1x 8TB3104.204K-00	Screw clamp set for ACOPOSmulti 8BVI0110HxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-00, 1x 8TB3104.204K-00
Certifications				
CE	Yes			
UL	cULus E225616 Power conversion equipment			
Mechanical characteristics				
Weight	68 g		75 g	110 g

Table 375: 8BZVI0110SS.000-1A, 8BZVI0110S0.000-1A, 8BZVI0110DS.000-1A, 8BZVI0110D0.000-1A - Technical data

23.3.5 Order data

Model number	Short description	Figure
	Terminal block sets	
8BZVI0220SS.000-1A	Screw clamp terminal block set for ACOPOSmulti 8BVI0220HxSS and 8BVI0220HxSA modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-00	
8BZVI0220S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0220HxS0 modules: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-00	
8BZVI0220DS.000-1A	Screw clamp terminal block set for ACOPOSmulti 8BVI0220HxDS modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	
8BZVI0220D0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0220HxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-11, 1x 8TB3104.204K-11	

Table 376: 8BZVI0220SS.000-1A, 8BZVI0220S0.000-1A, 8BZVI0220DS.000-1A, 8BZVI0220D0.000-1A - Order data

23.3.6 Technical data

Model number	8BZVI0220SS.000-1A	8BZVI0220S0.000-1A	8BZVI0220DS.000-1A	8BZVI0220D0.000-1A
General information				
Short description	Screw clamp terminal block set for ACOPOSmulti 8BVI0220HxSS modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-00	Screw clamp set for ACOPOSmulti 8BVI0220HxS0 modules: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-00	Screw clamp terminal block set for ACOPOSmulti 8BVI0220HxDS modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-10, 1x 8TB3104.204K-10	Screw clamp set for ACOPOSmulti 8BVI0220HxD0 modules: 1x 8TB2112.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB2104.203F-00, 1x 8TB3104.204G-10, 1x 8TB3104.204K-10
Certifications				
CE	Yes			
UL	cULus E225616 Power conversion equipment			
Mechanical characteristics				
Weight	65 g	72 g	79 g	114 g

Table 377: 8BZVI0220SS.000-1A, 8BZVI0220S0.000-1A, 8BZVI0220DS.000-1A, 8BZVI0220D0.000-1A - Technical data

23.3.7 Order data

Model number	Short description	Figure
	Terminal block sets	
8BZVI0440SS.000-1A	Screw clamp set for ACOPOSmulti 8BVI0440HxSS, 8BVI0440HxSA modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-10	
8BZVI0440S0.000-1A	Screw clamp set for ACOPOSmulti 8BVI0330HxS0, 8BVI0440HxS0 modules: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-10	
8BZVP044000.000-1A	Screw clamp set for ACOPOSmulti modules 8BVP0220Hx00 and 8BVP0440Hx00: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.204A-00, 1x 8TB4104.202L-10	

Table 378: 8BZVI0440SS.000-1A, 8BZVI0440S0.000-1A, 8BZVP044000.000-1A - Order data

23.3.8 Technical data

Model number	8BZVI0440SS.000-1A	8BZVI0440S0.000-1A	8BZVP044000.000-1A
General information			
Short description	Screw clamp set for ACOPOSmulti 8BVI0440HxSS modules: 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-10	Screw clamp set for ACOPOSmulti 8BVI0440HxS0 modules: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.203L-00, 1x 8TB4104.204G-10	Screw clamp set for ACOPOSmulti modules 8BVP0220Hx00 and 8BVP0440Hx00: 1x 8TB2106.2010-00, 1x 8TB2108.2010-00, 1x 8TB2104.204A-00, 1x 8TB4104.202L-10
Certifications			
CE		Yes	
UL		cULus E225616 Power conversion equipment	
Mechanical characteristics			
Weight	67 g	72 g	85 g

Table 379: 8BZVI0440SS.000-1A, 8BZVI0440S0.000-1A, 8BZVP044000.000-1A - Technical data

23.3.9 Order data

Model number	Short description	Figure
	Terminal block sets	
8BZVI1650SS.000-1A	Screw clamp terminal block set for ACOPOSmulti 8BVI0660HxSS, 8BVI0880HxSS, 8BVI1650HxSS, 8BVI0660HxSA, 8BVI0880HxSA and 8BVI1650HxSA modules: 1x 8TB2104.203L-00, 1x 8TB2108.2010-00	
8BZVI1650S0.000-1A	Screw clamp terminal block set for ACOPOSmulti 8BVI0660HxS0, 8BVI0880HxS0 and 8BVI16500HxS0 modules: 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	
8BZVP165000.000-1A	Screw clamp set for ACOPOSmulti modules 8BVP0880Hx00 and 8BVP1650Hx00: 1x 8TB2104.204A-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	

Table 380: 8BZVI1650SS.000-1A, 8BZVI1650S0.000-1A, 8BZVP165000.000-1A - Order data

23.3.10 Technical data

Model number	8BZVI1650SS.000-1A	8BZVI1650S0.000-1A	8BZVP165000.000-1A
General information			
Short description	Screw clamp terminal block set for ACOPOSmulti 8BVI0880HxSS and 8BVI1650HxSS modules: 1x 8TB2104.203L-00, 1x 8TB2108.2010-00	Screw clamp terminal block set for ACOPOSmulti 8BVI0880HxS0 and 8BVI16500HxS0 modules: 1x 8TB2104.203L-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00	Screw clamp set for ACOPOSmulti modules 8BVP0880Hx00 and 8BVP1650Hx00: 1x 8TB2104.204A-00, 1x 8TB2106.2010-00, 1x 8TB2108.2010-00
Certifications			
CE	Yes		
UL	cULus E225616 Power conversion equipment		
Mechanical characteristics			
Weight	42 g	67 g	49 g

Table 381: 8BZVI1650SS.000-1A, 8BZVI1650S0.000-1A, 8BZVP165000.000-1A - Technical data

24 Fuse sets

24.1 8BXS000.0000-00

24.1.1 Order data

Model number	Short description	Figure
	Fuse sets	
8BXS000.0000-00	ACOPOSmulti fuse set: 2x fuse 14x51 mm, 50 A, fast-acting	

Table 382: 8BXS000.0000-00 - Order data

24.1.2 Technical data

Model number	8BXS000.0000-00
General information	
Short description	ACOPOSmulti fuse set: 2 fuses, 14 x 51 mm, 50 A, ultra fast-acting
Certifications	
CE	Yes
Mechanical characteristics	
Weight	41 g

Table 383: 8BXS000.0000-00 - Technical data

24.2 8BXS001.0000-00

24.2.1 Order data

Model number	Short description	Figure
	Fuse sets	
8BXS001.0000-00	ACOPOSmulti fuse set: 2x fuse 14x51 mm, 20 A, fast-acting	

Table 384: 8BXS001.0000-00 - Order data

24.2.2 Technical data

Model number	8BXS001.0000-00
General information	
Short description	ACOPOSmulti fuse set: 2 fuses, 14 x 51 mm, 20 A, ultra fast-acting
Certifications	
CE	Yes
Mechanical characteristics	
Weight	41 g

Table 385: 8BXS001.0000-00 - Technical data

24.3 8BXS002.0000-00

24.3.1 Order data

Model number	Short description	Figure
	Fuse sets	
8BXS002.0000-00	ACOPOSmulti fuse set: 2x fuse 14x51 mm, 10 A, fast-acting	

Table 386: 8BXS002.0000-00 - Order data

24.3.2 Technical data

Model number	8BXS002.0000-00
General information	
Short description	ACOPOSmulti fuse set: 2 fuses, 14 x 51 mm, 10 A, ultra fast-acting
Certifications	
CE	Yes
Mechanical characteristics	
Weight	41 g

Table 387: 8BXS002.0000-00 - Technical data

24.4 8BXS003.0000-00

24.4.1 Order data

Model number	Short description	Figure
	Fuse sets	
8BXS003.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 30 A, fast-acting	

Table 388: 8BXS003.0000-00 - Order data

24.4.2 Technical data

Model number	8BXS003.0000-00
General information	
Short description	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 30 A, fast-acting
Certifications	
CE	Yes
Mechanical characteristics	
Weight	9 g

Table 389: 8BXS003.0000-00 - Technical data

24.5 8BXS004.0000-00

24.5.1 Order data

Model number	Short description	Figure
	Fuse sets	
8BXS004.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 12 A, fast-acting	

Table 390: 8BXS004.0000-00 - Order data

24.5.2 Technical data

Model number	8BXS004.0000-00
General information	
Short description	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 12 A, fast-acting
Certifications	
CE	Yes
Mechanical characteristics	
Weight	9 g

Table 391: 8BXS004.0000-00 - Technical data

24.6 8BXS005.0000-00

24.6.1 Order data

Model number	Short description	Figure
	Fuse sets	
8BXS005.0000-00	ACOPOSmulti fuse set: 2x fuse 14x51 mm, 25 A, fast-acting	

Table 392: 8BXS005.0000-00 - Order data

24.6.2 Technical data

Model number	8BXS005.0000-00
General information	
Short description	ACOPOSmulti fuse set: 2 fuses, 14 x 51 mm, 25 A, ultra fast-acting
Certifications	
CE	Yes
Mechanical characteristics	
Weight	41 g

Table 393: 8BXS005.0000-00 - Technical data

24.7 8BXS006.0000-00

24.7.1 Order data

Model number	Short description	Figure
	Fuse sets	
8BXS006.0000-00	ACOPOSmulti fuse set: 1x fuse 10x38 mm, 15 A, fast-acting	

Table 394: 8BXS006.0000-00 - Order data

24.7.2 Technical data

Model number	8BXS006.0000-00
General information	
Short description	ACOPOSmulti fuse set: 1x fuse 10 x 38 mm, 15 A, fast-acting
Certifications	
CE	Yes
Mechanical characteristics	
Weight	9 g

Table 395: 8BXS006.0000-00 - Technical data

25 Accessory sets

25.1 8BXB000.0000-00

25.1.1 Order data

Model number	Short description	Figure
	Accessory sets	
8BXB000.0000-00	ACOPOSmulti accessory set for encoder buffering consists of the following: 1 lithium battery AA 3.6 V, 1 cover for battery compartment	

Table 396: 8BXB000.0000-00 - Order data

25.1.2 Technical data

Model number	8BXB000.0000-00
General information	
Short description	ACPmulti accessory set for encoder buffering consisting of: 1 lithium battery AA 3.6 V 1 protective cap for battery holder
Certification	
CE	Yes
Environmental conditions	
Temperature	
Storage	-20 to +60°C
Relative humidity	
Storage	0 to 95°C (non-condensing)
Mechanical characteristics	
Weight	20 g

Table 397: 8BXB000.0000-00 - Technical data

Caution!

The battery should be changed every 5 years. The change intervals refer to the average service life and operating conditions and are recommended by B&R. It is not the maximum buffer duration.

Only use a replacement battery from the 8BXB000.0000-00 accessory set!

Information:

Make sure to insert the battery with correct polarity!
Used batteries must be disposed of properly!

Warning!

There is a risk of explosion if batteries are not handled properly. Do not recharge, disassemble or dispose of in fire.

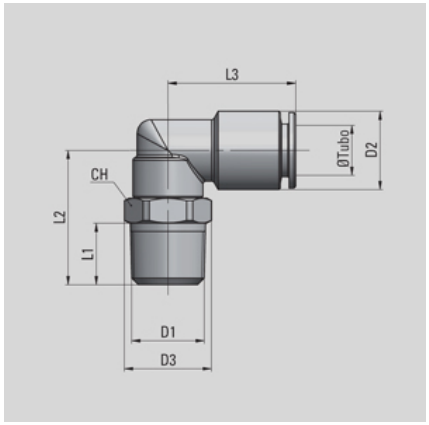
25.2 8BXW000.0000-00

25.2.1 Technical data

Model number	8BXW000.0000-00
General information	
Short description	ACOPOSmulti accessory set: 2x fitting for mounting plate 8B0MxxxxHCxx.xxx-x, angled
Certifications	
CE	Yes
Mechanical characteristics	
Housing	
Material	Galvanized brass
Dimensions	
Length	29.8 mm
Height	27 mm
Depth	14.5 mm
Diameter	8 mm
Weight	23 g

Table 398: 8BXW000.0000-00 - Technical data

25.2.2 Dimensions



ø tube	D1	D2	D3	L1	L2	L3	CH
8 mm	R1/8	14	14.5	7.5	20	22.5	13

Table 399: Fitting 8BXW000.0000-00, angled - Dimensions

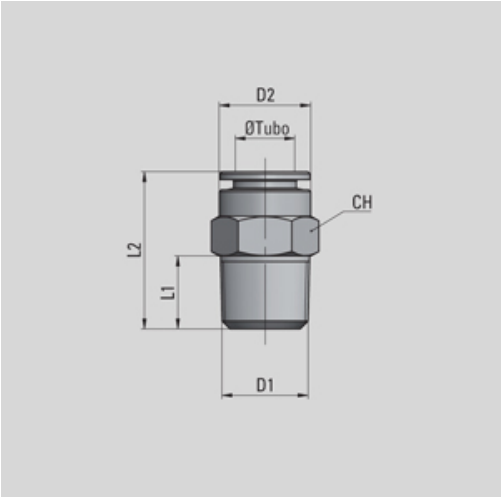
25.3 8BXW001.0000-00

25.3.1 Technical data

Model number	8BXW001.0000-00
General information	
Short description	ACOPOSmulti accessory set: 2x fitting for mounting plate 8B0MxxxxHCxx.xxx-x, straight
Certifications	
CE	Yes
Mechanical characteristics	
Housing	
Material	Nickel-plated brass
Dimensions	
Height	25 mm
Depth	14 mm
Diameter	8 mm
Weight	14 g

Table 400: 8BXW001.0000-00 - Technical data

25.3.2 Dimensions



ø tube	D1	D2	L1	L2	CH
8	R1/8	14	7.5	25	14

Table 401: Fitting 8BXW001.0000-00, straight - Dimensions

Chapter 3 • Installation

1 General information

ACOPOSmulti drives systems must be installed in control cabinets with at least IP54 protection. [18)]

Warning!

The information listed in the section "Handling and installation" on page 37 must be observed!

1.1 8B0M mounting plates

1.1.1 8B0MxxxxHW00.000-1 (wall mounting)

The mounting surface for 8B0MxxxxHW00.000-1 mounting plate must provide sufficient stability for the mounting plate in addition to being non-flammable, level and free of contaminants.

Mounting holes (type and quantity) are to be prepared as described in section 4.5.1 "8B0MnnnnHW00.000-1 mounting plates" on page 456.

Spacing for mounting and ventilation of ACOPOSmulti modules can be found in the dimension diagrams for the individual modules.

1.1.2 8B0MxxxxHF00.000-1 (feed-through mounting)

The mounting surface for 8B0MxxxxHF00.000-1 mounting plate must provide sufficient stability for the mounting plate in addition to being non-flammable, level and free of contaminants.

Caution!

It is especially important that the mounting surface is level so that the entire surface of the 8B0MxxxxHF00.000-1 mounting plate completely rests against it. The mounting surface must meet the "smoothness of 1 mm over the entire mounting surface" criteria.
Mounting on uneven surfaces can lead to reduced heat dissipation from the ACOPOSmulti modules to the mounting plate.

Caution!

The area of the mounting surface where the seal for the 8B0MxxxxHF00.000-1 mounting plate sits must be free of scratches and residue. Otherwise, it cannot be guaranteed that protection guidelines in accordance with EN 60529 are being met!

The cutout for the feed-through heat sink and the mounting holes (type and quantity) are to be prepared as described in section 4.7.1 "8B0MnnnnHF00.000-1 mounting plates" on page 482.

Spacing for mounting and ventilation of ACOPOSmulti modules can be found in the dimension diagrams for the individual modules.

[18)] Except for 8B0WxxxxH000.001-1 braking resistors.

1.1.3 8B0MxxxxHC00.000-1 (cold plate mounting)

The mounting surface for 8B0MxxxxHC00.000-1 mounting plate must provide sufficient stability for the mounting plate in addition to being non-flammable, level and free of contaminants.

Caution!

It is especially important that the mounting surface is level so that the entire surface of the 8B0MxxxxHC00.000-1 cold plate cold mounting plate completely rests against it. The mounting surface must meet the "smoothness of 1 mm over the entire mounting surface" criteria.
Mounting on uneven surfaces can lead to reduced heat dissipation from the ACOPOSmulti modules to the mounting plate.

Mounting holes (type and quantity) are to be prepared as described in section 4.6.1 "8B0MnnnnHC00.000-1 mounting plates" on page 468.

Spacing for mounting and ventilation of ACOPOSmulti modules can be found in the dimension diagrams for the individual modules.

Water connections for inlet and return flow

For the position of the water connections for inlet and return flow can be see the installation drawing ("8B0MnnnnHC00.000-1 - Dimension diagram and installation dimensions" on page 468). The maximum permissible tightening torque is 10 Nm.

Information:

B&R recommends using ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plates with ACOPOSmulti 8BXW accessory sets (fittings with tapered R 1/8 Whitworth male pipe thread per EN 10226-1) for the water connections for inlet flow and return flow.

Caution!

The feed must be connected to the bottom connector of the 8B0MxxxxHC00.000-1 mounting plate.

The return line must be connected to the top connector of the 8B0MxxxxHC00.000-1 mounting plate.

Information:

Using fittings from ACOPOSmulti 8BXW accessory sets achieves impermeability of the water connections at tightening torques >7 Nm. The maximum permissible tightening torque is 10 Nm.

If other fittings are used, the tightening torque required for the impermeability of the water connections must be determined by the user, but the maximum value of 10 Nm is not permitted to be exceeded.

Caution!

B&R has tested and approved the production of the water connection for inlet flow and return flow of 8B0MnnnnHC00.000-1 mounting plates with fittings with tapered R 1/8 Whitworth male pipe thread per EN 10226-1.

The use of other fittings (e.g. with cylindrical external pipe thread) can result in increased effort in sealing the water connections and is therefore the responsibility of the user.

Caution!

Before commissioning the cooling circuit, the impermeability of the water connections for inlet and return flow and return of 8B0MnnnnHC00.000-1 mounting plates must be checked by the user!

1.2 Mounting ACOPOSmulti modules

Danger!

Before beginning work, disconnect the supply voltage and wait 5 minutes to ensure that the DC bus for the ACOPOSmulti drive system has discharged. Regulations must be observed!

- Attach the module to the top of the ACOPOSmulti mounting plate(s) using the mounting clip(s):

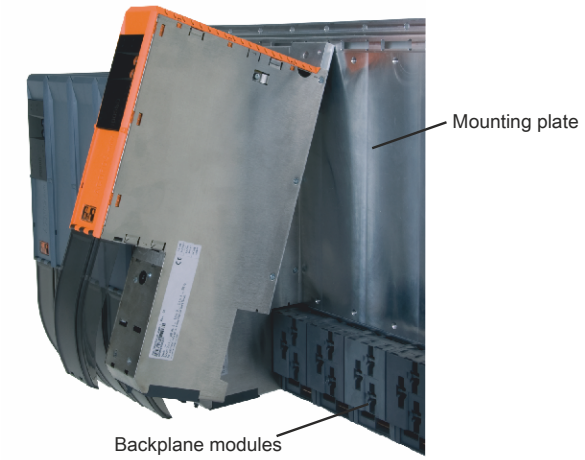


Figure 140: Attaching modules

- Clip the module into the backplane module(s).
  The module must be completely attached, so that it rests straight in the backplane module(s) in order for the module contacts to function properly.
- Tighten all M6 mounting screws (2 screws per module width) on the module to a **torque between 4 and 5 Nm**.
  Tightening the bottom mounting screw creates a conductive contact between the module and the rail system of the supply voltage on the backplane module.



Figure 141: Tightening the fastening screws

1.3 8BVI inverter modules

1.3.1 Changing the backup battery

Battery-backed encoders can be connected to EnDat 2.2 plug-in module 8BAC0120.001-x. The module also supports encoders with battery-backed multi-turn functionality. These multi-turn encoders do not keep track of position information in the event of power failure. Battery voltage monitoring is handled by the encoder itself and enabled automatically.

The battery compartment for the required backup battery is located behind the black cover on the front of the ACOPOSmulti 8BVP power supply modules and ACOPOSmulti 8BVI inverter modules.

The backup battery is available as accessory set 8BXB000.0000-00 (includes the backup battery and a cap for the battery compartment).

Caution!

The following conditions must be met for the position of the encoder position to be maintained when changing the backup battery:

- **The 24V LED on the ACOPOSmulti module must be lit.**
- **An 8BAC0120.001-x EnDat 2.2 plug-in module is plugged into the ACOPOSmulti module.**
- **The battery-backed encoder is connected to this 8BAC0120.001-x EnDat 2.2 plug-in module.**

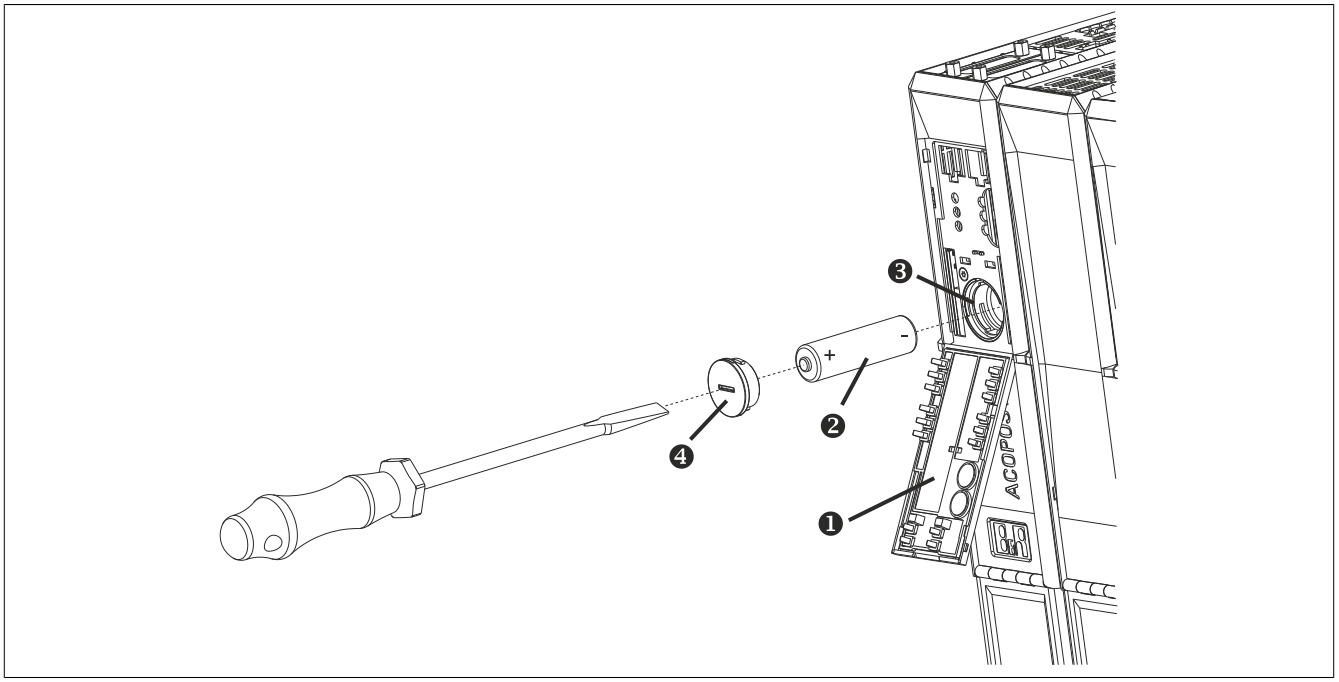


Figure 142: Changing/Inserting the backup battery

Procedure

1. Open the cover ❶ on the ACOPOSmulti module.
2. If there is already a backup battery ❷ in the module:
   Unlock the cap ❹ by rotating it to the left. Remove the cap and remove the old backup battery ❷ from the battery compartment ❸.
3. Place the new backup battery ❷ into the battery compartment ❸ as shown.
4. Place the cap ❹ on the battery compartment ❸ and lock it by rotating it to the right.
5. Close the cover ❶.
   The BAT LED on the ACOPOSmulti module should be green.

Caution!

The battery should be changed every 5 years. The change intervals refer to the average service life and operating conditions and are recommended by B&R. It is not the maximum buffer duration.

Only use a replacement battery from the 8BXB000.0000-00 accessory set!

Information:

Make sure to insert the battery with correct polarity!
Used batteries must be disposed of properly!

Warning!

There is a risk of explosion if batteries are not handled properly. Do not recharge, disassemble or dispose of in fire.

1.3.2 Installing 8BCH hybrid motor cables

1. Disconnect ACOPOSmulti drive system from power mains and prevent reconnection.

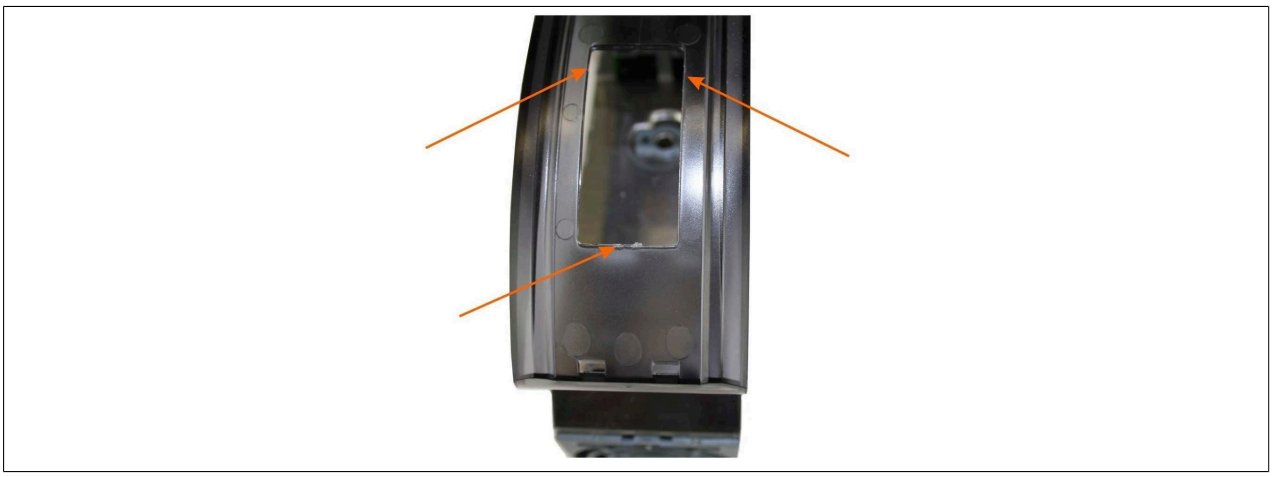
Danger!

Before performing service work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the ACOPOSmulti drive system has discharged. Observe regulations!

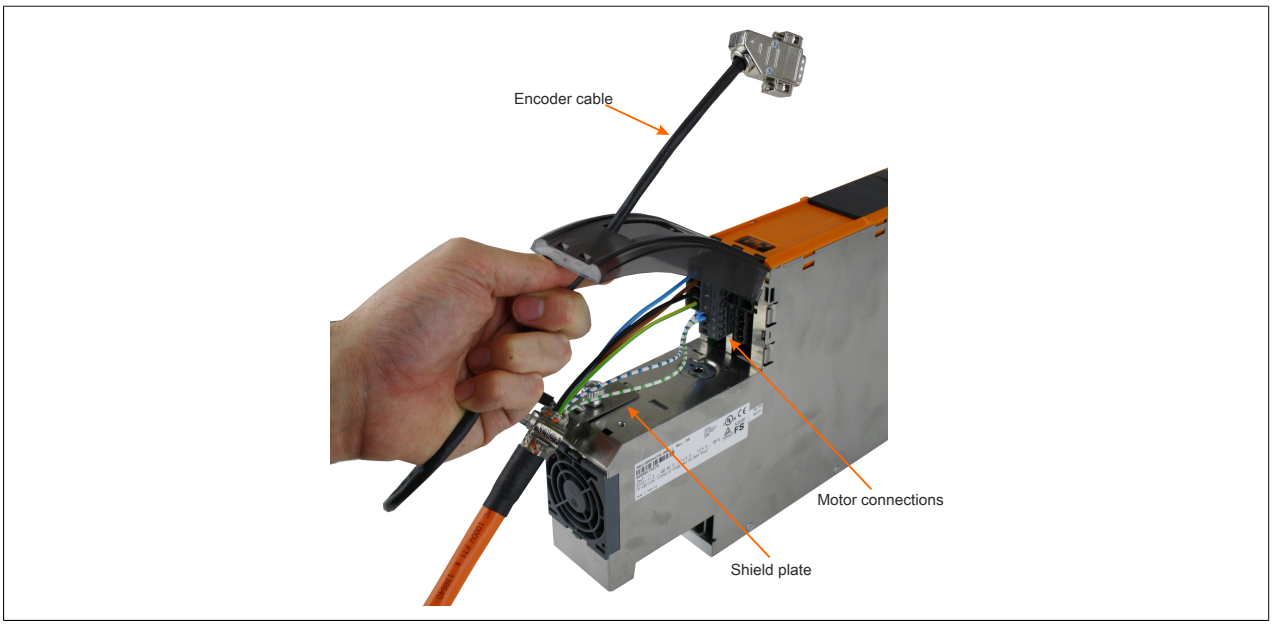
2. Prepare ACOPOSmulti inverter module:
   - Wrap both hands around the the cable cover.
   - Use your thumb to press against the pre-cut area of the cable cover until broken through (see image).



3. Smooth out the cutout area with a suitable tool (e.g. Stanley knife) to prevent damage to the encoder cable when feeding through the opening.



4. Connecting 8BCH hybrid motor cables:
   - ° Opening the cable cover
   - ° Attach the shield plate of the 8BCH hybrid motor cable to the 8BVI inverter module.
   - ° Attach to the motor connectors.
   - ° Insert the encoder cable through the opening towards the top, connect the DSUB connector to the EnDat 2.2 plug-in module and screw in.



5. Closing the cable cover



1.4 8BVE0500Hx00.000-1 expansion modules

Warning!

When installing ACOPOSmulti 8BVE expansion modules, it is important that both of the mounting screws on the module are properly tightened!
If ACOPOSmulti 8BVE expansion modules are not mounted correctly, proper module cooling cannot be guaranteed, which could cause the damping resistors in the expansion modules to be destroyed since they are not equipped with temperature monitoring.

1.4.1 Installing device fuses

Before initial operation, device fuses must be installed in the corresponding fuse holders. These are found on the broad left side as seen from the front of the module:

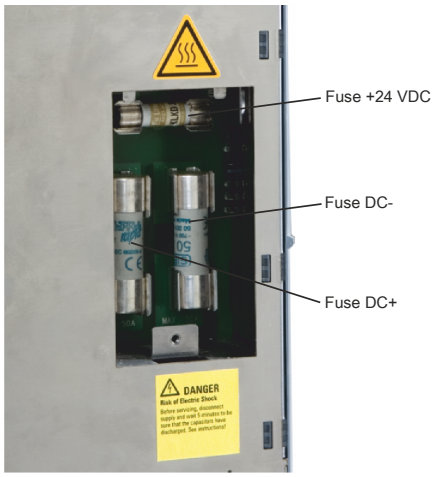


Figure 143: Expansion module - Installing device fuses

After installing the device fuses, the cover (included in delivery) must be placed on the expansion module and tightened down with the fastening screws:



Figure 144: Expansion module - Closing the cover plate

1.4.2 Replacing device fuses

The device fuses in the expansion module are located on the left side of the device (as seen from the front) under a cover plate. A tool for removing the device fuses is included under the cover plate.

Required tools: Screwdriver

Danger!

Before beginning work, disconnect the supply voltage and wait 5 minutes to ensure that the DC bus for the ACOPOSmulti drive system has discharged. Regulations must be observed!

Danger!

The surfaces of ACOPOSmulti modules can be very hot!

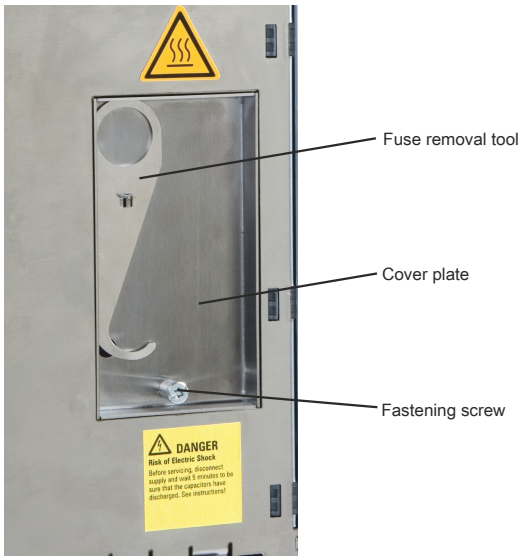


Figure 145: Expansion module - Closing the cover plate

1. Remove the fastening screw.
2. Lift and remove the cover from the module.

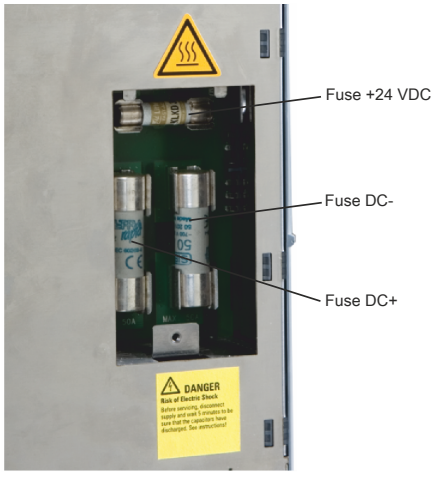


Figure 146: Expansion module - Removing the cover plate

3. Remove the fuse removal tool from under the cover plate:
   Push the fuse removal tool out of the cover plate from behind using a screwdriver.

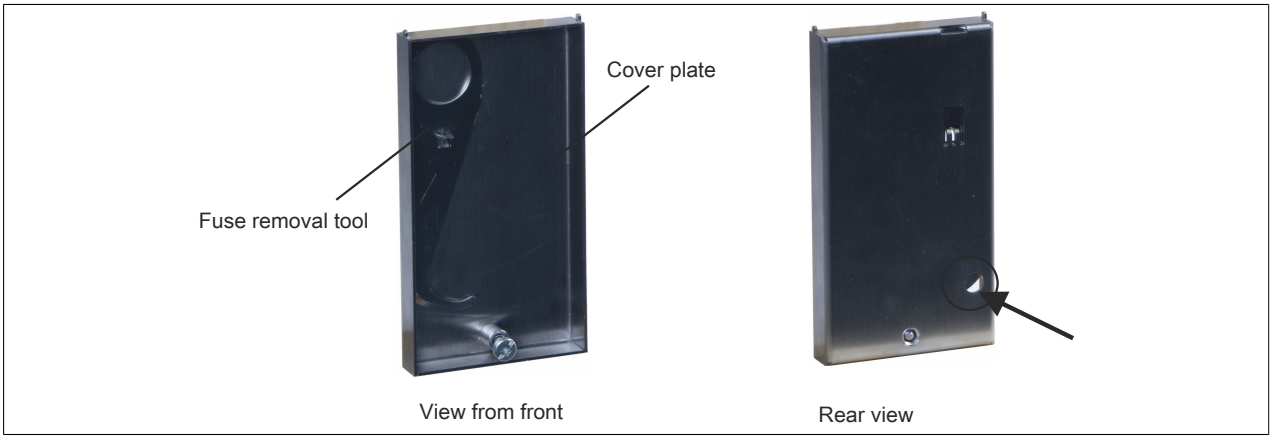


Figure 147: Removing the fuse removal tool

4. Insert the hooked end of the fuse removal tool under the fuse to be removed.

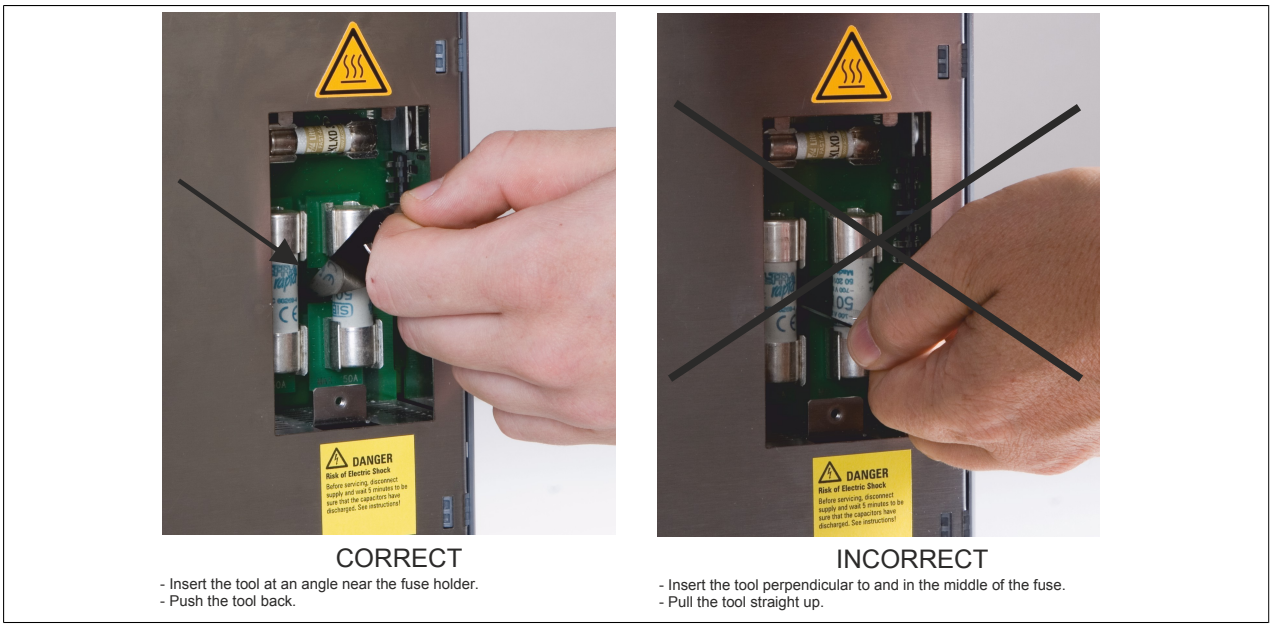


Figure 148: Using the fuse removal tool

5. Push the tool back to remove the fuse.

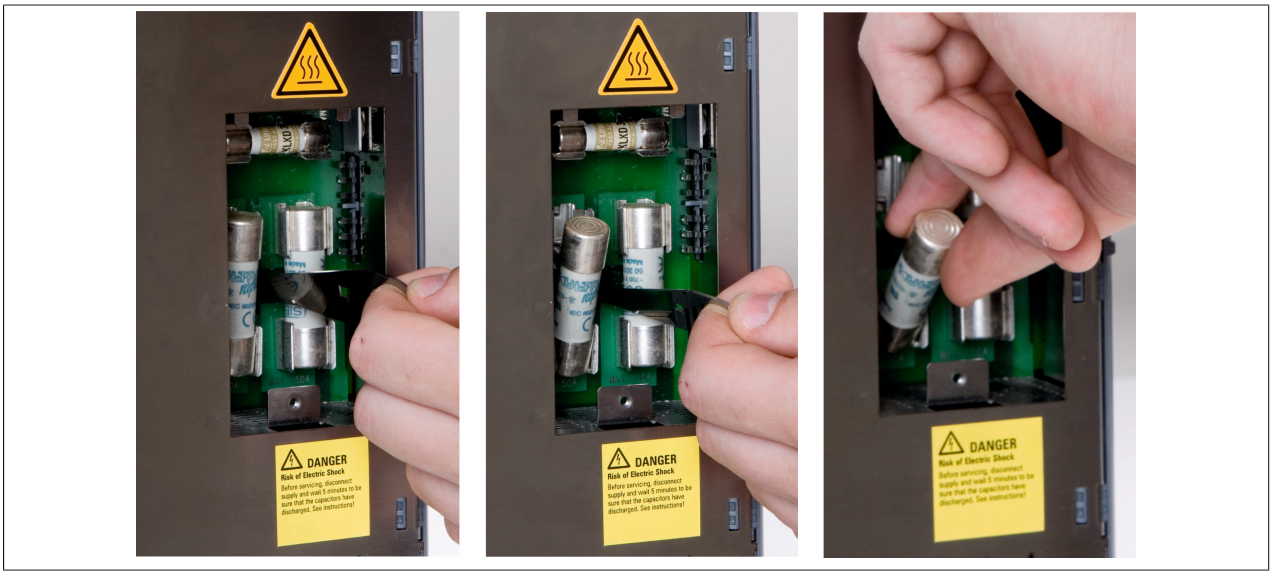


Figure 149: Removing the fuse

6. Take the fuse out of the fuse holder.
7. Place the new fuse in the fuse holder.
8. Put the fuse removal tool back under the cover plate.
9. Attach the cover to the module and tighten the fixing with a maximum torque of 0.6 Nm.

1.5 Replacing the 8BXF001.0000-00 fan module

Procedure:

1. Disconnect the ACOPOSmulti drive system from power mains and prevent reconnection.

> **Danger!**
>
> **Before beginning work, disconnect the supply voltage and wait 5 minutes to ensure that the DC bus for the ACOPOSmulti drive system has discharged. Regulations must be observed!**

2. Disconnect all connectors from the ACOPOSmulti module.
3. Unscrew the ACOPOSmulti module from the mounting plate (see "Mounting ACOPOSmulti modules" on page 420).
4. The fan module is snapped into the ACOPOSmulti module using two snap-fit connectors. Press these two snap-fit connector clips together as shown by the arrows and carefully pull the fan module out of the ACOPOSmulti module.

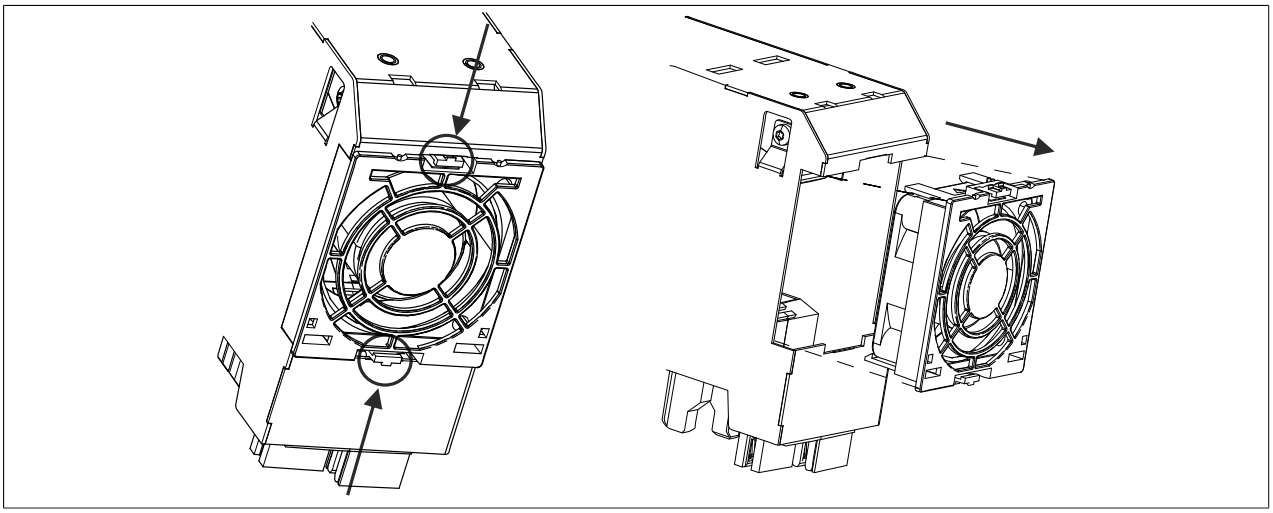
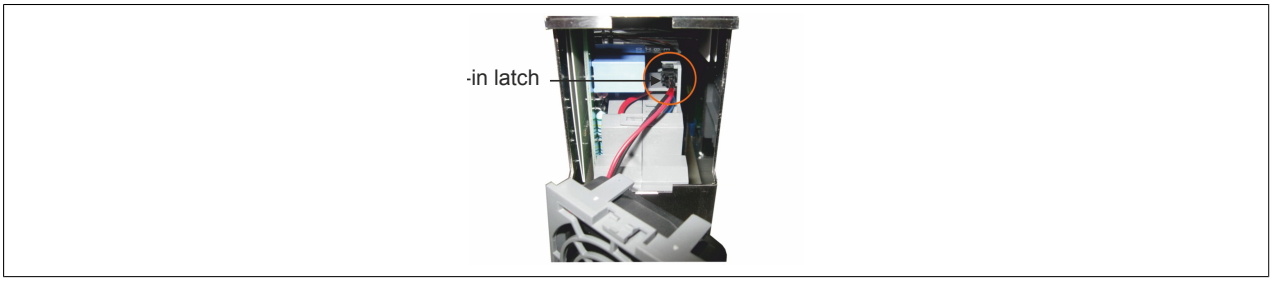


Figure 150: Fan module snap-fit connectors

5. Disconnect the fan module cable connector by pressing the snap-in latch. Unplug the fan module cable from the ACOPOSmulti module.



6. Plug in the new fan module cable into the ACOPOSmulti module connector. Slide the fan module into the ACOPOSmulti module until both snap-fit connectors click into place.
7. Repeat steps 4 through 6 for all other fan modules that need to be replaced.
8. Fasten the ACOPOSmulti module back to the mounting plate (see "Mounting ACOPOSmulti modules" on page 420).
9. Reconnect all connectors on the ACOPOSmulti module.

> **Information:**
>
> **8BXF001.0000-00 fan modules have an average service life of approx. 65,000 h.**
> **B&R recommends replacing all fan modules on an ACOPOSmulti module at the same time.**

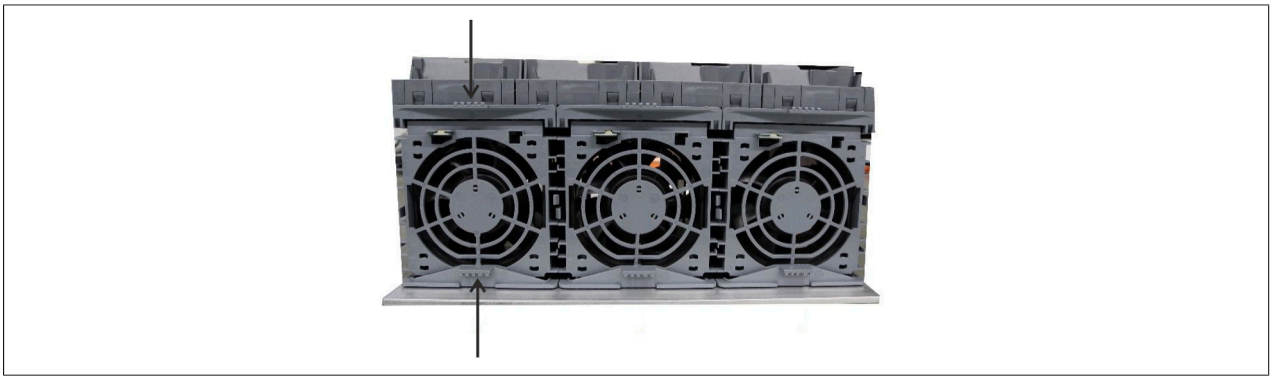
1.6 Replacing the 8BXF002.0000-00 fan module

Procedure:

1. Disconnect the ACOPOSmulti drive system from the power system and safeguard it from being restarted.

> ### Danger!
>
> **Before performing service work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the ACOPOSmulti drive system has discharged. Observe regulations!**

2. The fan module is snapped into the bottom of the 8B0MxxxxHW mounting plate using two snap-fit connectors. Press these two snap-fit connector clips together as shown by the arrows and carefully pull the fan module out of the mounting plate.



3. The cable for the new fan module must be installed as shown to prevent possible damage.



4. Slide the new fan module into the mounting plate until both snap-fit connectors click into place.
5. Repeat steps 2 to 4 for all other fan modules that need to be replaced.

> ### Information:
>
> **8BXF002.0000-00 fan modules have an average service life of approx. 65,000 hours.**
> **B&R recommends replacing all fan modules of an ACOPOSmulti 8B0MxxxxHW mounting plate at the same time.**

1.7 Fan module 8B0M0040HFF0.000-00

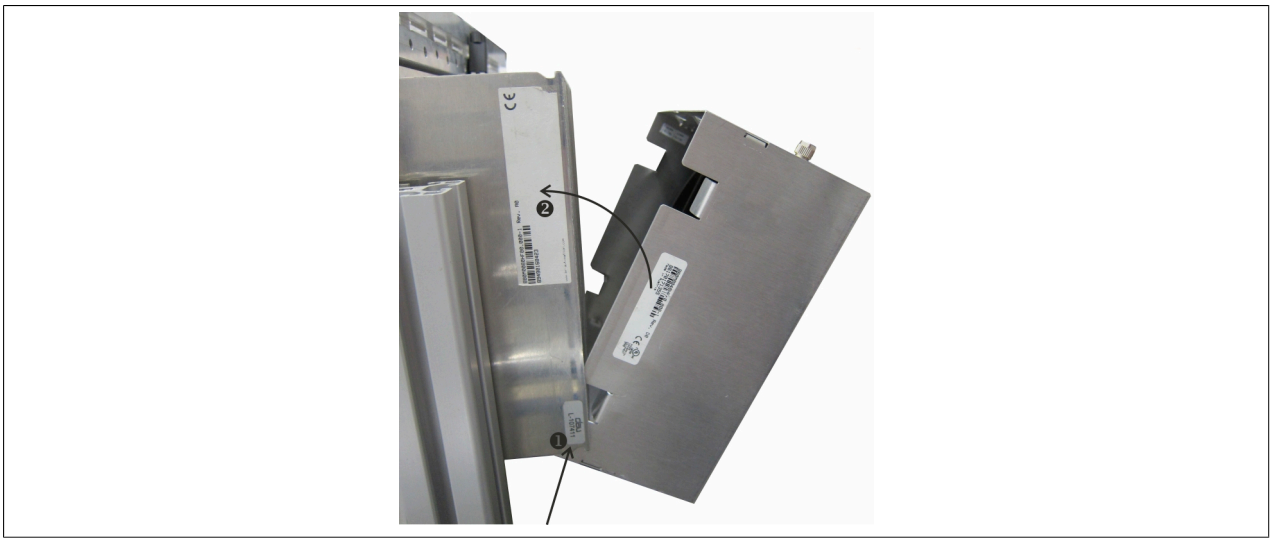
1.7.1 Installing the 8B0M0040HFF0.000-00 fan module

Procedure:

1. Disconnect the ACOPOSmulti drive system from the power system and safeguard it from being restarted.

> **Danger!**
>
> **Before performing service work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the ACOPOSmulti drive system has discharged. Observe regulations!**

2. Slide the bottom of the fan module at position (❶) between the first two plates on the heat sink of the 8B0MxxxxHF mounting plate and then insert the top as shown in (❷) until the snap-fit connectors click into place.



3. Repeat step 2 until all fan modules have been installed. The following fan modules must be placed between the next available plates on the 8B0MxxxxHF mounting plate.
4. Cable all fan modules (see section "Wiring example" on page 320).

1.7.2 Replacing the 8B0M0040HFF0.000-00 fan module

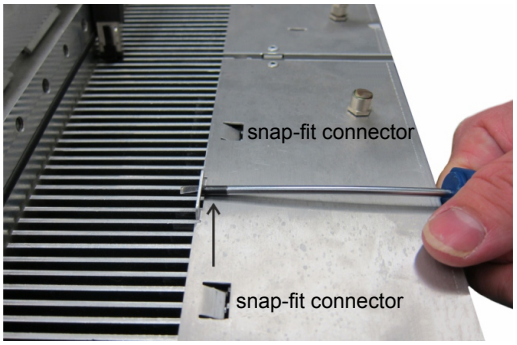
Procedure:

Required tools: Flat-blade screwdriver

1. Disconnect the ACOPOSmulti drive system from the power system and safeguard it from being restarted.

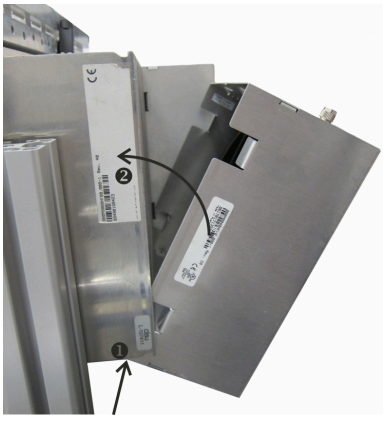
> **Danger!**
>
> **Before performing service work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the ACOPOSmulti drive system has discharged. Observe regulations!**

2. Disconnect the connectors from the X1 and X2 connectors on the fan module.
3. The fan module is snapped into the 8B0MxxxxHF mounting plate using two snap-fit connectors. Use a flat-blade screwdriver to push up the clip marked with the error to loosen the snap-fit connectors. While doing so, carefully tip the fan module backwards and remove from the mounting plate's heat sink.





4. Slide the bottom of the new fan module at position (❶) between the plates on the heat sink of the 8B0MxxxxHF mounting plate and then insert the top on the mounting plate's heat sink as shown in (❷) until the snap-fit connectors click into place.



5. Repeat steps 2 to 4 for all other fan modules that need to be replaced.
6. Cable all replaced fan modules (see section "Wiring example" on page 320).

Information:

8B0M0040HFF0.000-00 fan modules have an average service life of approx. 80,000 h. B&R recommends replacing all fan modules on an 8B0MxxxxHF00.xxx-x mounting plate at the same time.

1.8 8BVR regeneration chokes

ACOPOSmulti 8BVR regeneration chokes must be installed in a closed electrical operating area (e.g. a control cabinet).

Caution!

Certain mounting orientations can block the view of the warning sticker on the regeneration choke. Two additional warning stickers are therefore included in delivery for the user to place in a clearly visible location on the regeneration choke. These warning stickers are attached to the regeneration choke by a cable tie and must be removed before initial operation since the backing film for the warning sticker is not sufficiently heat-resistant!

Warning!

When installing ACOPOSmulti regeneration chokes, it is important to make sure that the windings and connection wires are also strongly insulated from neighboring electrically conductive components (e.g. control cabinet wall).

If this reinforced insulation is implemented with an area of empty space, then a minimum distance of 8 mm (or 12.7 mm in accordance with cULus) to neighboring conductive parts is necessary.

1.9 8B0W external braking resistors

Danger!

8B0W external braking resistors can reach extremely high surface temperatures during operation (depending on the type, up to a max. 355 °C under nominal conditions).

It is therefore important to ensure that 8B0W external braking resistors are only installed on surfaces that are suited for these high temperatures!

Danger!

Direct contact between operating personnel and the hot surfaces of 8B0W external braking resistors must be prevented using suitable measures in order to avoid serious burns!

Danger!

8B0W external braking resistors can be considered intrinsically safe if they are connected to a 8B0P passive power supply module operated with a mains supply voltage of 3x 380 - 500 VAC. The maximum time until the 8B0W external braking resistors are damaged is approximately 5.5 min in this case; a maximum surface temperature of approximately 479°C is achieved when this happens.

1.9.1 Mounting orientation

The following mounting orientations are permitted for 8B0W external braking resistors:

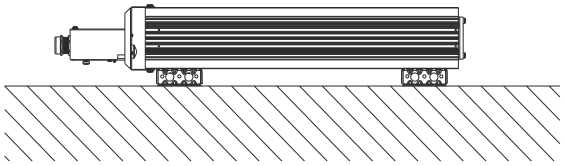
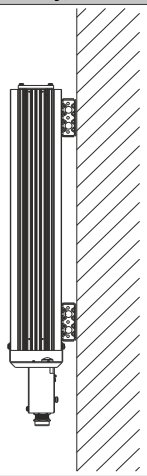
Standing horizontally	Hanging vertically, terminal box below
	

Table 402: Permissible mounting orientations for 8B0W external braking resistors

The following mounting orientation is not permitted:

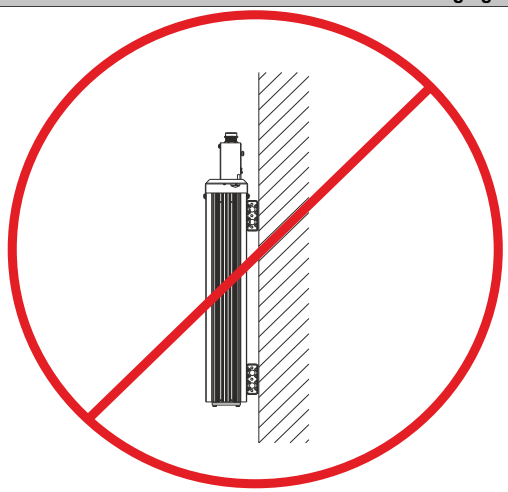
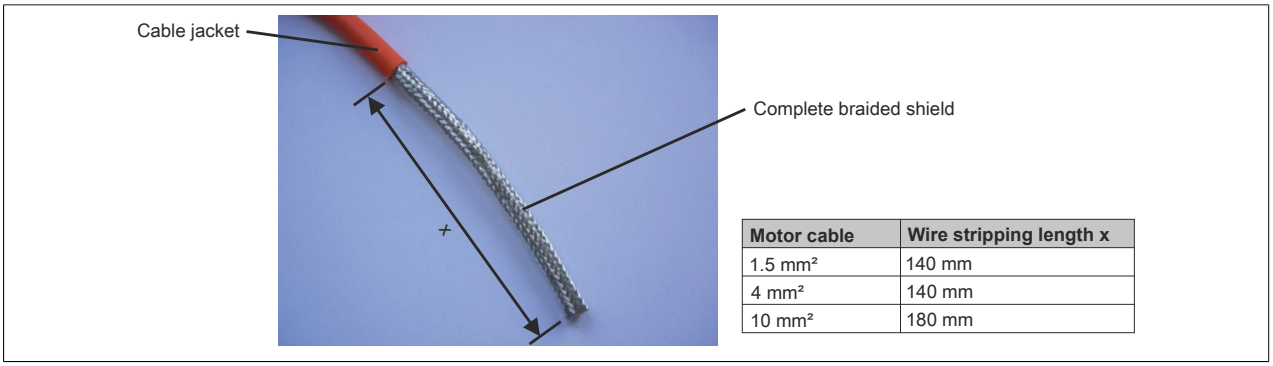
Hanging vertically, terminal box above	
	**Danger!** **Vertical mounting with the terminal box above can cause the temperature in the terminal box to increase sharply due to the heat from the 8B0W external braking resistor. In extreme cases, this can damage the insulation on the connection cable and cause short circuits in the connection terminal!**

Table 403: Impermissible mounting orientation for 8B0W external braking resistors

2 Motor cables

2.1 Assembly example of a 1.5 mm² motor cable (module-side)

1. Shorten the motor cable to the required length.
2. Strip the motor cable on the module end of the cable (make sure not to irreparably damage the complete braided shield).



Motor cable	Wire stripping length x
1.5 mm²	140 mm
4 mm²	140 mm
10 mm²	180 mm

Figure 151: Stripped cable end

3. Pull the cable shield over the cable jacket and cut off the stranding elements.

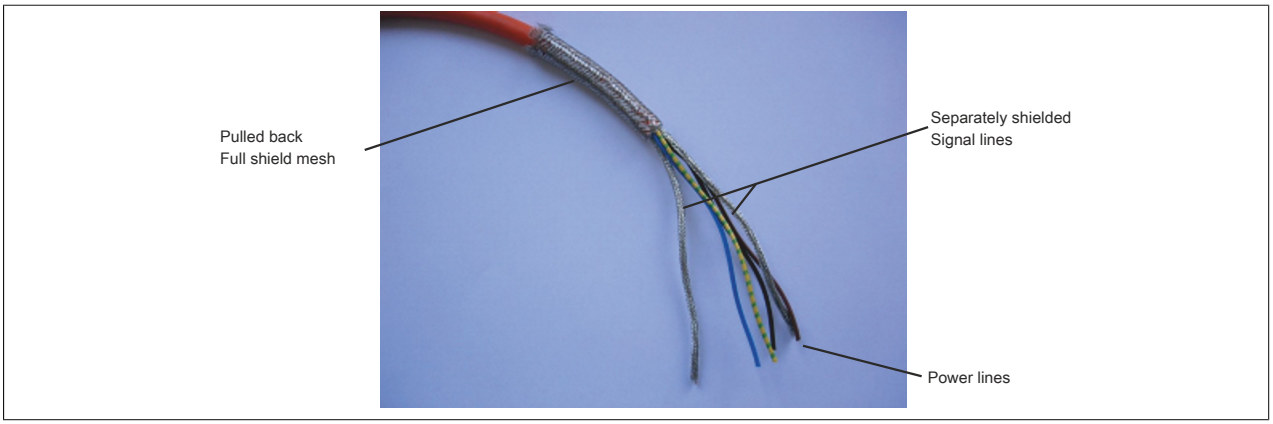


Figure 152: Cable end with shielding mesh pulled back

4. Pull the separately shielded signal lines (2x 2 conductors) out of the braided shield.

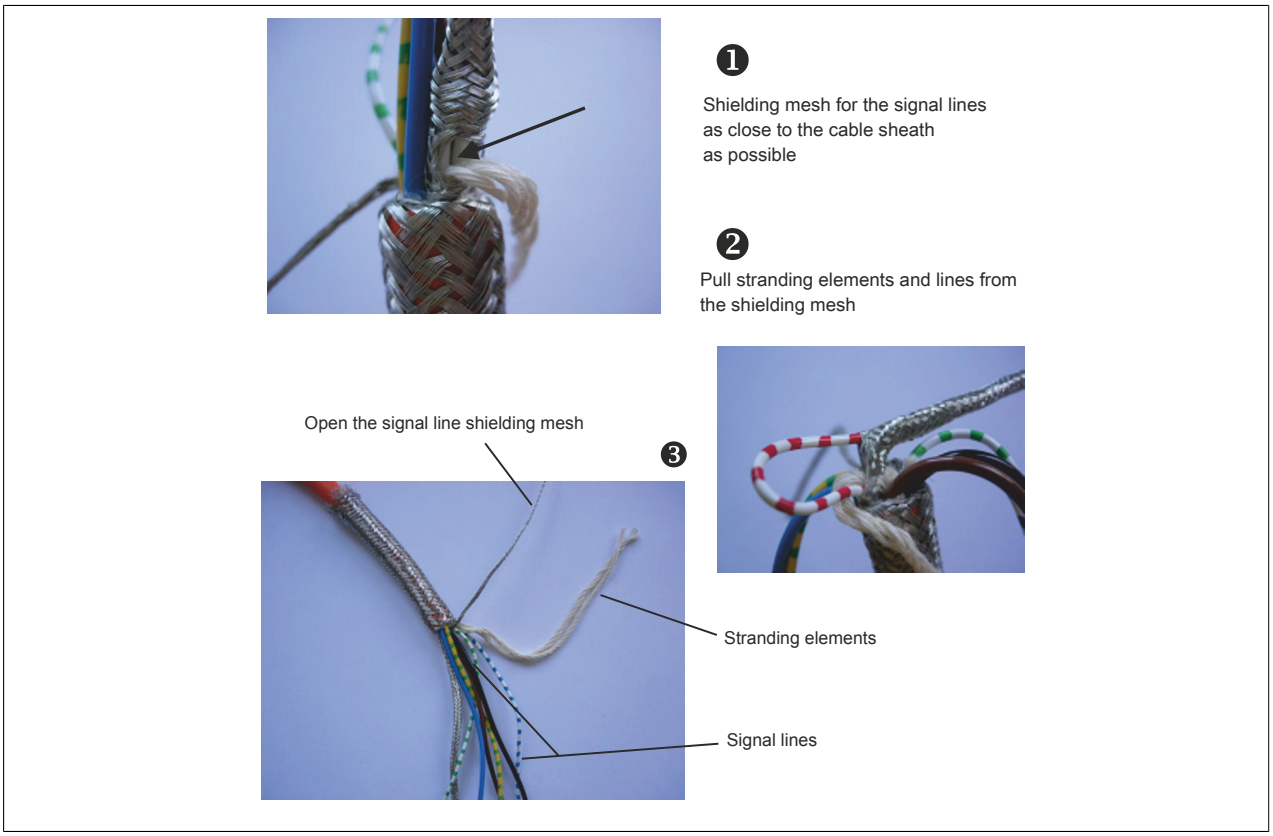


Figure 153: Pulling out the separately shielded signal lines

5. Cut off the stranding elements of the separately shielded conductors.

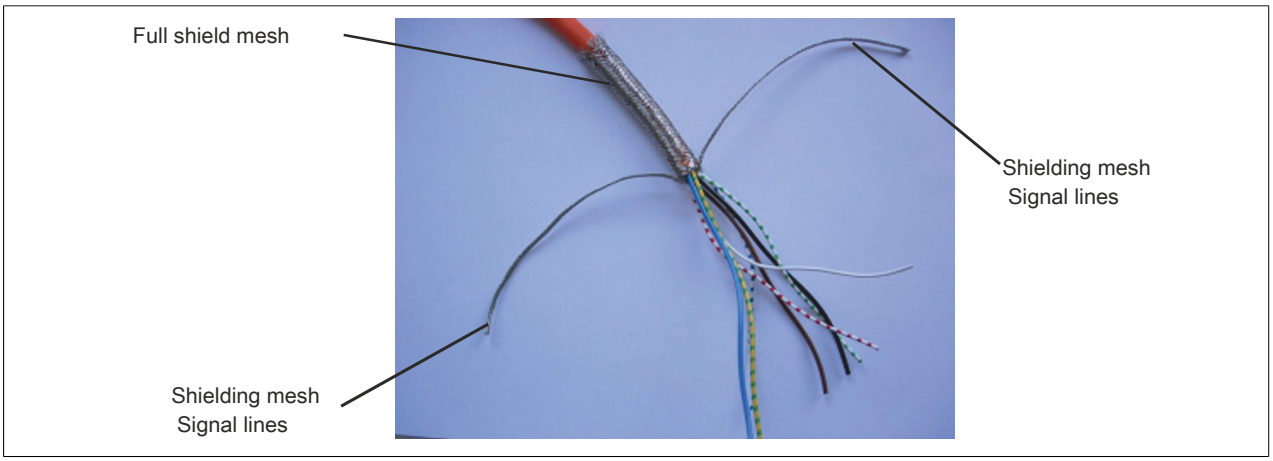


Figure 154: Cable end without stranding elements

6. Shorten the shielding braid to a length of approx. 40 mm and pull the braided shield of the signal conductors back over the cable jacket.

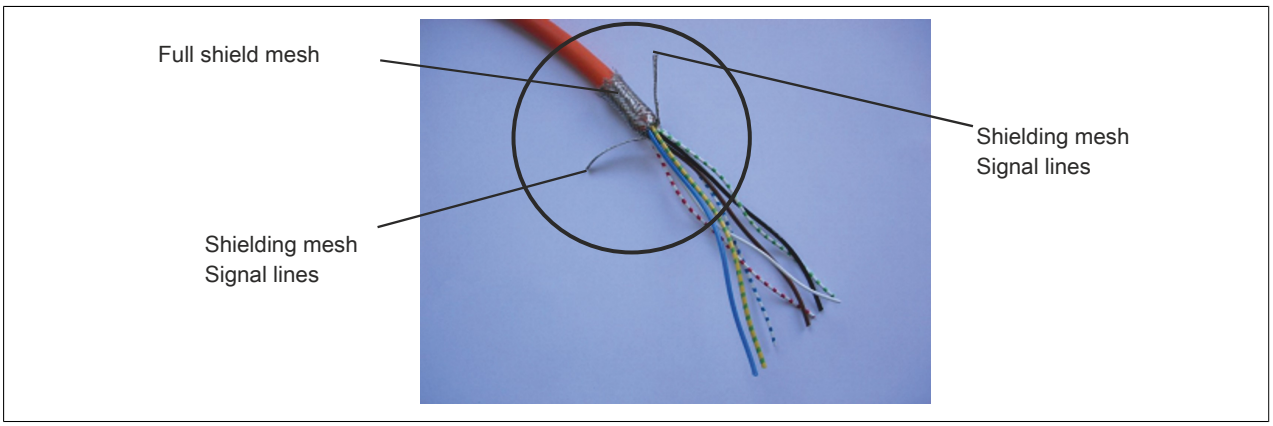


Figure 155: Cable ends with shortened shielding mesh

7. Attach all braided shields to the cable jacket with heat shrink tubing (approx. 20 mm long) so that an approx. 30 mm long piece of the braided shield remains free.[19)]

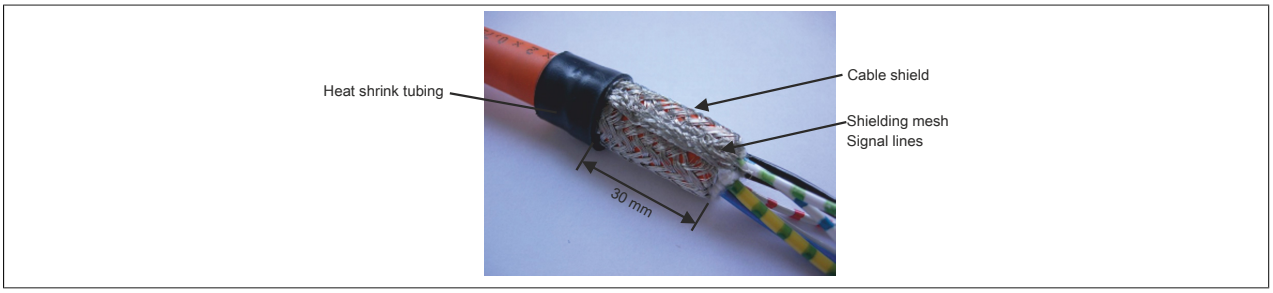
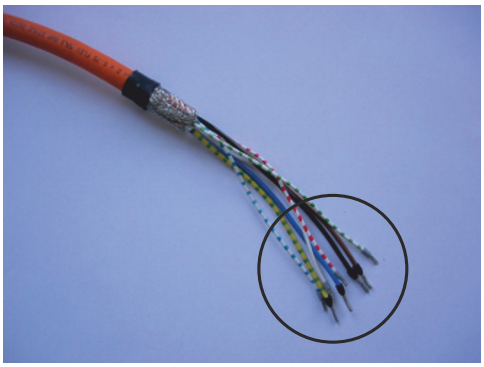


Figure 156: Attaching the shielding mesh

8. Strip the ends of the conductors and provide them with wire end sleeves.



Motor cable	Stripped lengths	
	Power lines	Signal lines
1.5 mm²	10 mm	8 mm
4 mm²	12 mm	8 mm
10 mm²	18 mm	8 mm

Motor cable	Wire end sleeves	
	Power lines	Signal lines
1.5 mm²	1.5 mm²	0.75 mm²
4 mm²	4 mm²	1 mm²
10 mm²	10 mm²	1.5 mm²

Figure 157: Wire ends with wire end sleeves

[19)] It is recommended to use shrink hoses with adhesive filling.

9. Install the shield components (using the example of shield component set 8SCS000.0000- 00).

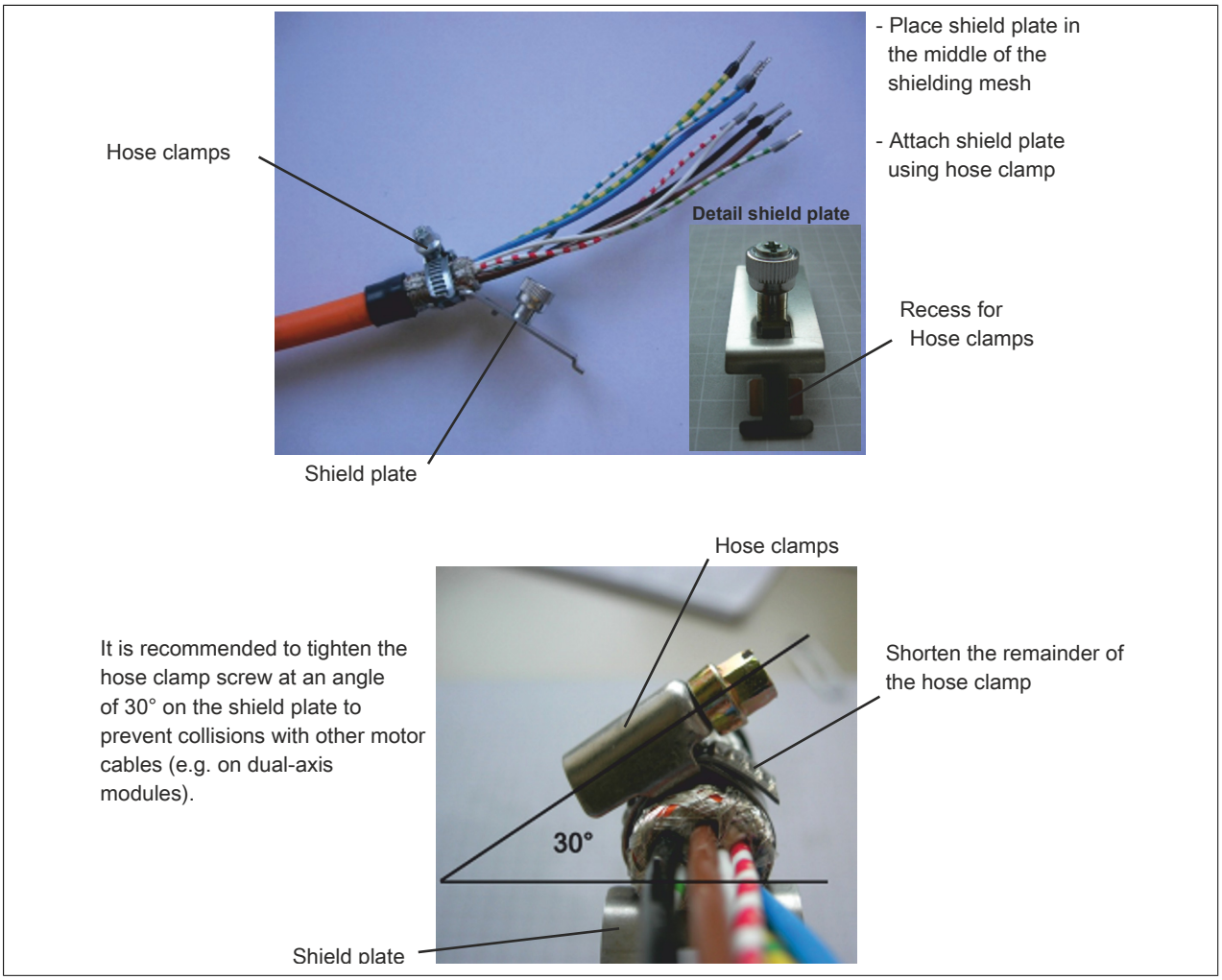


Figure 158: Installing shield components

3 Shield component sets

3.1 Overview of possible shield component sets

3.1.1 Shield component sets for single-width modules

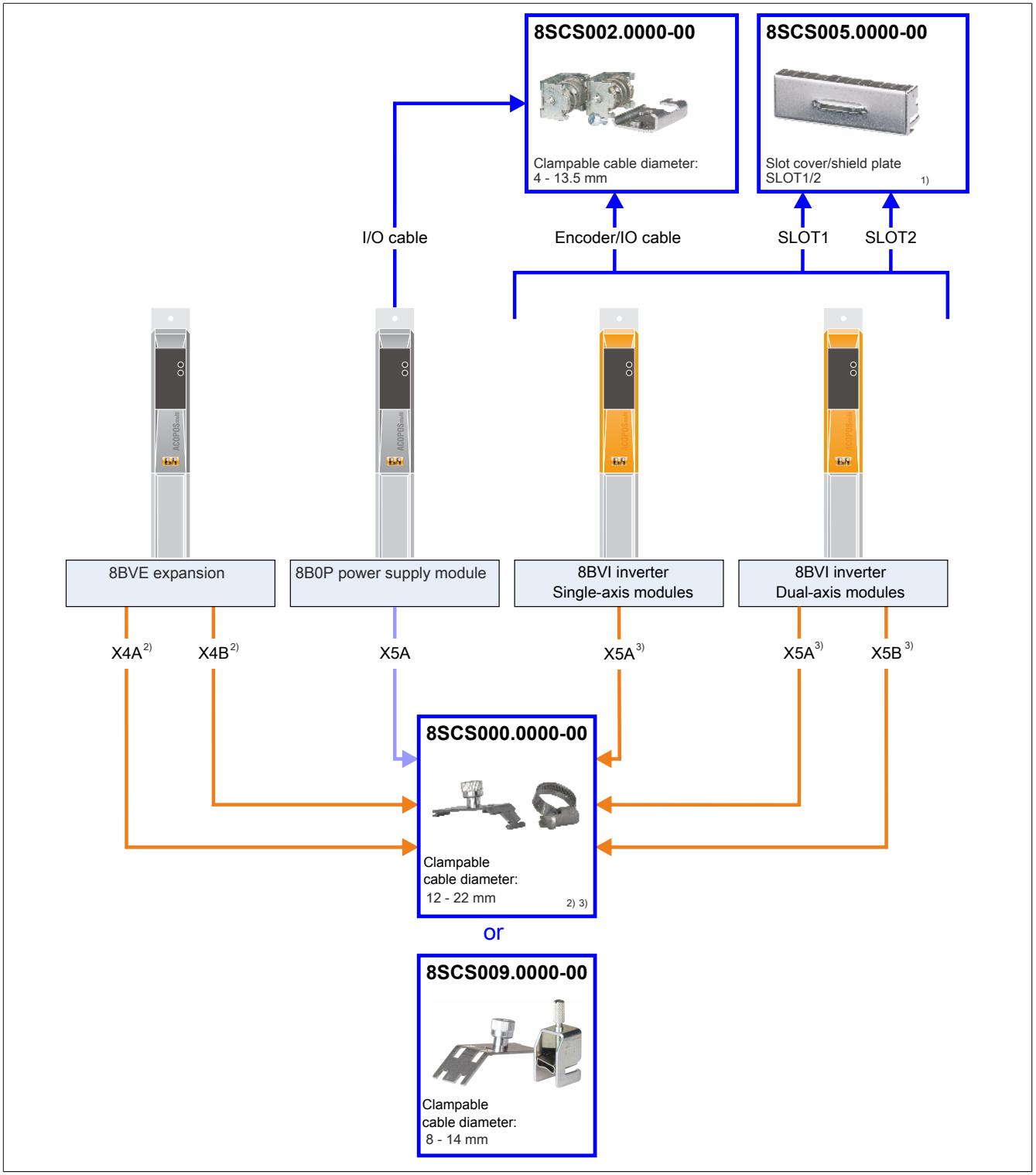


Figure 159: Overview of shield components sets for single-width modules

1) On ACOPOSmulti SafeMOTION inverter modules (1-axis modules), shield component set 8SCS005.0000-00 is already preinstalled in SLOT2. It is not possible to install shield component set 8SCS005.0000-00 on ACOPOSmulti SafeMOTION inverter modules (2-axis modules) (SLOT1 and SLOT2 are already occupied).
2) Shield component set 8SCS000.0000-00 is already preinstalled on 8BCA expansion cables.
3) Shield component set 8SCS000.0000-00 is already preinstalled on B&R 8BCM motor cables with a cross section up to 4 mm².

3.1.2 Shield component sets for double-width modules

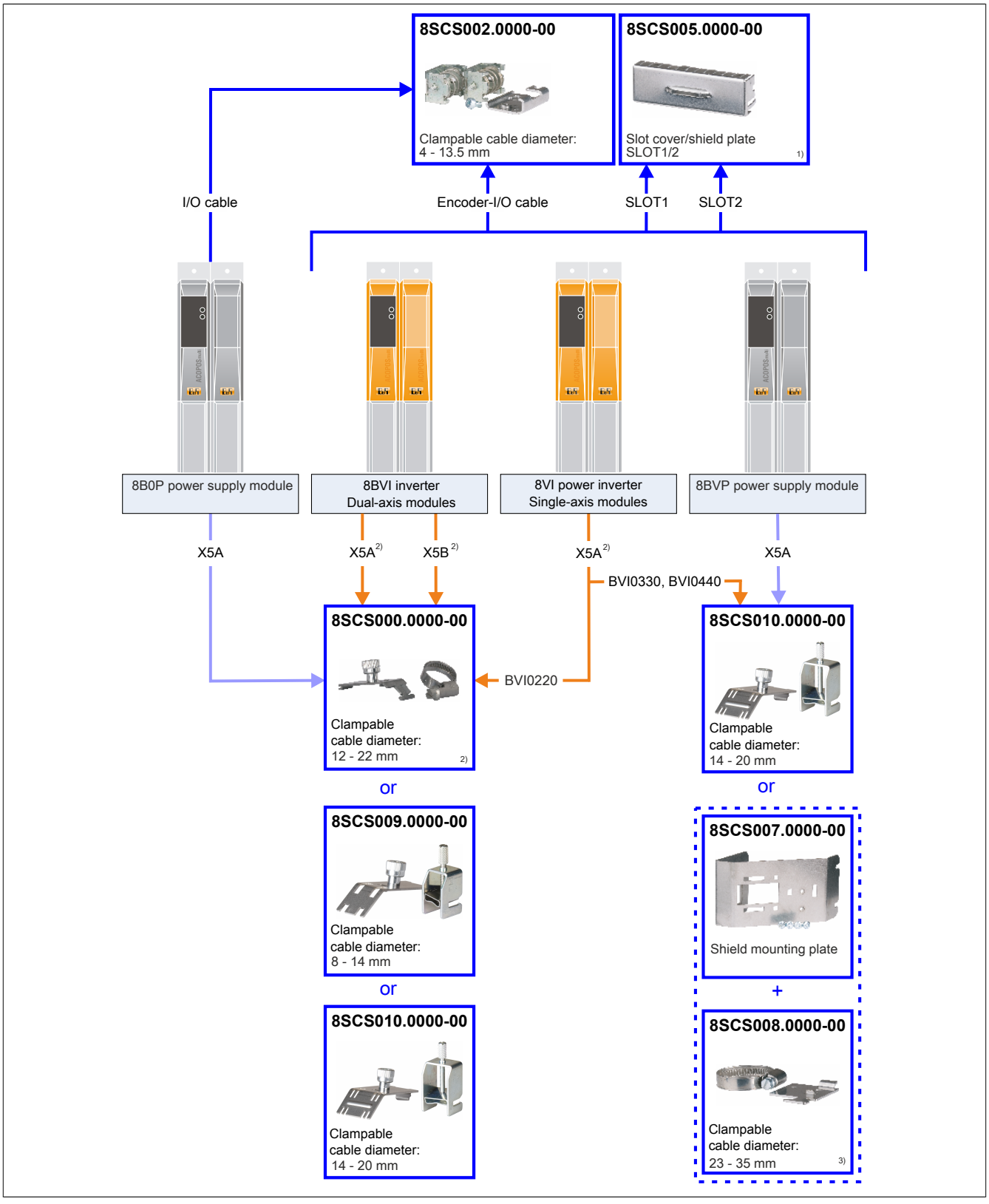


Figure 160: Overview of shield components sets for double-width modules

1) On ACOPOSmulti SafeMOTION inverter modules (1-axis modules), shield component set 8SCS005.0000-00 is already preinstalled in SLOT2. It is not possible to install shield component set 8SCS005.0000-00 on ACOPOSmulti SafeMOTION inverter modules (2-axis modules) (SLOT1 and SLOT2 are already occupied).
2) Shield component set 8SCS000.0000-00 is already preinstalled on B&R 8BCM motor cables with a cross section up to 4 mm².
3) Shield component set 8SCS008.0000-00 is already preinstalled on B&R 8BCM motor cables with a cross section of 10 mm².

3.1.3 Shield component sets for 4x-width modules

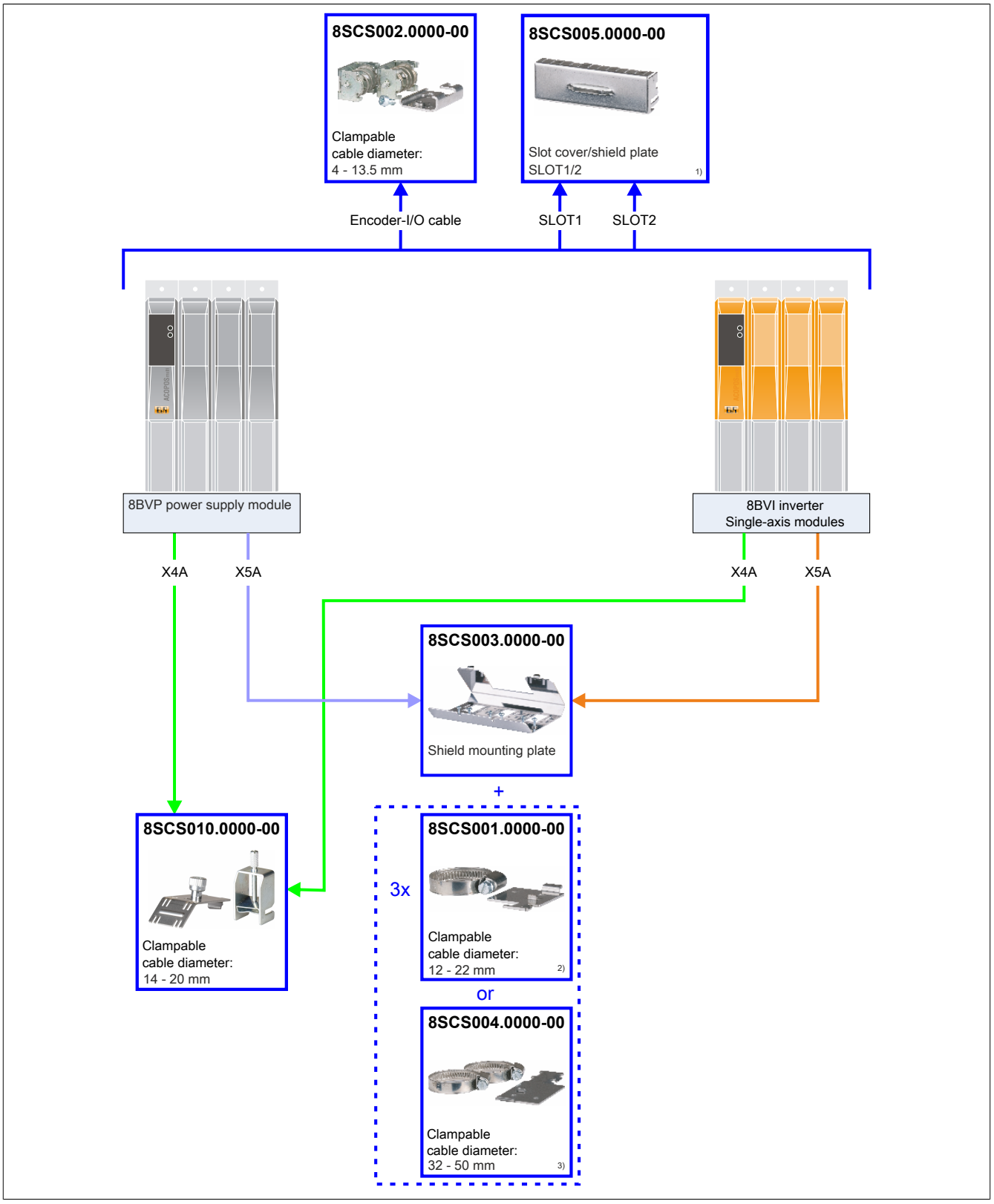


Figure 161: Overview of shield components sets for 4x-width modules

1) On ACOPOSmulti SafeMOTION inverter modules (1-axis modules), shield component set 8SCS005.0000-00 is already preinstalled in SLOT2. It is not possible to install shield component set 8SCS005.0000-00 on ACOPOSmulti SafeMOTION inverter modules (2-axis modules) (SLOT1 and SLOT2 are already occupied).
2) B&R recommends the use of shield component set 8SCS001.0000-00 to shield individual wires.
3) B&R recommends the use of shield component set 8SCS004.0000-00 to shield cables.

3.1.4 Shield component sets for 8x-width modules

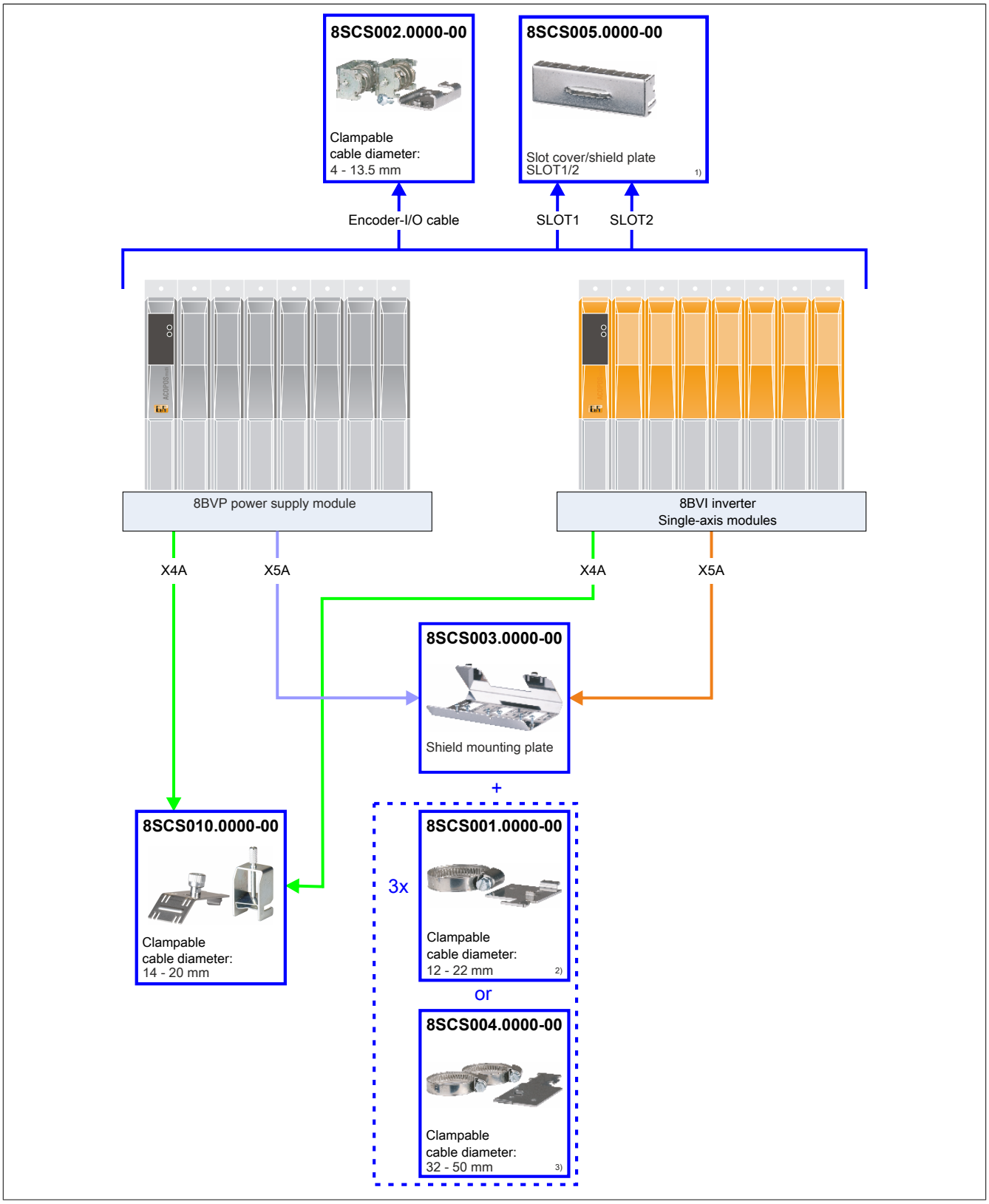


Figure 162: Overview of shield components sets for 8x-width modules

1) On ACOPOSmulti SafeMOTION inverter modules (1-axis modules), shield component set 8SCS005.0000-00 is already preinstalled in SLOT2. It is not possible to install shield component set 8SCS005.0000-00 on ACOPOSmulti SafeMOTION inverter modules (2-axis modules) (SLOT1 and SLOT2 are already occupied).
2) B&R recommends the use of shield component set 8SCS001.0000-00 to shield individual wires.
3) B&R recommends the use of shield component set 8SCS004.0000-00 to shield cables.

3.2 8SCS002.0000-00 shield component set

The 8SCS002.0000-00 shield set can be used to shield I/O cables for the connections on the top of ACOPOSmulti modules.

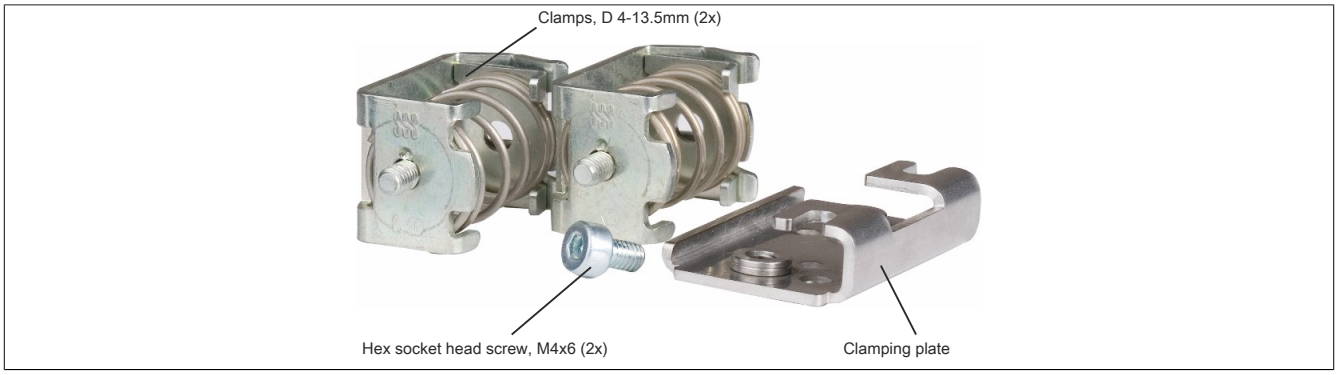


Figure 163: 8SCS002.0000-00 shield set

Required tools

- Flat-head screwdriver, size 2
- Hex key, size 3

3.2.1 Preparation

Before installing the 8SCS002.0000-00 shield set, a clip must first be removed from the top left plastic cover of the ACOPOSmulti module using a suitable tool (such as a flat-head screwdriver):

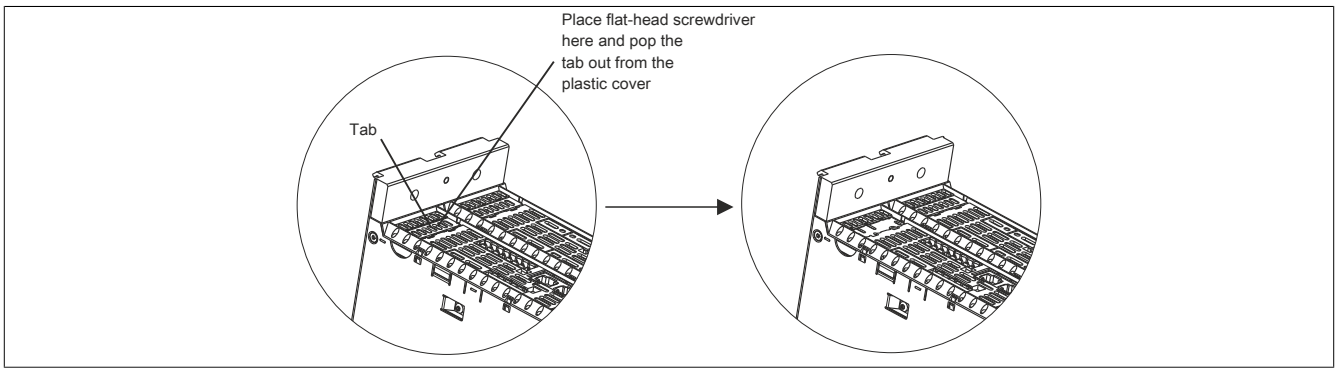
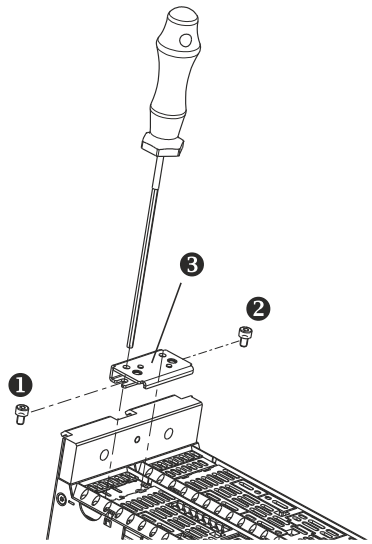
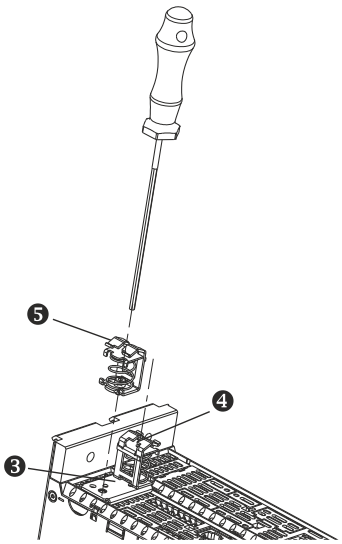
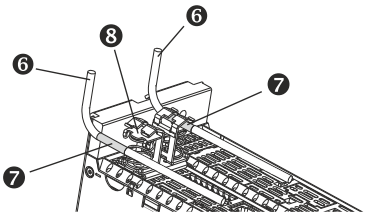
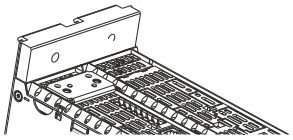


Figure 164: Removing the clip

3.2.2 Installation

Step 1: Installing the clamping plate	Step 2: Installing the clamps on the clamping plate	Step 3: Installing the I/O cable
		
1. Place hex socket head screws ❶ and ❷ in the openings provided in the clamping plate ❸. 2. Fasten the clamping plate ❸ to the ACOPOSmulti module (fastening torque 2 Nm). 3. Result: Clamping plate ❸ installed 	1. Position and fasten the clamps ❹ and ❺ to the clamping plate ❸ as illustrated (the required screws are integrated in the clamps ❹ and ❺; fastening torque = max. 2 Nm).	1. Strip the I/O cable that you intend to shield ❻ on the end near the clamp to a length of approximately 2 cm (❼). 2. Press down the clamp's spring plate ❽. 3. Slide the stripped end of the I/O cable sideways into the clamp. 4. Release the spring plate ❽. 5. Spring tension will fasten the I/O cable in the clamp.

4 Dimension diagrams and installation dimensions

4.1 General information

4.1.1 Swivel range of the connector cover

The swivel range of the connector covers on the front of the ACOPOSmulti modules must not be impeded during installation in order to avoid any cabling problems.

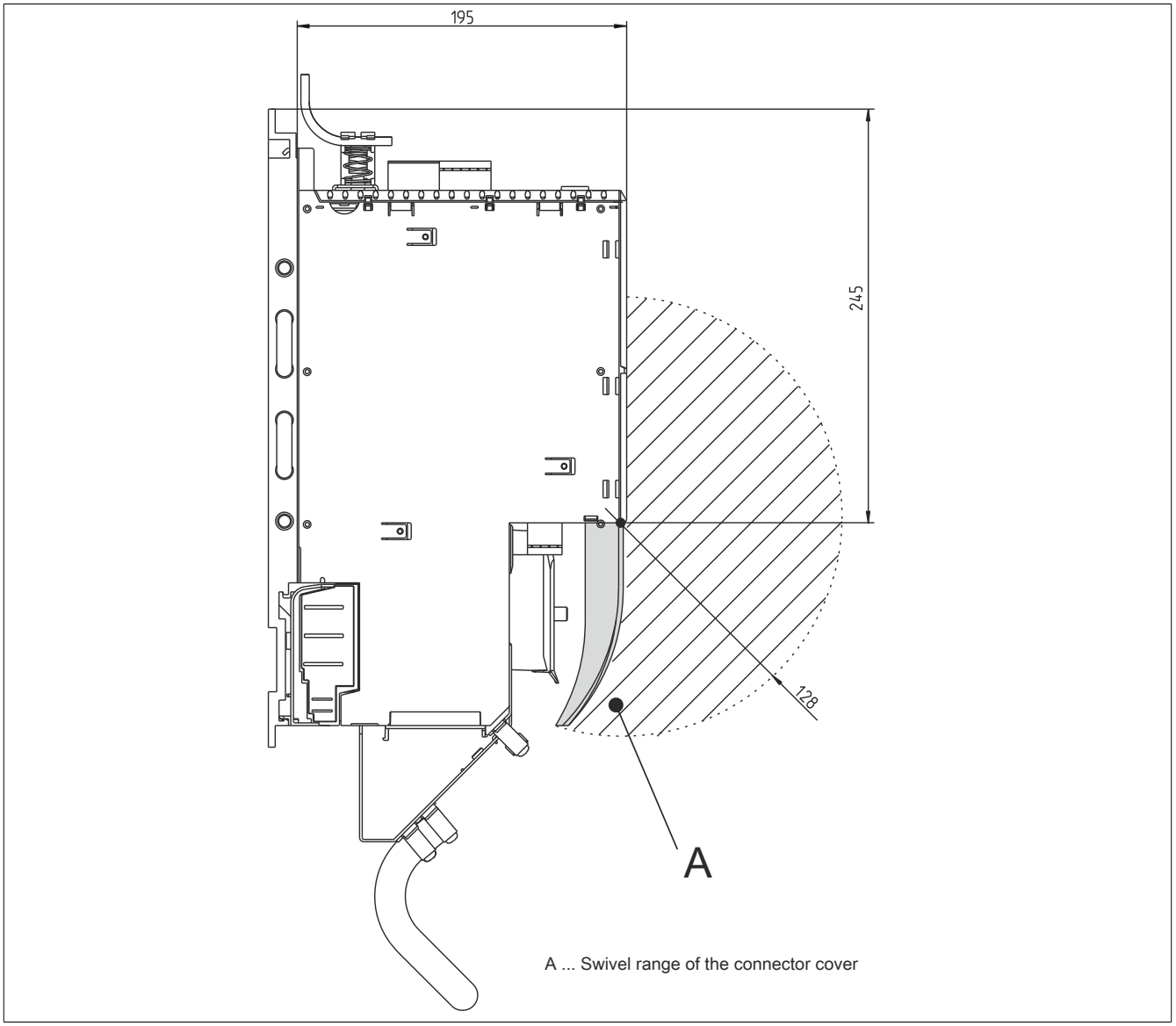
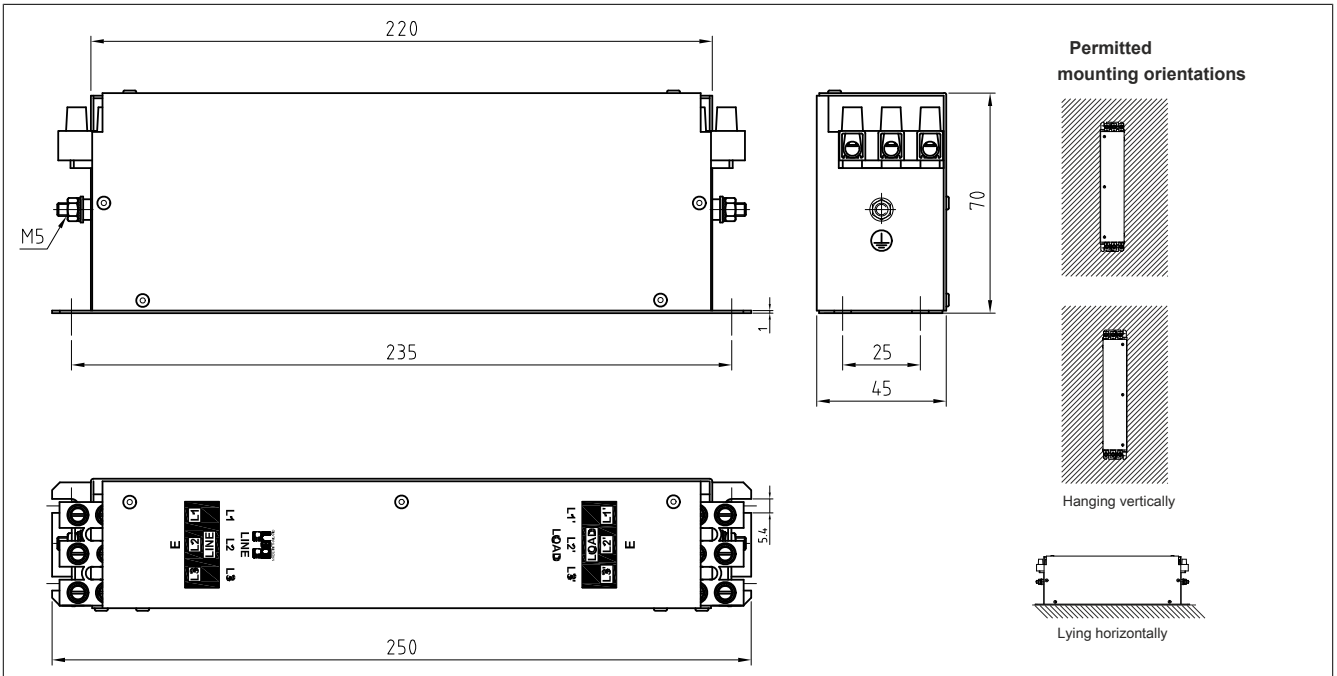


Figure 165: Swivel range of the connector cover

4.2 8B0F passive line filters

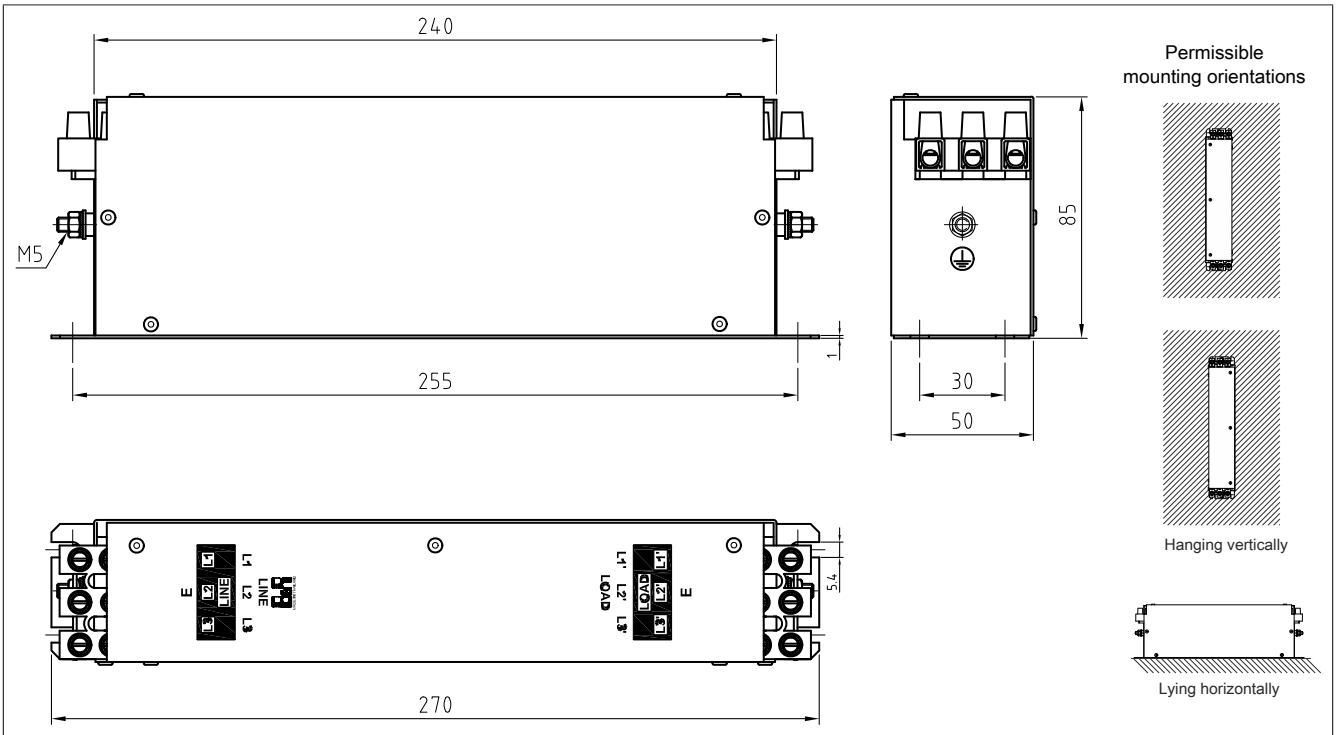
4.2.1 8B0F0160H000.A00-1



For proper air circulation, at least 60 mm has to be left free above, below and on the front side of the module.

Figure 166: 8B0F0160H000.A00-1 - Dimension diagram and installation dimensions

4.2.2 8B0F0300H000.000-1



For proper air circulation, at least 60 mm has to be left free above, below and on the front side of the module.

Figure 167: 8B0F0300H000.000-1 - Dimension diagram and installation dimensions

4.2.3 8B0F0550H000.000-1

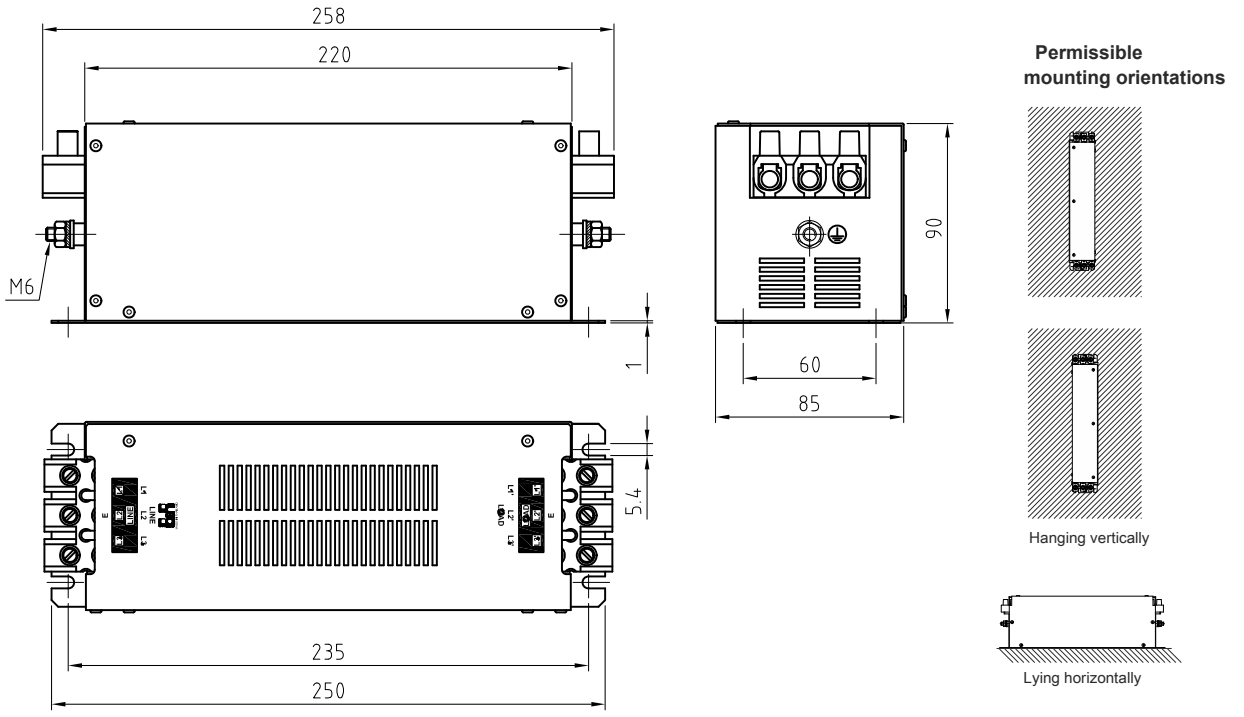


Figure 168: 8B0F0550H000.000-1 - Dimension diagram and installation dimensions

4.3 8BVF line filters

4.3.1 8BVF0220H000.000-1 - Dimension diagram and installation dimensions

Up to revision D0:

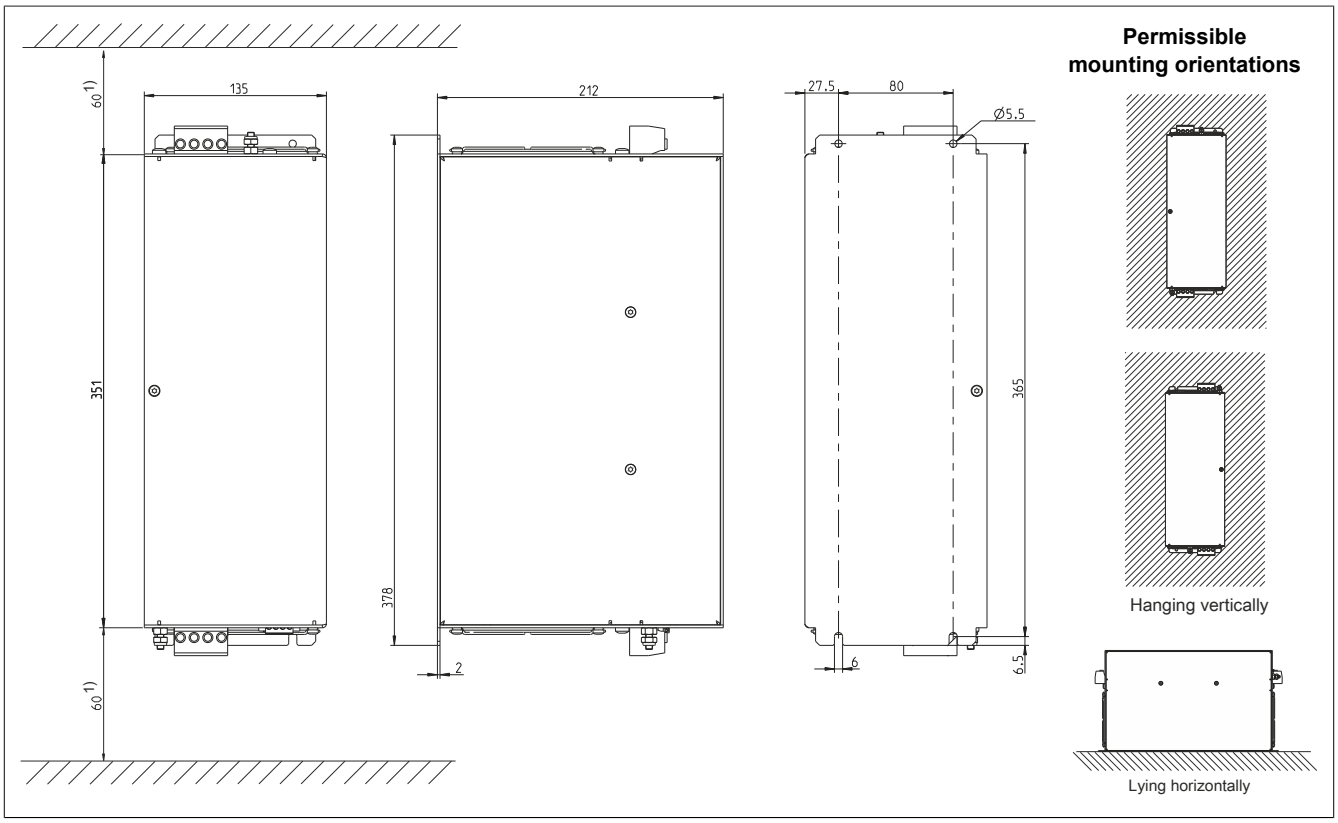


Figure 169: 8BVF0220H000.000-1 - Dimension diagram and installation dimensions (up to revision D0)

1) For sufficient air circulation, a clearance of at least 60 mm must be provided above, below and in front of the module.

Revision E0 and later with reinforced housing construction with identical main dimensions:

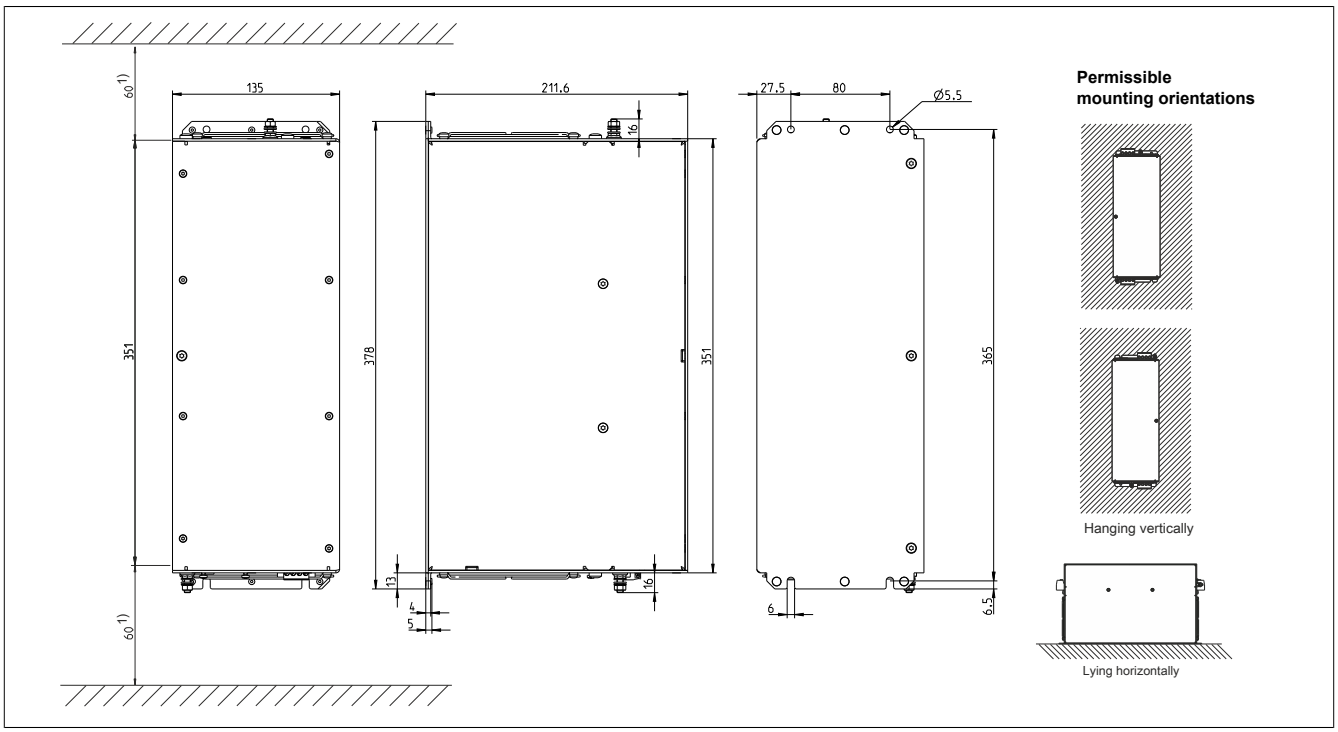


Figure 170: 8BVF0220H000.000-1 - Dimension diagram and installation dimensions (revision E0 and later)

1) For sufficient air circulation, a clearance of at least 60 mm must be provided above, below and in front of the module.

4.3.2 8BVF0440H000.001-2 - Dimension diagram and installation dimensions

Up to revision E0:

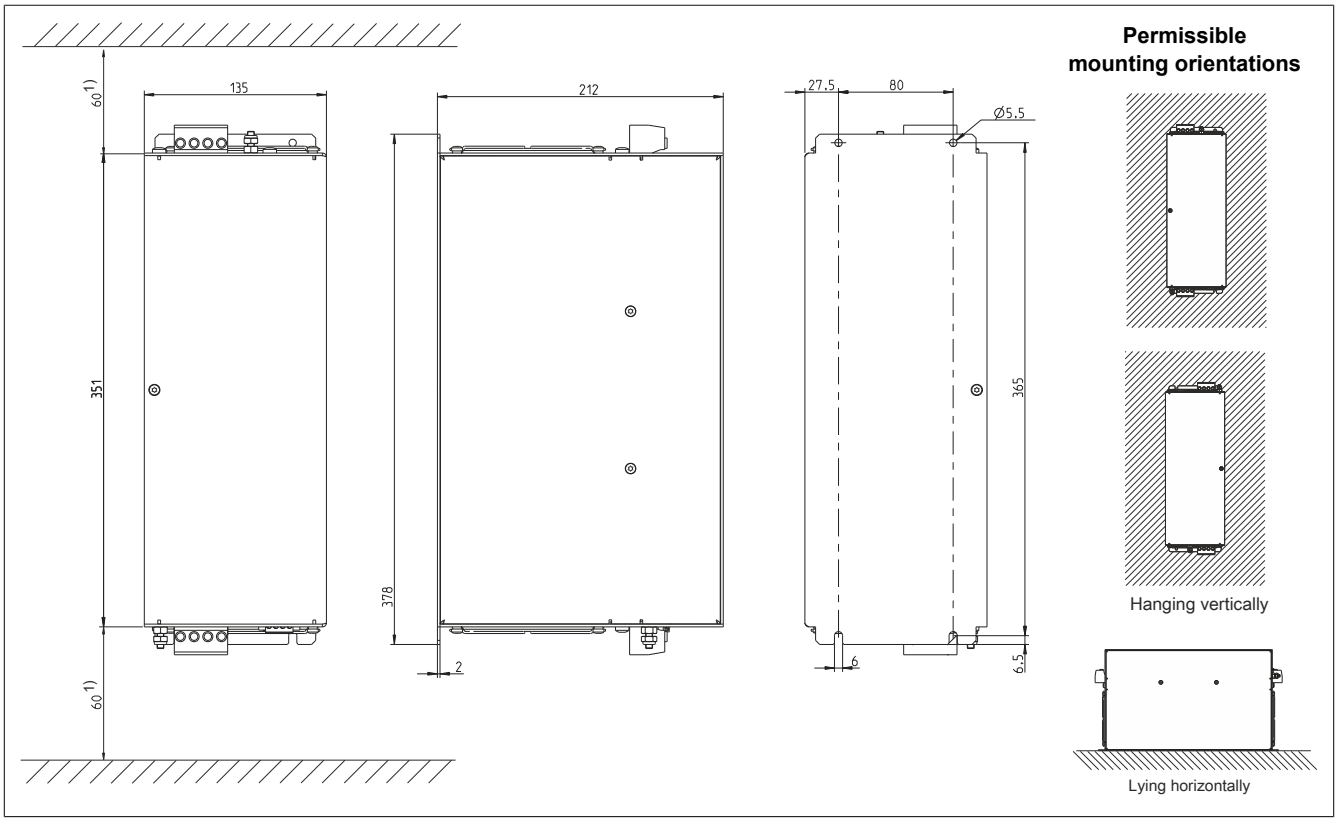


Figure 171: 8BVF0440H000.001-2 - Dimension diagram and installation dimensions (up to revision E0)

1) For sufficient air circulation, a clearance of at least 60 mm must be provided above, below and in front of the module.

Revision F0 and later with reinforced housing construction with identical main dimensions:

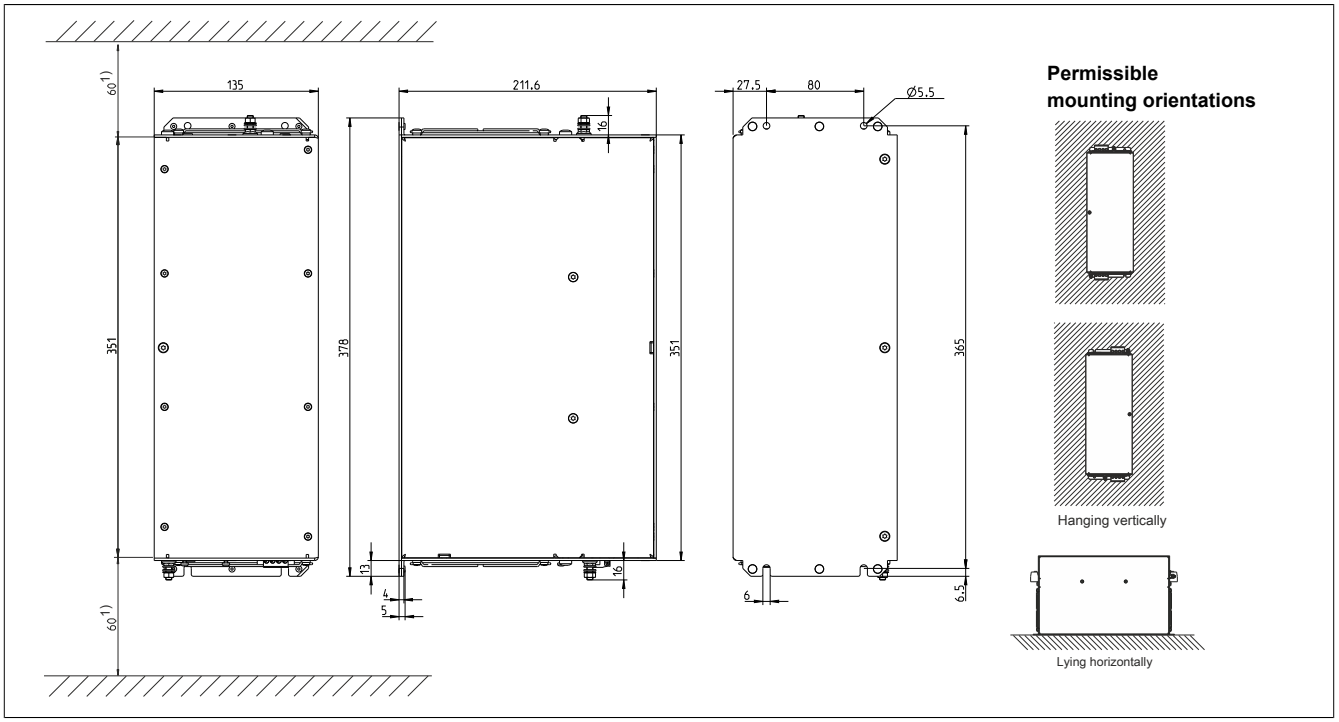


Figure 172: 8BVF0440H000.001-2 - Dimension diagram and installation dimensions (revision F0 and later)

1) For sufficient air circulation, a clearance of at least 60 mm must be provided above, below and in front of the module.

4.3.3 8BVF0880H000.000-1 - Dimension diagram and installation dimensions

Up to revision E0:

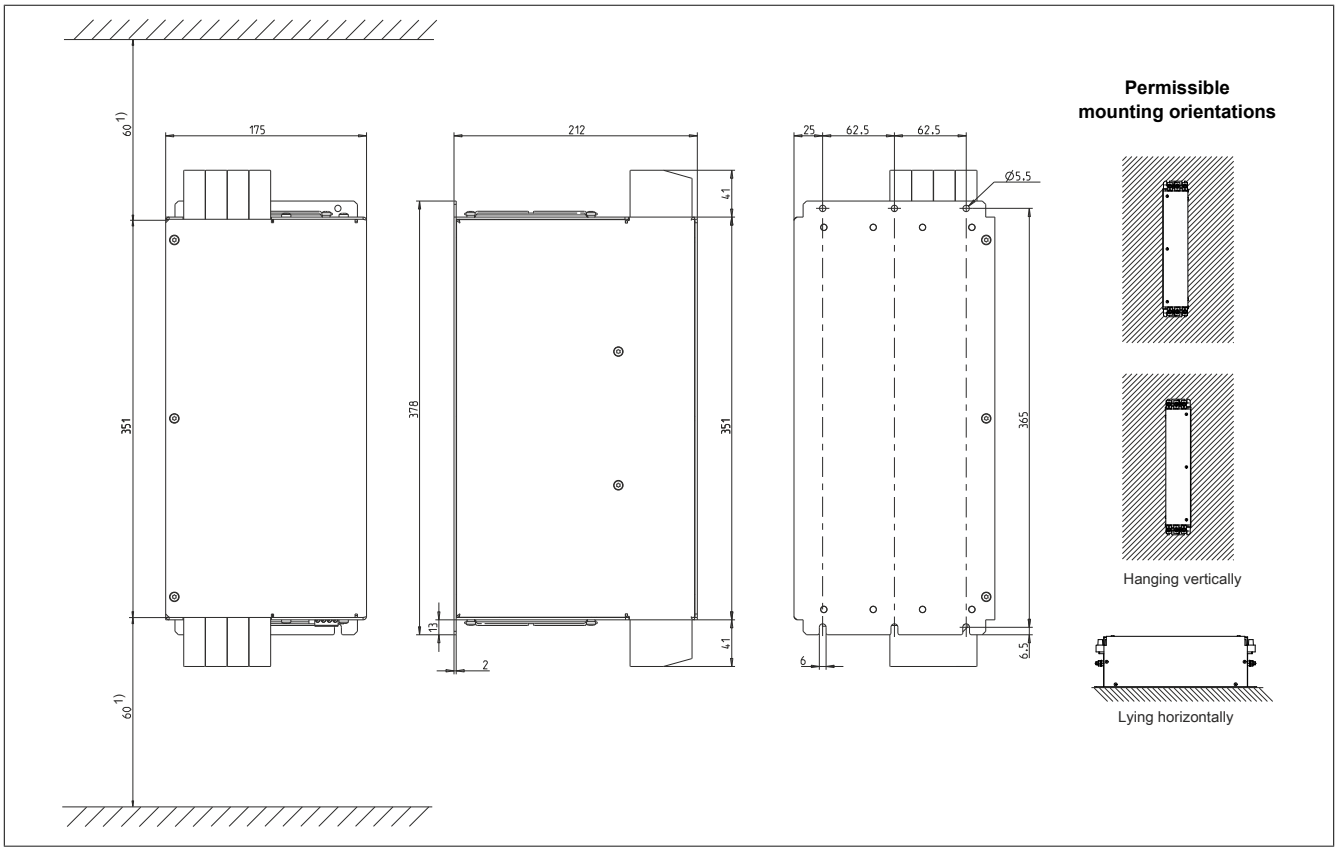


Figure 173: 8BVF8800H000.000-1 - Dimension diagram and installation dimensions (up to revision E0)

1) For sufficient air circulation, a clearance of at least 60 mm must be provided above, below and in front of the module.

Revision F0 and later with reinforced housing construction with identical main dimensions:

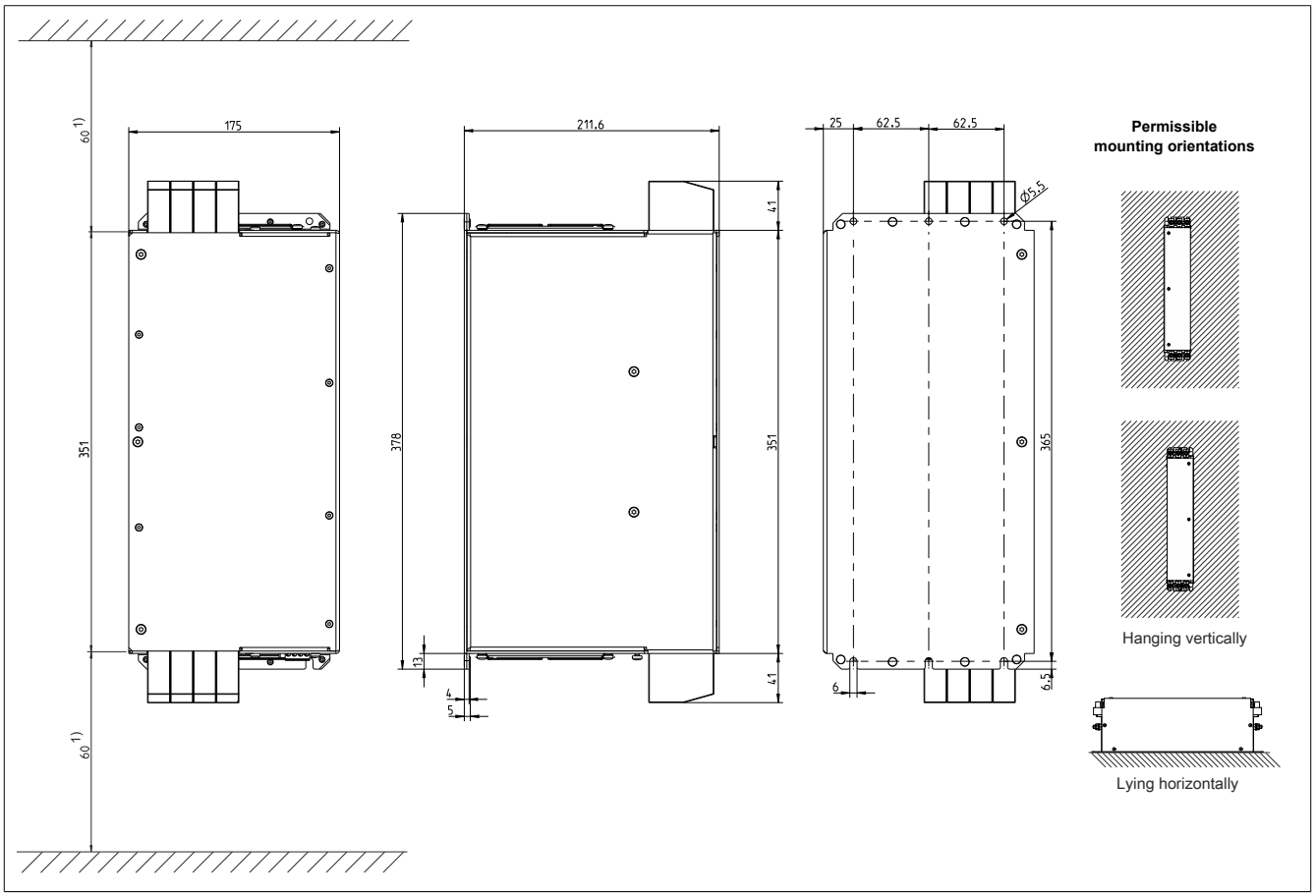


Figure 174: 8BVF0880H000.000-1 - Dimension diagram and installation dimensions (revision F0 and later)

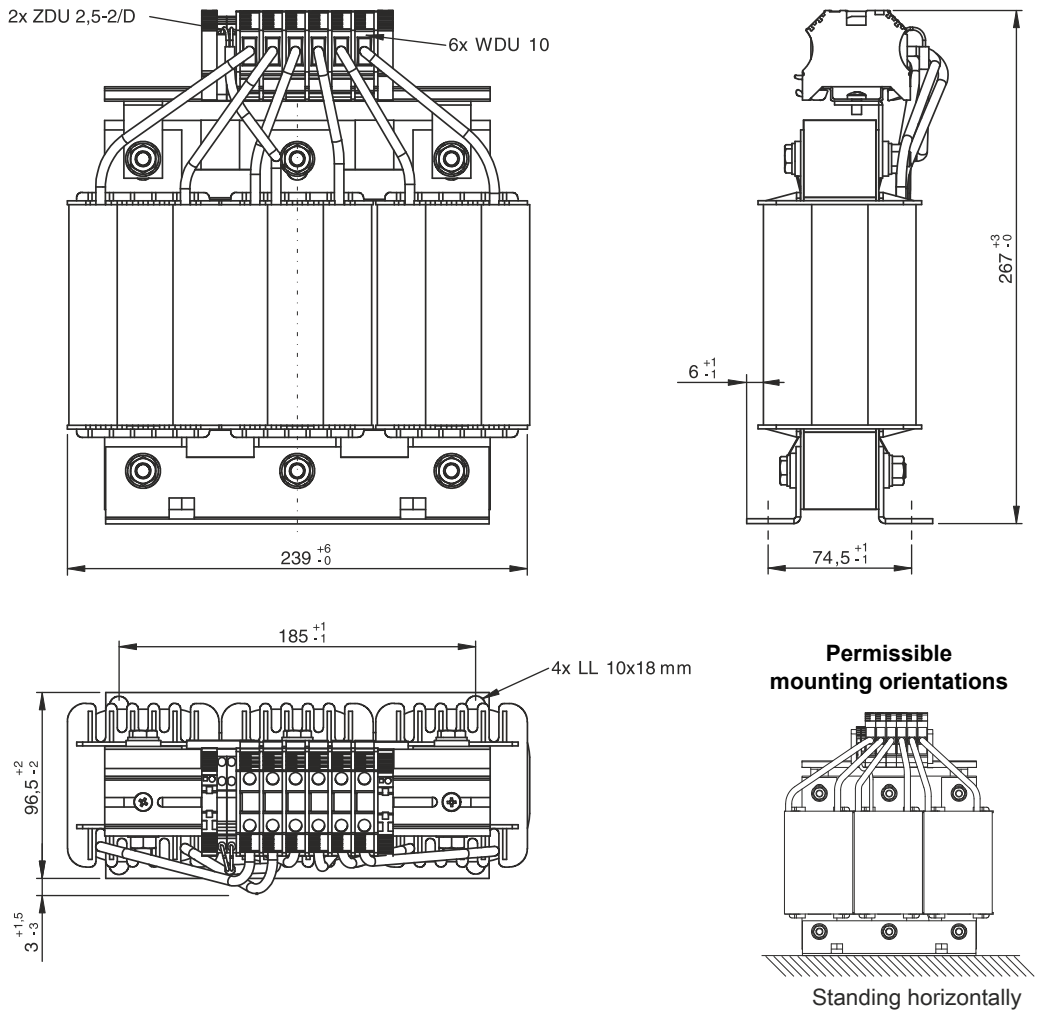
1) For sufficient air circulation, a clearance of at least 60 mm must be provided above, below and in front of the module.

4.4 8BVR regeneration chokes

Caution!

Certain mounting orientations can block the view of the warning sticker on the regeneration choke. Two additional warning stickers are therefore included in delivery for the user to place in a clearly visible location on the regeneration choke. These warning stickers are attached to the regeneration choke by a cable tie and must be removed before initial operation since the backing film for the warning sticker is not sufficiently heat-resistant!

4.4.1 8BVR0220H000.100-1



For sufficient air circulation, a clearance of at least 13 mm must be provided above and to the side of the regeneration choke.

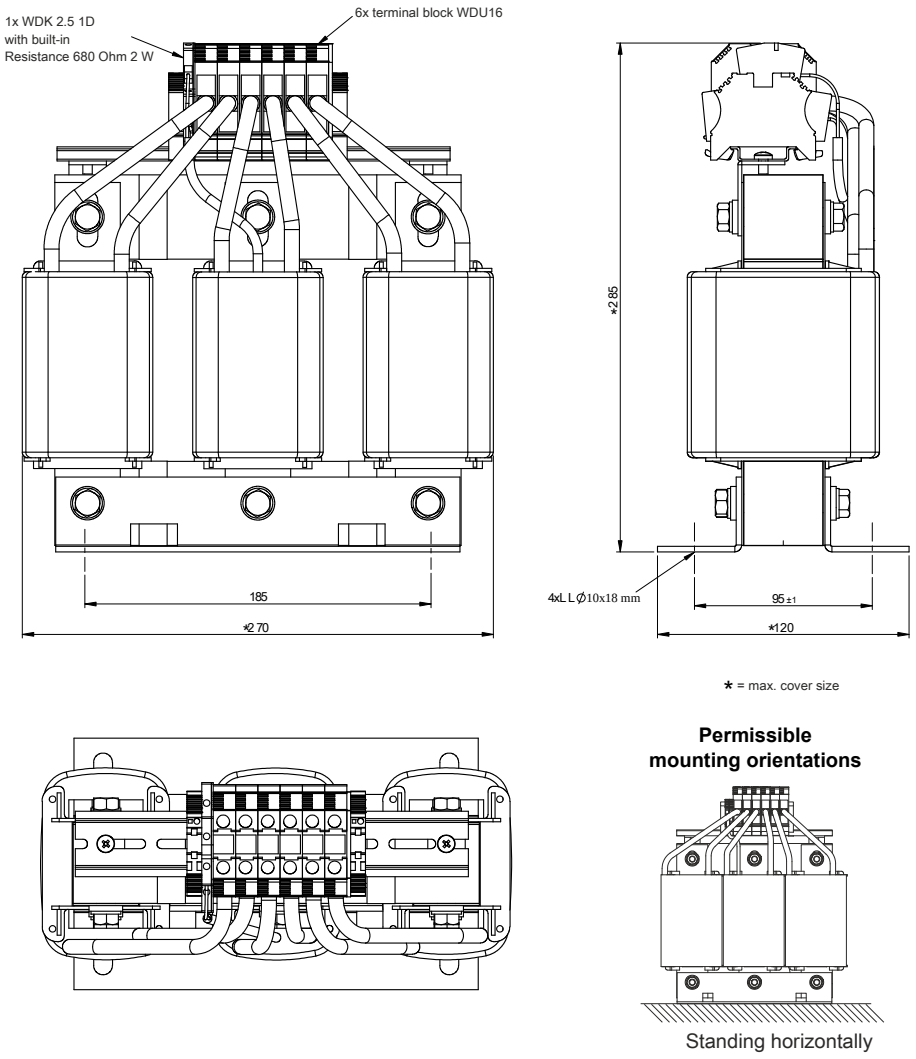
Figure 175: 8BVR0220H000.100-1 - Dimension diagram and installation dimensions

Warning!

When installing ACOPOSmulti regeneration chokes, it is important to make sure that the windings and connection wires are also strongly insulated from neighboring electrically conductive components (e.g. control cabinet wall).

If this reinforced insulation is implemented with an area of empty space, then a minimum distance of 8 mm (or 12.7 mm in accordance with cULus) to neighboring conductive parts is necessary.

4.4.2 8BVR0440H000.100-2



For sufficient air circulation, a clearance of at least 13 mm must be provided above and to the side of the regeneration choke.

Figure 176: 8BVR0440H000.100-2 - Dimension diagram and installation dimensions

Warning!

When installing ACOPOSmulti regeneration chokes, it is important to make sure that the windings and connection wires are also strongly insulated from neighboring electrically conductive components (e.g. control cabinet wall).

If this reinforced insulation is implemented with an area of empty space, then a minimum distance of 8 mm (or 12.7 mm in accordance with cULus) to neighboring conductive parts is necessary.

4.4.3 8BVR0880H000.100-1

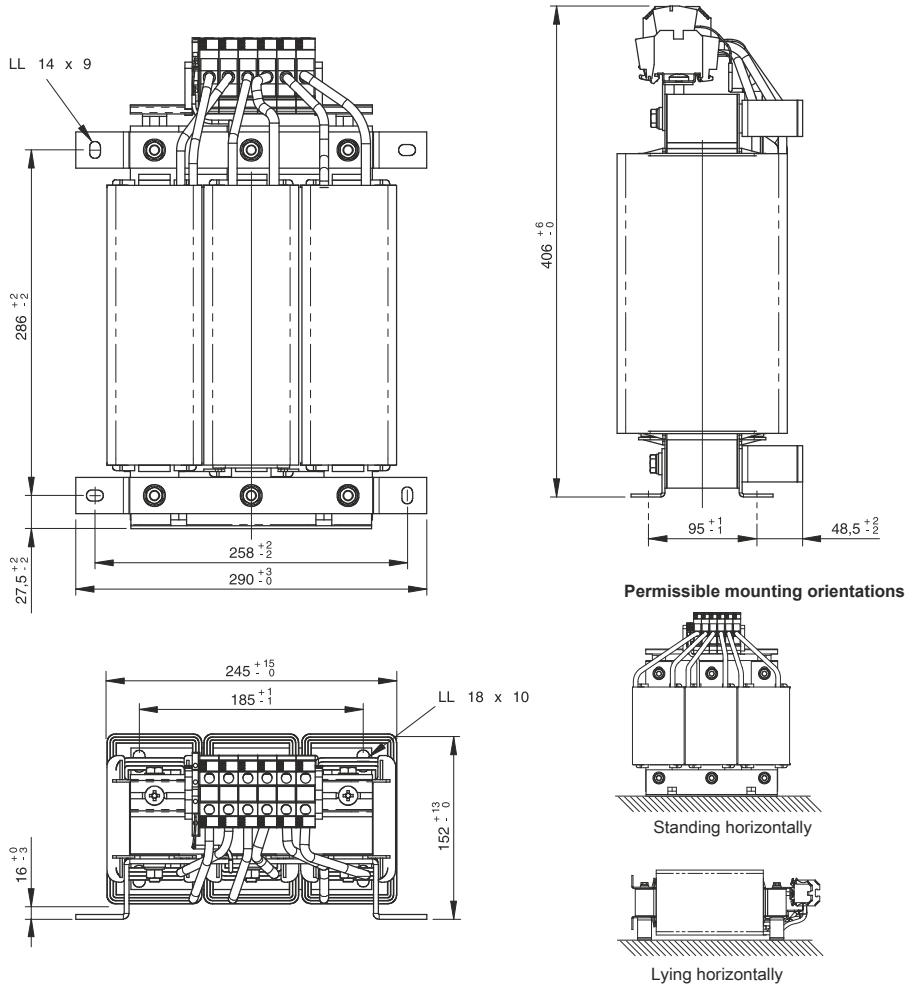


Figure 177: 8BVR0880H000.100-1 - Dimension diagram and installation dimensions

Warning!

When installing ACOPOSmulti regeneration chokes, it is important to make sure that the windings and connection wires are also strongly insulated from neighboring electrically conductive components (e.g. control cabinet wall).

If this reinforced insulation is implemented with an area of empty space, then a minimum distance of 8 mm (or 12.7 mm in accordance with cULus) to neighboring conductive parts is necessary.

4.4.4 8BVR1650H000.100-1

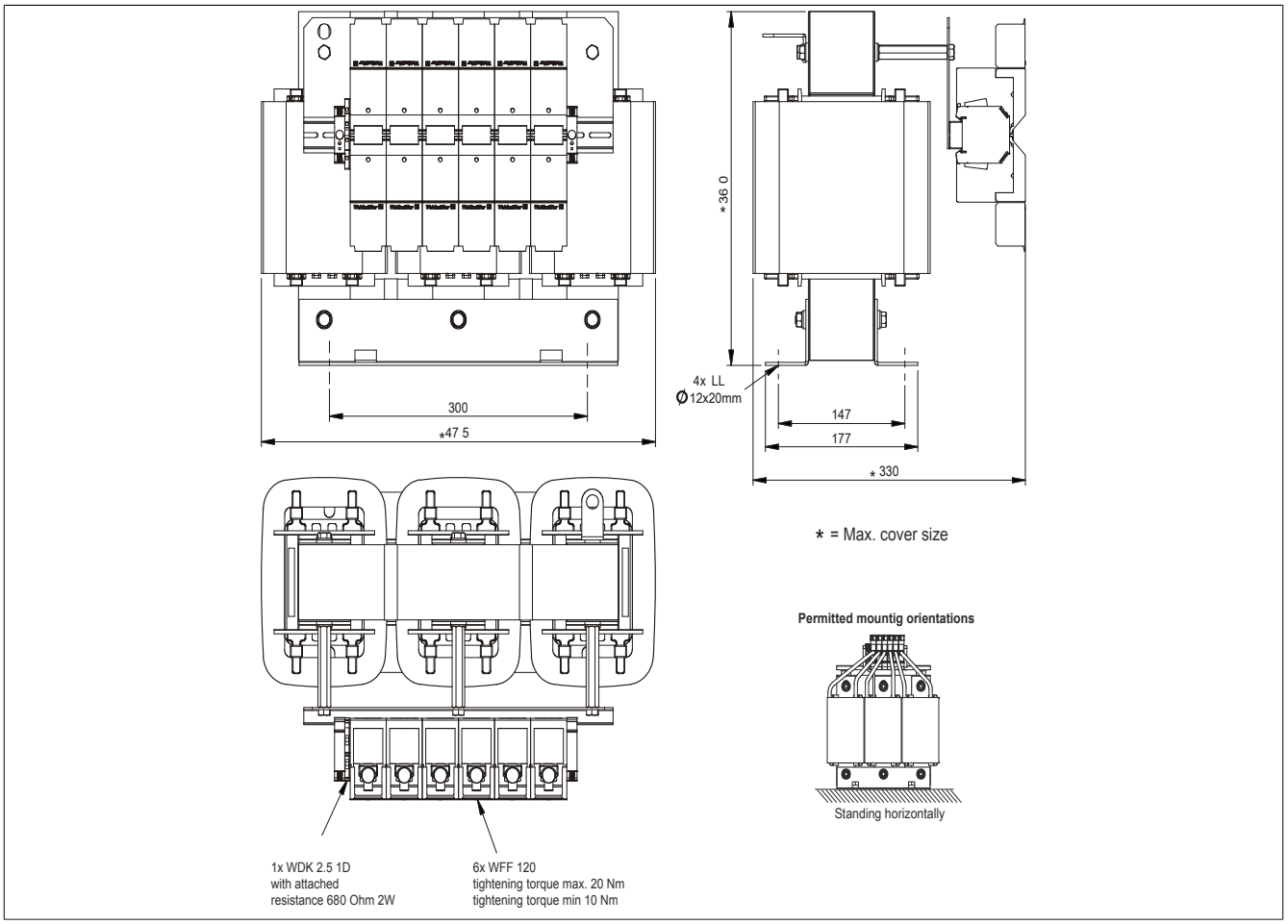


Figure 178: 8BVR1650H000.100-1 - Dimension diagram and installation dimensions

Warning!

When installing ACOPOSmulti regeneration chokes make sure that the windings and connection wires are strongly insulated from the neighboring electrically conductive components (e.g. control cabinet wall).

If this reinforced insulation is implemented solely through the use of an air gap, a minimum distance to adjacent conductive parts of 8 mm (or 12.7 mm per cULus) is required.

4.5 Wall mounting

4.5.1 8B0MnnnnHW00.000-1 mounting plates

Information:

nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

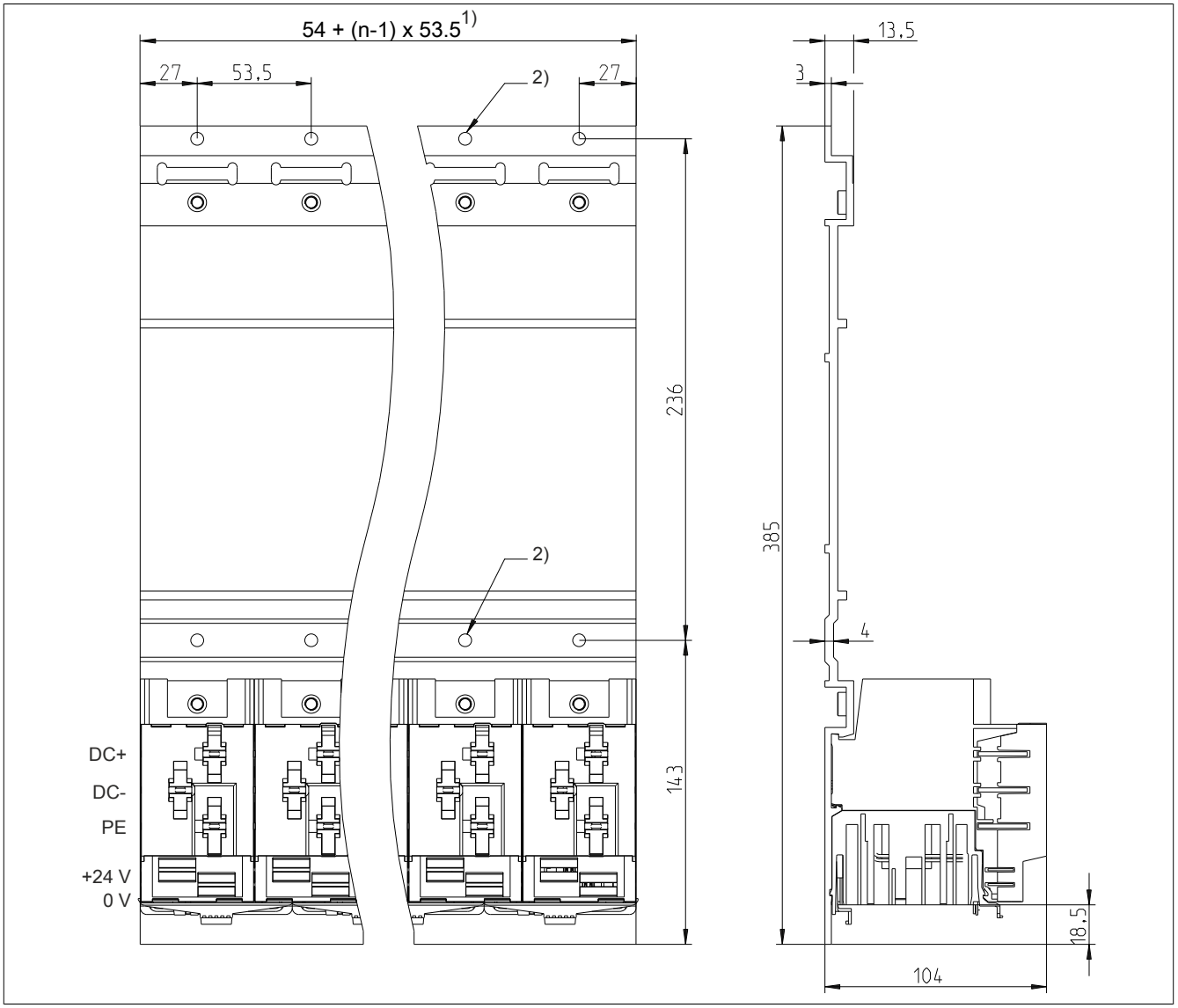


Figure 179: 8B0MnnnnHW00.000-1 - Dimension diagram and installation dimensions

1) n... Number of width units on the mounting plate
2) 2x n mounting holes ø 6 mm
The heads of the fastening screws are not permitted to exceed a height of 6 mm.

4.5.2 8BxP0220HW00.00x-1, 8BxP0440HW00.00x-1 power supply modules

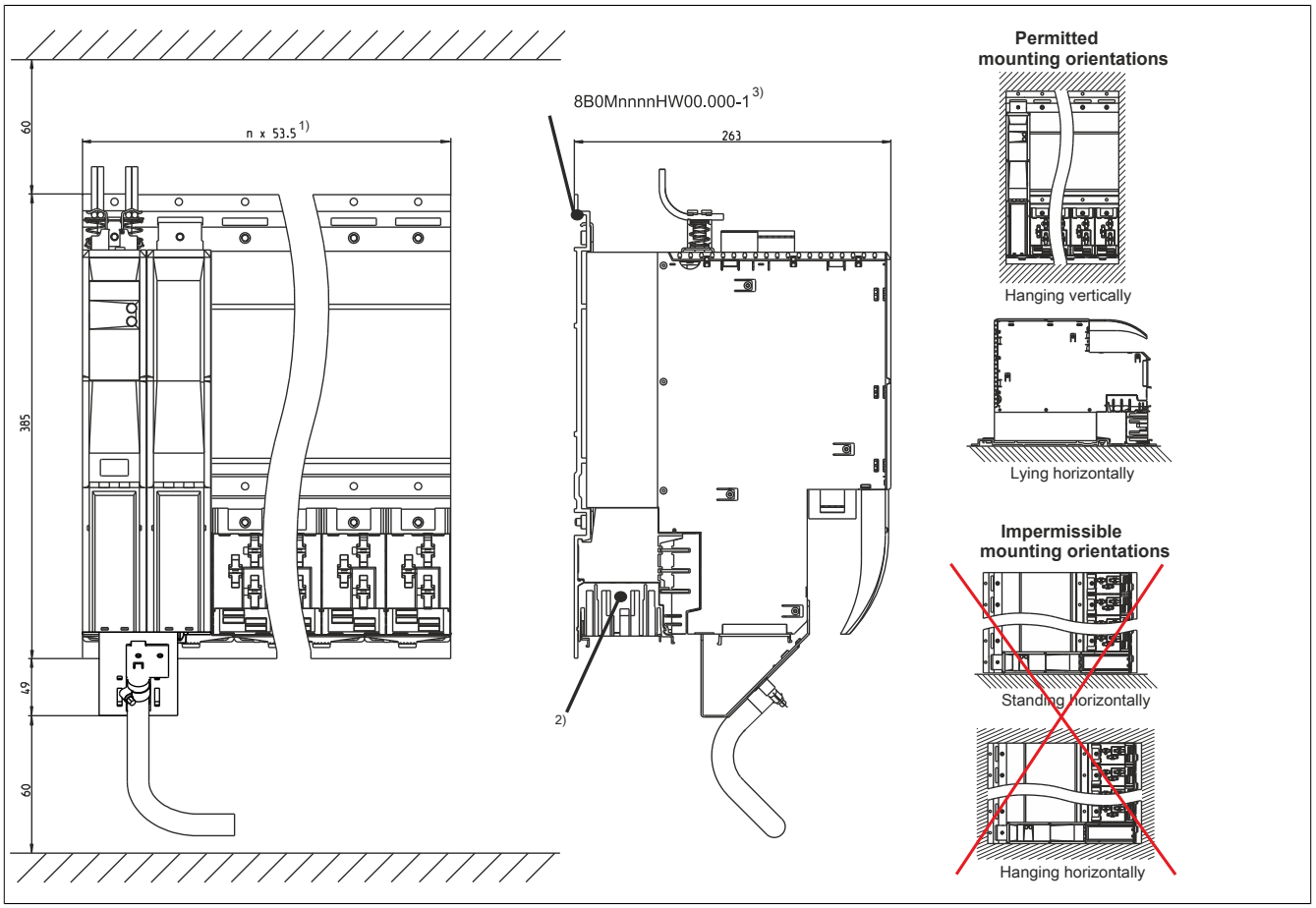


Figure 180: 8BxP0220HW00.00x-1, 8BxP0440HW00.00x-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.3 8BVP0880HW00.000-1 power supply module

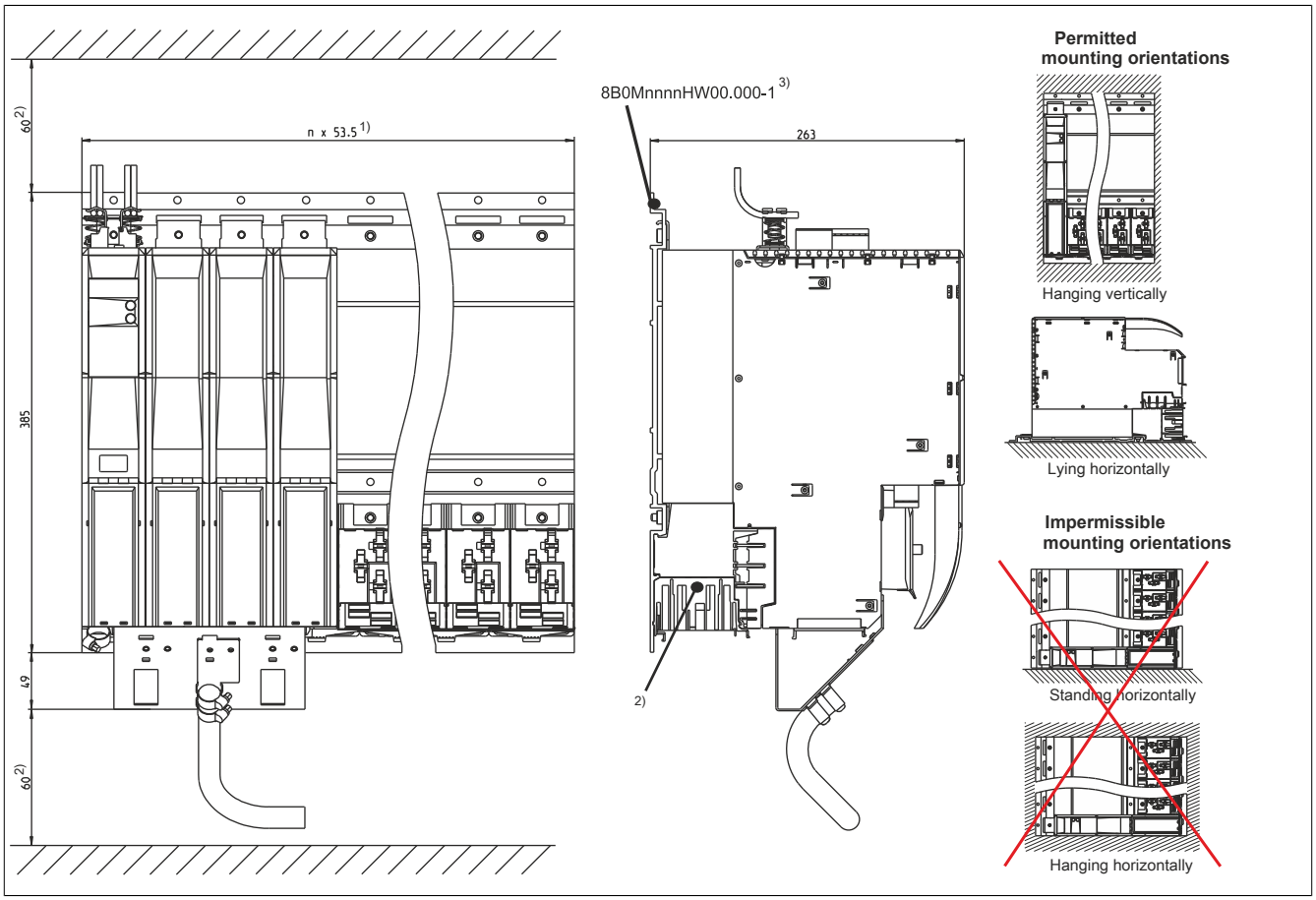


Figure 181: 8BVP0880HW00.000-1 - Dimension diagram and installation dimensions

1) n ... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.4 Auxiliary supply modules

8B0C0160HW00.000-1, 8B0C0320HW00.000-1

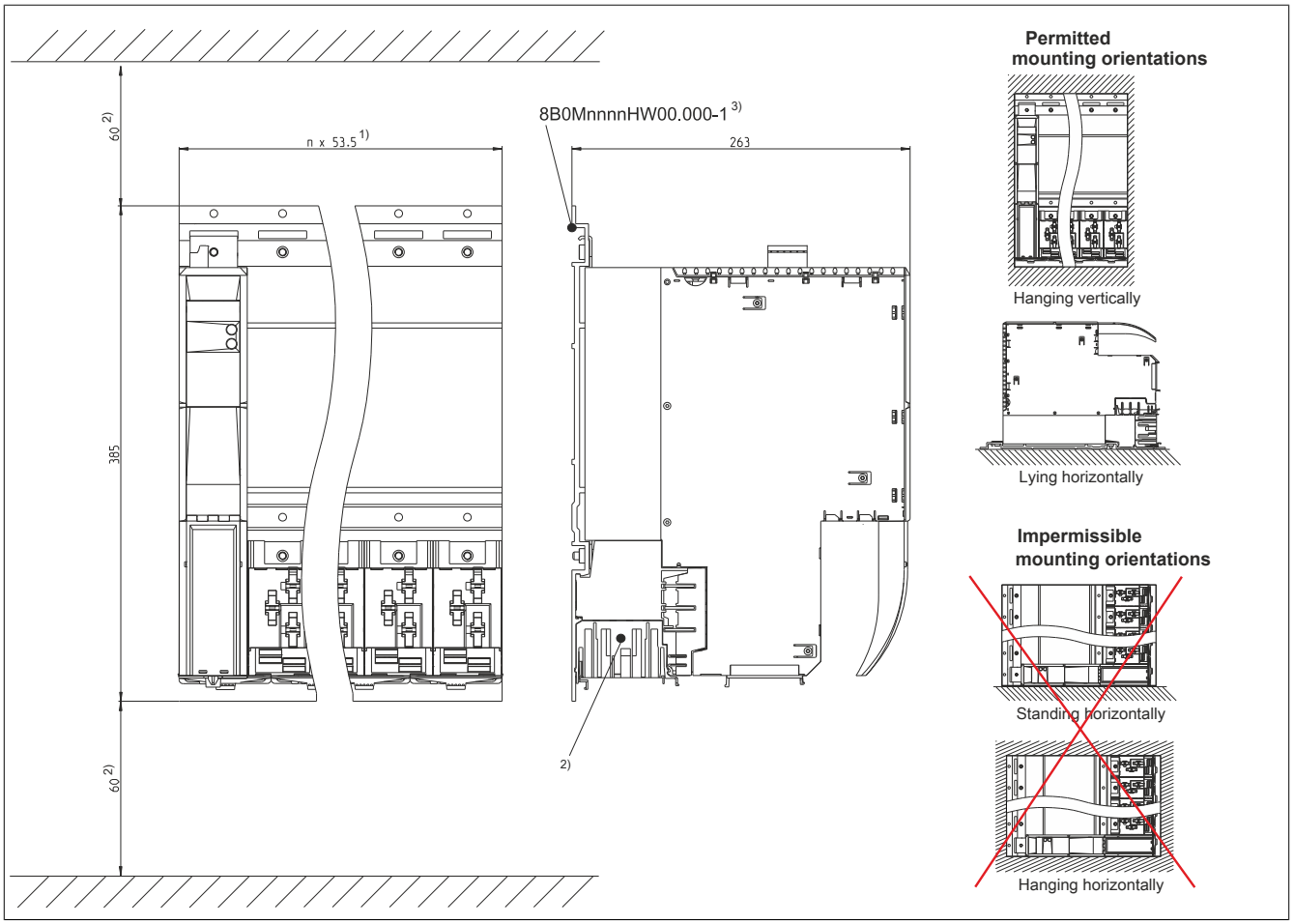


Figure 182: 8B0C0160HW00.000-1, 8B0C0320HW00.000-1 - Dimension diagram and installation dimensions

1) n ... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

8B0C0160HW00.001-1, 8B0C0320HW00.002-1, 8B0C0320HW00.00A-1

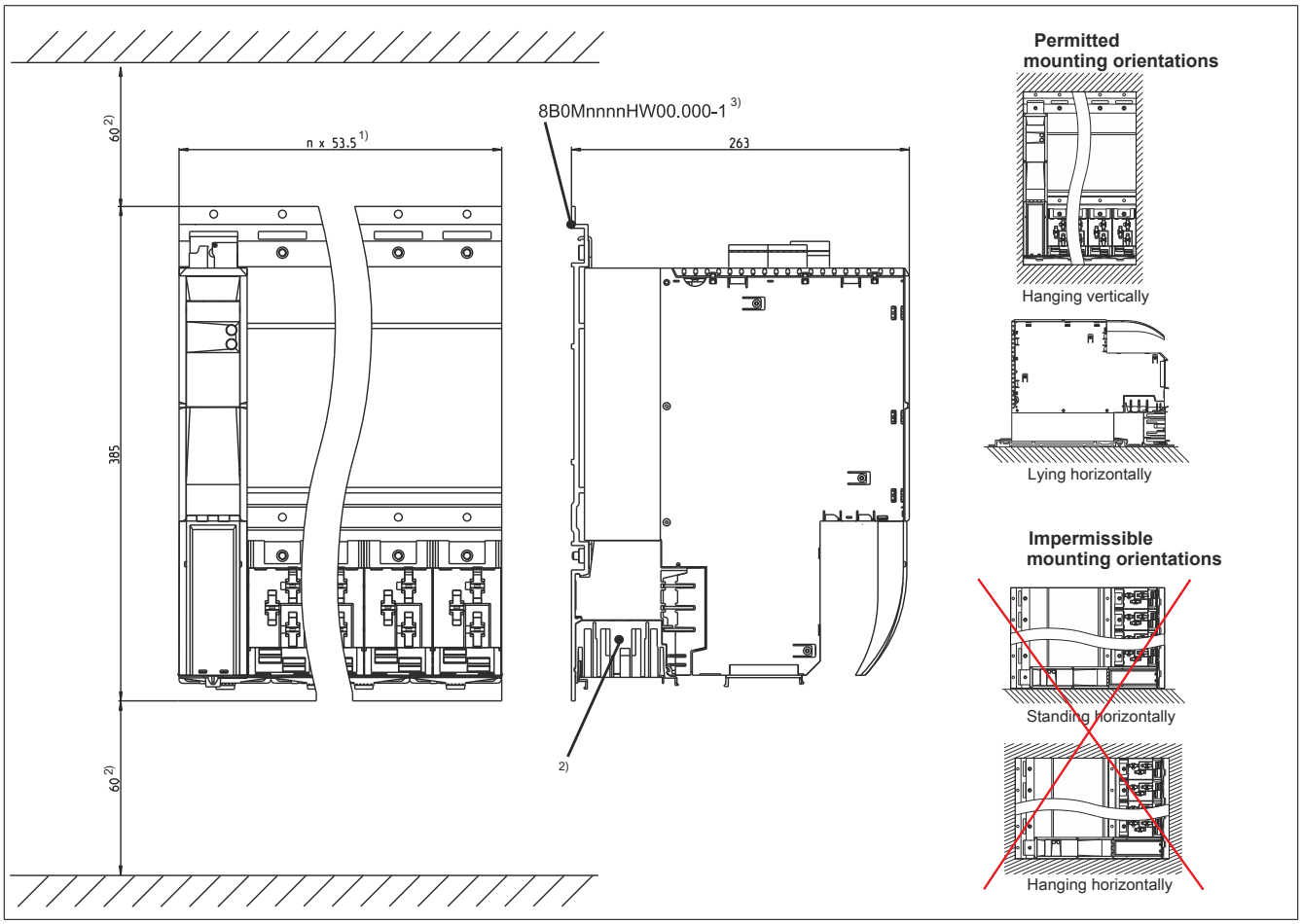


Figure 183: 8B0C0160HW00.001-1, 8B0C0320HW00.002-1, 8B0C0320H-W00.00A-1 - Dimension diagram and installation dimensions

1) n ... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.5 Single-width inverter modules (single-axis modules)

8BVI0014HWSx.000-1, 8BVI0028HWSx.000-1, 8BVI0055HWSx.000-1, 8BVI0110HWSx.000-1

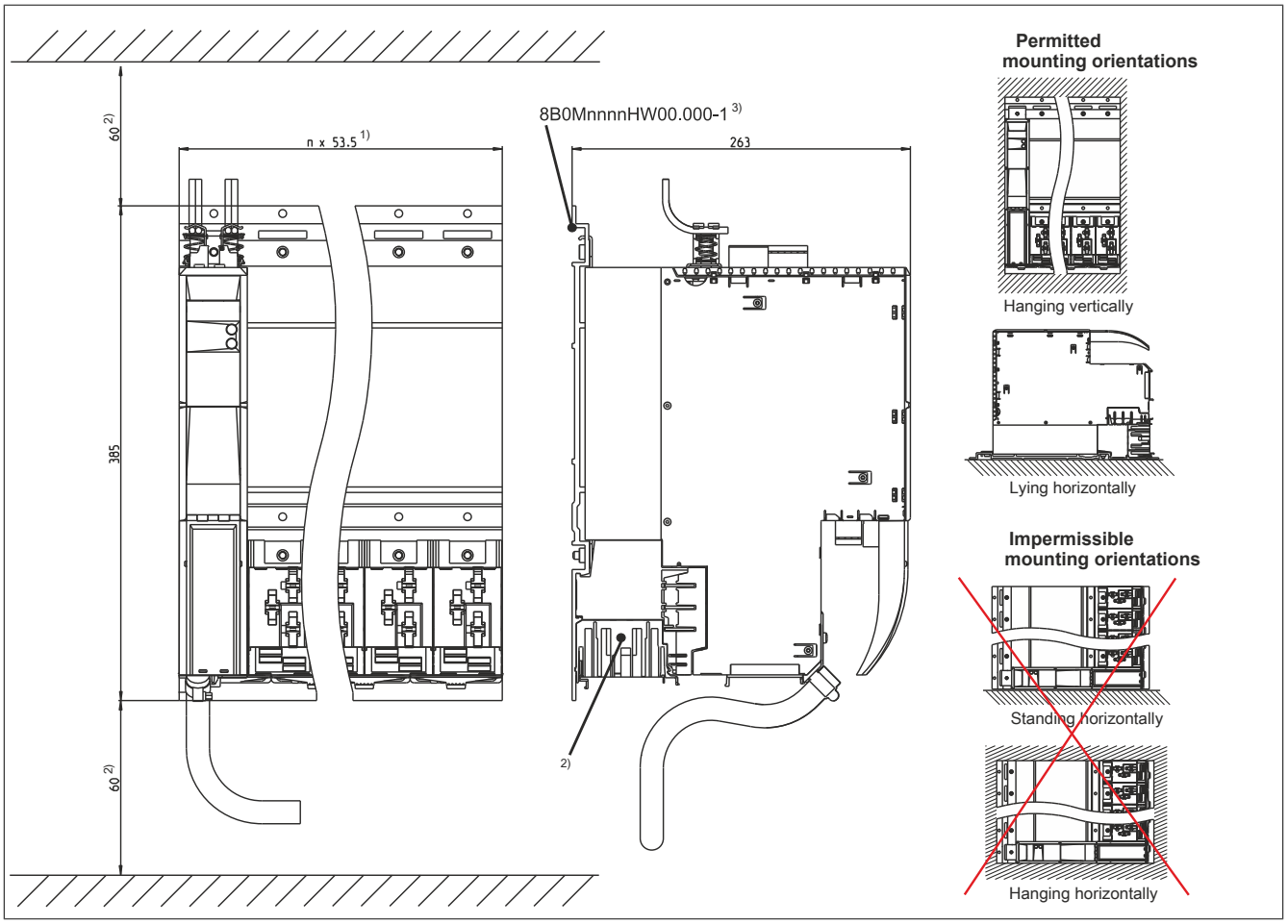


Figure 184: 8BVI0014HWSx.000-1, 8BVI0028HWSx.000-1, 8BVI0055H-WSx.000-1, 8BVI0110HWSx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.6 Single-width inverter modules (dual-axis modules)

8BVI0014HWDx.000-1, 8BVI0028HWDx.000-1, 8BVI0055HWDx.000-1

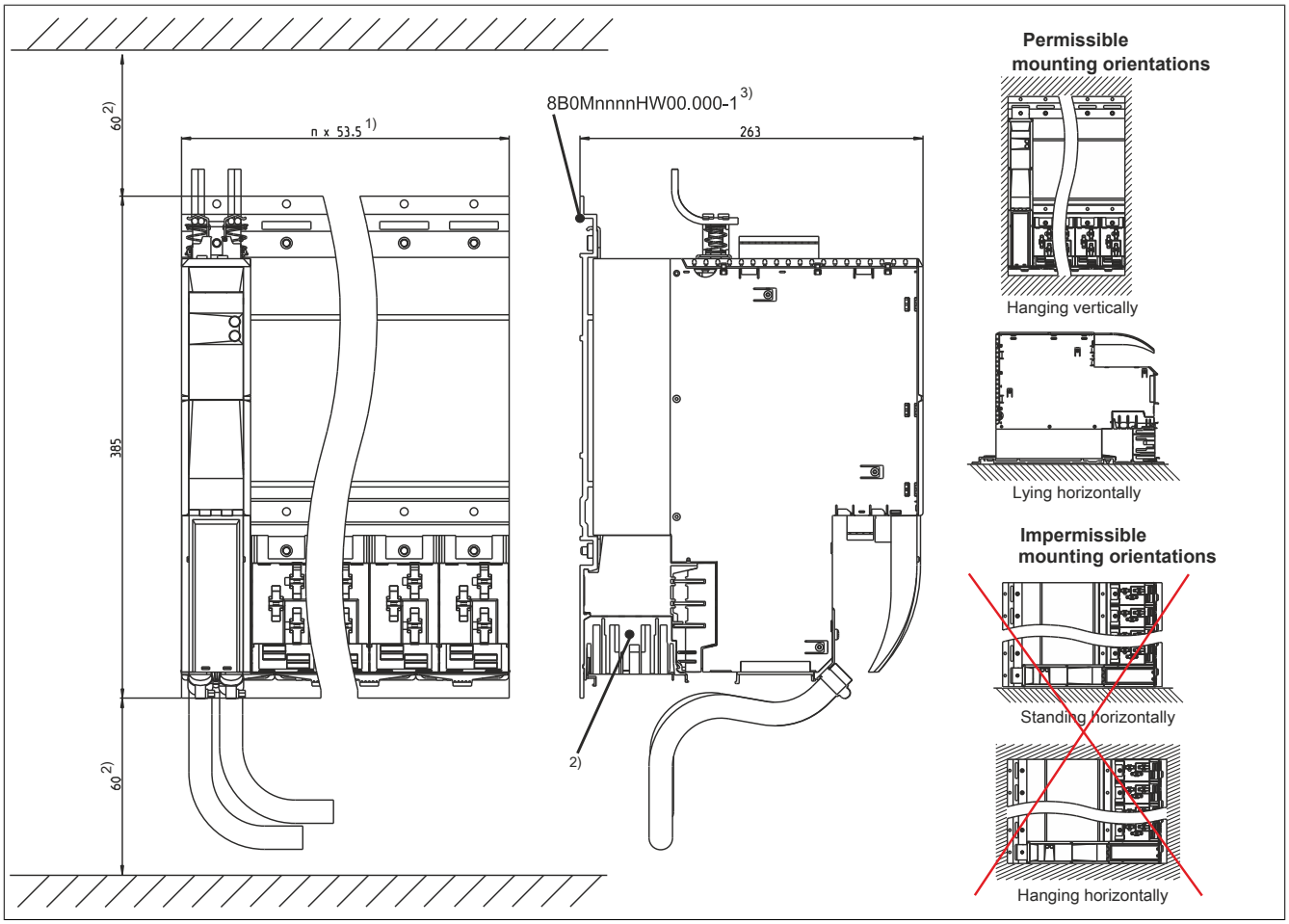


Figure 185: 8BVI0014HWDx.000-1, 8BVI0028HWDx0.000-1, 8BVI0055H-WDx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.7 8BVI0220HWSx.000-1, 8BVI0330HWSx.000-1, 8BVI0440HWSx.000-1 inverter modules

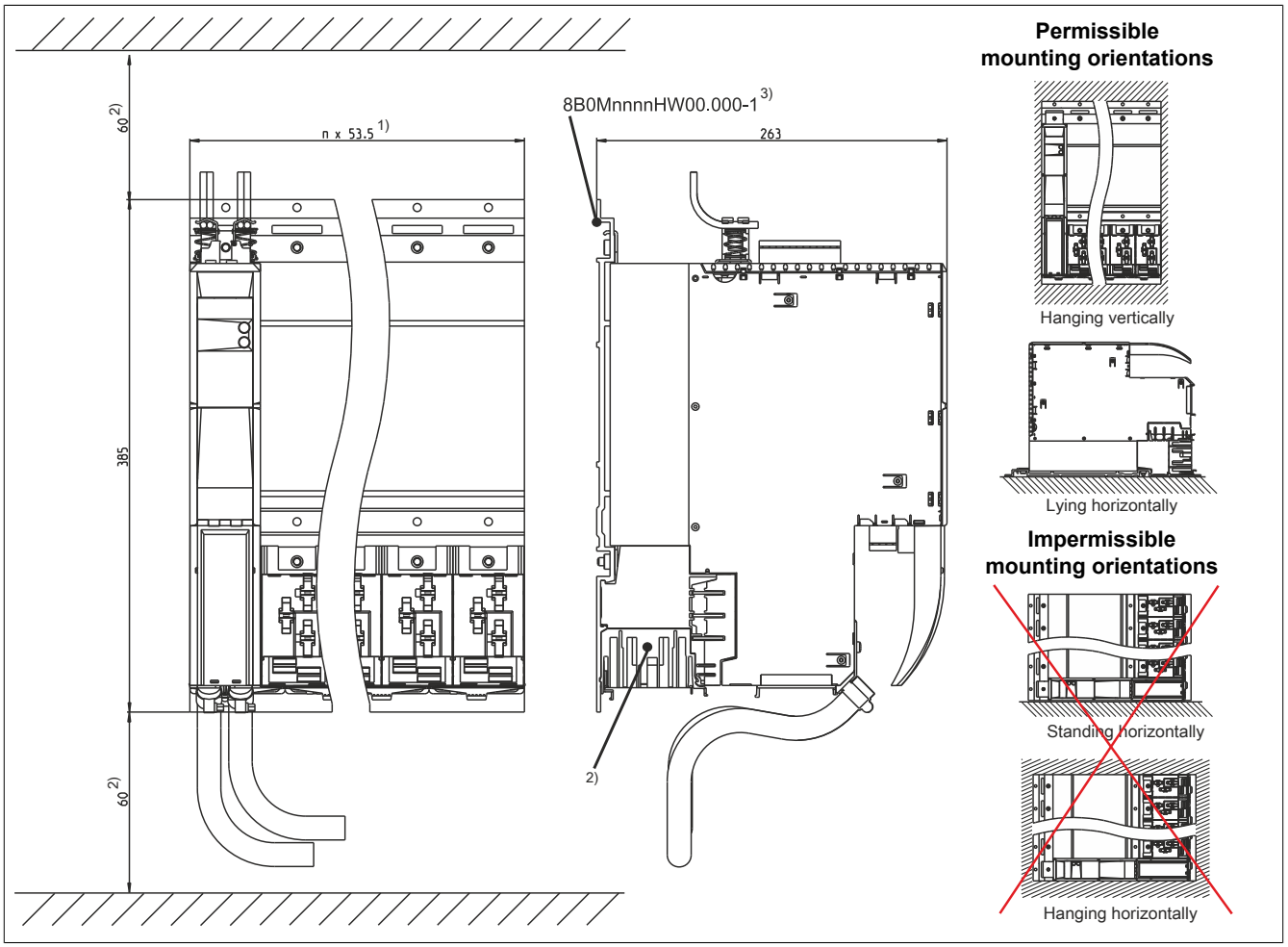


Figure 186: 8BVI0220HWSx.000-1, 8BVI0330HWSx.000-1, 8BVI0440H-WSx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.8 8BVI0110HWDx.000-1, 8BVI0220HWDx.000-1 inverter modules

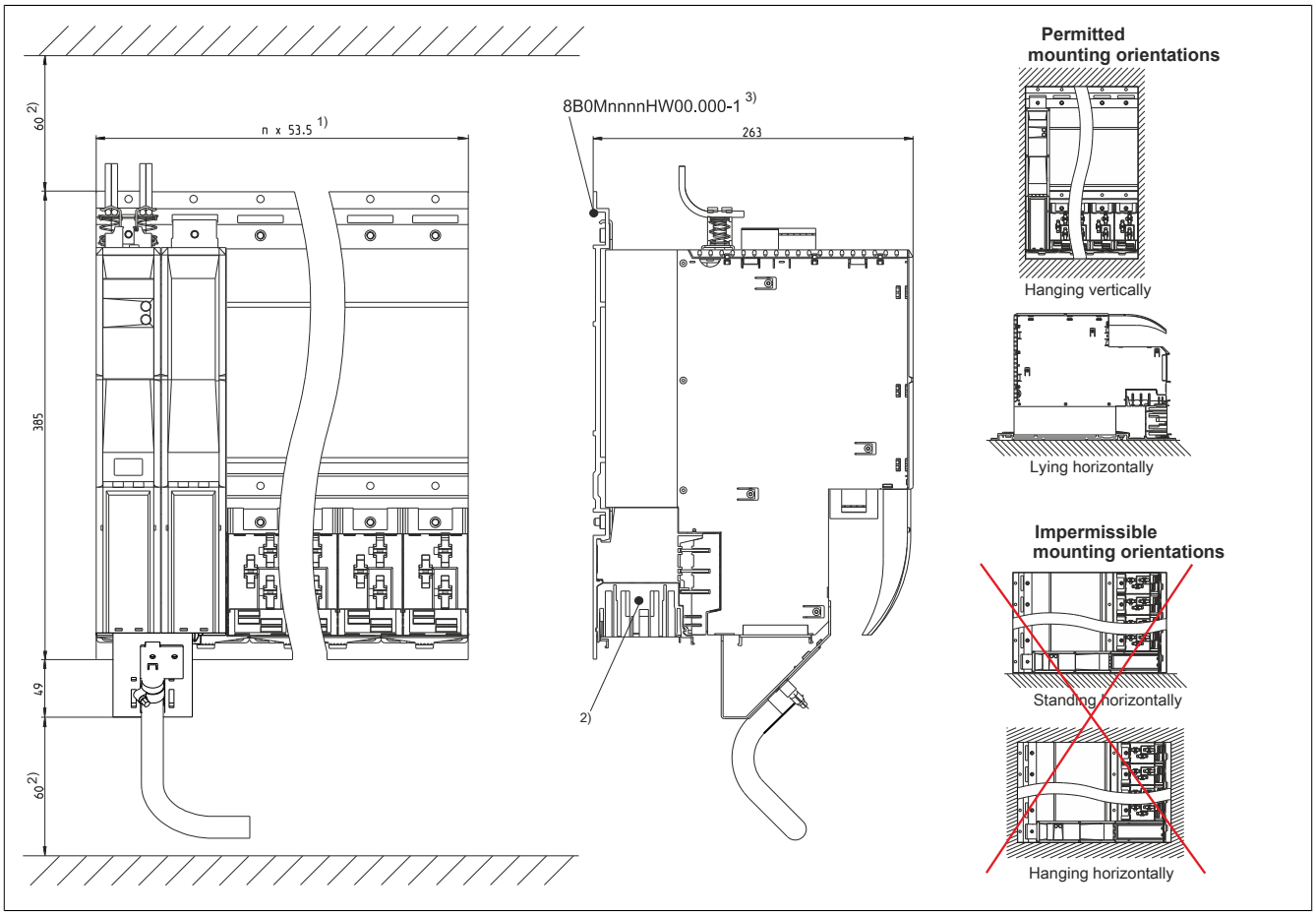


Figure 187: 8BVI0110HWDx.000-1, 8BVI0220HWDx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.9 Inverter modules 8BVI0660HWS0.000-1, 8BVI0880HWS0.004-1, 8BVI1650HWS0.000-1

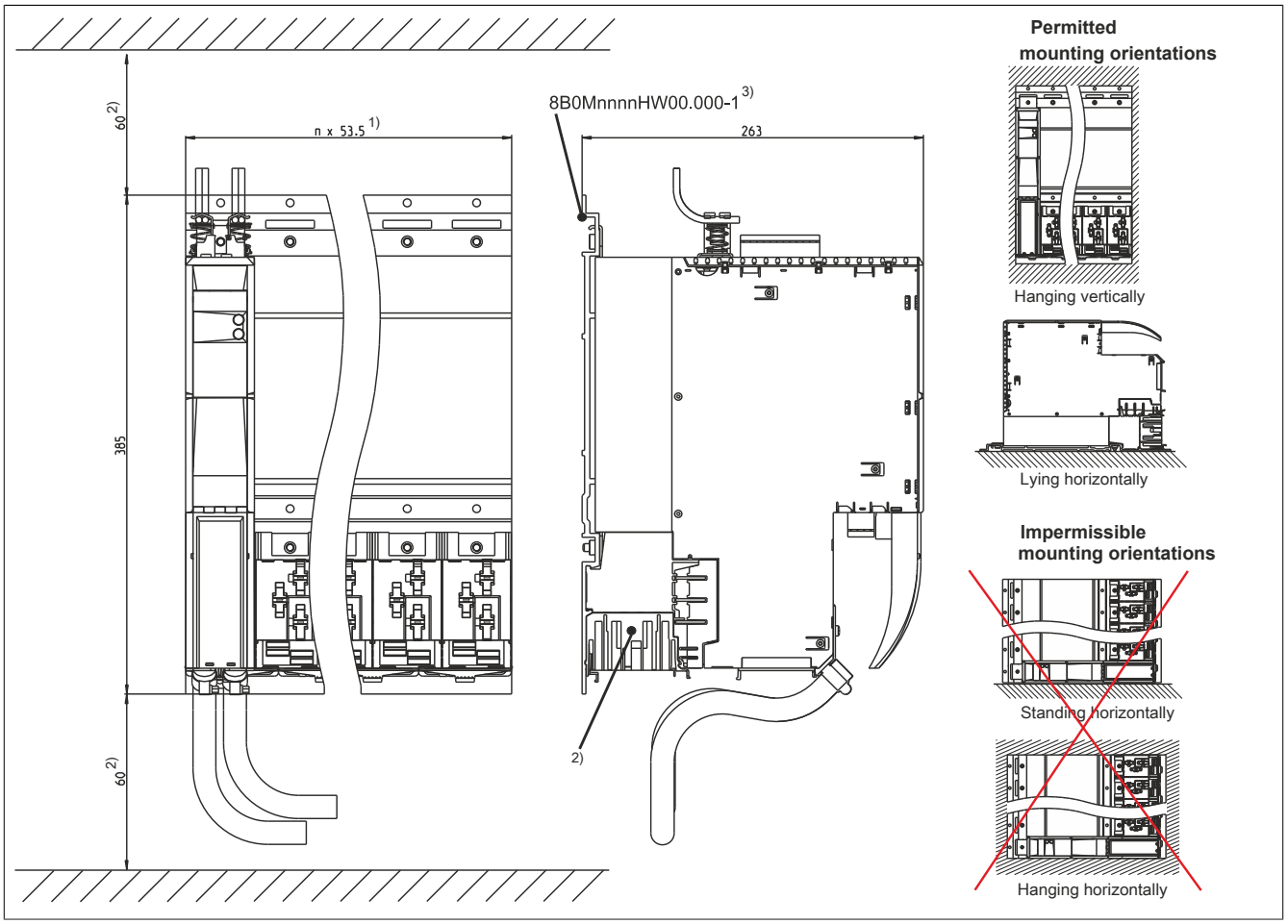


Figure 188: Dimension diagram and installation dimensions for 8BVI0660HWS0.000-1, 8BVI0880HWS0.004-1, 8BVI1650HWS0.000-1

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.10 8BVE0500HW00.000-1 expansion module

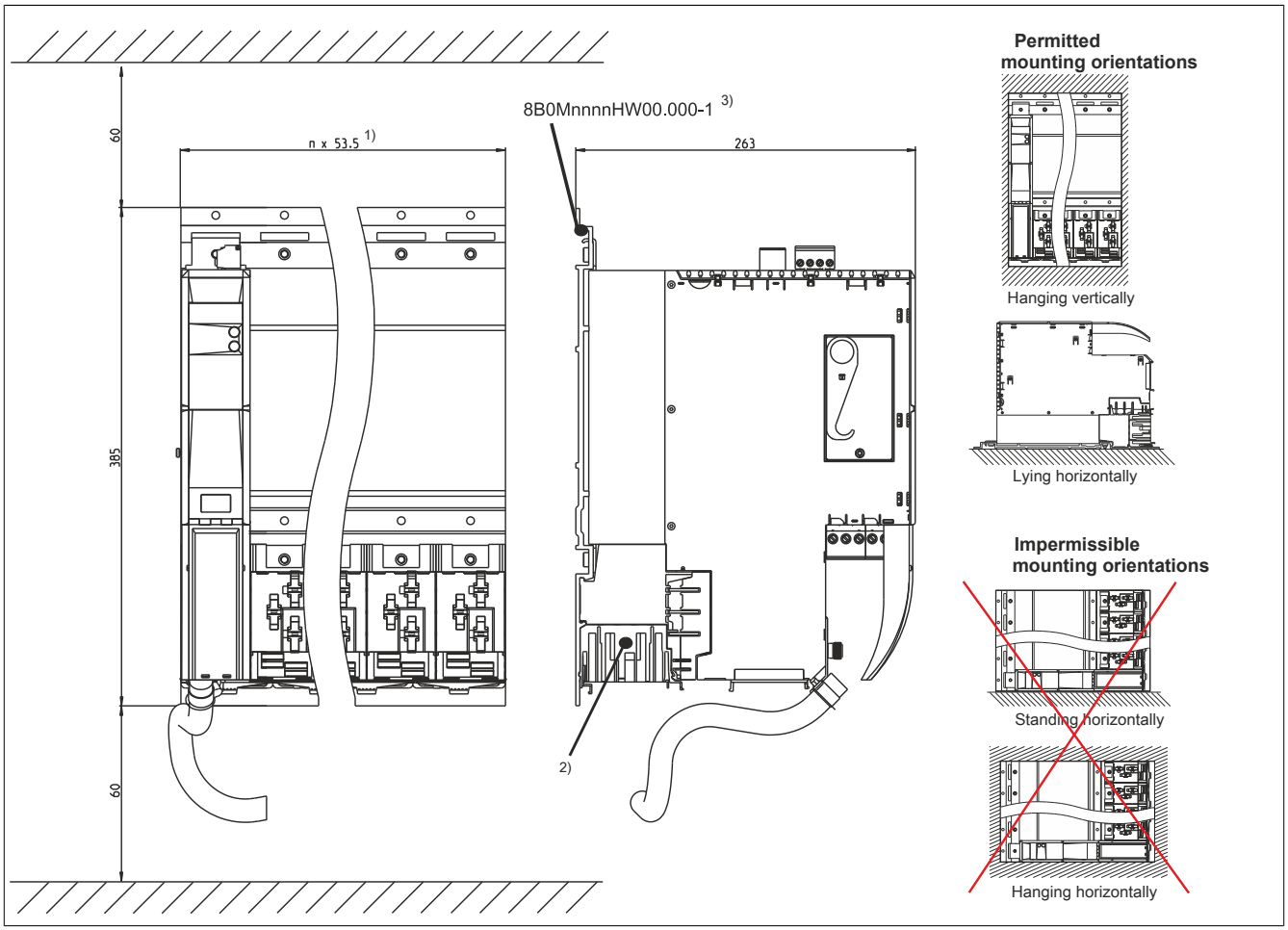


Figure 189: 8BVE0500HW00.000-1 - Dimension diagram and installation dimensions

1) n ... Necessary width (slots) of the mounting plate.
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.5.11 8B0K1650HW00.000-1, 8B0K3630HW00.001-1 capacitor modules

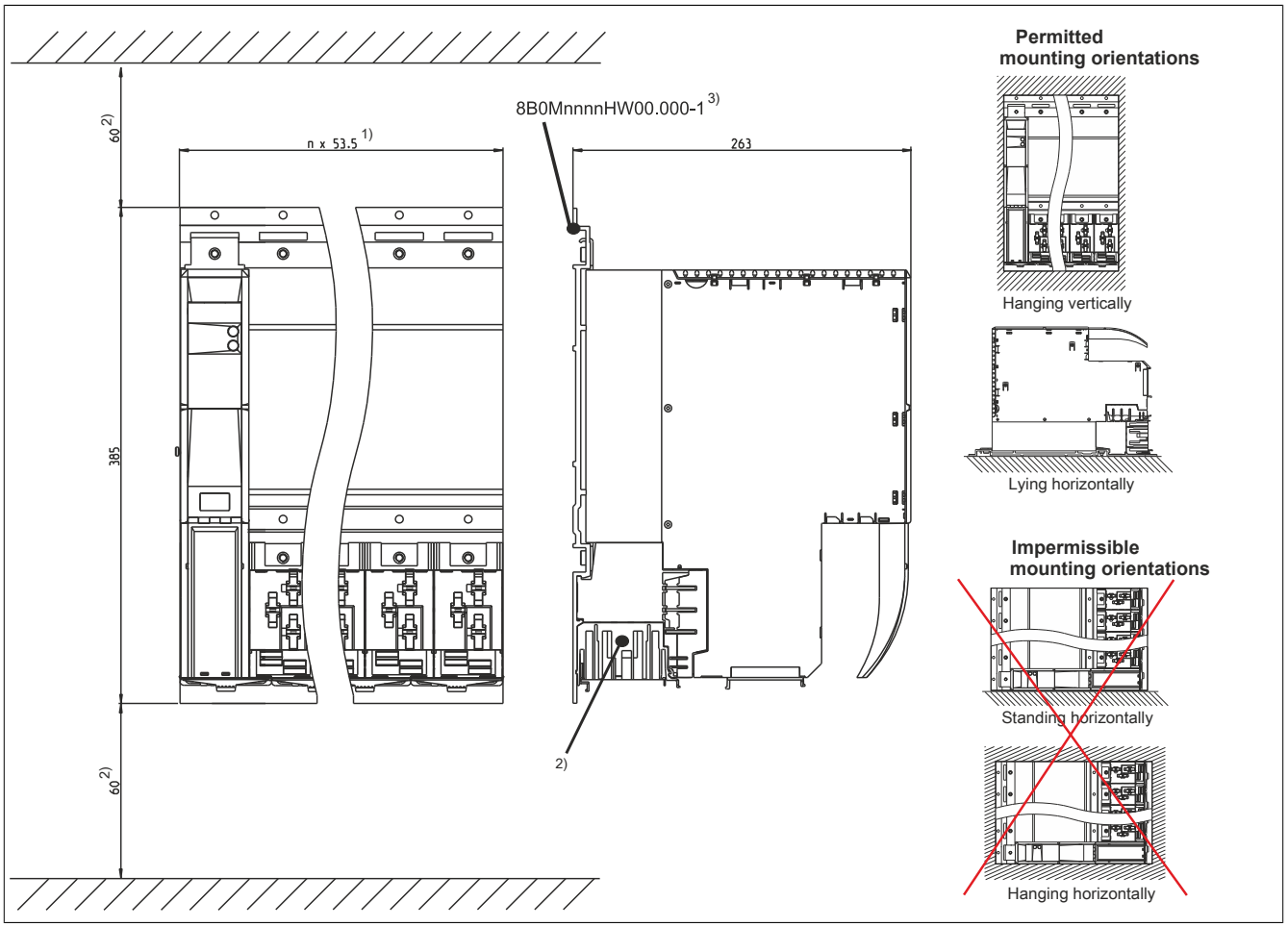


Figure 190: 8B0K1650HW00.000-1, 8B0K3630HW00.001-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
To ensure that the fan modules in the mounting plate can be replaced easily, at least 250 mm clearance must be available below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

4.6 Cold plate mounting

4.6.1 8B0MnnnnHC00.000-1 mounting plates

Information:

nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

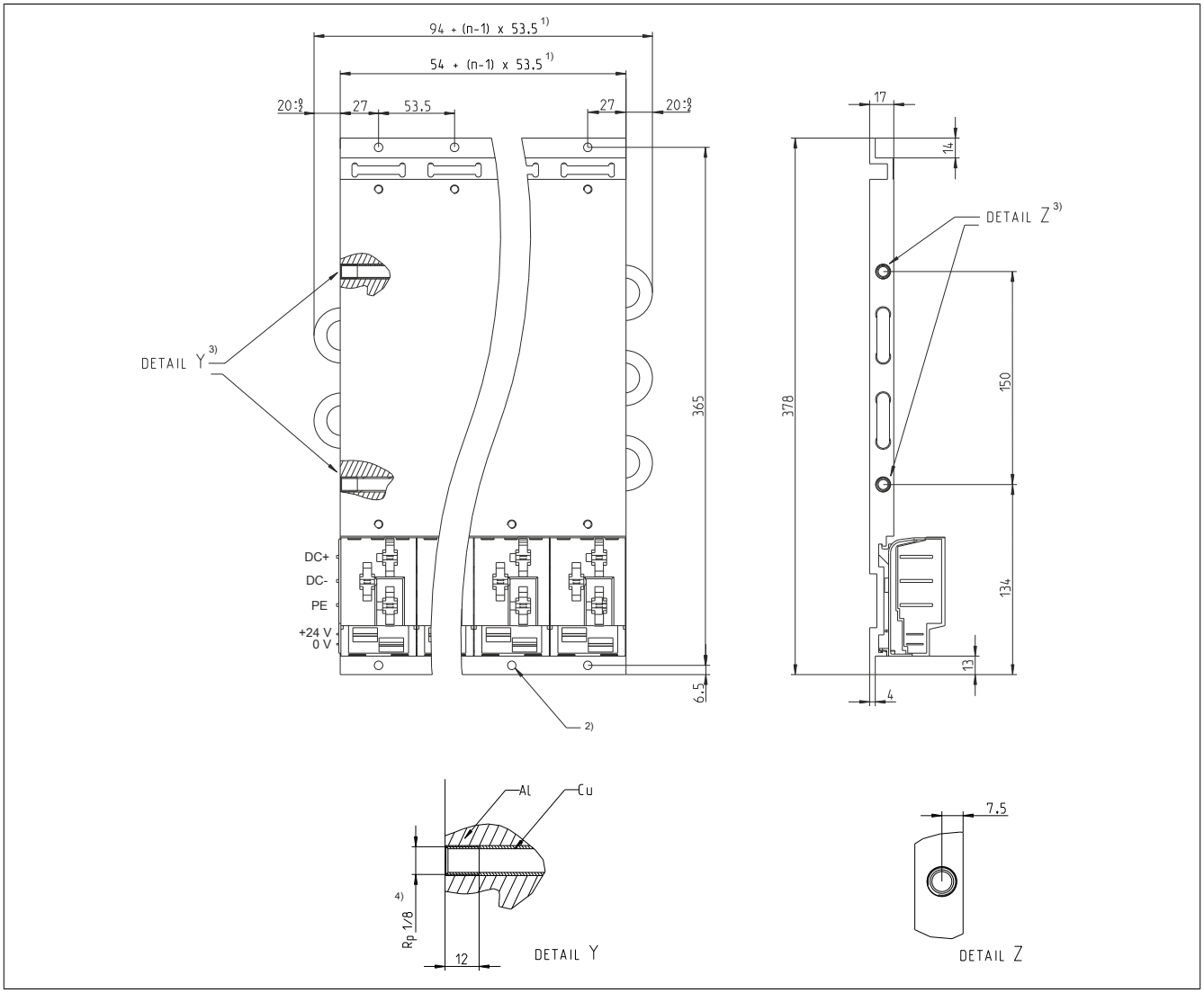


Figure 191: 8B0MnnnnHC00.000-1 - Dimension diagram and installation dimensions

1) n... Number of width units on the mounting plate
2) 2x n mounting holes ø 6 mm
   The heads of the fastening screws are not permitted to exceed a height of 6 mm.
3) The maximum tightening torque is 10 Nm.
4) A 1/8 Rp thread is cut into the copper tube at the factory. Due to the mechanical construction (copper tube pressed in aluminum), the finished threads have a form similar to Rc 1/8 per EN 10226-2.

Information:

Valves in cooling systems must in principle be thread-sealed with respect to the coolant. This must preferably be done using suitable liquid-sealing agents or metal-sealing functions. Suitable sealing agents are Teflon tape or LOCTITE 5331, for example.

Information:

B&R recommends using ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plates with ACOPOSmulti 8BXW accessory sets (fittings with tapered R 1/8 Whitworth male pipe thread per EN 10226-1) for the water connections for inlet flow and return flow.

Caution!

B&R has tested and approved the production of the water connection for inlet flow and return flow of 8B0MnnnnHC00.000-1 mounting plates with fittings with tapered R 1/8 Whitworth male pipe thread per EN 10226-1.

The use of other fittings (e.g. with cylindrical external pipe thread) can result in increased effort in sealing the water connections and is therefore the responsibility of the user.

4.6.2 8BxP0220HC00.00x-1, 8BxP0440HC00.00x-1 power supply modules

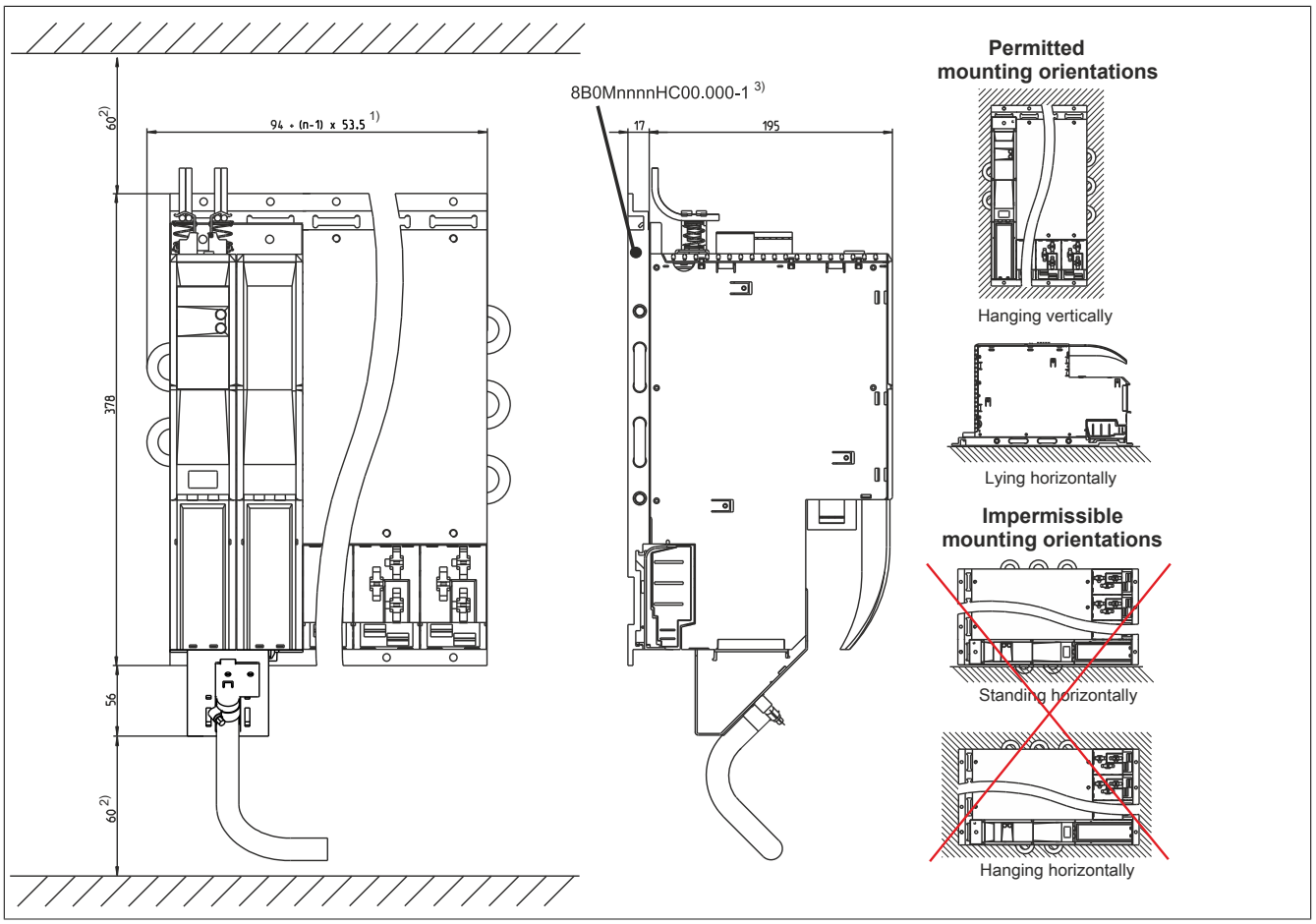


Figure 192: 8BxP0220HC00.00x-1, 8BxP0440HC00.00x-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.3 8BVP0880HC00.004-1 power supply module

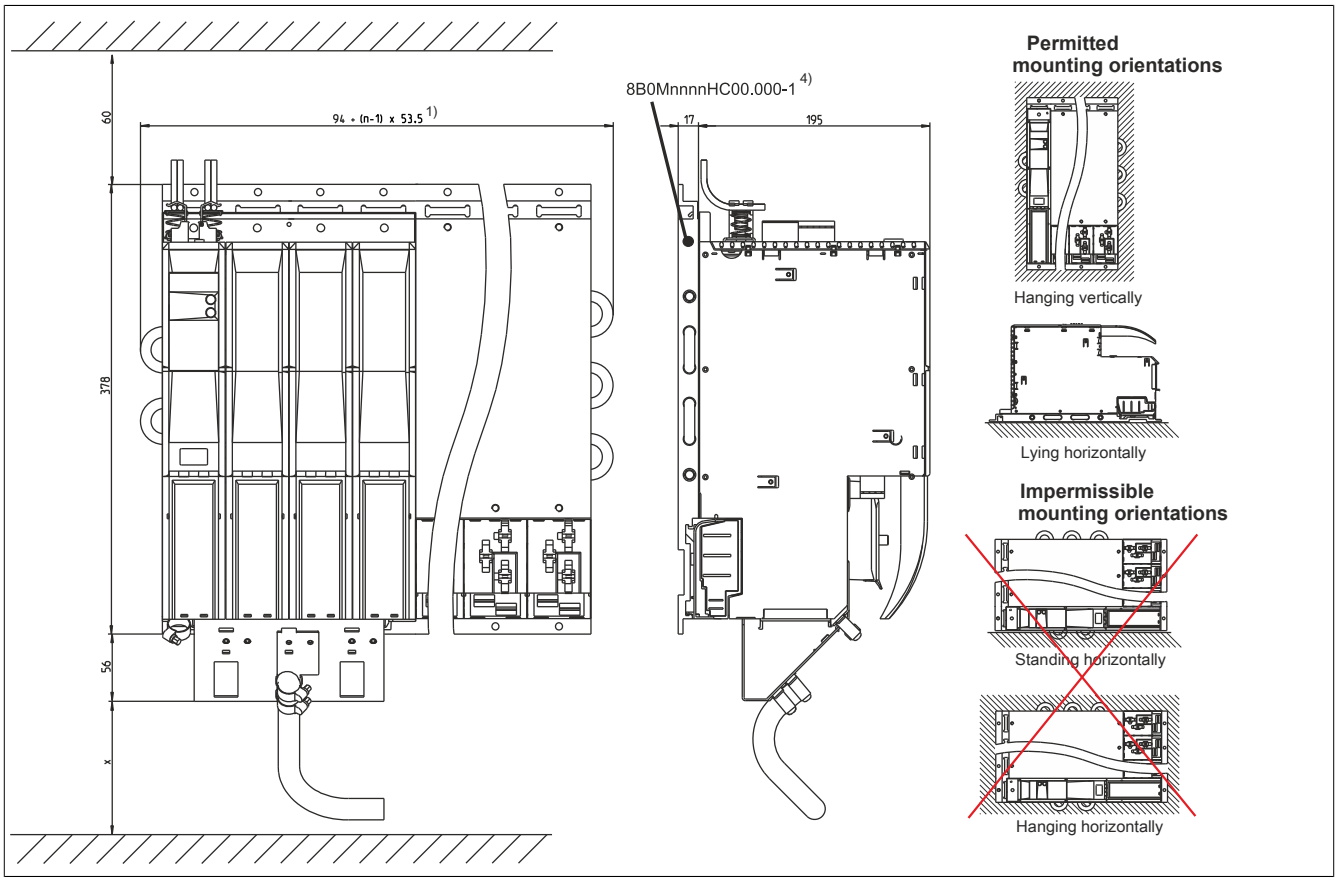


Figure 193: 8BVP0880HC00.004-1 - Dimension diagram and installation dimensions

1) n ... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) The required spacing x to the wiring on the bottom of the module depends on the power cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.4 8BVP1650HC00.000-1 power supply module

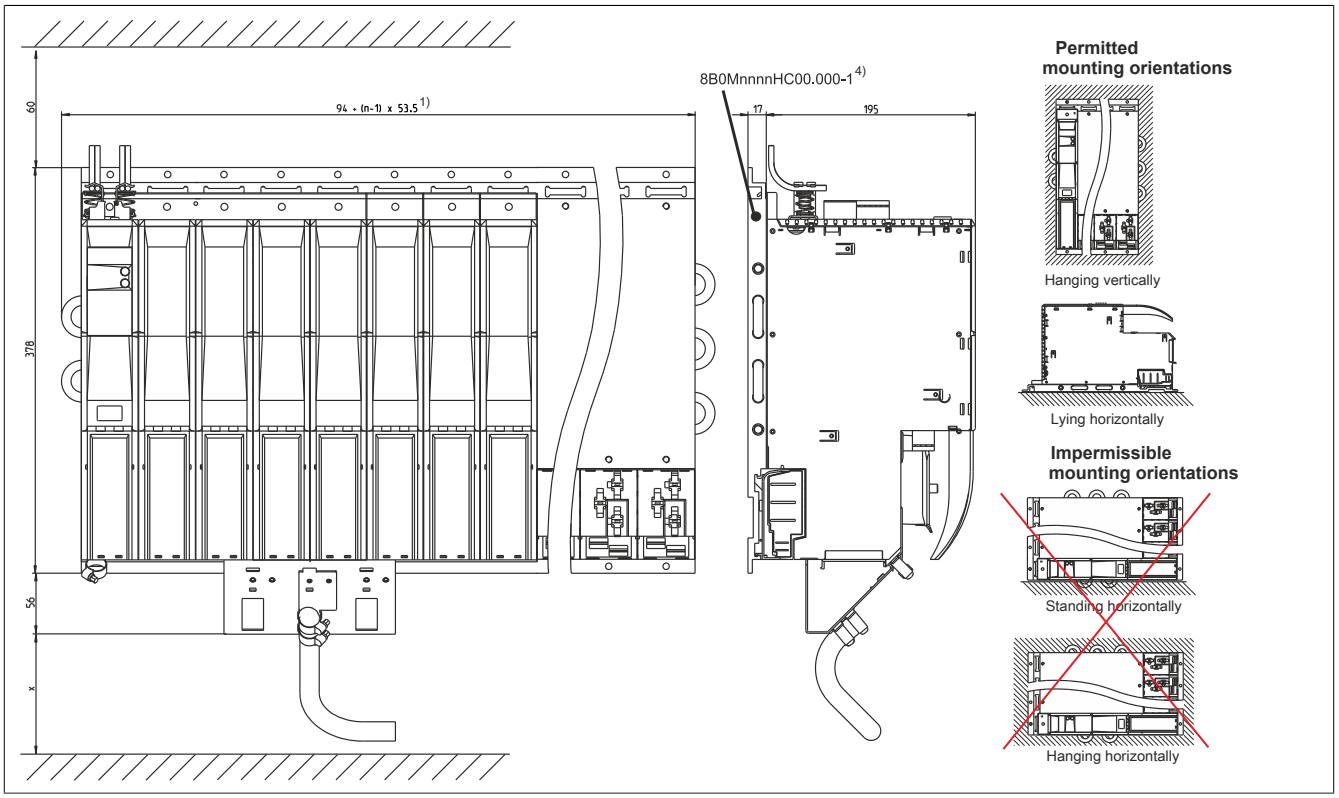


Figure 194: 8BVP1650HC00.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) The required spacing x to the wiring on the bottom of the module depends on the motor cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.5 Auxiliary supply modules

8B0C0160HC00.000-1, 8B0C0320HC00.000-1

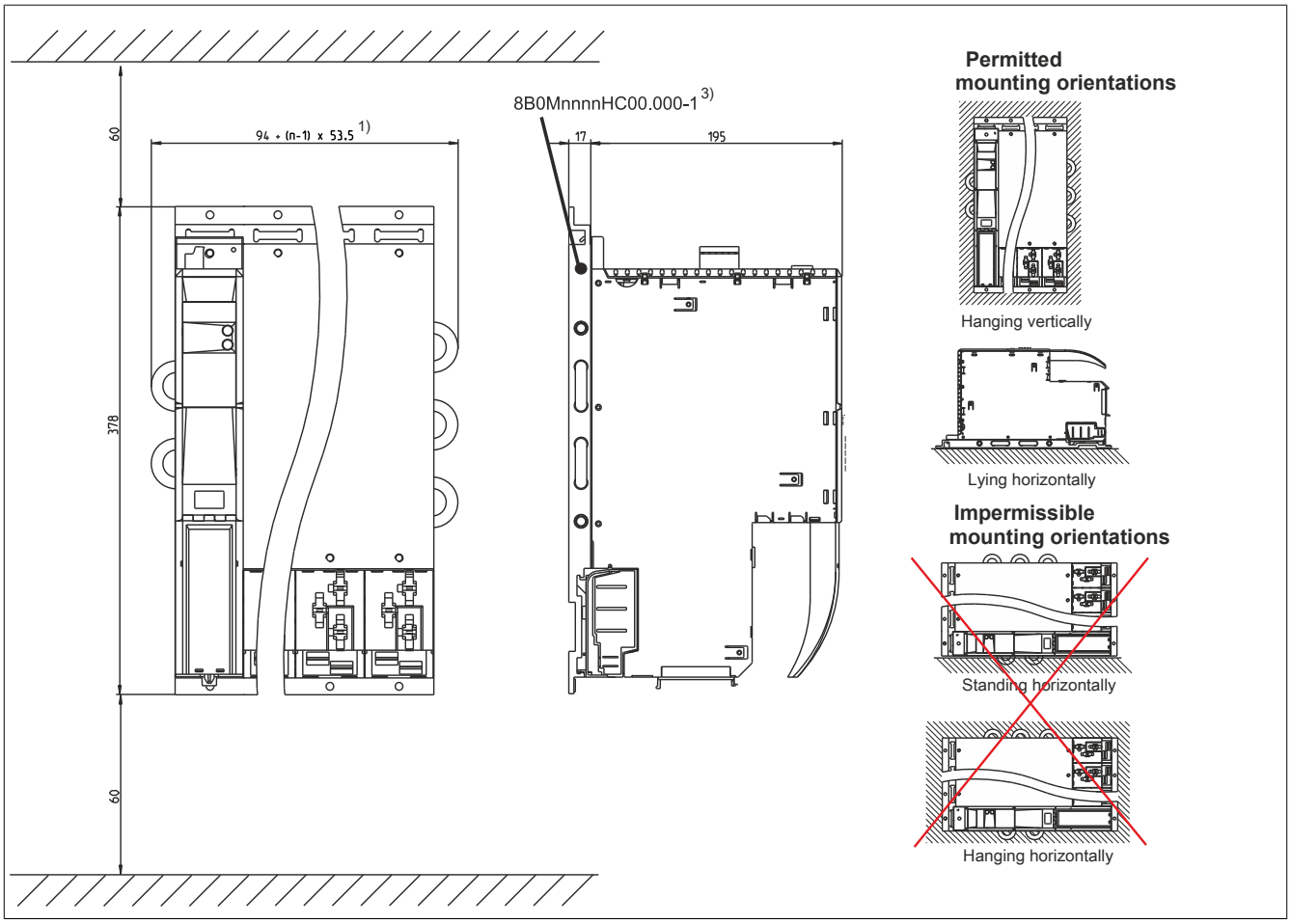


Figure 195: 8B0C0160HC00.000-1, 8B0C0320HC00.000-1 - Dimension diagram and installation dimensions

1) n ... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

8B0C0160HC00.001-1, 8B0C0320HC00.002-1, 8B0C0320HC00.00A-1

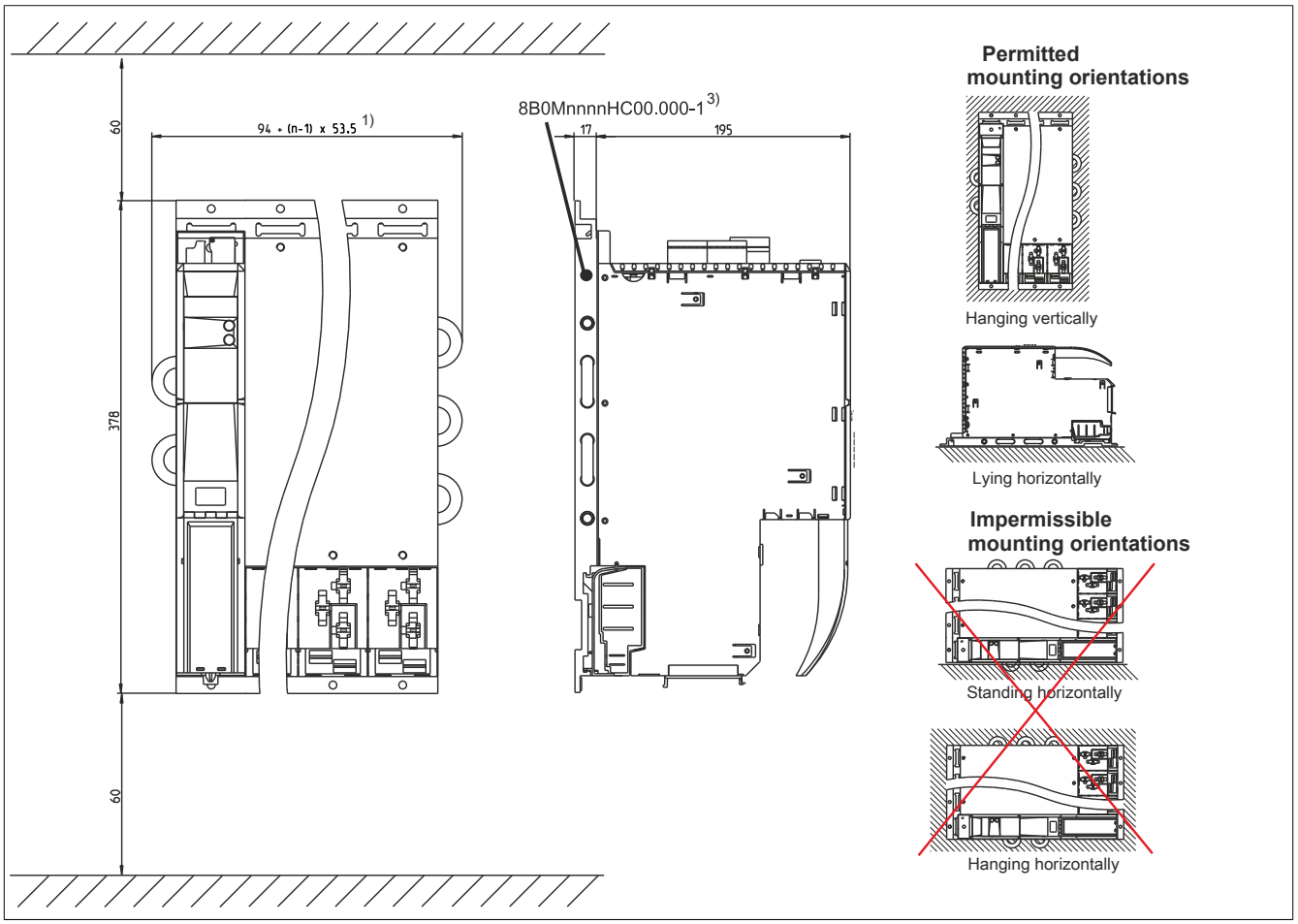


Figure 196: 8B0C0160HC00.001-1, 8B0C0320HC00.002-1, 8B0C0320HC00.00A-1 - Dimension diagram and installation dimensions

1) n ... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.6 Single-width inverter modules (single-axis modules)

8BVI0014HCSx.000-1, 8BVI0028HCSx.000-1, 8BVI0055HCSx.000-1, 8BVI0110HCSx.000-1

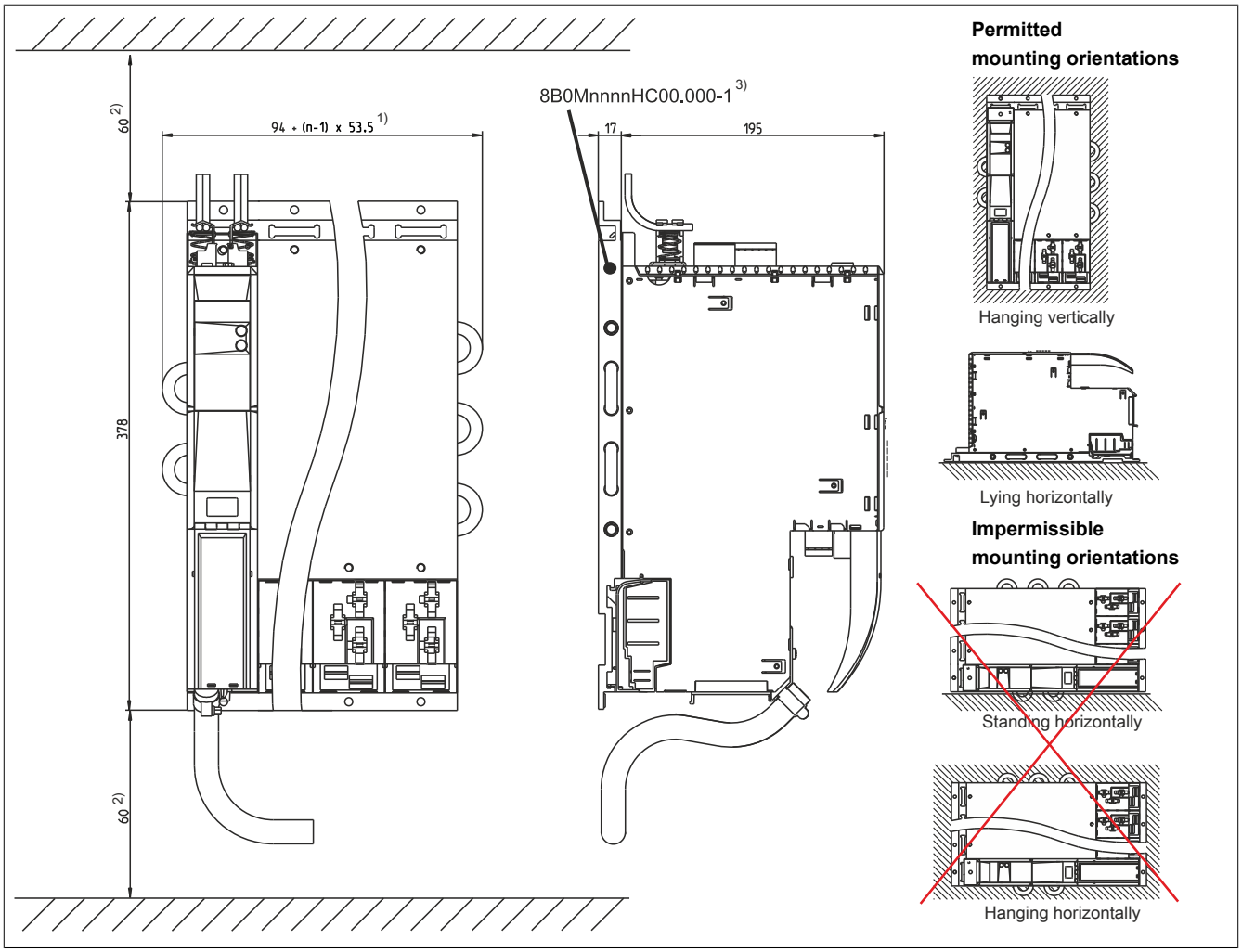


Figure 197: 8BVI0014HCSx.000-1, 8BVI0028HCSx.000-1, 8BVI0055HCSx.000-1, 8BVI0110HCSx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.7 Single-width inverter modules (dual-axis modules)

8BVI0014HCDx.000-1, 8BVI0028HCDx.000-1, 8BVI0055HCDx.000-1

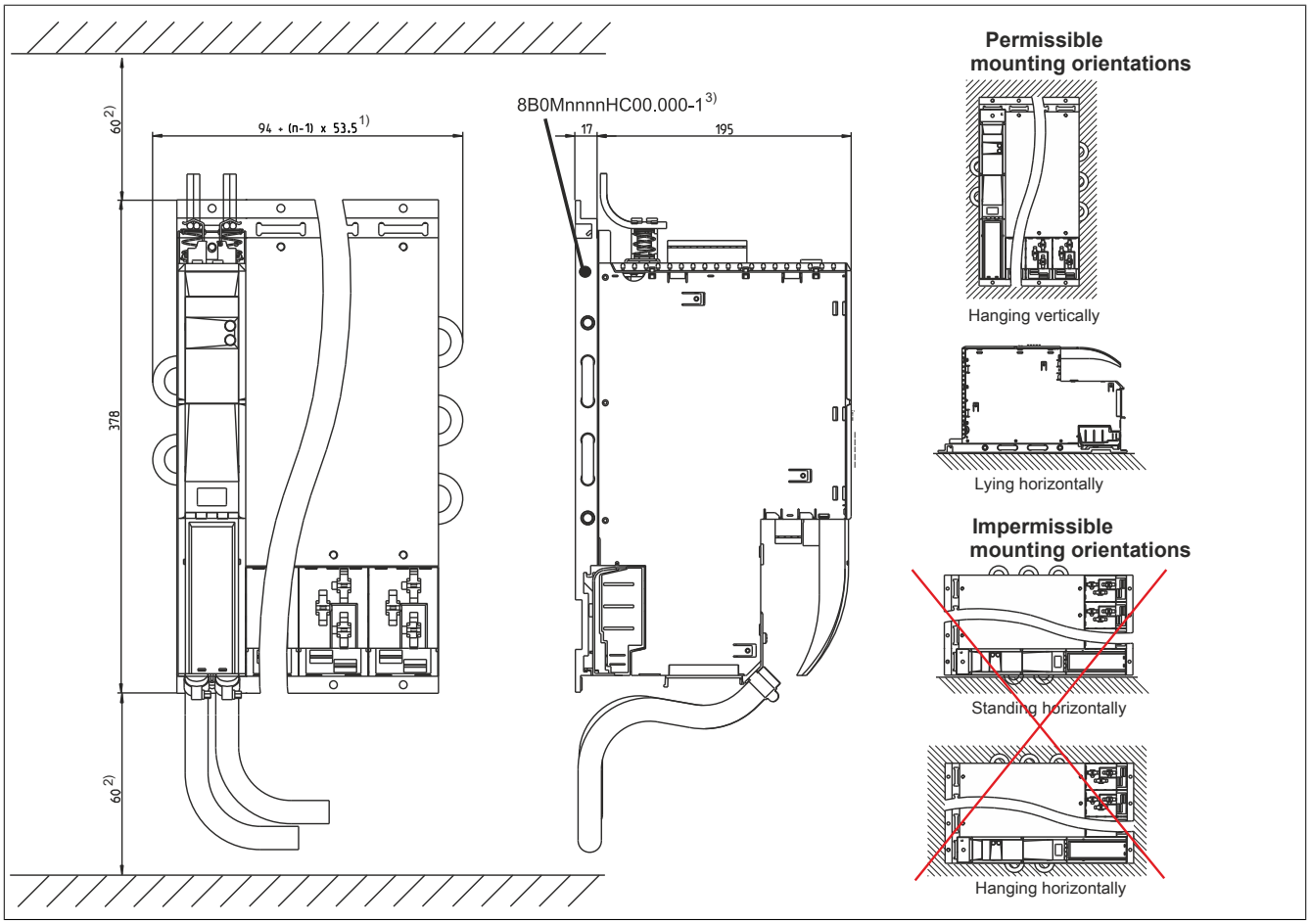


Figure 198: 8BVI0014HCDx.000-1, 8BVI0028HCDx.000-1, 8BVI0055HCDx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.8 8BVI0220HCSx.000-1, 8BVI0440HCSx.000-1 inverter modules

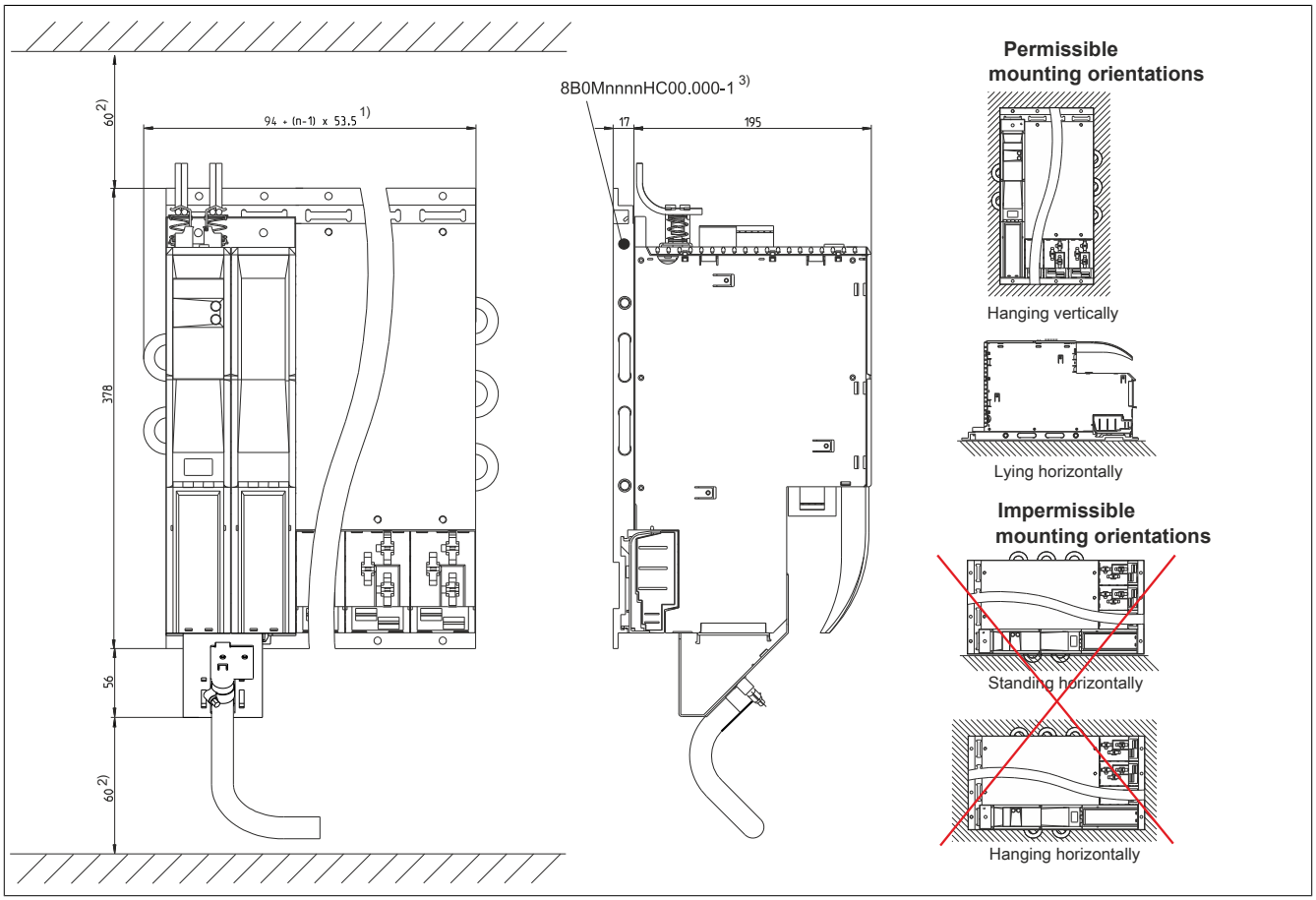


Figure 199: 8BVI0220HCSx.000-1, 8BVI0440HCSx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.9 8BVI0110HCDx.000-1, 8BVI0220HCDx.000-1 inverter modules

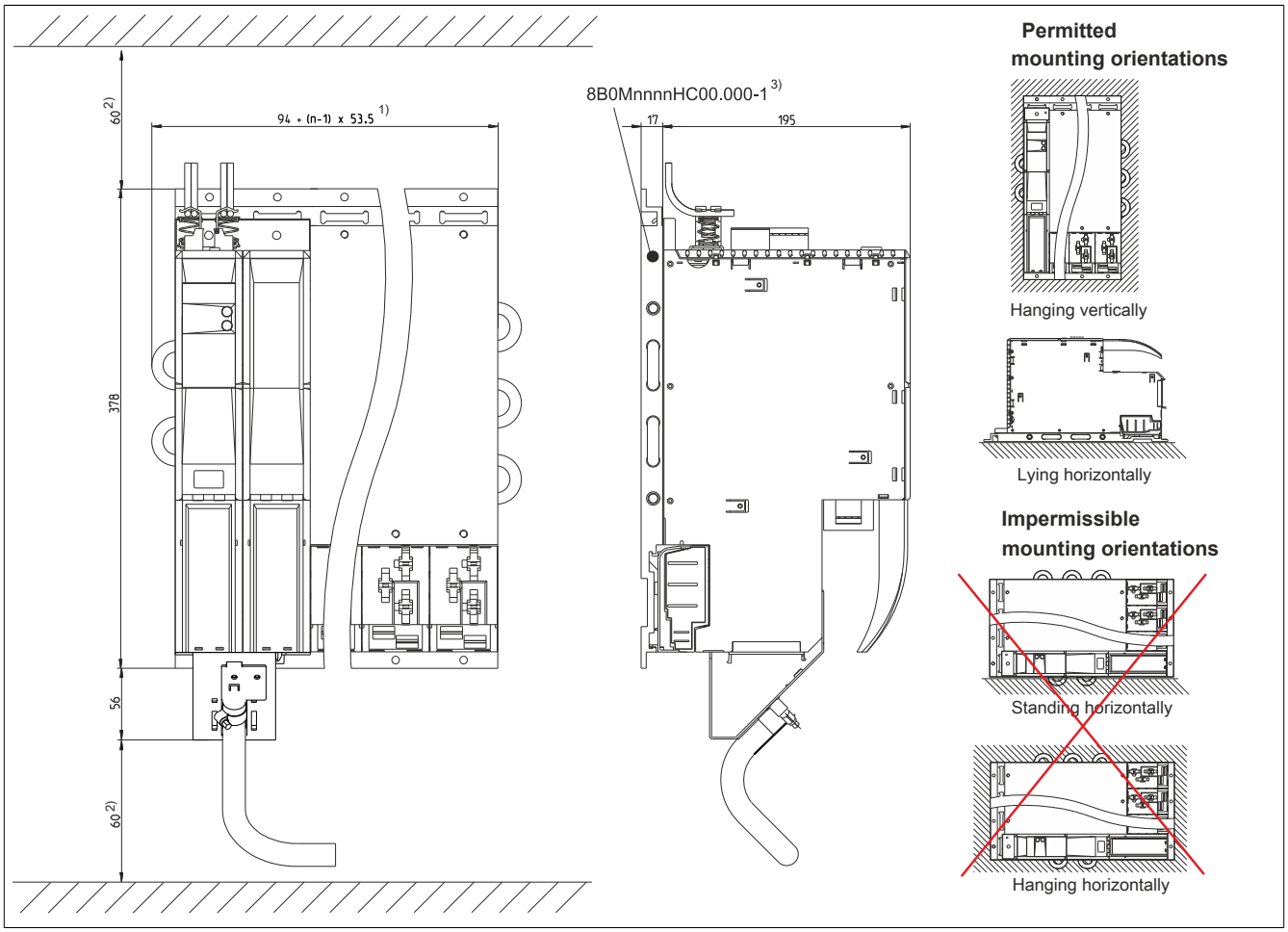


Figure 200: 8BVI0110HCDx.000-1, 8BVI0220HCDx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.10 8BVI0880HCSx.004-1 inverter module

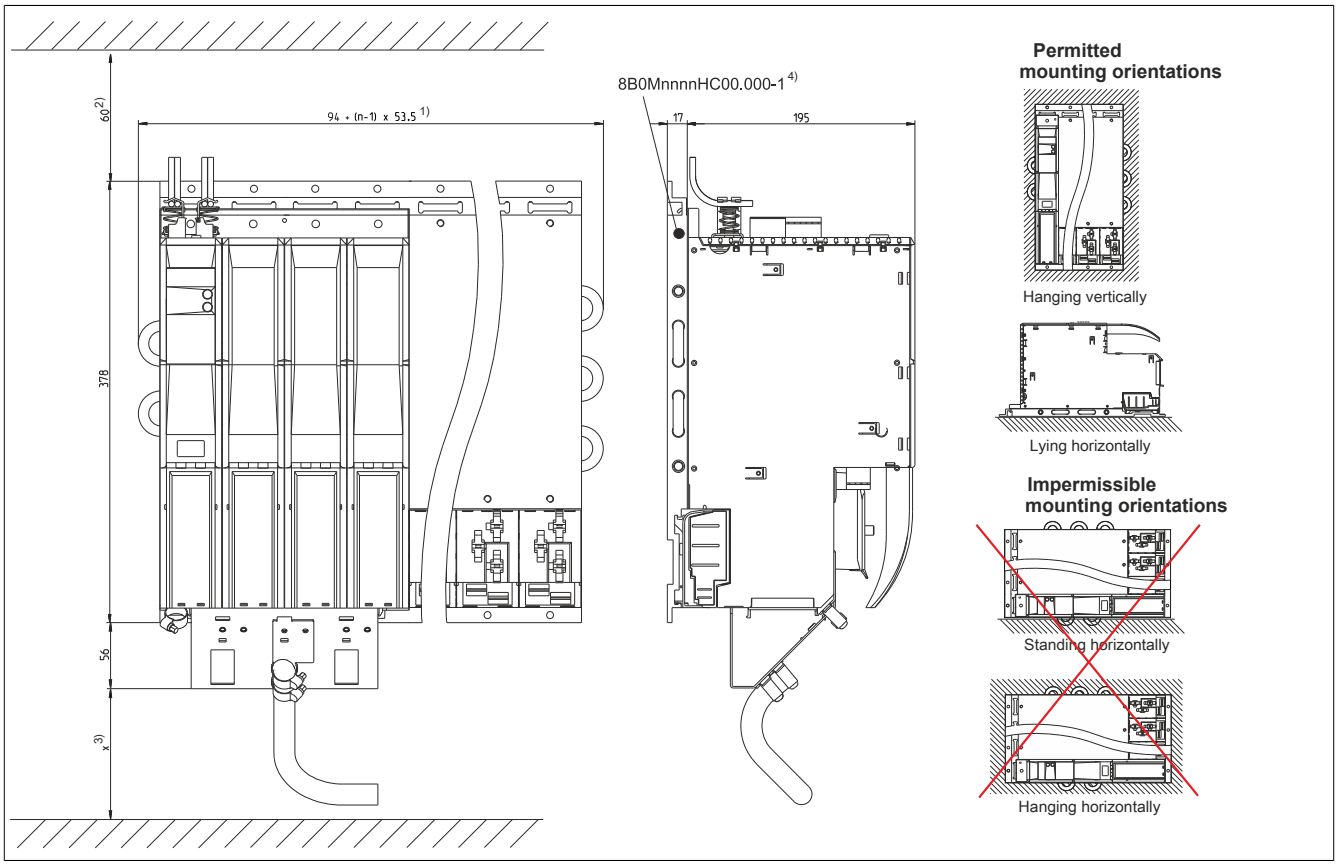


Figure 201: 8BVI0880HCSx.004-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) The required spacing x to the wiring on the bottom of the module depends on the motor cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.11 8BVI1650HCS0.000-1 inverter module

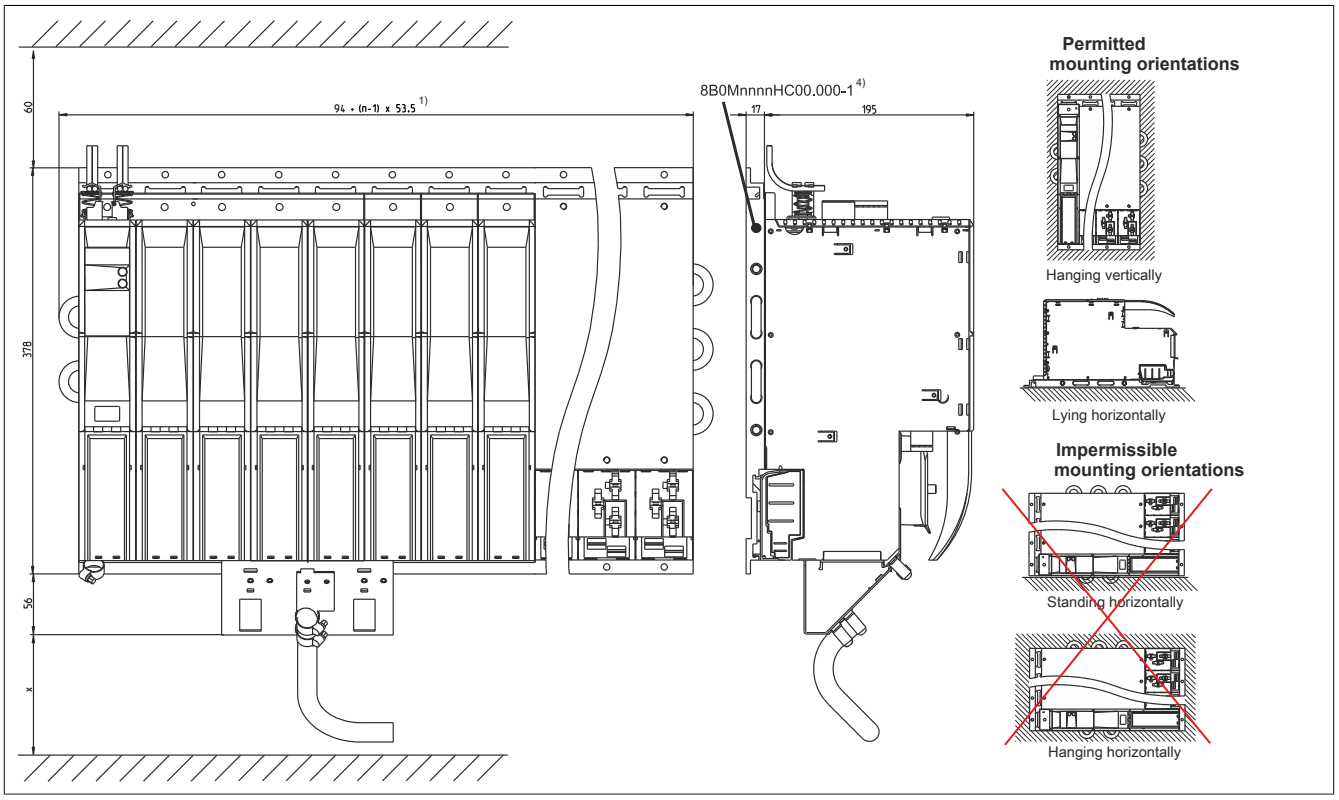


Figure 202: 8BVI1650HCS0.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) The required spacing x to the wiring on the bottom of the module depends on the motor cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.12 8BVE0500HC00.000-1 expansion module

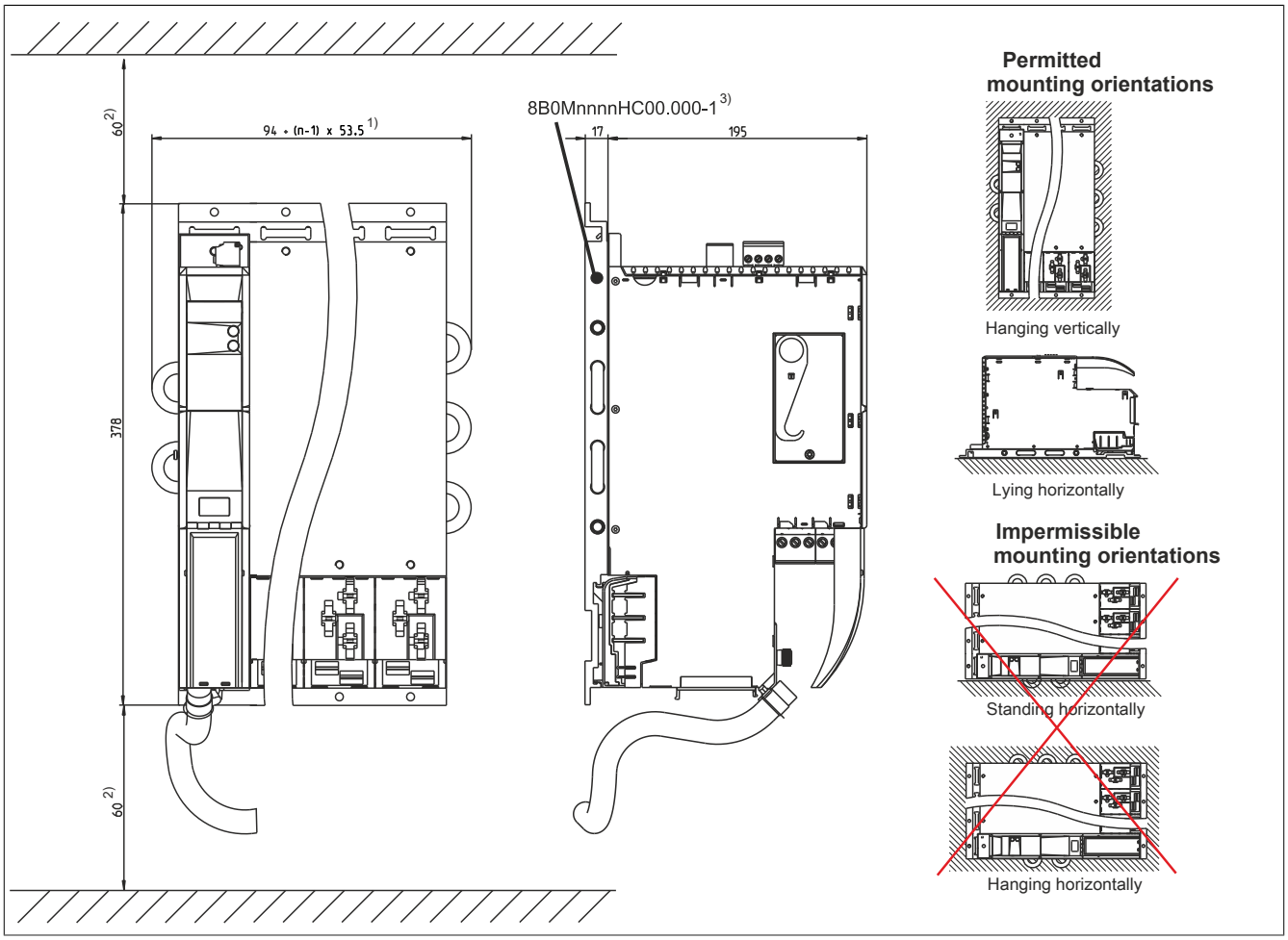


Figure 203: 8BVE0500HC00.000-1 - Dimension diagram and installation dimensions

1) n ... Necessary width (slots) of the mounting plate.
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.6.13 8B0K1650HC00.000-1, 8B0K3630HC00.001-1 capacitor modules

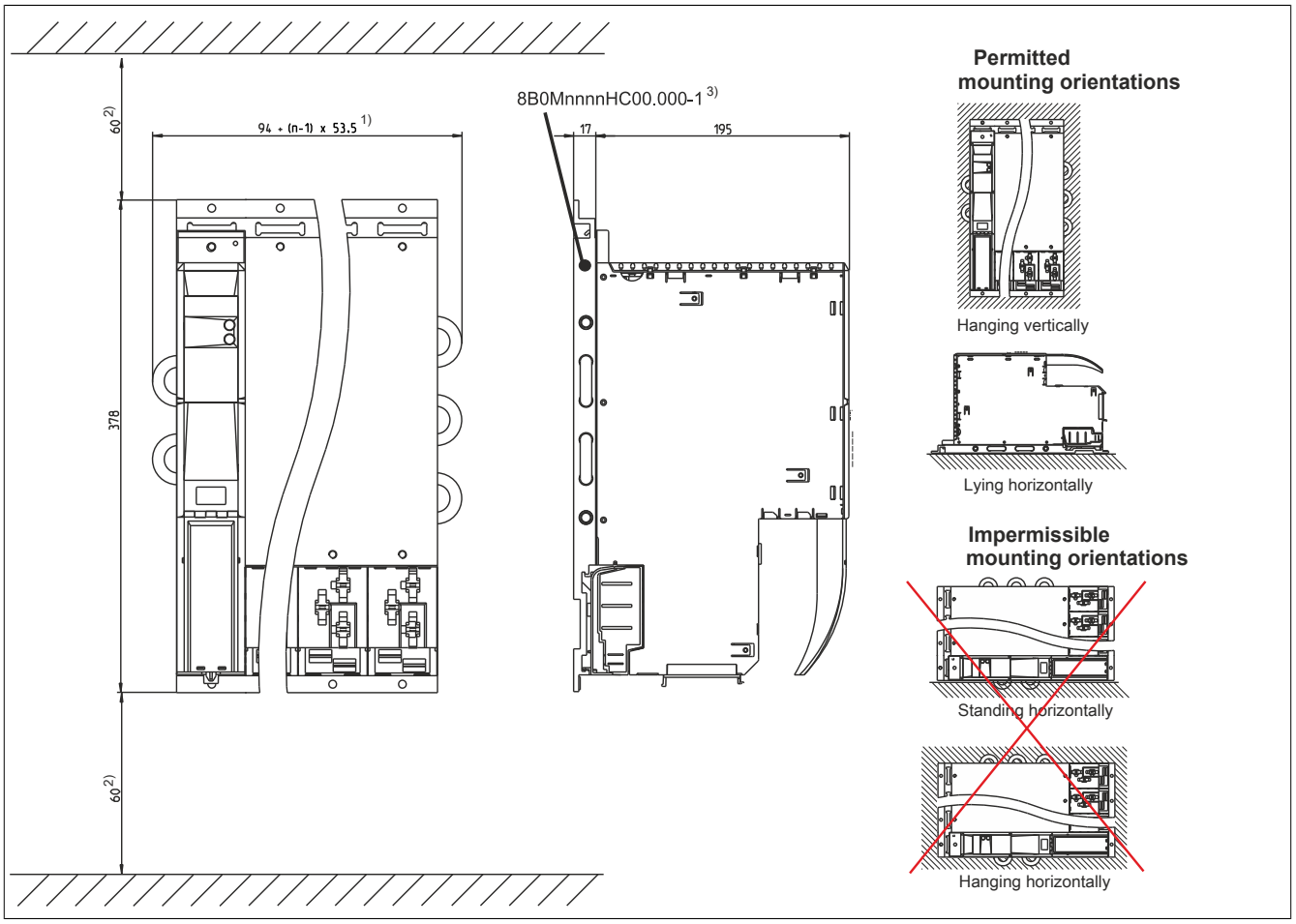


Figure 204: 8B0K1650HC00.000-1, 8B0K3630HC00.001-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7 Feed-through mounting

4.7.1 8B0MnnnnHF00.000-1 mounting plates

Note:

When securing mounting plate 8B0MnnnnHF00.000-1, make sure that the screws are mounted on the backplane side such that they comply with IP65 protection requirements per EN 60529.

Information:

nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

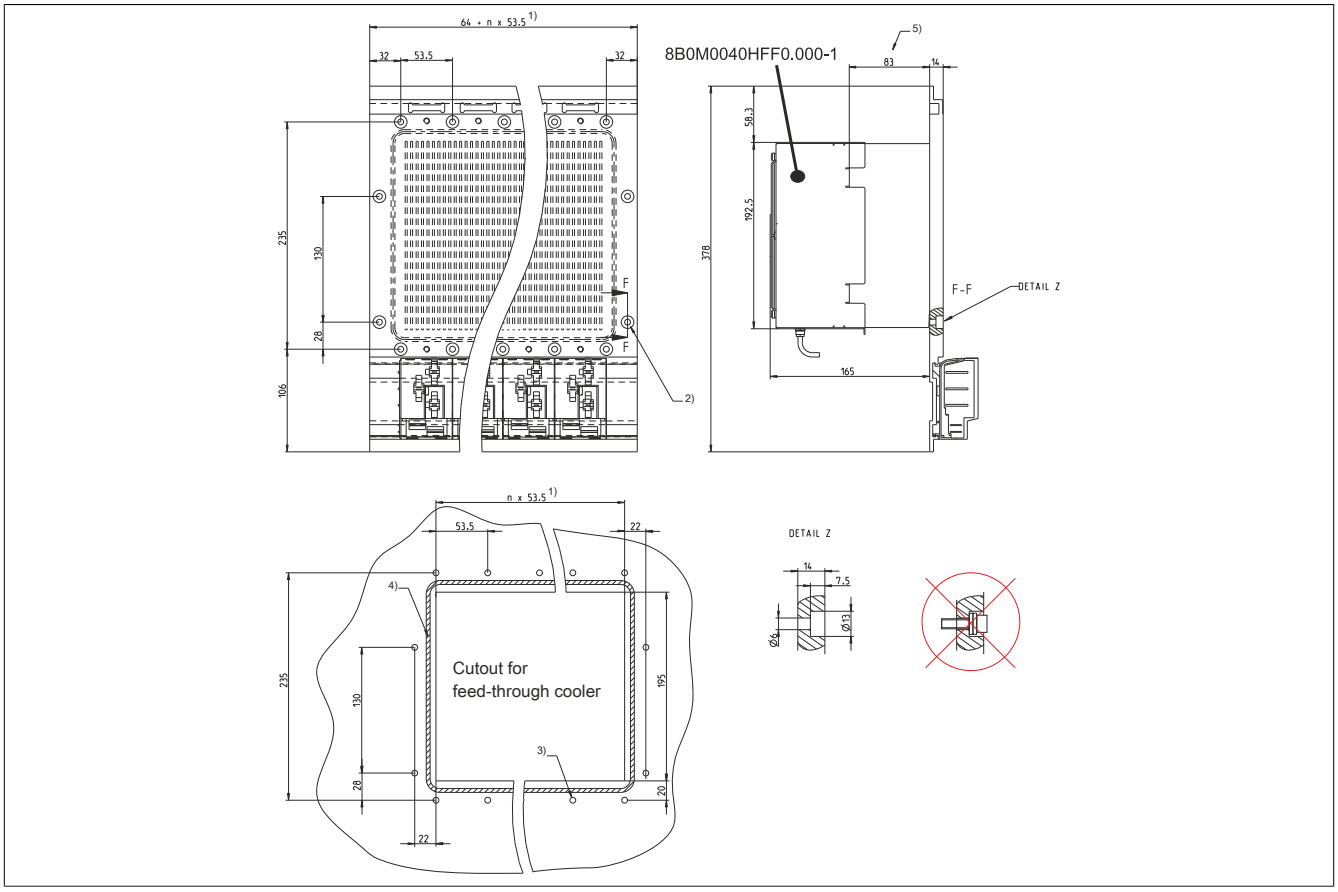


Figure 205: 8B0MnnnnHF00.000-1 - Dimension diagram and installation dimensions

1) n... Number of width units on the mounting plate
2) 6 + 2x n mounting holes ø 6 mm
The heads of the fastening screws are not permitted to exceed a height of 6 mm.
3) All drill holes 6 mm
4) Sealing surface
5) Fin depth of the feed-through heat sink without mounted fan 8B0M0040HFF0.000-1

Information:

The fastening elements of the feed-through heat sink must not extend beyond the installation surface! This would prevent the ACOPOSmulti modules from being mounted to the feed-through cooler.

4.7.2 8BxP0220HC00.00x-1, 8BxP0440HC00.00x-1 power supply modules

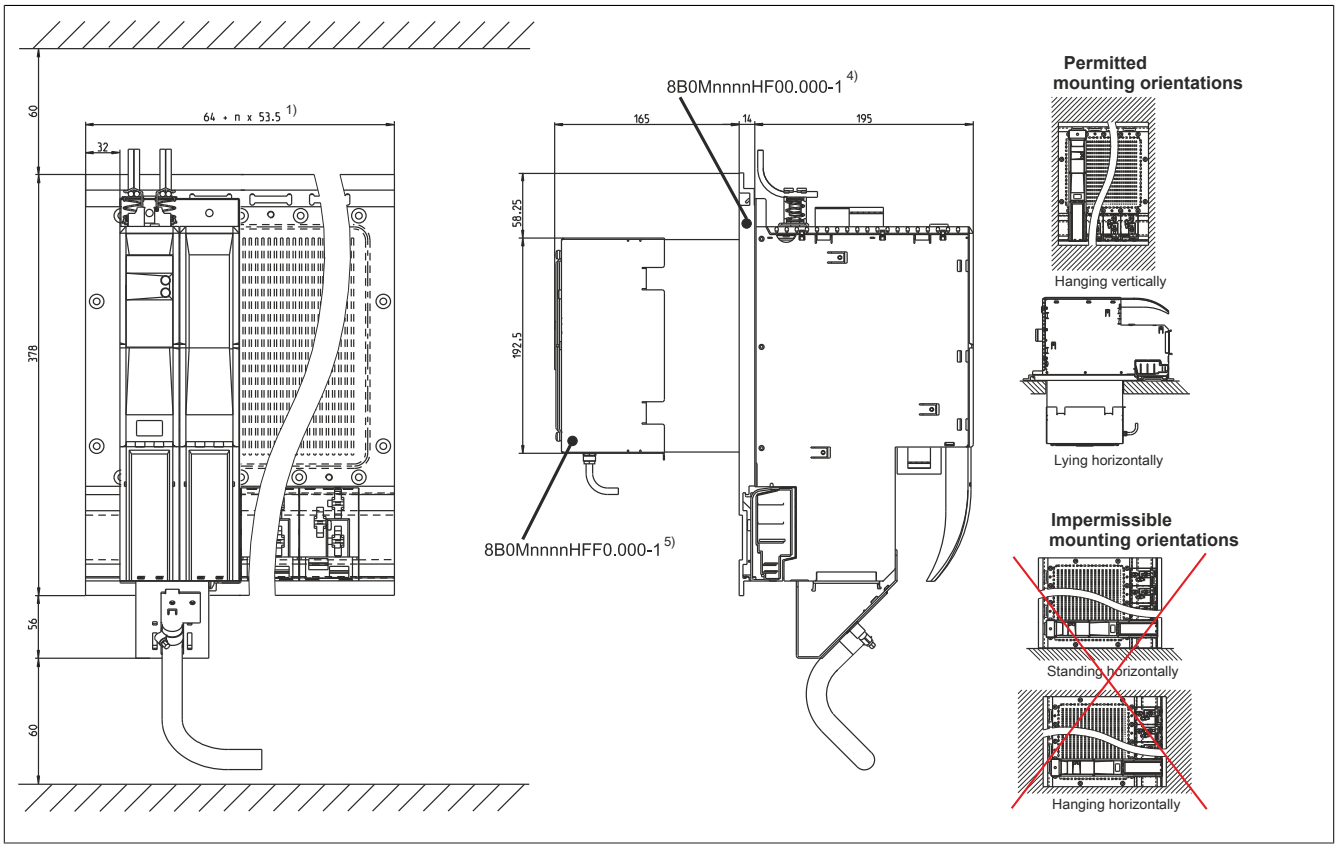


Figure 206: 8BxP0220HC00.00x-1, 8BxP0440HC00.00x-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) The required spacing to the wiring on the bottom of the module depends on the power cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
5) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.3 8BVP0880HC00.004-1 power supply module

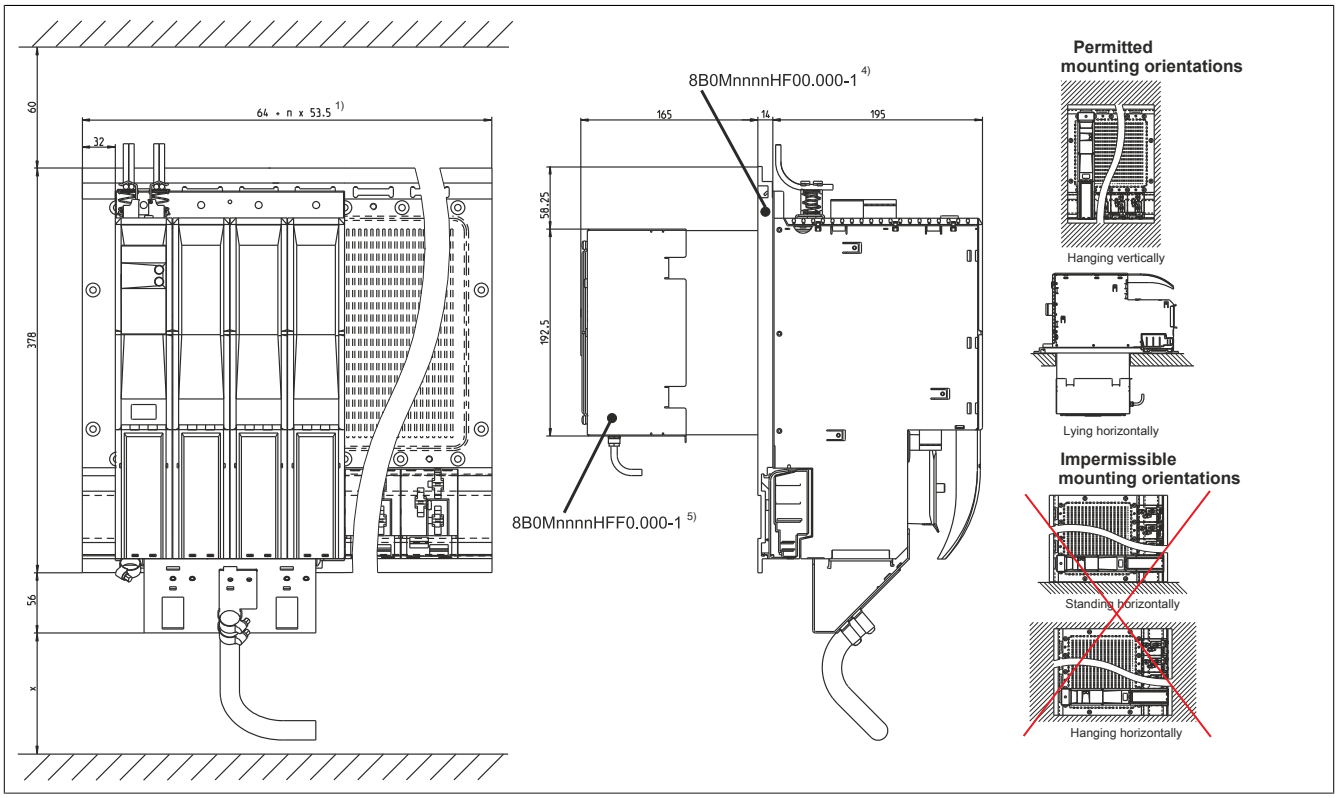


Figure 207: 8BVP0880HC00.004-1 - Dimension diagram and installation dimensions

1) n ... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) The required spacing to the wiring on the bottom of the module depends on the power cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
5) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.4 8BVP1650HC00.000-1 power supply module

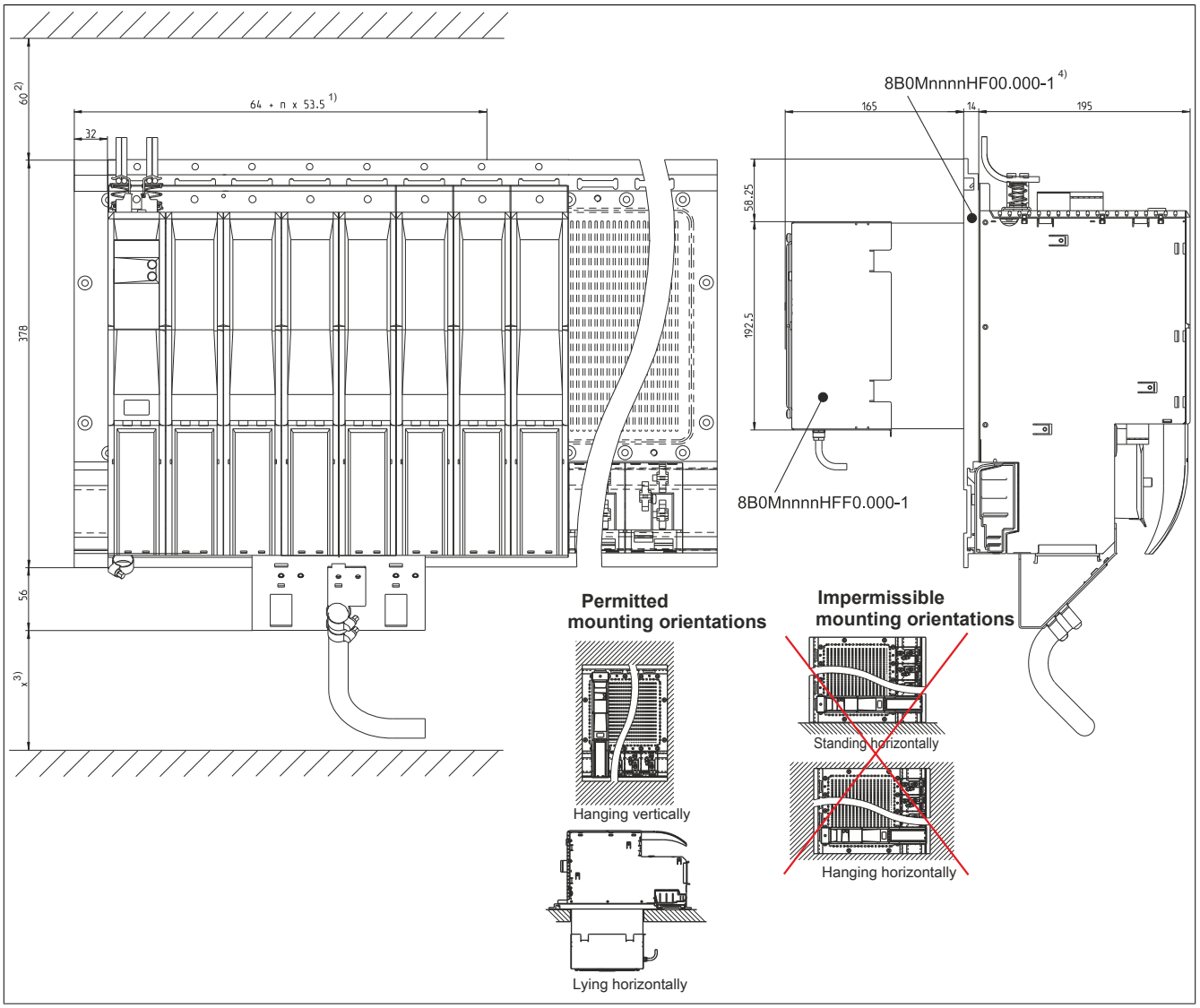


Figure 208: 8BVP1650HC00.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) The required spacing x to the wiring on the bottom of the module depends on the motor cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.5 Auxiliary supply modules

8B0C0160HC00.000-1, 8B0C0320HC00.000-1

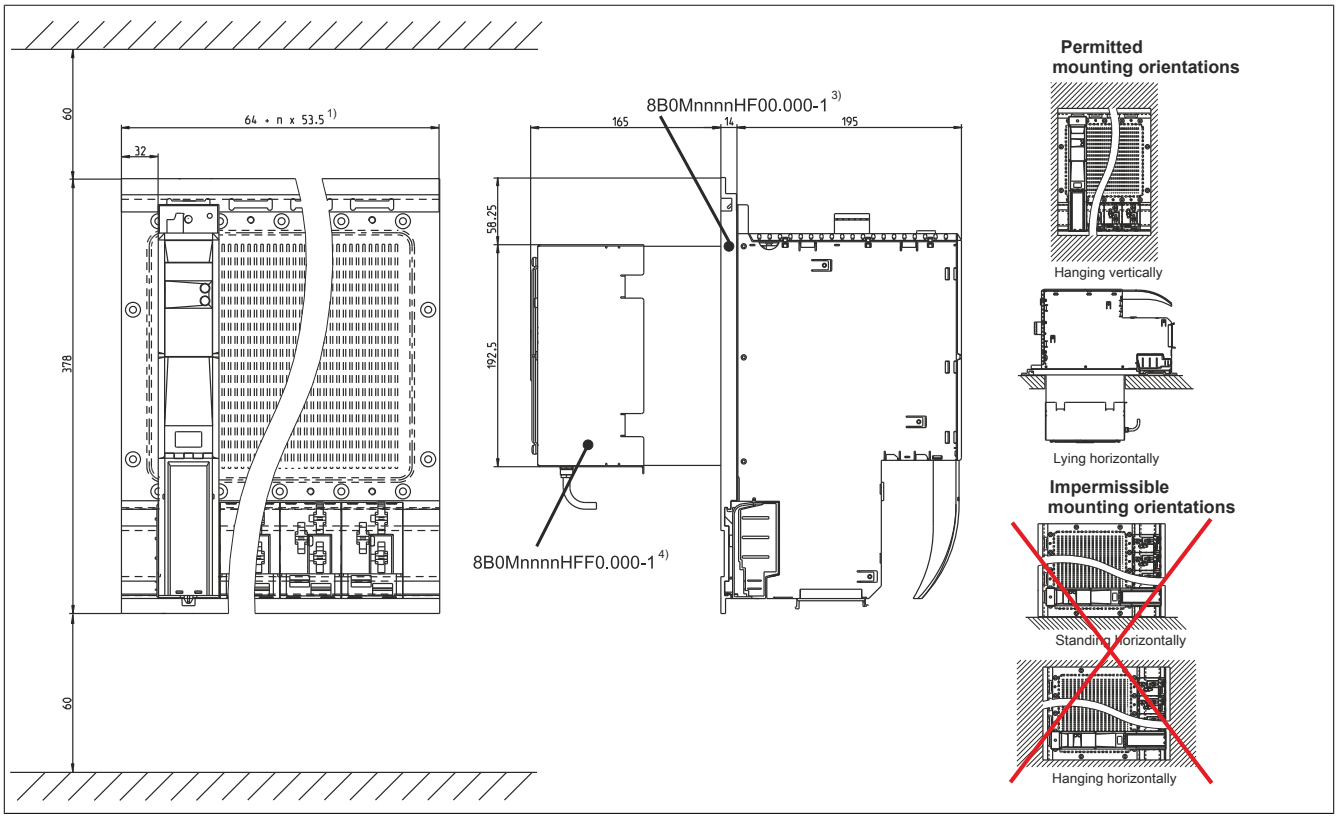


Figure 209: 8B0C0160HC00.000-1, 8B0C0320HC00.000-1 - Dimension diagram and installation dimensions

1) n ... Necessary width (slots) of the mounting plate.
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

8B0C0160HC00.001-1, 8B0C0320HC00.002-1, 8B0C0320HC00.00A-1

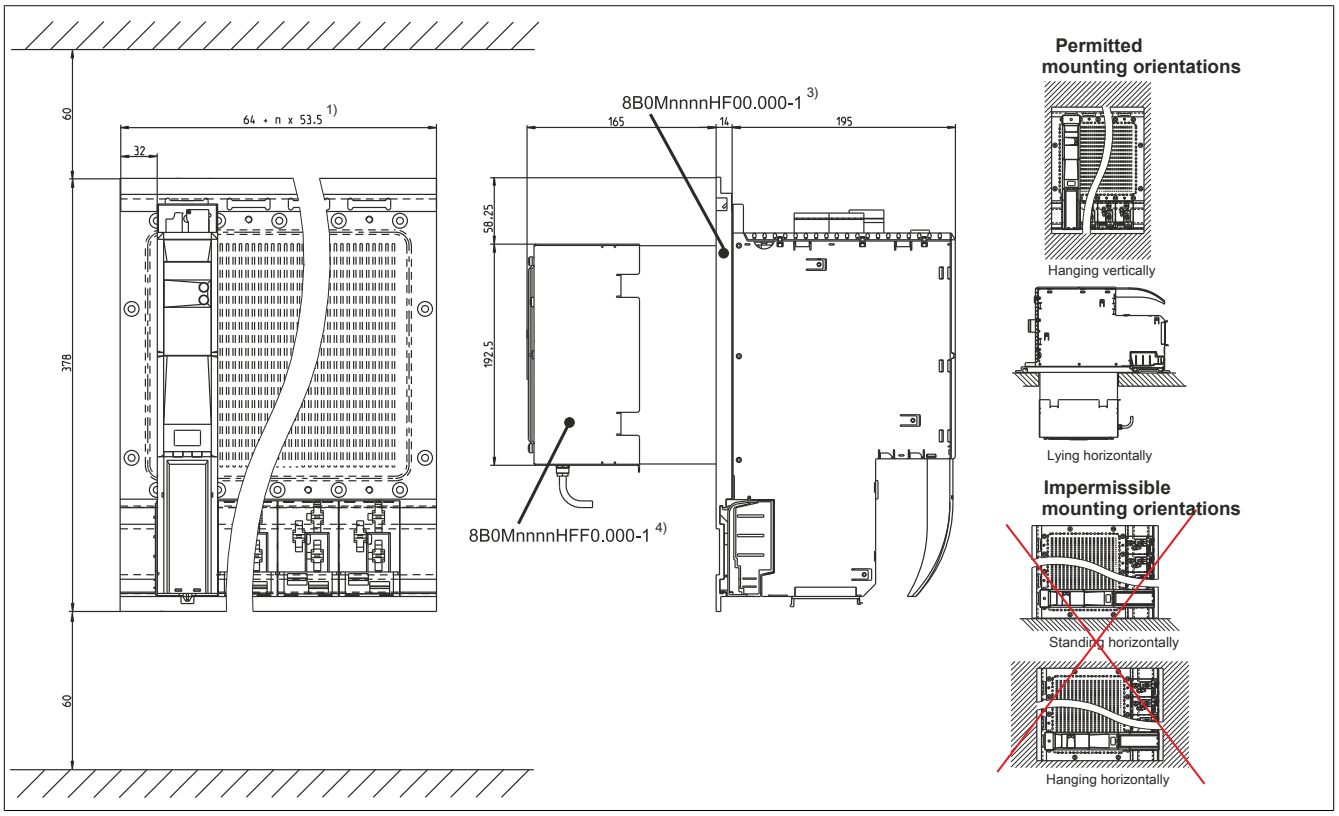


Figure 210: 8B0C0160HC00.001-1, 8B0C0320HC00.002-1, 8B0C0320HC00.00A-1 - Dimension diagram and installation dimensions

1) n ... Necessary width (slots) of the mounting plate.
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.6 Single-width inverter modules (single-axis modules)

8BVI0014HCSx.000-1, 8BVI0028HCSx.000-1, 8BVI0055HCSx.000-1, 8BVI0110HCSx.000-1

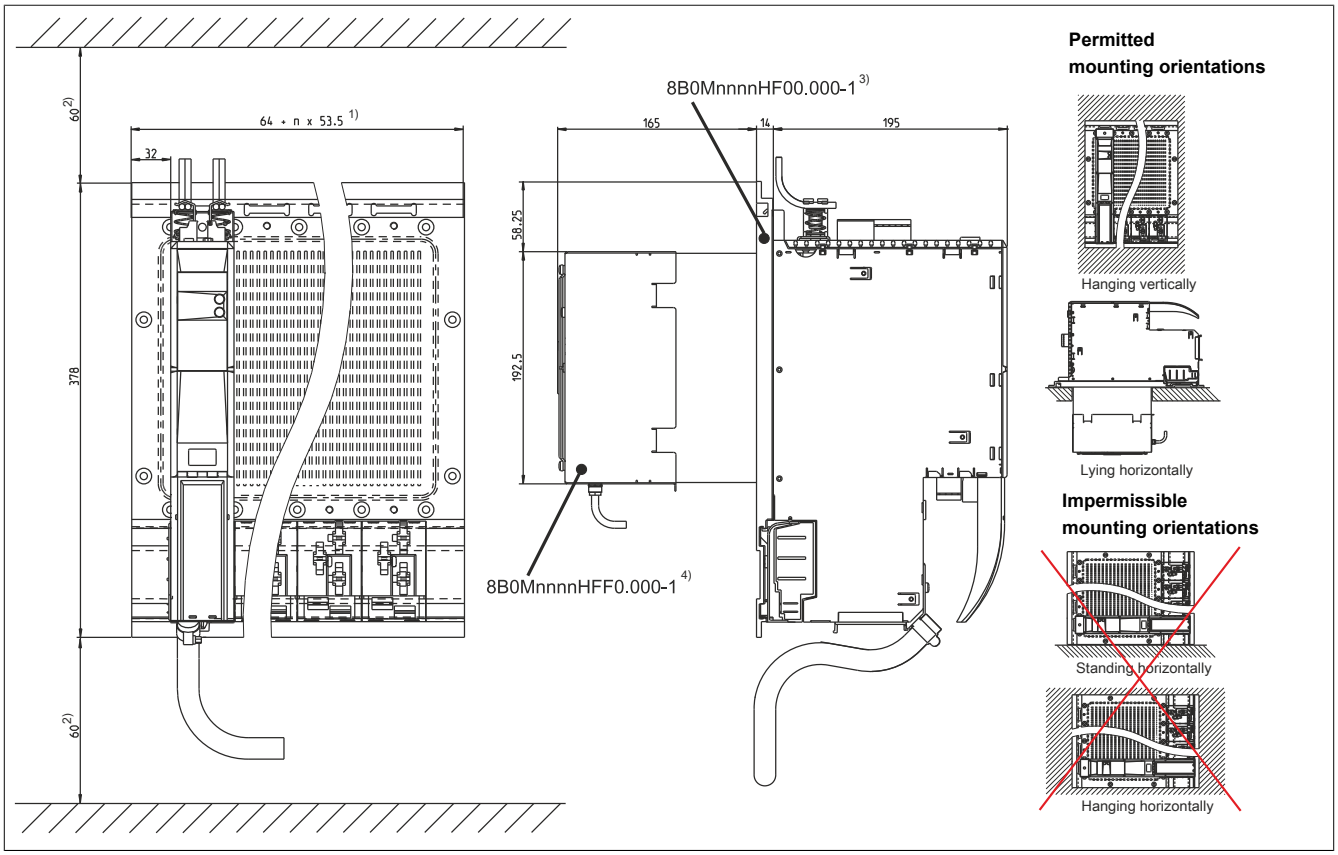


Figure 211: 8BVI0014HCSx.000-1, 8BVI0028HCSx.000-1, 8BVI0055HCSx.000-1, 8BVI0110HCSx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.7 Single-width inverter modules (dual-axis modules)

8BVI0014HCDx.000-1, 8BVI0028HCDx.000-1, 8BVI0055HCDx.000-1

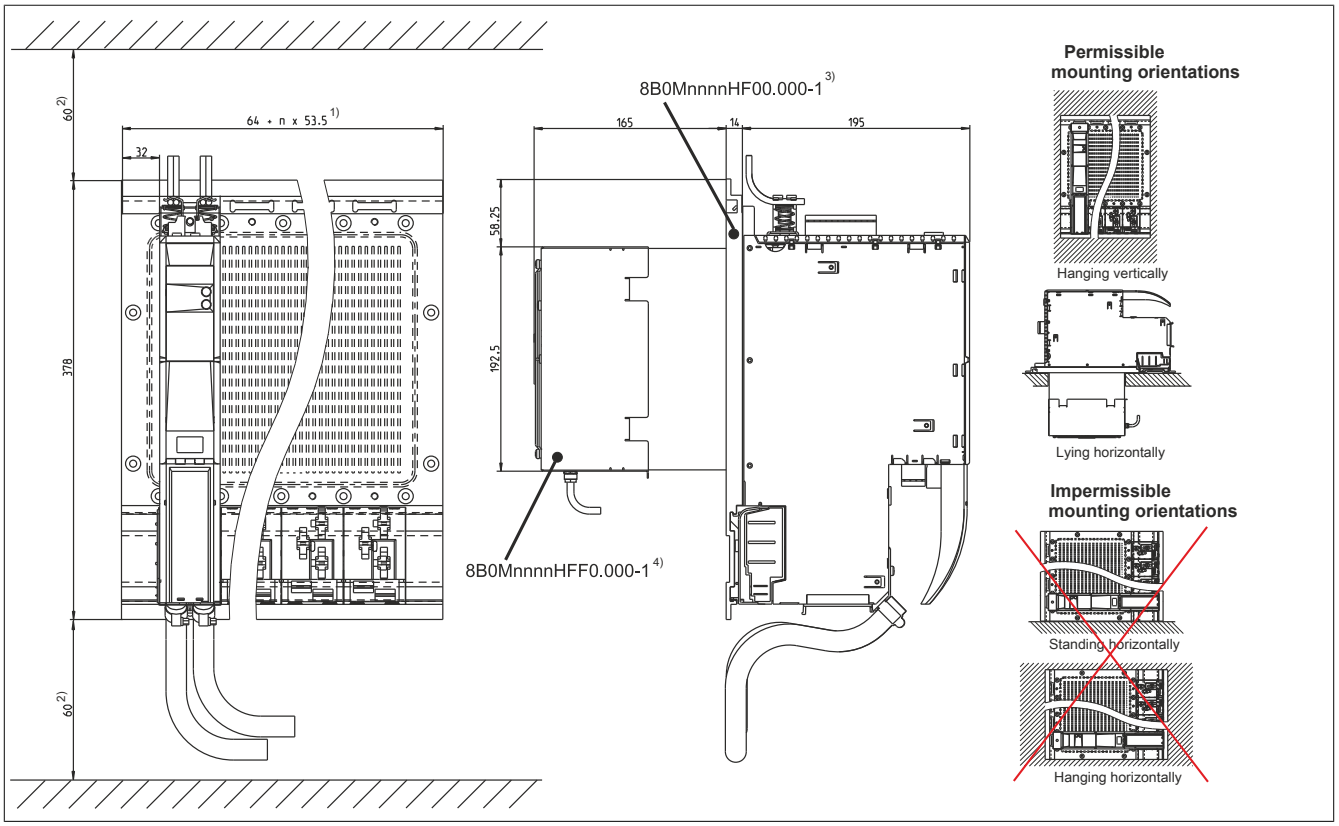


Figure 212: 8BVI0014HCDx.000-1, 8BVI0028HCDx.000-1, 8BVI0055HCDx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.8 8BVI0220HCSx.000-1, 8BVI0440HCSx.000-1 inverter modules

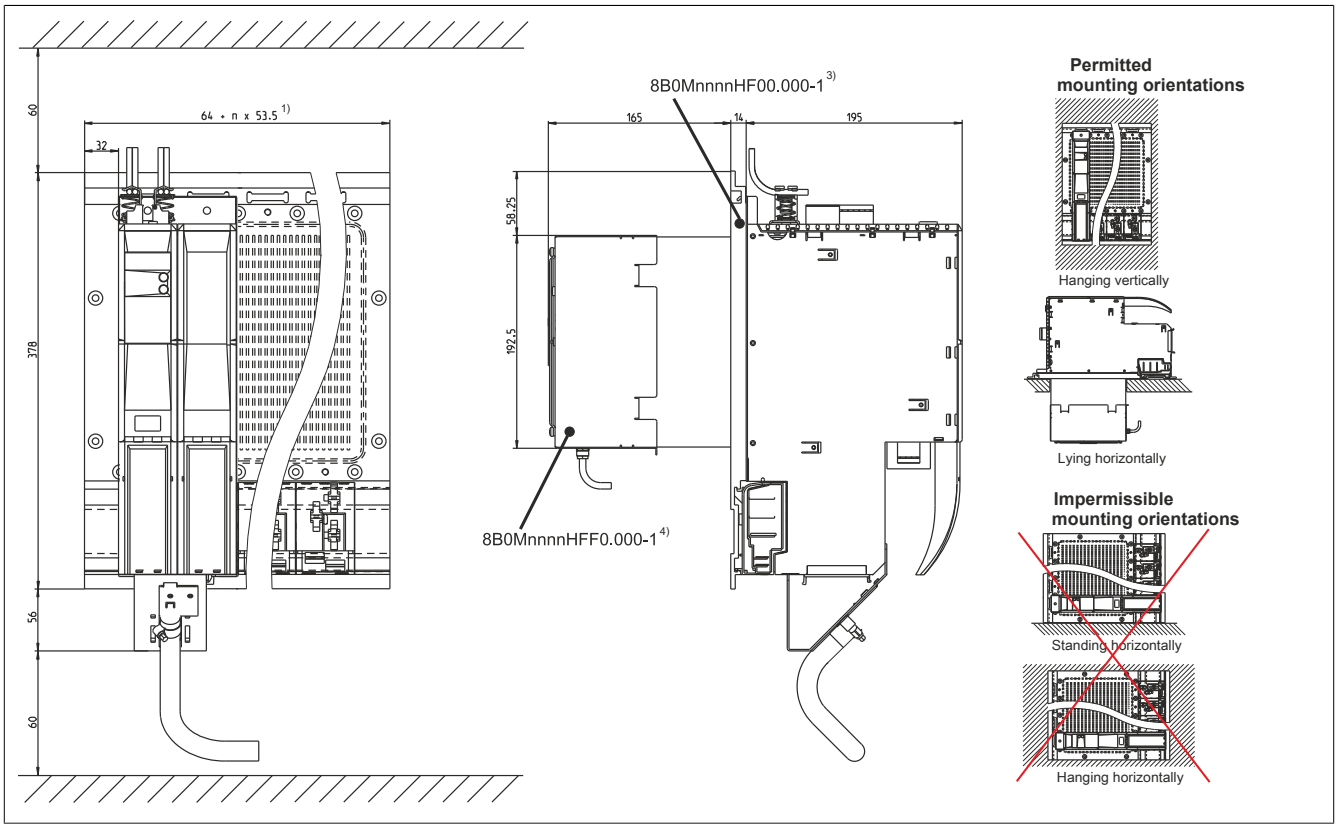


Figure 213: 8BVI0220HCSx.000-1, 8BVI0440HCSx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.9 8BVI0110HCDx.000-1, 8BVI0220HCDx.000-1 inverter modules

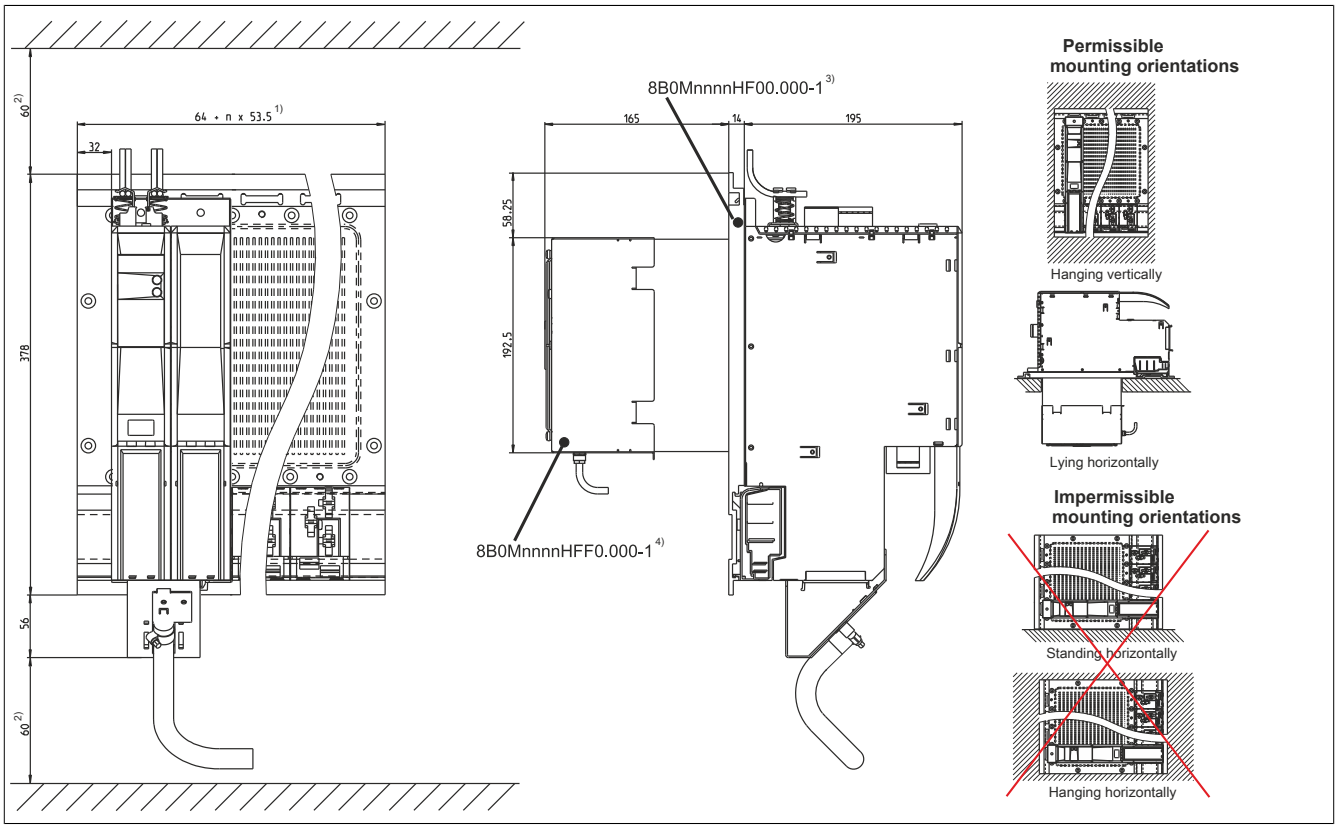


Figure 214: 8BVI0110HCDx.000-1, 8BVI0220HCDx.000-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.10 8BVI0880HCSx.004-1 inverter module

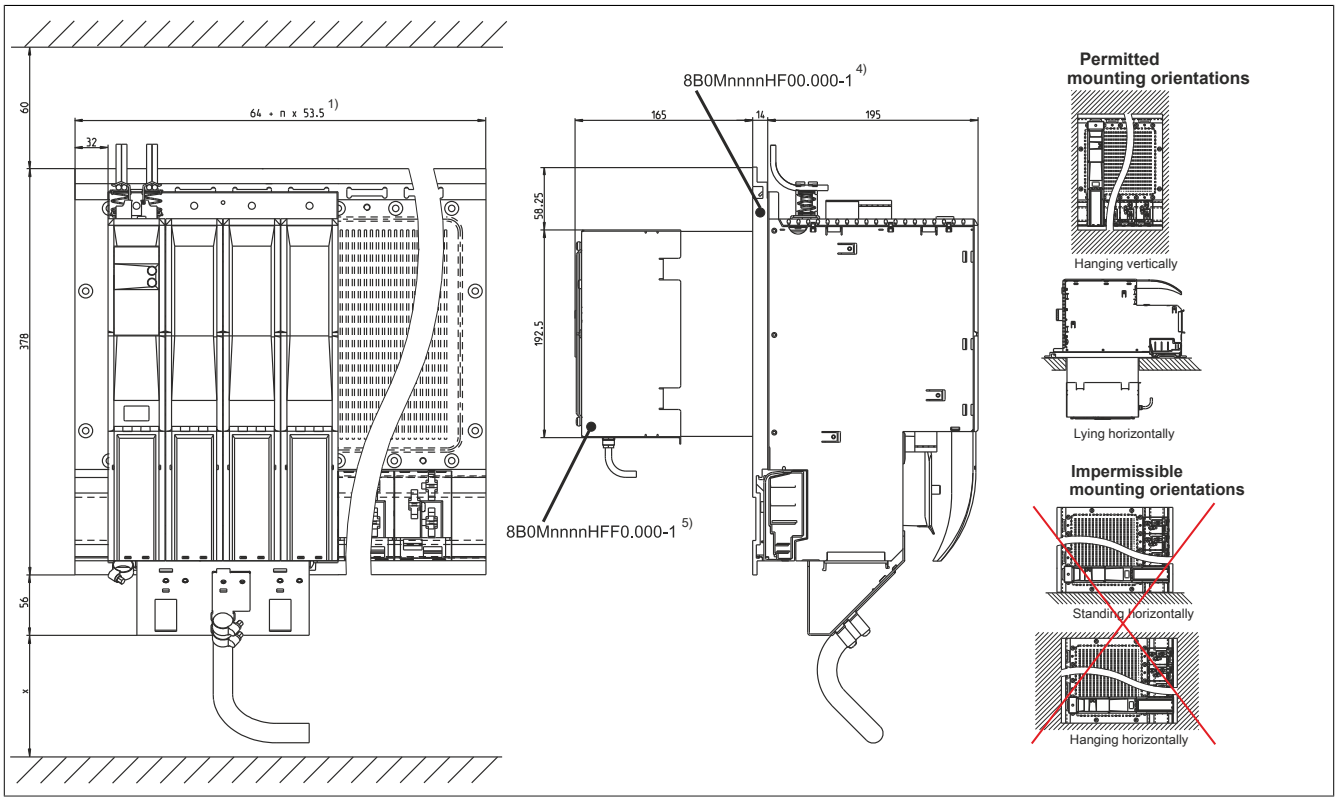


Figure 215: 8BVI0880HCSx.004-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) The required spacing x to the wiring on the bottom of the module depends on the motor cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
5) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.11 8BVI1650HCS0.000-1 inverter module

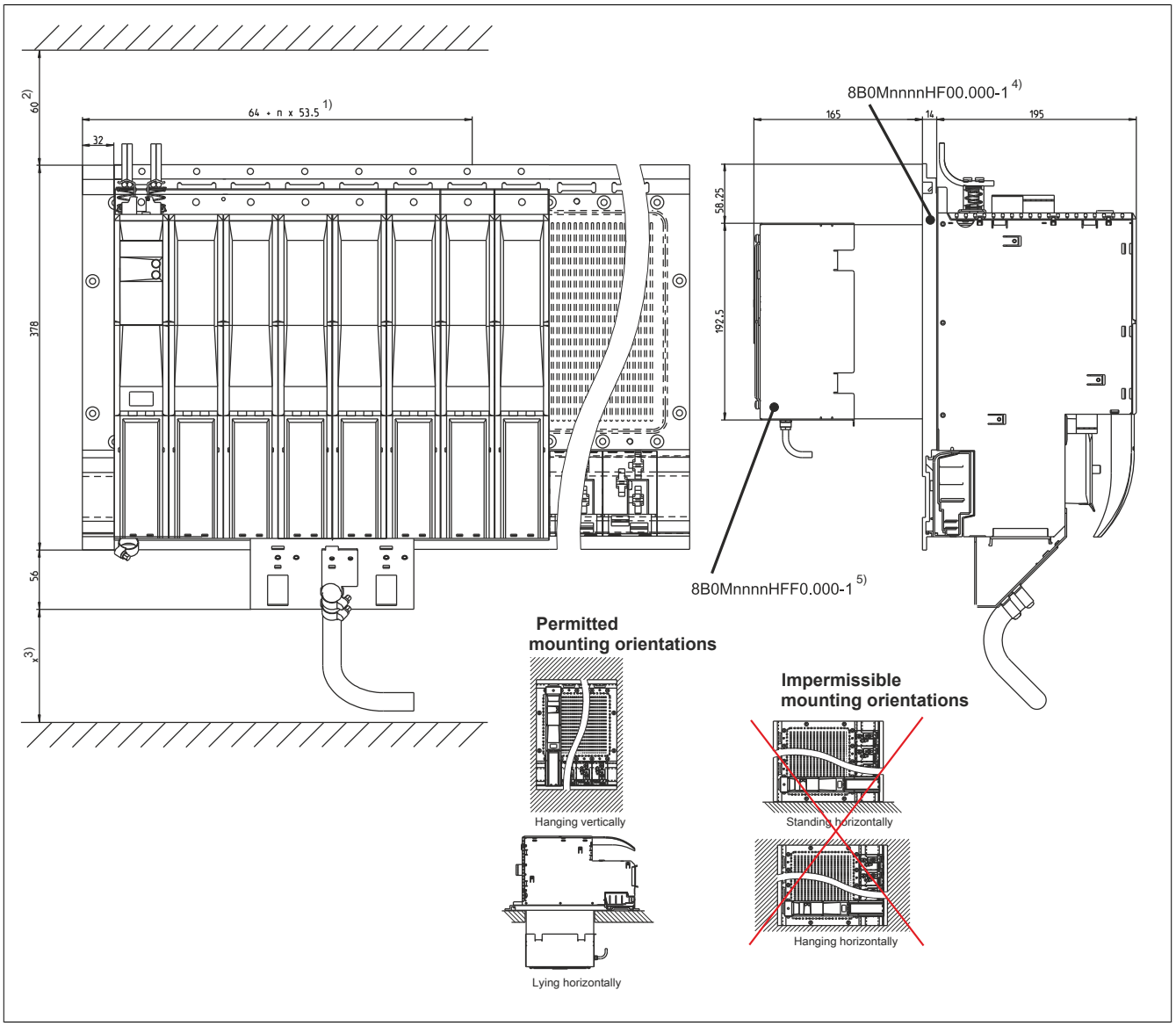


Figure 216: 8BVI1650HCS0.000-1 - Dimension diagram and installation dimensions

1) n... Necessary width (slots) of the mounting plate.
2) For proper air circulation, at least 60 mm clearance must be available above and below the module.
3) The required spacing x to the wiring on the bottom of the module depends on the motor cable being used.
4) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
5) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.12 8BVE0500HC00.000-1 expansion module

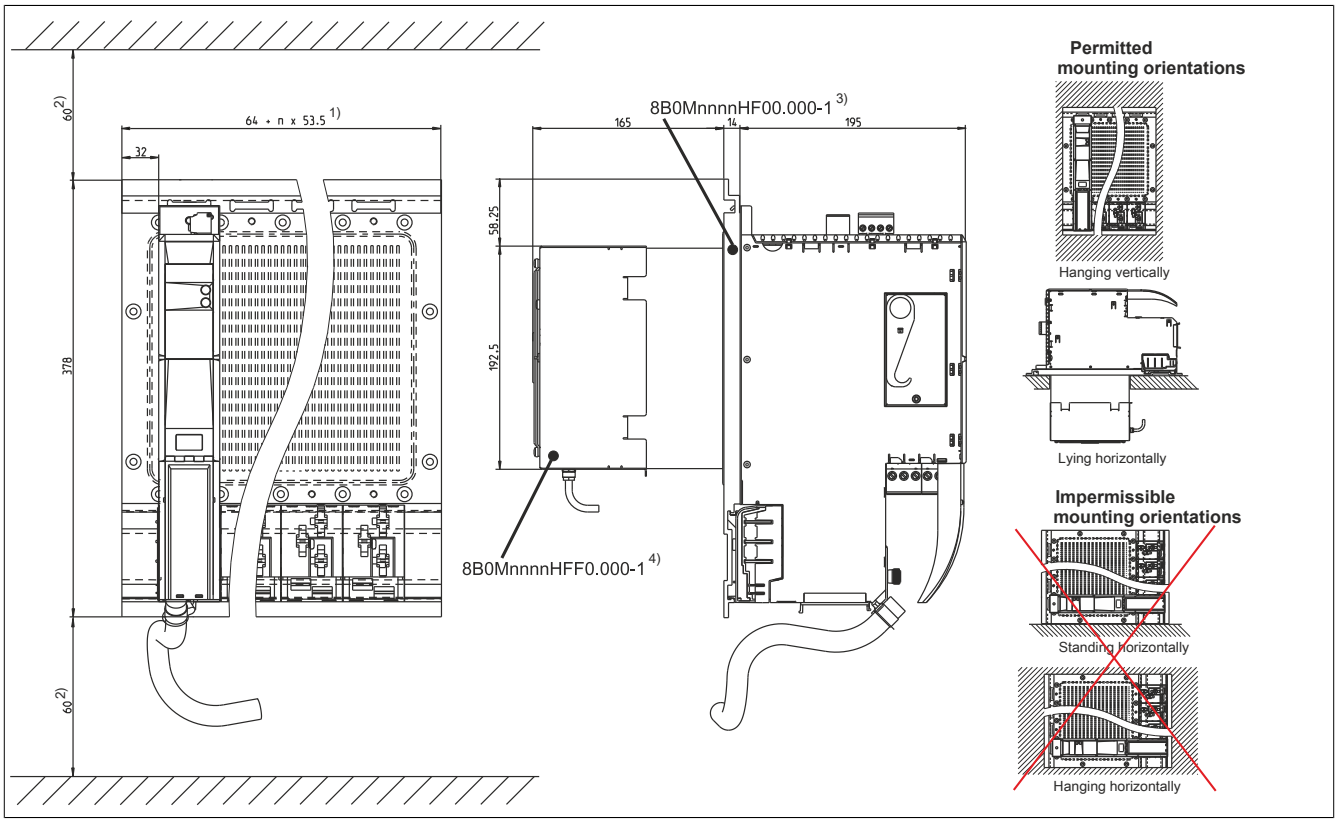


Figure 217: 8BVE0500HC00.000-1 - Dimension diagram and installation dimensions

1) n ... Necessary width (slots) of the mounting plate.
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.7.13 8B0K1650HC00.000-1, 8B0K3630HC00.001-1 capacitor modules

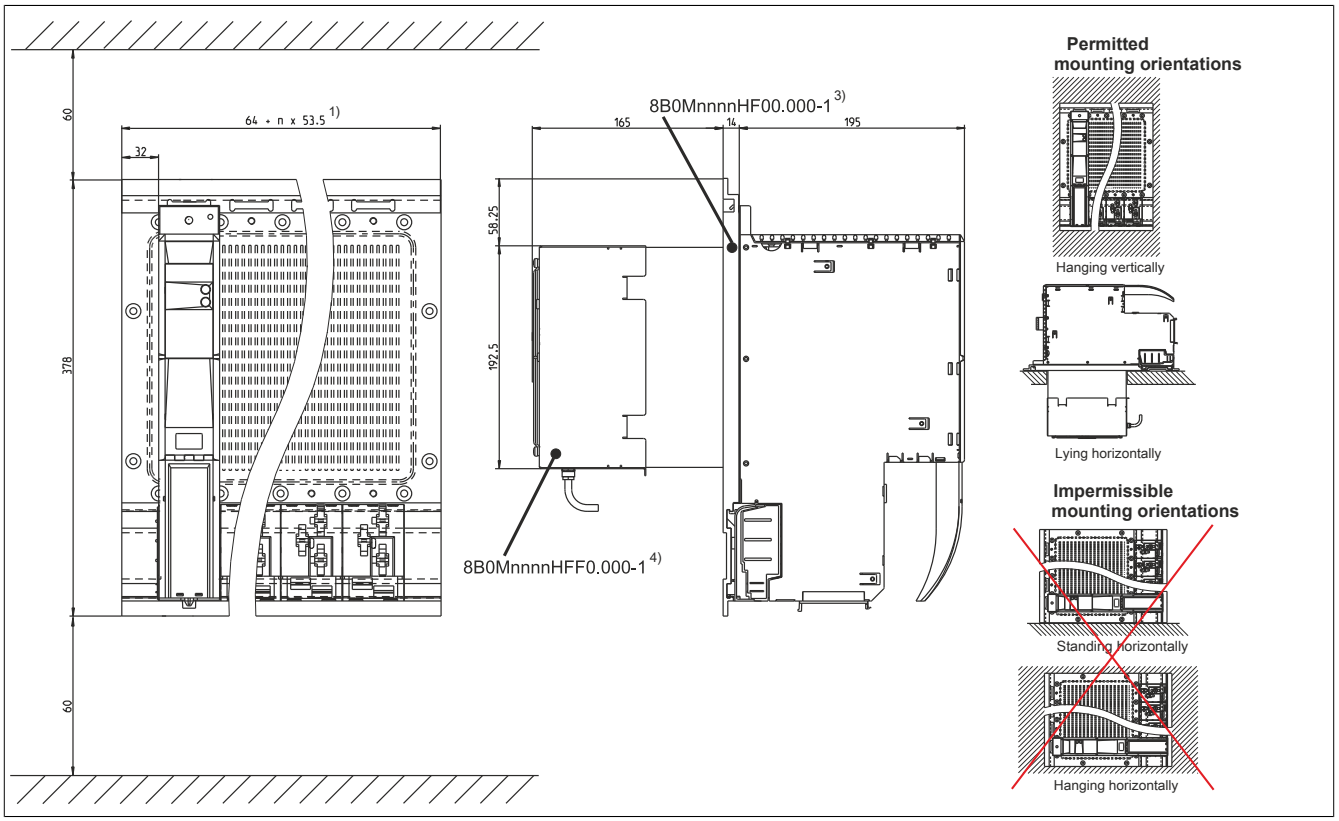


Figure 218: 8B0K1650HC00.000-1, 8B0K3630HC00.001-1 - Dimension diagram and installation dimensions

1) n... Number of slots on the mounting plate
2) For proper air circulation, at least 60 mm clearance must be available above the mounting plate as well as below the module.
3) nnnn indicates the number of slots (e.g. 0160 refers to 16 slots).
4) For proper air circulation, at least 100 mm has to be left free around the fan module.

Information:

When mounting ACOPOSmulti modules for cold-plate or feed-through mounting, be sure not to scratch the backplane. This can impair thermal dissipation to the mounting plate.

Do not set down ACOPOSmulti modules for cold-plate or feed-through mounting on their bottom side. Doing so could break the clips that hold the unit is fan. Broken clips make it more difficult to replace the fans later on.

4.8 External braking resistors

4.8.1 8B0W0045H000.000-1, 8B0W0079H000.000-1, 8B0W0096H000.000-1

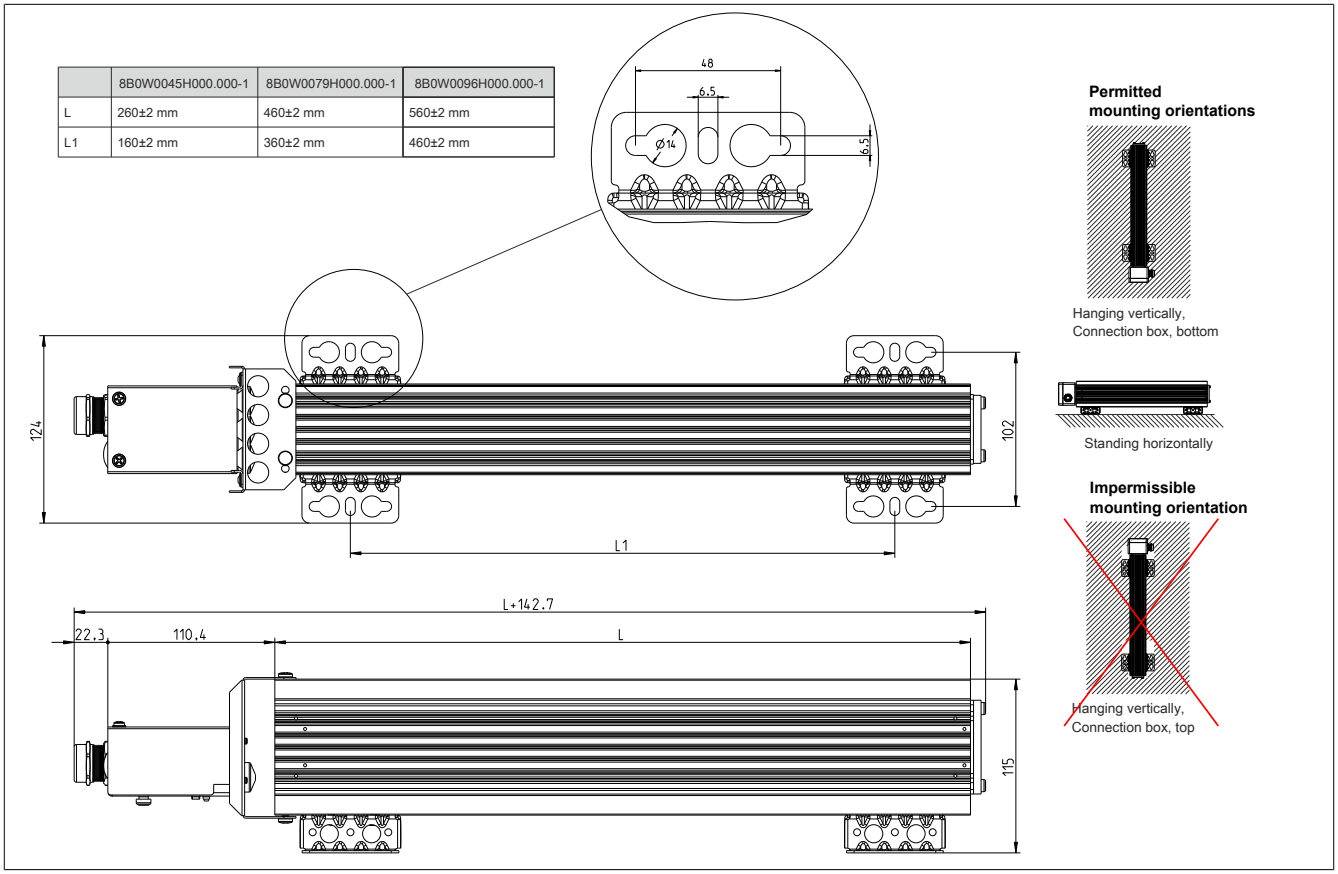


Figure 219: 8B0W0045H000.000-1, 8B0W0079H000.000-1, 8B0W0096H000.000-1 - Dimension diagram and installation dimensions

Warning!

8B0W external braking resistors can reach extremely high surface temperatures both during operation as well as after being switched off!

4.8.2 8B0W0045H000.001-1, 8B0W0079H000.001-1, 8B0W0096H000.001-1

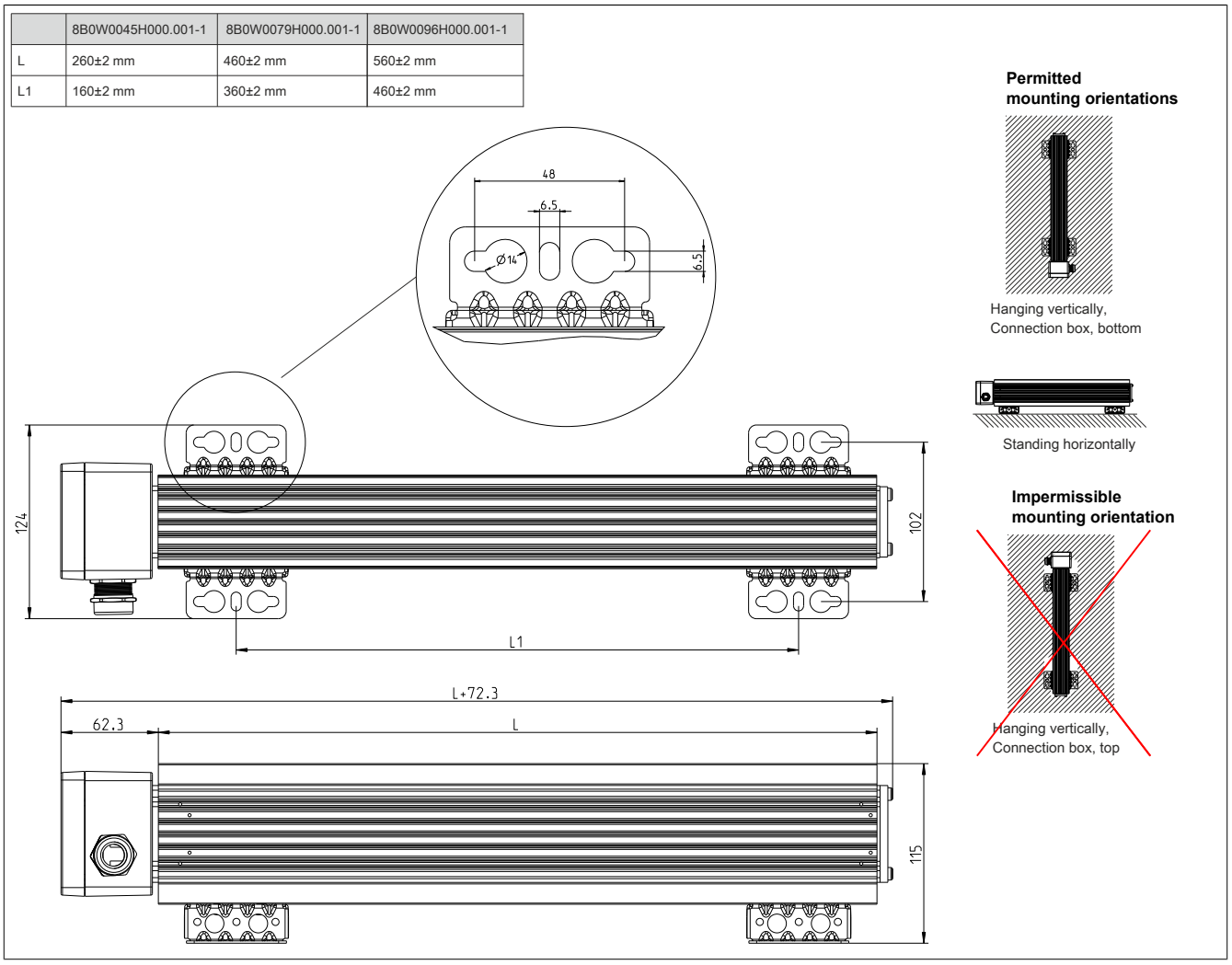


Figure 220: 8B0W0045H000.001-1, 8B0W0079H000.001-1, 8B0W0096H000.001-1 - Dimension diagram

Warning!

8B0W external braking resistors can reach extremely high surface temperatures both during operation as well as after being switched off!

External braking resistor 8B0W - Installation dimensions

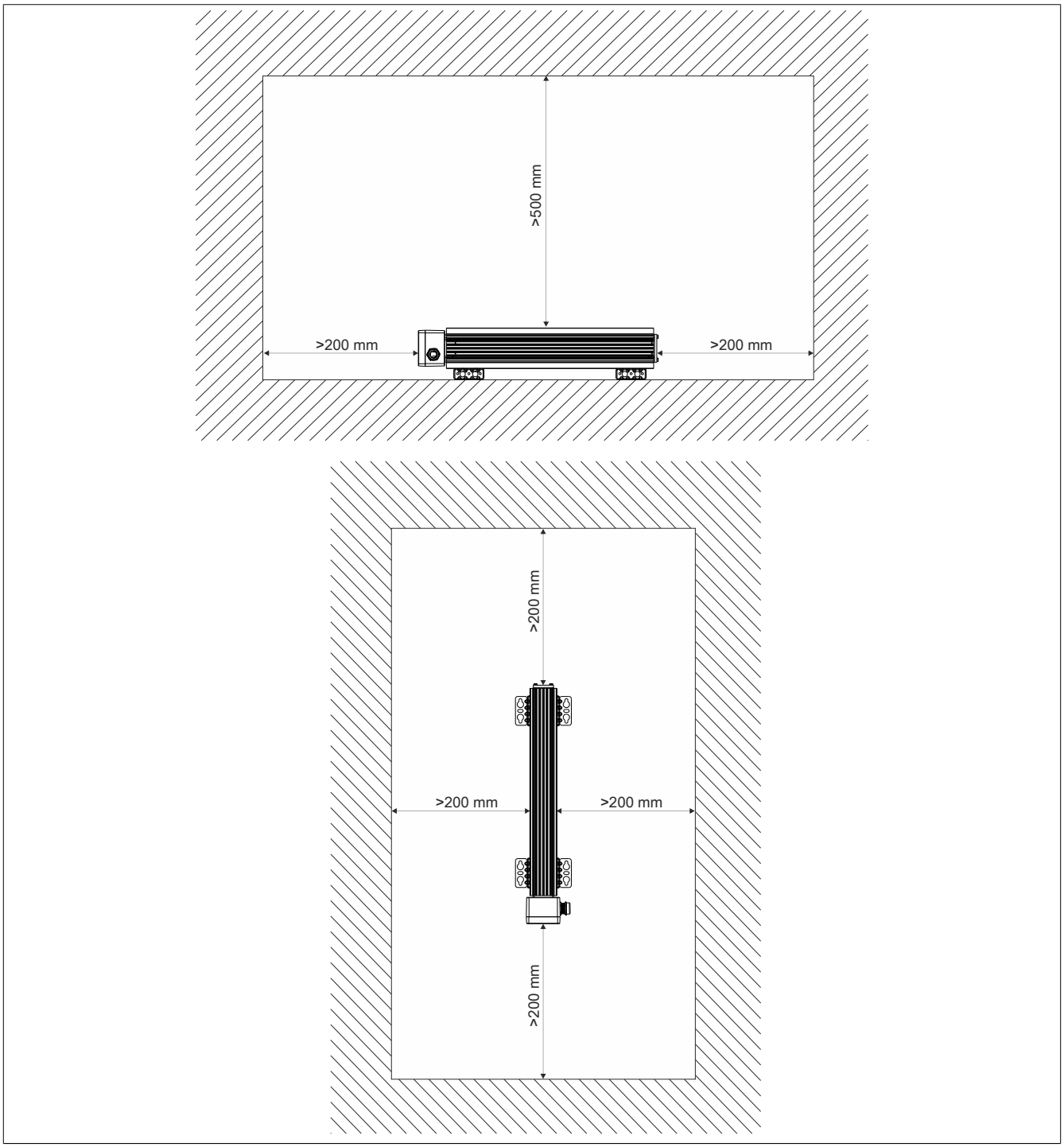


Figure 221: 8B0W external braking resistors - Installation dimensions

4.9 8B0M0040HFF0.000-1 fan module

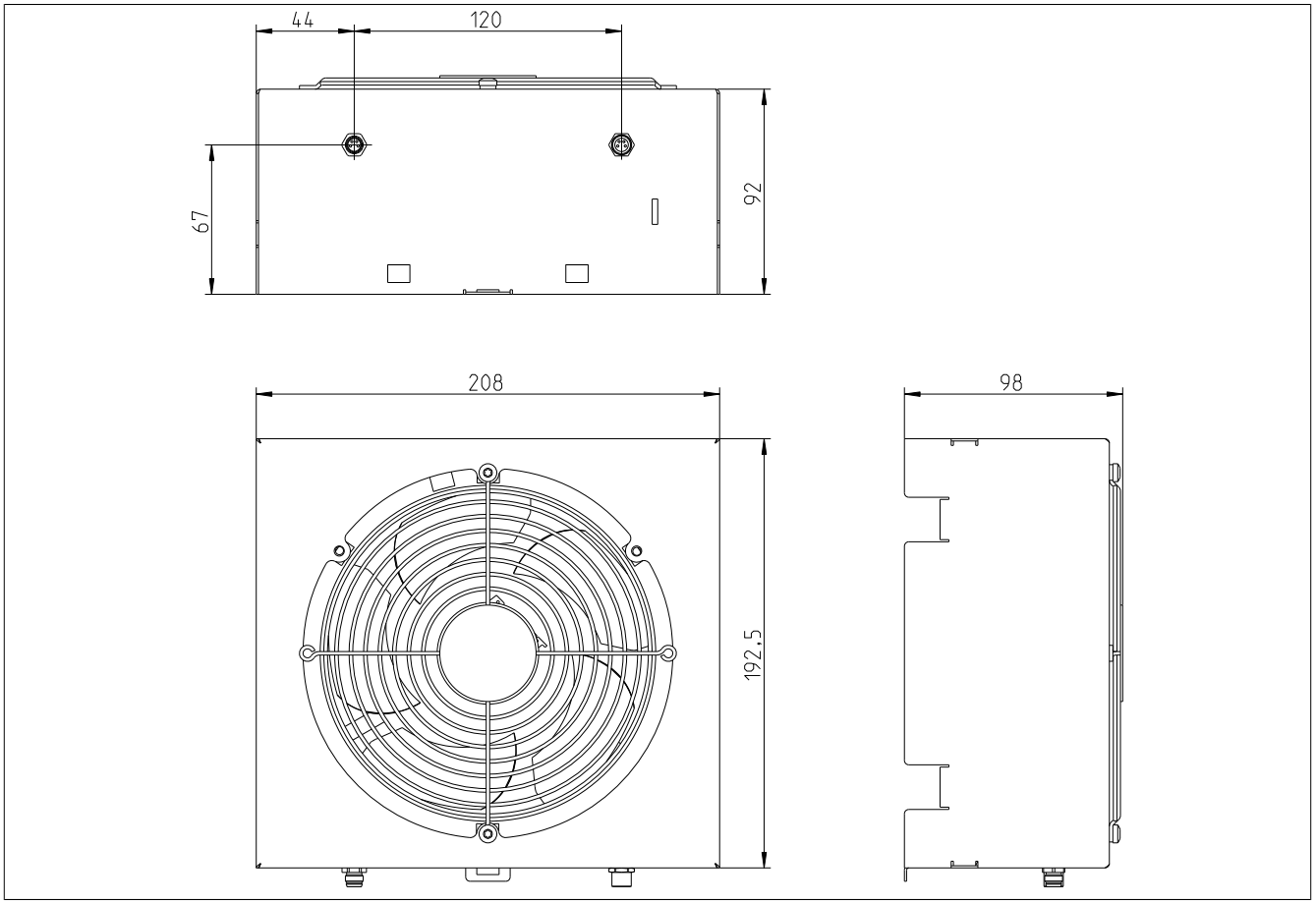


Figure 222: 8B0M0040HFF0.000-1 - Dimension diagram and installation dimensions

5 Installation and removal of plug-in modules

5.1 General information

> **Caution!**
>
> **Observe the guidelines listed in section 4.4 "Protection against electrostatic discharge" when installing and removing plug-in modules!**

ACOPOSmulti 8BVI inverter modules and 8BVP power supply modules are equipped with up to two free slots for plug-in modules:

The necessary plug-in modules are selected in accordance with the requirements of the application and connected to the ACOPOSmulti drive system.

	8B0P... / 8B0C... / 8B0K... / 8BVE...	8BVPxxxxHx00.xxxx-1	8BVIxxxxHxx0.xxx-1	8BVIxxxxHxSS.xxx-1 8BVIxxxxHxSA.xxx-1	8BVIxxxxHxDS.xxx-1
Max. possible number of plug-in modules	---	2		1 [1]	--- [2]

Table 404: Maximum possible number of plug-in modules by ACOPOSmulti module

1) SLOT2 is available. SLOT1 of the ACOPOSmulti module is occupied by the SafeMOTION module.
2) SLOT1 and SLOT2 of the ACOPOSmulti module are occupied by SafeMOTION modules.

Overview

Model number	Short description	Page
8BAC0120.000-1	ACOPOSmulti plug-in module, EnDat 2.1 interface	259
8BAC0120.001-2	ACOPOSmulti plug-in module, EnDat 2.2 interface	264
8BAC0121.000-1	ACOPOSmulti plug-in module, HIPERFACE interface	267
8BAC0122.000-1	ACOPOSmulti plug-in module, resolver interface 10 kHz	271
8BAC0123.000-1	ACOPOSmulti plug-in module, incremental encoder and SSI absolute encoder interface for RS422 signals	277
8BAC0123.001-1	ACOPOSmulti plug-in module, incremental encoder interface for 5 V single-ended and 5 V differential signals	283
8BAC0123.002-1	ACOPOSmulti plug-in module, incremental encoder interface for 24 V single-ended and 24 V differential signals	290
8BAC0124.000-1	ACOPOSmulti plug-in module, SinCos interface	295
8BAC0125.000-1	ACOPOSmulti plug-in module, SinCos EnDat 2.1/SSI/BiSS interface	300
8BAC0130.000-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 2 digital outputs, 500 mA, max. 1.25 kHz, 2 digital inputs 24 VDC	303
8BAC0130.001-1	ACOPOSmulti plug-in module, 2 digital outputs, 50 mA, max. 62.5 kHz, 4 digital outputs, 500 mA, max. 1.25 kHz	306
8BAC0132.000-1	ACOPOSmulti plug-in module, 4 analog inputs ±10 V	309
8BAC0133.000-1	ACOPOSmulti plug-in module, 3 RS422 outputs for ABR encoder emulation, 1 MHz	313

Observe the following assignments of the modules to the slots:

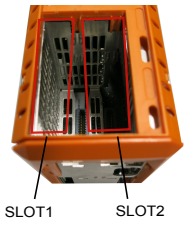
Figure	Plug-in module	Operation possible in	
		SLOT1[1]	SLOT2[2]
	8BAC0120.000-1	Yes	
	8BAC0120.001-2	Yes	
	8BAC0121.000-1	Yes	
	8BAC0122.000-1	Yes	
	8BAC0123.000-1	Yes	
	8BAC0123.001-1	Yes	
	8BAC0123.002-1	Yes	
	8BAC0124.000-1	Yes	
	8BAC0130.000-1	No	Yes
	8BAC0130.001-1	No	Yes
	8BAC0132.000-1	Yes	
	8BAC0133.000-1	No	Yes

Table 405: Slot assignments for ACOPOSmulti plug-in modules

1) SLOT1 is occupied by the SafeMOTION module on ACOPOSmulti SafeMOTION 8BVIxxxxHxxS/8BVIxxxxHxxA inverter modules.
2) SLOT2 is occupied by the SafeMOTION module on ACOPOSmulti SafeMOTION 8BVIxxxxHxDS inverter modules.

5.2 Installation

1. Disconnect the ACOPOSmulti inverter module / power supply module from the power system and safeguard it from being restarted.
2. Switch off the 24 VDC supply voltage.
3. Open the front cover.
4. Slide the plug-in module into an available slot until it makes an audible click:

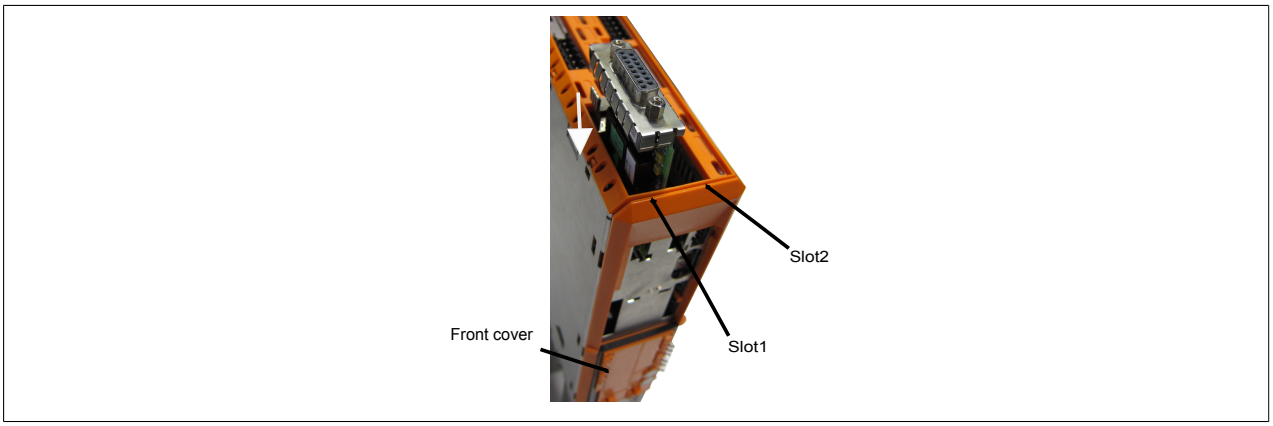


Figure 223: Installing ACOPOSmulti plug-in modules

5. Close the front cover. The act of closing locks the plug-in module into the inverter module / power supply module and prevents it from being pulled back out.
6. Switch on the 24 VDC supply voltage.
7. Connect the ACOPOSmulti inverter module / power supply module to the power system.

5.3 Removal

1. Disconnect the ACOPOSmulti inverter module / power supply module from the power system and safeguard it from being restarted.
2. Switch off the 24 VDC supply voltage.
3. Open the front cover.
4. Remove the plug-in module from the top:

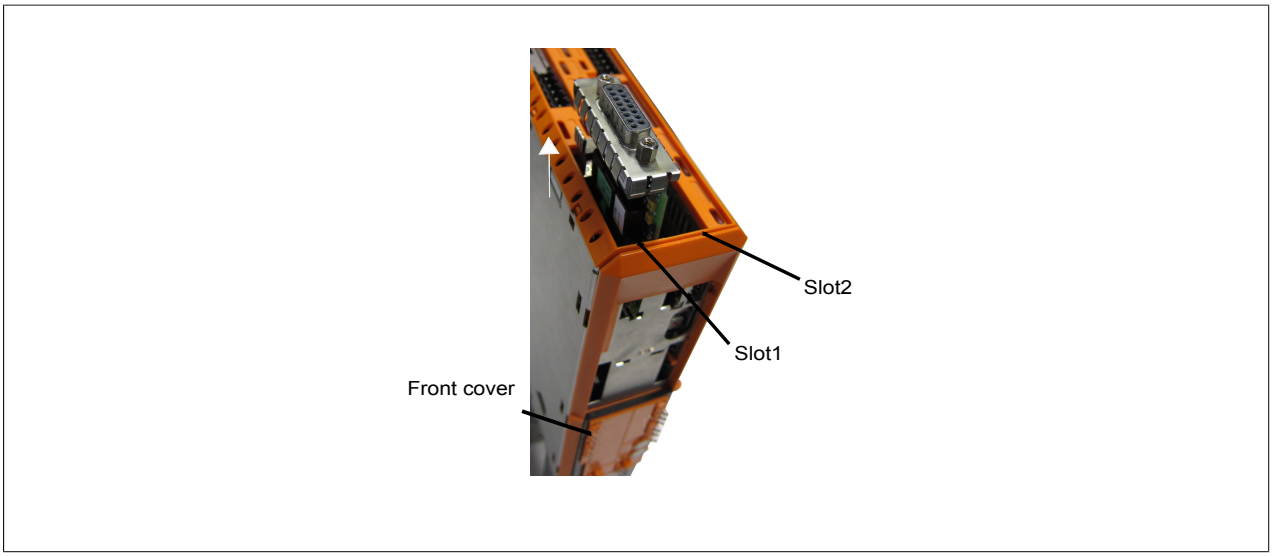


Figure 224: Removing ACOPOSmulti plug-in modules

5. Close the front cover until it makes an audible click.
6. Switch on the 24 VDC supply voltage.
7. Connect the ACOPOSmulti inverter module / power supply module to the power system.

6 Using cooling systems in control cabinets

Cooling systems are sometimes required for maintaining the permissible ambient temperature levels of ACOPOS-multi drives systems in control cabinets.

For details about dimensioning cooling systems, see "Dimensioning cooling systems for cooling control cabinets" on page 553.

6.1 Natural convection

The power dissipation is radiated outwards via the control cabinet walls.

Warning!

Only use well-sealed control cabinets. Otherwise, contaminated ambient air can penetrate the control cabinet!

6.2 Using filter fans

Filter fans and outlet filters should be arranged on the control cabinet so that air is taken in from below and exits above.

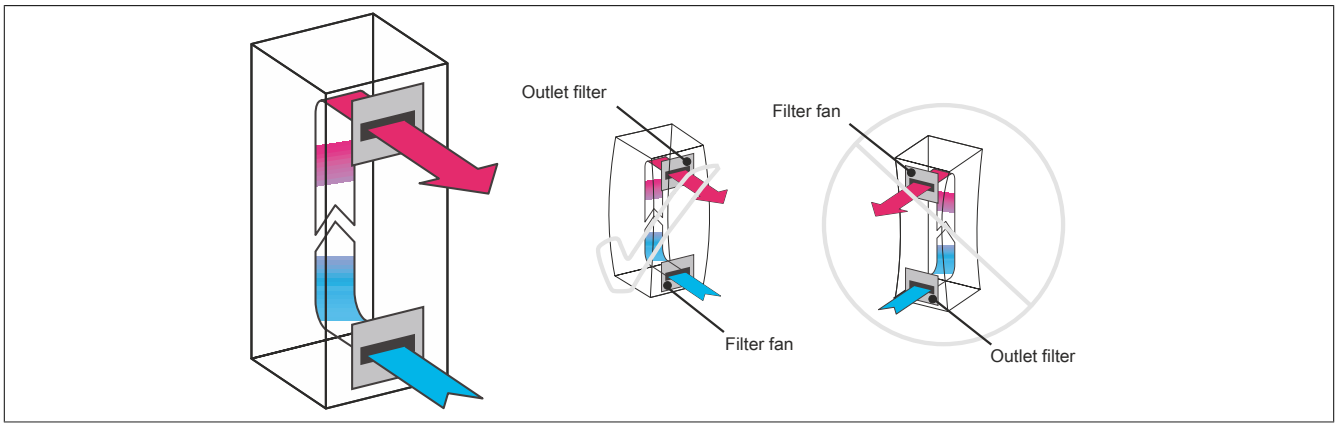


Figure 225: Filter fans - Function diagram

Caution!

Contaminated air can penetrate improperly sealed control cabinets when using a fan intake! This type of air flow is to be avoided.

Warning!

Only use well-sealed control cabinets. Otherwise, contaminated ambient air can penetrate the control cabinet! [20)]

[20)] Control cabinets that – taking into account the location and physical environmental conditions – provide adequate protection against the ingress of solid foreign objects (dust, metal cuttings, etc.) and liquids (coolant, etc.). For details, see EN 60204-1.

6.3 Using air/air heat exchangers

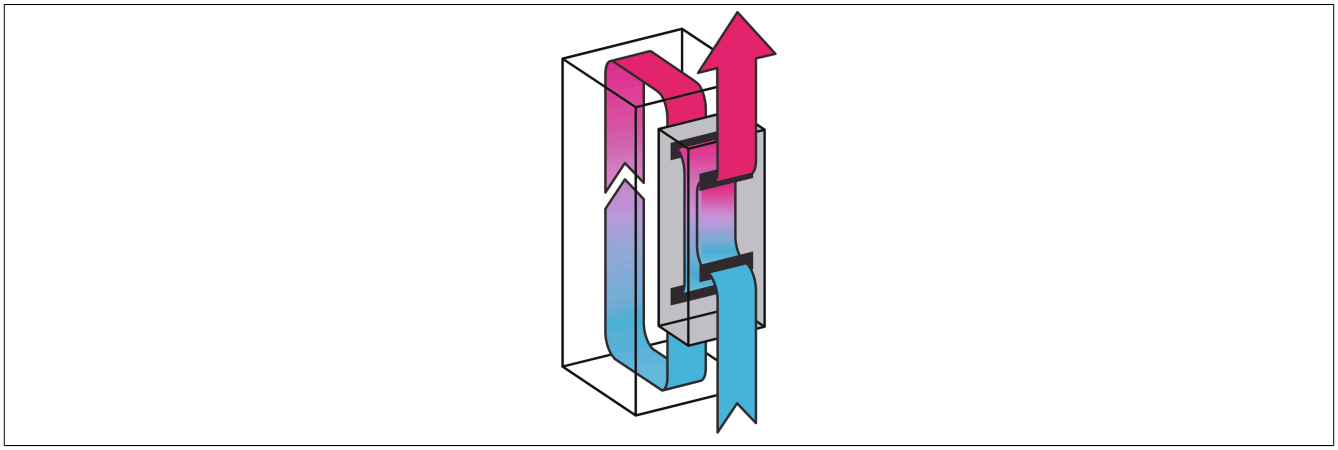


Figure 226: Air/Air heat exchangers - Function diagram

Caution!

Uniform air circulation must be ensured in the control cabinet. Air inlets and outlets for the internal circulation of the air/air heat exchanger are not permitted to be covered since this would prevent sufficient air circulation in the control cabinet.

Sufficient clearance (>200 mm) in front of air inlets and outlets is recommended.

Caution!

If the control cabinet contains modules or electronic components with their own fans, make sure that the direction of air flow does not go against the cooling system's flow of cool air. This can create air short circuits that prevent sufficient cooling inside the control cabinet.

Warning!

Only use well-sealed control cabinets. Otherwise, contaminated ambient air can penetrate the control cabinet!

Installing air/air heat exchangers behind mounting plates should generally be avoided. If this is necessary, however, then corresponding ventilation plates must be used. Air inlets and outlets must also be made in the mounting plate.

6.4 Using air/water heat exchangers

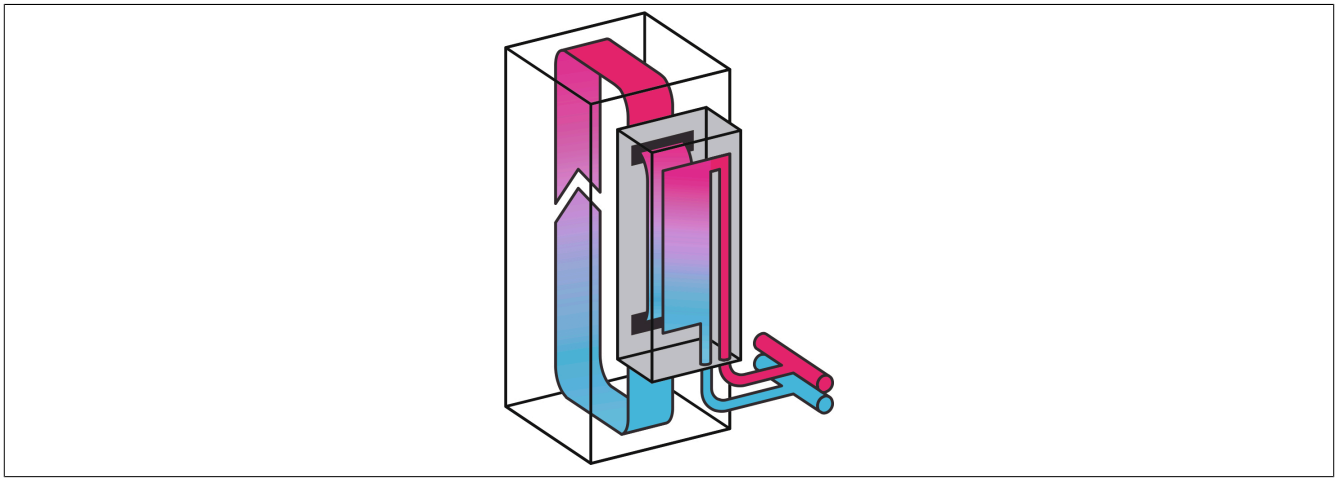


Figure 227: Air/Water heat exchangers - Function diagram

Caution!

Uniform air circulation must be ensured in the control cabinet. Air inlets and outlets for the internal circulation of the air/water heat exchanger are not permitted to be covered since this would prevent sufficient air circulation in the control cabinet.

Sufficient clearance (>200 mm) in front of air inlets and outlets is recommended.

Caution!

If the control cabinet contains modules or electronic components with their own fans, make sure that the direction of air flow does not go against the cooling system's flow of cool air. This can create air short circuits that prevent sufficient cooling inside the control cabinet.

Warning!

Only use well-sealed control cabinets. Otherwise, contaminated ambient air can penetrate the control cabinet!

Installing air/water heat exchangers behind mounting plates should generally be avoided. If this is necessary, however, then corresponding ventilation plates must be used. Air inlets and outlets must also be made in the mounting plate.

6.5 Using cooling units

6.5.1 General information

Caution!

Incorrect installation of cooling units may cause condensation which can damage the ACOPOSmulti drive systems installed there!

Condensation can enter the ACOPOSmulti drive systems with the cooled air flow!

Warning!

Only use well-sealed control cabinets. Otherwise, ambient air can penetrate and cause condensation!

During operation with the control cabinet doors open (e.g. service), the ACOPOSmulti drive systems are not allowed to be cooler than the air in the control cabinet at any time after the doors are closed.

To keep the temperature of the ACOPOSmulti drive systems and the control cabinet at the same level, the cooling unit must remain in operation even when the system is switched off.

Cooling units must be installed in a way that prevents condensation from dripping into the ACOPOSmulti drive systems. This should be considered when selecting the control cabinet (special construction for use of cooling units on top of the control cabinet).

Also make sure that condensed water which forms in the cooling unit fan when it is switched off cannot sprinkle into the ACOPOSmulti drive systems.

Make sure the temperature setting of the cooling unit is correct! Only set the control cabinet's internal temperature as low as is necessary.

Be sure to follow the installation guidelines for the cooling unit provided in its operating manual!

6.5.2 Placing a cooling unit on top of the control cabinet

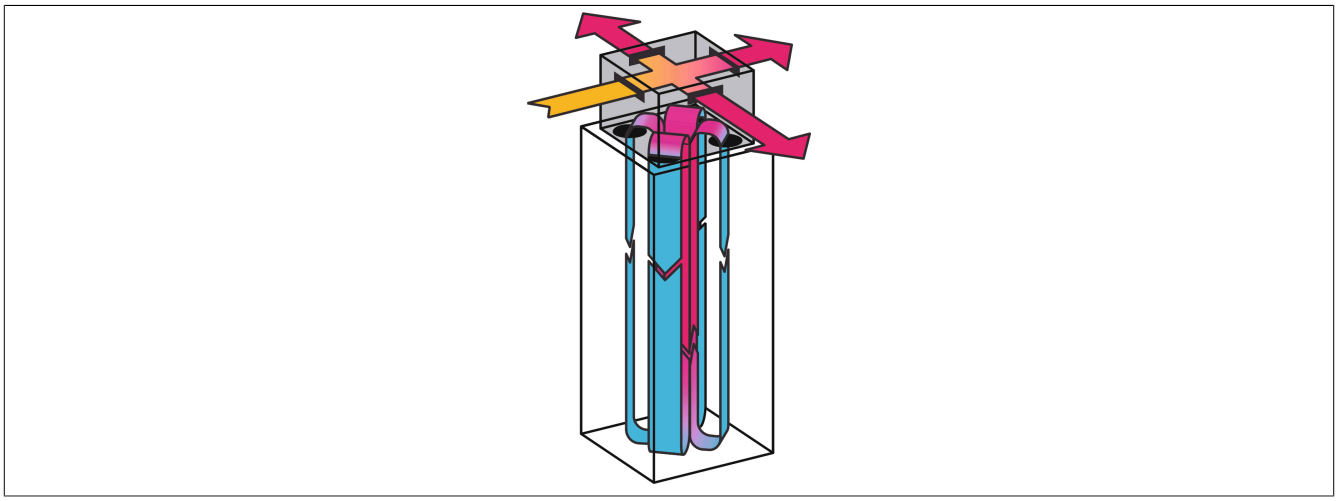


Figure 228: Placing a cooling unit on top of the control cabinet

Caution!

When installing cooling units on top of the control cabinet, particular attention must be paid to targeted air routing! The flow of cool air must be directed by the airflow systems to the lowest possible point in the control cabinet (see figure above).

Caution!

Make sure that the flow of cool air in the cooling system is not directed against the air flow from the fans in the ACOPOSmulti drive system. This could create air pockets that would prevent sufficient cooling of ACOPOSmulti drive systems.

Condensation must be directed off the cooling unit according to manufacturer specifications so that it does not end up in the ACOPOSmulti drive system.

6.5.3 Placing a cooling unit on the front of the control cabinet

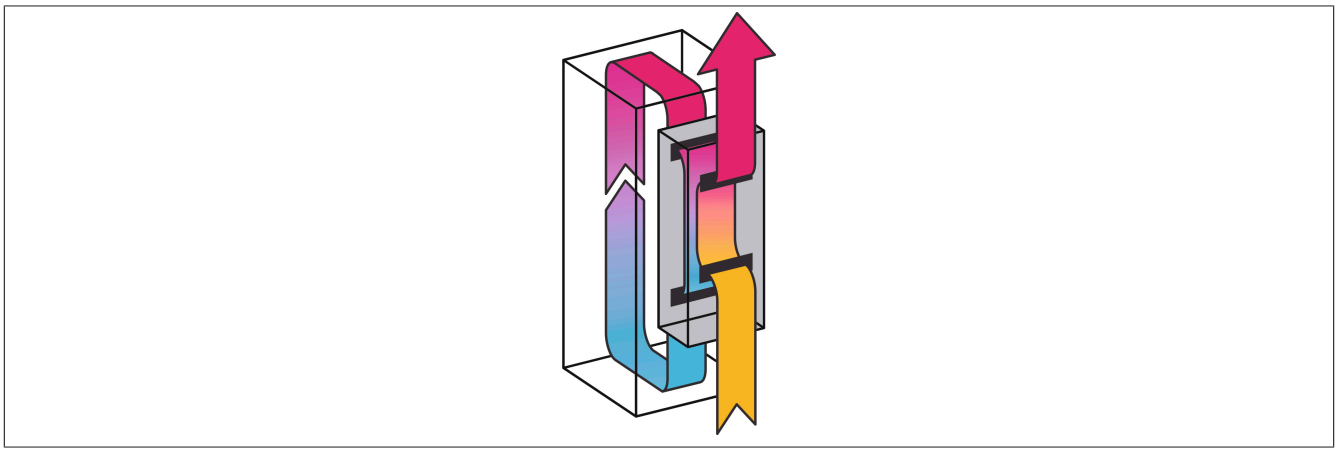


Figure 229: Placing a cooling unit on the front of the control cabinet

Caution!

The flow of cool air from the cooling unit must be directed by the airflow systems to the lowest possible point in the control cabinet (see figure above).

Caution!

Make sure that the flow of cool air in the cooling system is not directed against the air flow from the fans in the ACOPOSmulti drive system. This could create air pockets that would prevent sufficient cooling of ACOPOSmulti drive systems.

Condensation must be directed off the cooling unit according to manufacturer specifications so that it does not end up in the ACOPOSmulti drive system.

Chapter 4 • Dimensioning

1 Power mains connection

1.1 General information

1.1.1 Network configurations

The power mains connection for the ACOPOSmulti drive system is made using terminals X1 / L1, L2, L3 and PE on the ACOPOSmulti line filter. The ACOPOSmulti drive system can be directly connected to TT and TN systems (these are three-phase systems with grounded neutral).

When using ungrounded IT mains (three-phase systems without grounded neutral or with an impedance grounded neutral) or TN-S mains with grounded phase conductor and protective ground conductor, isolation transformers must be used. The secondary neutral must be grounded and connected to the ACOPOSmulti drive system protective ground conductor. This makes it possible to prevent overvoltages between external conductors and the housing for the ACOPOSmulti modules. Three-phase isolation transformers with the corresponding input and output voltages and a vector group with secondary neutral can be used (e.g. 3x 400 V / 3x 400 V, Dyn5).

In the USA, TT and TN power mains are among the most common mains systems and are referred to as "Delta/Wye with grounded Wye neutral". IT power mains systems are also known as "systems with ungrounded secondary" and TN-S power mains with grounded phase conductor as "Delta / Delta with grounded leg".

Danger!

ACOPOSmulti drive systems are only permitted to be operated directly on grounded, three-phase industrial power systems (TT, TN-C, TN-S, TN-C-S). When using the ACOPOSmulti drive system in residential areas, shops or small businesses, additional filtering measures must be implemented by the user.

Danger!

ACOPOSmulti drive systems are not permitted to be operated directly on IT and TN-S mains with a grounded phase conductor and protective ground conductor!

Danger!

ACOPOSmulti drive system with 8BVP power supply modules are not permitted to be operated in power grids with voltage stabilizers!

Warning!

ACOPOSmulti drive systems are suitable for power systems that can provide a maximum short circuit current (SCCR) of 65 kA_{eff} at 480 V_{eff} and that are protected with class gG / class J fuses or circuit breakers.

Warning!

ACOPOSmulti drive systems provide integral solid state short circuit protection. Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

Warning!

The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

Warning!

The power mains short circuit capacity Sk must be 10 times greater than the continuous power of the selected servo power supply module.

1.1.2 Supply voltage range

The permissible supply voltage range for ACOPOSmulti drive systems is 3x 220 VAC to 480 VAC ±10%.

Corresponding matching transformers must be used for other mains voltages. In grounded power systems, autotransformers can also be used for this voltage adjustment; the star point does not have to be connected in this case.

Warning!

The apparent power from the transformer (intermediate transformer, autotransformer) must be at least 25% of the continuous power from the ACOPOSmulti power supply module being used. Otherwise, parasitic leakage inductances can cause excessive heating of the transformer. In extreme cases, this can cause critical damage to the transformer!

1.1.3 Protective ground connection (PE)

The following information concerning the protective ground connection corresponds to IEC 61800-5-1, Item 4.3.5.4 "Connection elements for the protective ground conductor" and must be observed.

A protective ground conductor must be connected to the line filter and also the ACOPOSmulti power supply module.

Wire cross section

The wire cross section of the protective ground conductor is oriented to the outer wires and must be selected according to the following table:

Wire cross section for outer wire A [mm²]	Minimum wire cross section for the protective ground connection A_{PE} [mm²] 1)
A ≤ 16	$A_{PE} = A$
16 < A ≤ 35	$A_{PE} = 16$
35 < A	$A_{PE} = A / 2$

Table 406: Selecting the cross section of the protective ground conductor

1) Any protective ground conductor that is not part of a cable must have a minimum wire cross section of 4 mm².

Increased discharge current

Warning!

ACOPOSmulti drive systems are devices with increased discharge current (greater than 3.5 mA AC or 10 mA DC).

A permanent (immobile) protective ground connection must be provided for ACOPOSmulti line filters / power supply units. The following conditions must be met, depending on the ACOPOSmulti module being used:

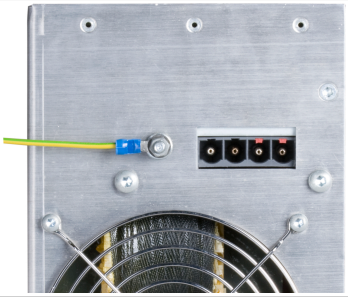
ACOPOSmulti module	Condition	Figure
8BVF0220H000.000-1 8BVF0440H000.001-2	In addition to the connection of the first protective ground conductor on terminal X1/PE, a second protective ground conductor with the same cross section must be connected on the designated connector (M5 threaded bolt).	
8BVF0880H000.000-1	The cross section of the protective ground conductor connected to terminal X1 / PE must be at least 10 mm² Cu.	---

Table 407: Protective ground conditions for ACOPOSmulti 8BVF line filters

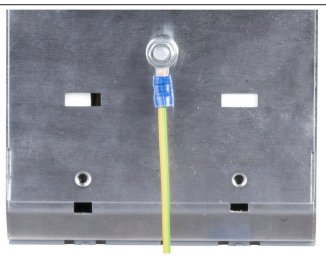
ACOPOSmulti module	Condition	Figure
8B0P0110Hx00.000-1	In addition to the connection of the first protective ground conductor on terminal X5 / PE, a second protective ground conductor with the same cross section must be connected on the designated connector (M5 threaded bolt).	
8BxP0220Hx00.00x-1 8BxP0440Hx00.00x-1	In addition to the connection of the first protective ground conductor on terminal X5 / PE, a second protective ground conductor with the same cross section must be connected on the designated connector (M5 threaded bolt).	
8BVP0880Hx00.004-1 8BVP1650Hx00.000-1	The cross section of the protective ground conductor connected to terminal X5 / PE must be at least 10 mm² Cu.	---

Table 408: Protective ground conditions for ACOPOSmulti 8BxP power supply modules

Warning!

This product can cause direct current in the protective ground conductor.

1.2 Dimensioning

In general, dimensioning the mains power input, fuse protection and (if necessary) line contactor depends on the structure of the mains connection.

1.2.1 Design of the ACOPOSmulti power mains connections

The structure of a power mains connection with circuit breaker can be seen in the following diagrams:

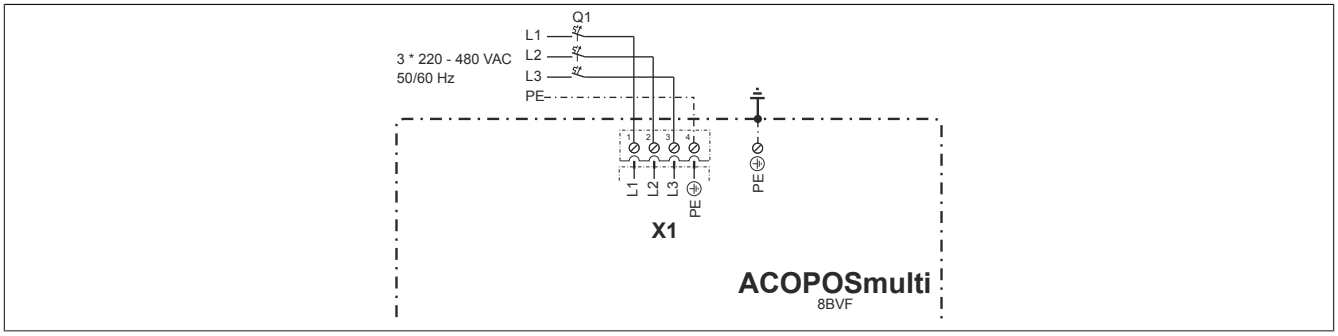


Figure 230: Circuit diagram for ACOPOSmulti 8BVF line filter, power mains connection

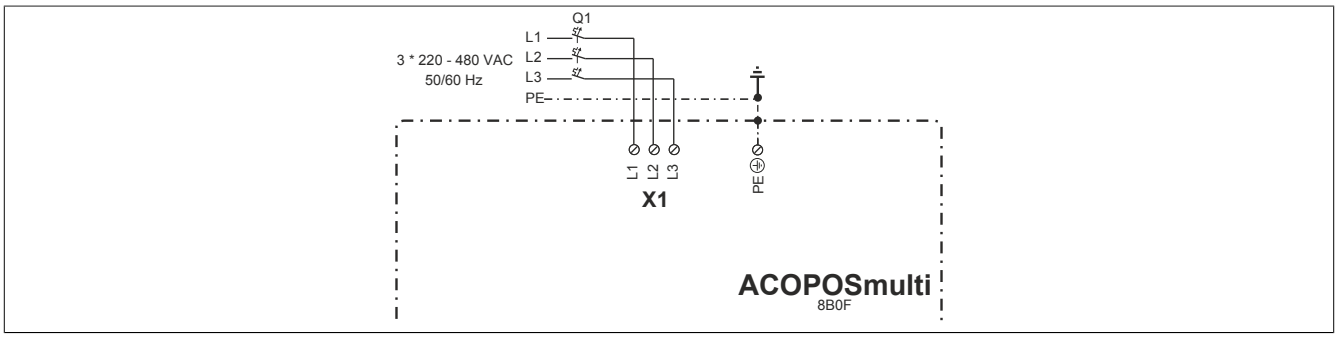


Figure 231: Circuit diagram for ACOPOSmulti passive 8B0F line filter, power mains connection

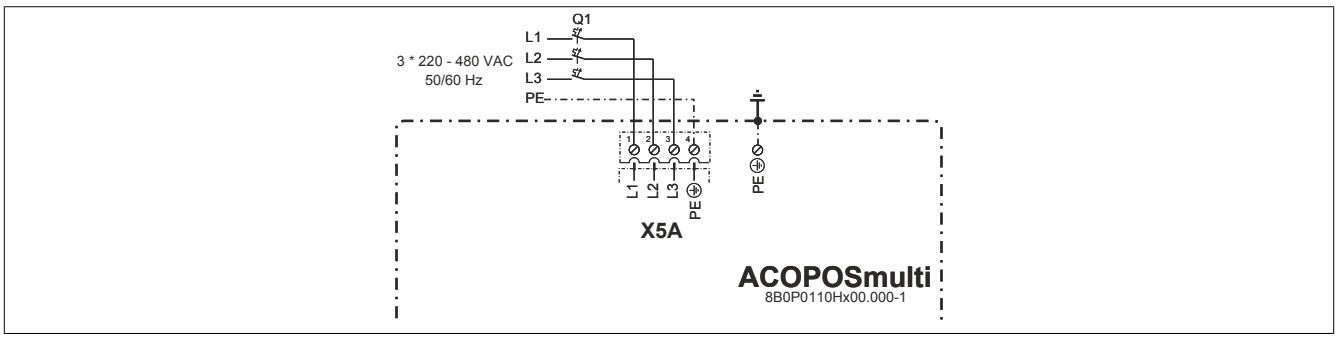


Figure 232: Circuit diagram for ACOPOSmulti passive 8B0P0110 power supply module, power mains connection

Dimensioning the power mains and overcurrent protection

Information:

When choosing a suitable fuse, the user must also account for characteristics such as aging effects, temperature derating, overcurrent capacity and the definition of the rated current, which can vary by manufacturer and type. In addition, the fuse that is selected must also be able to handle application-specific characteristics (e.g. overcurrent that occurs in acceleration cycles).

The cross section of the power mains and the rated current for overcurrent protection should be determined based on the average current load to be expected.

The average current load I_{Mains} to be expected can be calculated as follows: [21)]

ACOPOSmulti drive system with 8BVP power supply module

$$I_{Mains}[A] = \frac{P[W]}{\sqrt{3} . U_{Mains}[V]}$$

Synchronous motors	Linear motors
$P[W] = \sum_{i=1}^{n} M_{eff_i}[Nm] . \frac{2\pi n_{mittel_i}[min^{-1}]}{60}$	$P[W] = \sum_{i=1}^{n} F_{eff_i} . \frac{2\pi n_{mittel_i}[min^{-1}]}{60}$

P[W] Sum of the effective power of all motors connected to the ACOPOSmulti drive system i

ACOPOSmulti drive system with 8B0P power supply module

$$I_{Mains}[A] = \frac{P[W] \cdot k}{\sqrt{3} . U_{Mains}[V]}$$

Synchronous motors	Linear motors
$P[W] = \sum_{i=1}^{n} M_{eff_i}[Nm] . \frac{2\pi n_{mittel_i}[min^{-1}]}{60}$	$P[W] = \sum_{i=1}^{n} F_{eff_i} . \frac{2\pi n_{mittel_i}[min^{-1}]}{60}$

P[W] Sum of the effective power of all motors connected to the ACOPOSmulti drive system i

The constant k for each of the various ACOPOSmulti passive 8B0P power supply modules is listed in the following table:

Name	ACOPOSmulti passive power supply module		
	8B0P0110	8B0P0220	8B0P0440
Constant k	1.8	2	

Table 409: Constant k

The cross section of the mains power input and the rated current of the fuse protection being used are chosen according to "Current-carrying capacity of PVC insulated three-phase cables or individual wires " on page 512 so that the current-carrying capacity of the selected cable cross section is greater than or equal to the calculated current-carrying capacity.

$I_Z \geq I_{Mains}$

The rated current of the fuse protection must be less than or equal to the permissible current load for the selected cable cross section (see Tab. 410 "Current-carrying capacity of PVC insulated three-phase cables or individual wires " on page 512).

$I_B \leq I_Z$

The following table shows the current-carrying capacity of PVC-insulated three-phase cables (or three current-carrying individual wires) per IEC 60204-1 at an ambient temperature of 40°C [22)] and 70°C maximum wire temperature (current-carrying capacity for installation type F and cross sections greater than 35 mm² for installation types B1 and B2 were taken from DIN VDE 0298-4).

21) If information concerning load torque, inertia and friction is available, the effective torque or active power is calculated using the following formulas:

$$M_{eff}[Nm] = \sqrt{\frac{1}{T_{Cycle}[s]} \cdot \sum_{1} M_i[Nm]^2 . t_i[s]}$$

$$F_{eff}[N] = \sqrt{\frac{1}{T_{Cycle}[s]} \cdot \sum_{1} F_i[N]^2 . t_i[s]}$$

To calculate n_{Avg} or v_{Avg}, information concerning the positioning cycle must be available. n_{Avg} or v_{Avg} are calculated using the following formulas:

$$n_{Avg}[min^{-1}] = \frac{1}{T_{Cycle}[s]} \cdot \sum_{i} n_i[min^{-1}] . t_i[s]$$

$$v_{Avg}[m/s] = \frac{1}{T_{Cycle}[s]} \cdot \sum_{i} v_i[m/s] . t_i[s]$$

If n_{Avg} or v_{Avg} takes on very low values, this can lead to imprecise results in some circumstances. In this case, different calculation formulas or approaches should be used after consultation with B&R.

22) Current-carrying capacity is specified in IEC 60204-1 for an ambient temperature of 40°C; this reference temperature is 30°C in DIN VDE 0298-4. The values specified from DIN VDE 0298-4 listed in table "Current-carrying capacity of PVC-insulated three-phase cables or single conductors" are likewise converted for an ambient temperature of 40°C using the factor k_{Temp} = 0.87 specified in the standard.
The specified current-carrying capacity does not take into account a reduction factor for groups of cables and single conductors. If necessary, this must be taken from the corresponding standards and included in the calculation.

Wire cross section [mm²]	Current-carrying capacity of cable cross section I_Z / Rated current of fuse I_B [A] depending on the installation type				
	Three individual wires in conduit or cable duct	Three-phase cable in conduit or cable duct	Three-phase cable on walls	Three-phase cable in a cable tray	Three individual wires in a cable tray
	B1	B2	C	E	F
1.5	13.5 / 13	13.1 / 10	15.2 / 13	16.1 / 16	---
2.5	18.3 / 16	17.4 /16	21 / 20	22 / 20	---
4	25 / 25	23 / 20	28 / 25	30 / 25	---
6	32 / 32	30 / 25	36 / 32	37 / 32	---
10	44 / 32	40 / 32	50 / 50	52 / 50	---
16	60 / 50	54 / 50	66 / 63	70 / 63	---
25	77 / 63	70 / 63	84 / 80	88 / 80	96 / 80
35	96 / 80	86 / 80	104 / 100	110 / 100	119 / 100
50	117 / 100	103 / 100	125 / 100	133 / 100	145 / 125
70	149 / 125	130 / 125	160 / 125	171 / 125	188 / 160
95	180 / 160	156 / 125	194 / 160	207 / 160	230 / 200

Table 410: Current-carrying capacity of PVC insulated three-phase cables or individual wires

When determining the cross section for the power mains, make sure that the cross section selected is within the range that can be used with power mains terminal X1 on the ACOPOSmulti line filter (see "Overview of terminal cross sections " on page 587).

Overcurrent protection in the form of a circuit breaker or a fuse is required. Circuit breakers (time lag) with type C tripping characteristics (per IEC/EN 60947-2) or fuses (time lag) with type gG tripping characteristics (per IEC 60269-1) must be used.[23)]

North America:

Only cables with copper wire can be used for cabling. These attachment cables must be able to withstand ambient temperatures up to 75°C.

Class J fuses per UL Standard 248-8 can be used (for example fuses of type AJTxx from Ferraz Shawmut (www.ferrazshawmut.com) or type LPJ-xxSP from Bussmann (www.bussmann.com), where xx represents the nominal current I_B of the respective fuse) or circuit breakers per UL 489.

Dimensioning the line contactor

The rated current of the line contactor is oriented to the overcurrent protection for the mains connection. The line contactor is set up so that nominal operating current specified by the manufacturer of the line contactor for category AC-1 per EN 60947-4-1 is approximately 1.3 times the rated current of the overcurrent protection.

[23)] Circuit breakers with a rated current of 6 A to 63 A are available on the market. In addition, only fuses can be used.

1.3 Fault current protective device (FI protection)

Fault current protection (RCD - residual current-operated protective device) can be used with ACOPOSmulti drive systems. The following points must be noted, however:

ACOPOSmulti drive systems have a power rectifier. If a short circuit to the frame occurs, a flat DC fault current can be created which prevents an AC current or pulse current sensitive RCD (type A or AC) from being activated, therefore canceling the protective function for all connected devices.

Danger!

If used for protection during direct or indirect contact of the fault current protection (RCD), only a Type B RCD (AC-DC sensitive, in accordance with IEC 60755) can be used for the ACOPOSmulti power mains connection. Otherwise, additional protective measures must be used, such as neutralization or isolation from the power mains using an isolation transformer.

1.3.1 Rated fault current

On ACOPOSmulti drive systems, fault current protection with a rated fault current of ≥300mA can be used. However, errors can occur:

- When connecting ACOPOSmulti drive systems to the power mains, contact chatter causes single or two-phase operation. This results in temporary increases to discharge currents via the bypass capacitors in the line filter and in the power supply and inverter modules.
- Because of high frequency discharge currents occurring during operation via the bypass capacitors in the power supply and inverter modules.
- Because of high frequency discharge currents occurring during operation via long motor cables.

1.3.2 Estimating possible ACOPOSmulti drive system configurations

Estimating ACOPOSmulti drive system configurations that can be used with certain fault current protection is somewhat imprecise for two reasons:

1. The rated fault currents listed by the manufacturer are maximum currents which will definitely trip the fault current protection device. Normally, the fault current protection device is tripped at approximately 60% of the rated fault current.
2. Contact chatter when connecting the ACOPOSmulti drive system to the power system depends on the switching device used.

To reduce problems with tripping currents, B&R has tested several typical residual-current circuit breakers available on the market. To reduce problems with contact chatter, B&R recommends connecting the ACOPOSmulti drive system to the power system with a line contactor. This normally results in sufficiently short contact chatter times.

To determine if an ACOPOSmulti drive system can be operated with a certain fault current protection device, the sums of all discharge capacitances C_D in the drive system must be determined:

$$C_A[\mu F] = C_{A_{linefilter}} + C_{A_{powersupplymodules}}[\mu F] + \sum C_{A_{invertermodules}}[\mu F]$$

The discharge capacitances for the individual modules in the respective ACOPOSmulti drive system are listed in the following table:

Module	Discharge capacitance C_A
ACOPOSmulti line filter	
8B0F0300H000.000-1	0.4 µF
8B0F0550H000.000-1	0.4 µF
8BVF0220H000.000-1	14.1 µF
8BVF0440H000.001-2	14.1 µF
8BVF0880H000.000-1	14.1 µF
ACOPOSmulti power supply modules	
8B0P0110Hx00.000-1	0.4 µF
8B0P0220Hx00.00x-1	0.9 µF
8B0P0440Hx00.00x-1	0.9 µF
8BVP0220Hx00.000-1	0.9 µF
8BVP0440Hx00.000-1	0.9 µF
8BVP0880Hx00.00x-1	0.9 µF
8BVP1650Hx00.000-1	1.8 µF
ACOPOSmulti inverter modules	
Single-axis modules	
8BVI0014HxSx.000-1	0.14 µF
8BVI0028HxSx.000-1	0.14 µF
8BVI0055HxSx.000-1	0.14 µF
8BVI0110HxSx.000-1	0.14 µF
8BVI0220HxSx.000-1	0.22 µF
8BVI0330HxSx.000-1	0.22 µF
8BVI0440HxSx.000-1	0.22 µF
8BVI0660HxSx.000-1	0.44 µF
8BVI0880HxSx.00x-1	0.44 µF
8BVI1650HxSx.000-1	0.9 µF
Dual-axis modules	
8BVI0014HxDx.000-1	0.2 µF
8BVI0028HxDx.000-1	0.2 µF
8BVI0055HxDx.000-1	0.2 µF
8BVI0110HxDx.000-1	0.44 µF
8BVI0220HxDx.000-1	0.44 µF

Table 411: Discharge capacitances C_D from ACOPOSmulti modules

1.3.3 Manufacturers of fault current protection devices that can be used

Manufacturer	Type	Comment	Rated current [mA]
Doepke (www.doebke.de)	DFS 4B SK 63-4/0.3	AC-DC sensitive	300
	DFS 4B SKS 63-4/0,3	AC-DC sensitive selective (delayed)	
	DFS 4B SK 63-4/0.5	AC-DC sensitive	500
	DFS 4B SKS 63-4/0,5	AC-DC sensitive selective (delayed)	
ABB (www.abb.com)	F204 B-63/0.3	AC-DC sensitive	300
	F204 BS-63/0.3	AC-DC sensitive selective (delayed)	

Table 412: Manufacturers of fault current protection devices that can be used

These fault current protection devices can be used up to a total discharge capacitance C_D of approx. 20 µF for the ACOPOSmulti drive system.

1.3.4 Examples

Example 1

A check must be carried out to determine if the following ACOPOSmulti drive system can be operated with the ABB F204B-63/0.3 fault current protection device:

ACOPOSmulti drive system consisting of		Discharge capacitance C_A	
Quantity	Module name	Per module	Total
1	8BVF0440H000.001-2	14.1 µF	14.1 µF
1	8BVR0440H000.001-2	---	---
1	8BVP0440HC00.000-1	0.9 µF	0.9 µF
1	8BVI0440HCS0.000-1	0.22 µF	0.22 µF
5	8BVI0028HCD0.000-1	0.14 µF	0.7 µF
Total discharge capacitance C_D			**15.92 µF**

Table 413: Checking if fault current protection devices can be used - Example 1

The total discharge capacitance C_D for this ACOPOSmulti drive system is lower than 20 µF. This ACOPOSmulti drive system can therefore be operated with the ABB F204B- 63/0.3 fault current protection device.

Example 2

A check must be carried out to determine if the following ACOPOSmulti drive system can be operated with the Doepke DFS 4B SK 63-4/0.5 fault current protection device:

ACOPOSmulti drive system consisting of		Discharge capacitance C_A	
Quantity	Module name	Per module	Total
1	8BVF0880H000.000-1	14.1 µF	14.1 µF
1	8BVR0880H000.000-1	---	---
1	8BVP0880HC00.004-1	0.9 µF	0.9 µF
1	8BVI0880HCS0.004-1	0.44 µF	0.44 µF
1	8BVI0440HCS0.000-1	0.22 µF	0.22 µF
2	8BVI0110HCS0.000-1	0.14 µF	0.28 µF
3	8BVI0055HCD0.000-1	0.14 µF	0.42 µF
Total discharge capacitance C_D			**16.36 µF**

Table 414: Checking if fault current protection devices can be used - Example 2

The total discharge capacitance C_D for this ACOPOSmulti drive system is lower than 20 µF. This ACOPOSmulti drive system can therefore be operated with the Doepke DFS 4B SK 63-4/0.5 fault current protection device.

2 Motor connection

On B&R motors, the power connections, the connections for the holding brake and the connections for the motor temperature sensor are all made using the same motor connector.

The motor connection is made on the ACOPOSmulti drive system via the ACOPOSmulti inverter module. This motor connection must be shielded appropriately (see "Overview" on page 564).

The design of the motor connection can be seen in the following diagram:

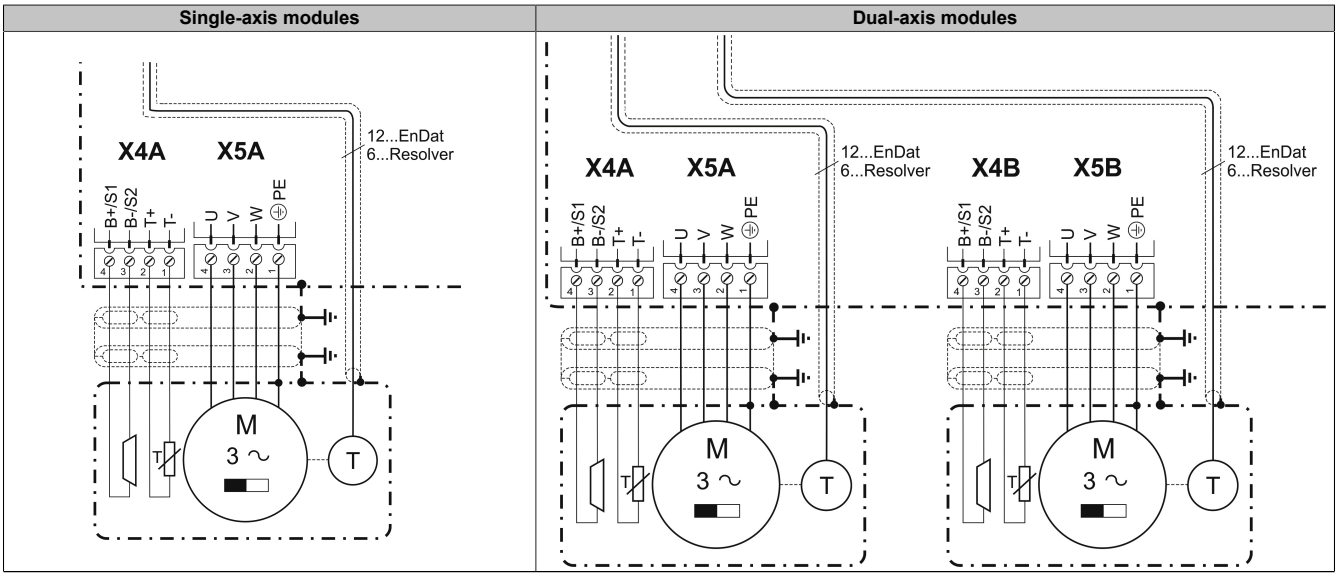


Table 415: Wiring diagram for ACOPOSmulti inverter modules, motor connection

The cross section of the motor cable must be dimensioned for the thermal equivalent RMS value of the motor current.[24)]

The cross section of the motor cable is chosen for B&R motor cables according to the following table so that the maximum current load for the cable cross section selected is greater than or equal to the thermal equivalent effective value of the motor current:

$I_Z \geq I_q$

Information:

For application-specific reasons, it is recommended to select the wire cross section of motor cables in such a way that the thermal equivalent RMS value of the motor current does not exceed 90% of the permissible current-carrying capacity of the wire cross section.

Motor cables - For use in cable drag chains

The following table shows the current-carrying capacity of specially insulated three-phase cables per DIN VDE 0298-4 at an ambient temperature of 40°C[25)] and maximum cable temperature of 90°C:

Wire cross section [mm²]	Maximum current load on the wire I_Z [A] depending on type of installation		
	Installation in electrical installation pipes	Installation on a wall	Installation in the air
	B2	C	E
0.75	11.5	13	13.5
1.5	17.8	20	20.9
2.5	23.7	27.3	29.1
4	31.9 [1)]	36.4 [1)]	38.2 [1)]
6	40	47.3	49.1
10	54.6	64.6	68.3

Table 416: Maximum current load for specially insulated three-phase cables

[24)] If information concerning load torque, inertia and friction is available, the thermal equivalent RMS value for the motor current of the motor being used can be calculated as follows:

$$I_q[A] = \sqrt{\frac{1}{T_{Cycle}[s]} \cdot \sum_i I_i[A]^2 . t_i[s]}$$

[25)] Current-carrying capacity is specified in DIN VDE 0298-4 for an ambient temperature of 30°C. The values listed in the "Current-carrying capacity of PVC-insulated three-phase cables or single conductors" table are converted for use at an ambient temperature of 40°C using the factor k_{Temp} = 0.91 specified in the standard.
The specified current-carrying capacity does not take into account a reduction factor for groups of cables and single conductors. If necessary, this must be taken from the corresponding standards and included in the calculation.

Wire cross section [mm²]	Maximum current load on the wire I_Z [A] depending on type of installation		
	Installation in electrical installation pipes	Installation on a wall	Installation in the air
	B2	C	E
16	72.8	87.4	91
25	95.6	108.3	115.6
35	116.5	133.8	143.8
50	140.1	162.9	174.7

Table 416: Maximum current load for specially insulated three-phase cables

1) Pre-assembled 8BCMxxxxxx.1312A-0 motor cables from B&R are only permitted to be loaded with max. 30 A.

Motor cables - Not for use in cable drag chains

The following table shows the current-carrying capacity of PVC-insulated three-phase cables per DIN VDE 0298-4 at an ambient temperature of 40°C[26)] and maximum cable temperature of 70°C:

Wire cross section [mm²]	Maximum current load on the wire I_Z [A] depending on type of installation		
	Installation in electrical installation pipes	Installation on a wall	Installation in the air
	B2	C	E
0.75	8.5	9.8	10.4
1.5	13.1	15.2	16.1
2.5	17.4	20.9	21.8
4	23.5	27.9	29.6
6	29.6	35.7	37.4
10	40	51.7	52.2

Table 417: Maximum current load for PVC-insulated three-phase cables

When determining the cross section for the motor cable, make sure that the cross section selected is within the range that can be used with motor connection terminal X5x see "Overview of terminal cross sections " on page 587.

2.1 Motor overload protection

ACOPOSmulti 8BVI inverter modules have various monitoring mechanisms to ensure motor overload protection. For detailed information on the various mechanisms, see Automation Help.

Caution!

Motor overload protection can only be ensured if there is a motor temperature sensor in the connected motor and it is evaluated on the ACOPOSmulti 8BVI inverter module.

The motor overload protection level can be calculated using the following formula: [27)]

$$\text{Level motor overload protection}\ [\%] = \frac{I_L}{I_N} * 100\% = \frac{1}{I_N} * 100\% * \sqrt{I_0^{\,2}\,\frac{T_{M_LIM} - T_{M_AMB}}{T_{M_LIM} - T_{M_AMB_N}} - \frac{n_{avg}}{n_N}\left(I_0^{\,2} - I_N^{\,2}\right)}$$

I_L	Motor overload protection current
I_0	Stall current of the motor
I_N	Nominal current of the motor
T_{M_LIM}	Maximum permissible motor temperature
T_{M_AMB}	Current ambient temperature of the motor
$T_{M_AMB_N}$	Nominal ambient temperature of the motor
n_{avg}	Average motor speed
n_N	Nominal speed of the motor

26) Current-carrying capacity is specified in DIN VDE 0298-4 for an ambient temperature of 30°C. The values listed in the "Current-carrying capacity of PVC-insulated three-phase cables or single conductors" table are converted for use at an ambient temperature of 40°C using the factor k_{Temp} = 0.91 specified in the standard.
The specified current-carrying capacity does not take into account a reduction factor for groups of cables and single conductors. If necessary, this must be taken from the corresponding standards and included in the calculation.

27) Valid for motor temperature model 2 (MOTOR_TEMPMODEL_MODE).

3 Braking resistors

3.1 General information

When braking servo motors, power is returned to the drive system. This causes the capacitors in the DC bus to be charged to higher voltages. Starting with a DC bus voltage of approx. 800 V, passive 8B0P power supply modules link an external braking resistor to the DC bus using the brake chopper and converts the braking energy to heat.

3.2 External braking resistor connections

An external braking resistor is connected using terminals X6 / RB+, RB- and PE. The structure of the external braking resistor connection can be seen in the following diagram:

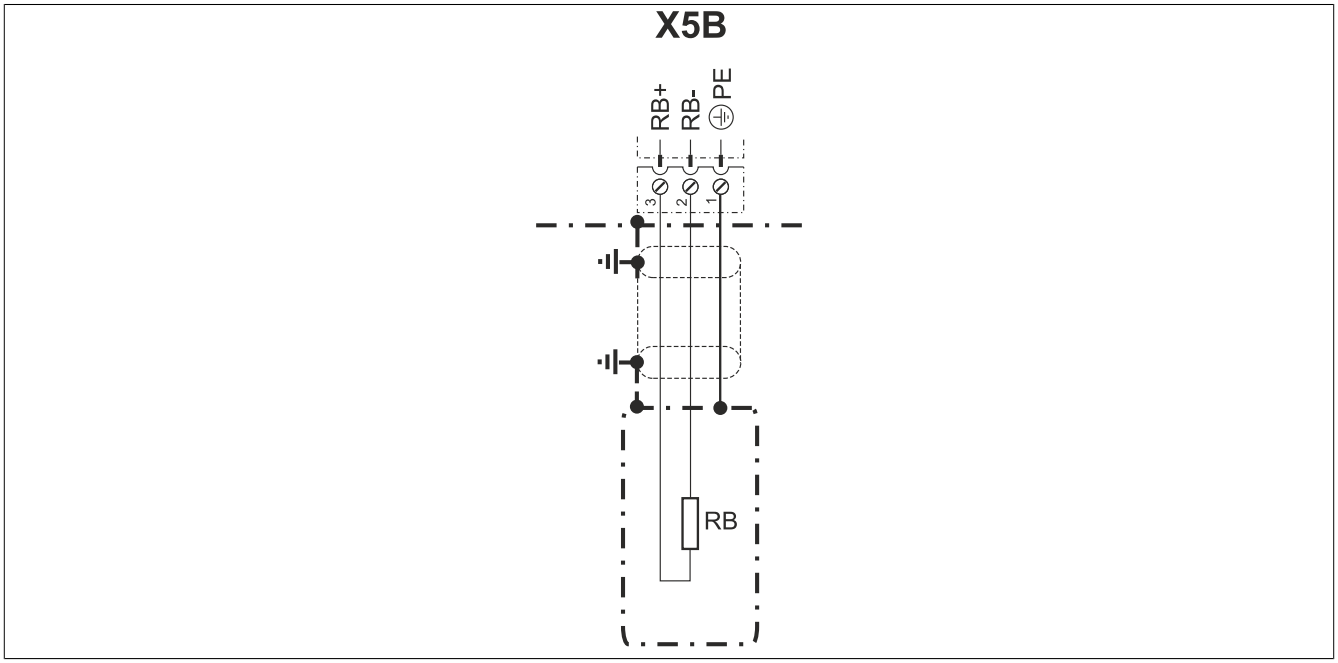


Figure 233: Circuit diagram 8B0P0xx0Hx00.00x-1, connection X5B (external braking resistor)

When determining the cross section[28)] for wiring the external braking resistors, make sure that the selected cross section is within the range that can be connected to the X5B braking resistor connection terminals (see "8B0P power supply modules " on page 588).

[28)] The cross section of the braking resistor wiring must be dimensioned for the thermal equivalent RMS value of the respective braking current. If information concerning the characteristics of the braking currents is available, the thermal equivalent RMS value of the braking current is calculated as follows:

$$I_q[A] = \sqrt{\frac{1}{T_{Cycle}[s]} \cdot \sum_i I_i[A]^2 . t_i[s]}$$

The cross section of the braking resistor wiring must then be selected based on "Current-carrying capacity of PVC insulated three-phase cables or individual wires " on page 512 such that the permissible current-carrying capacity of the cable cross section is greater than or equal to the thermal equivalent RMS value of the braking current ($I_Z \geq I_q$).

3.2.1 Fuse protection

To protect the external braking resistor connection, a fuse is built into the bottom of passive 8B0P power supply modules. [29)]

Passive power supply modules 8B0P


Table 418: The location where the fuse for the external braking resistor connection is installed

Information regarding what type of fuse is required can be found on a sticker (❶) near the fuse holder.

3.2.2 Replacing the fuse for the external braking resistor

8B0P0110 passive power supply modules are equipped with a connection for external braking resistors that is protected by fuse KLKD 015.

The fuse is located under a cover near the bottom of the front of the module.

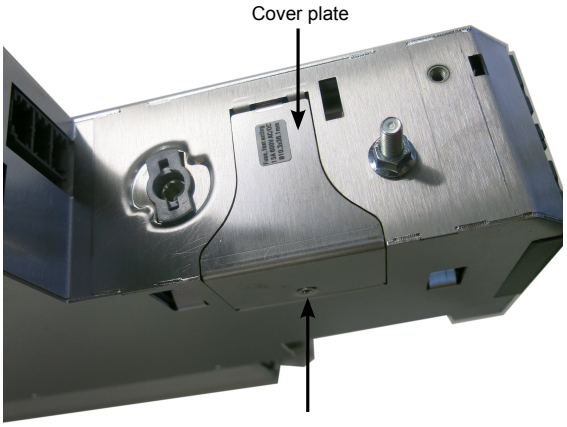


Figure 234: Fuse for external braking resistor connection

Required tool: Torx T10x60 screwdriver

Danger!

Before performing service work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the ACOPOSmulti drive system has discharged. Observe regulations!

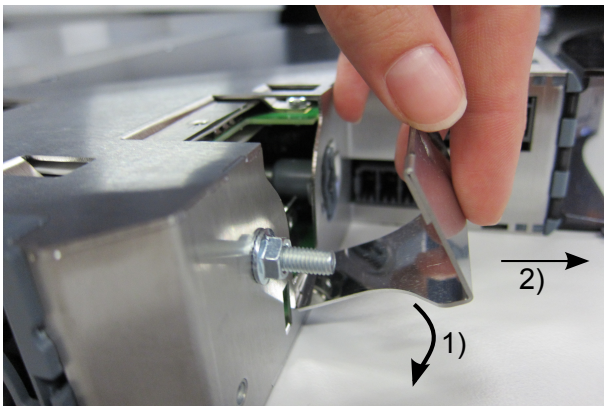
[29)] The fuses used must be fast-acting fuses ∅10x38 mm for 600 VAC/VDC.
For example, type KLKD0xx (xx is the rated current of the fuse in amperes e.g. KLKD030) from Littelfuse (www.littelfuse.com) can be used.

1. Remove the locating screw on the cover.



Figure 235: Removing the locating screw

2. Open up the cover (1) and pull it off to the side (2).



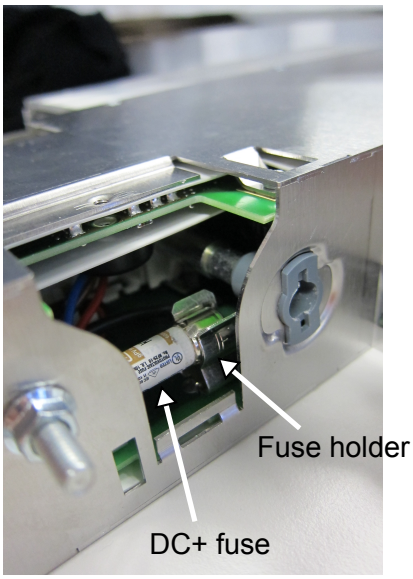
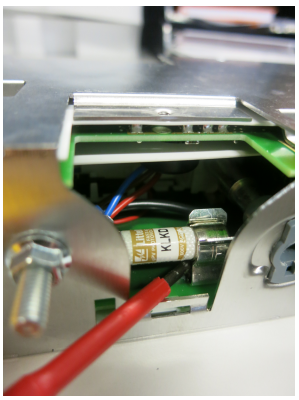


Figure 236: Opening up the cover and pulling off to the side

3. Place tip of the screwdriver underneath the fuse as close as possible to the fuse holder. Press down on the screwdriver to pry out the fuse as shown in the image.



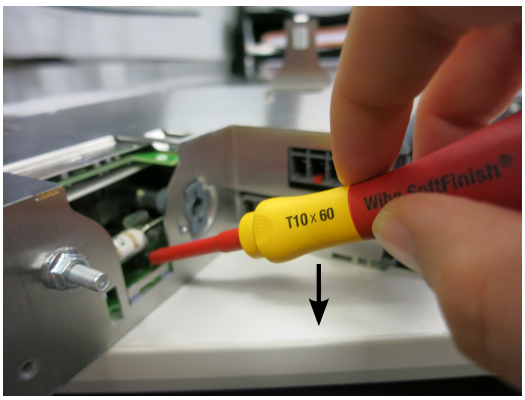


Figure 237: Prying out the fuse

4. Pry out the fuse and remove it from the fuse holder.

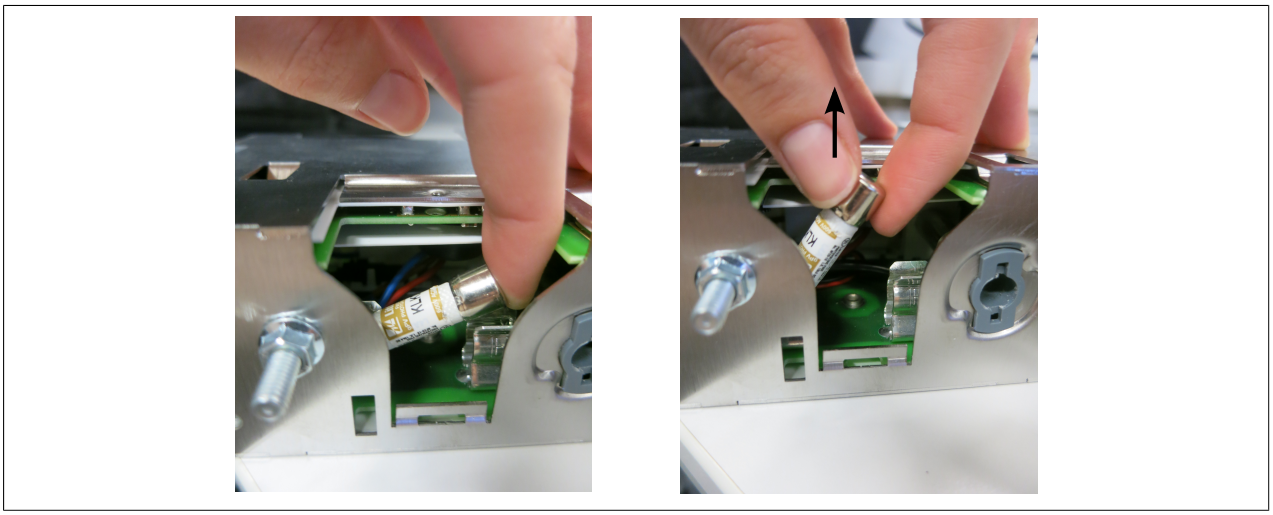


Figure 238: Removing the fuse

5. Place the new fuse evenly on top of the fuse holder and press on both sides to insert it. The fuse will audibly click into place.

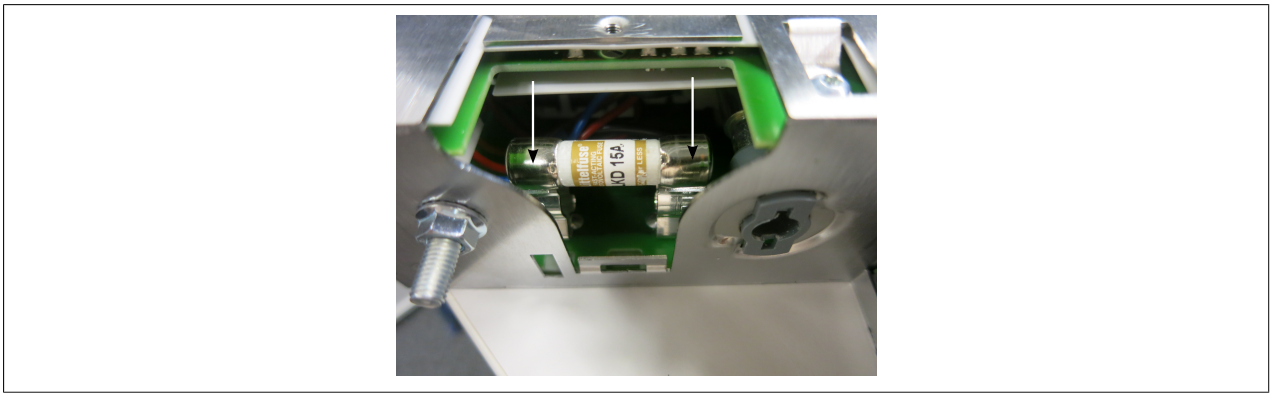


Figure 239: Inserting the fuse

6. Replace the cover on the module and tighten the locating screw.

3.3 Dimensioning braking resistors

3.3.1 Basis of the calculation

An external braking resistor can be dimensioned based on the sum of the movement and load profiles of all axes that are connected via the DC bus to the passive 8B0P power supply module to which the external braking resistor should be connected:

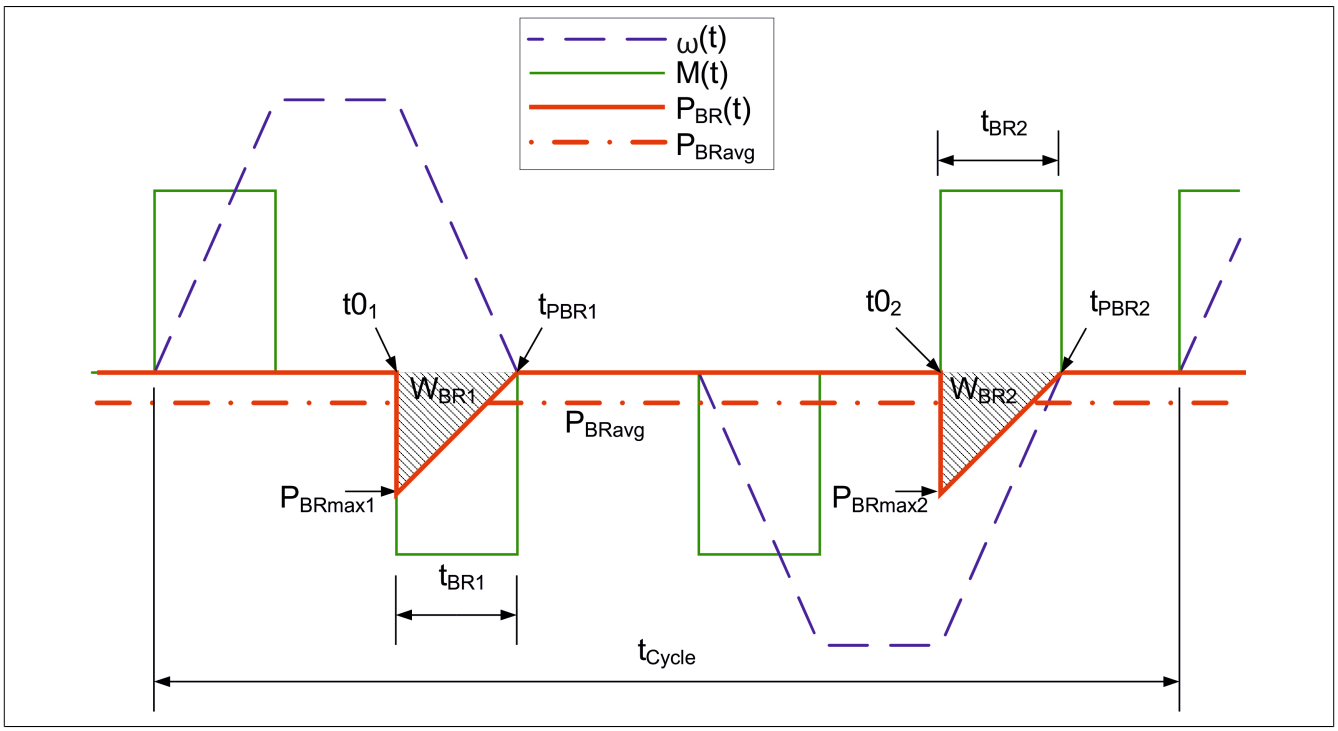


Figure 240: Composite movement and load profile for a sample application

ω(t)	Angular velocity
$P_{BR}(t)$	Brake power
P_{BRavg}	Average brake power for one cycle
M(t)	Torque
t_{Cycle}	Cycle duration
$t0_1$	Start time for braking procedure 1
t_{PBR1}	End time for braking procedure 1
P_{BRmax1}	Maximum brake power in braking procedure 1
W_{BR1}	Brake power for braking procedure 1
t_{BR1}	Duration of braking procedure 1
$t0_2$	Start time for braking procedure 2
t_{PBR2}	End time for braking procedure 2
P_{BRmax2}	Maximum brake power in braking procedure 2
W_{BR2}	Brake power for braking procedure 2
t_{BR2}	Duration of braking procedure 2

Power calculation

$P(t) = M(t).\omega(t)$

All instances of P(t) <0 will be labeled as brake power ratings $P_{BR}(t)$.

Braking energy per braking procedure (responsible for heating up the braking resistor during a braking procedure)

$$W_{BR_i} = \int_{t0_i}^{tP_{BR_i}} P_{BR_i}(t)dt$$

$P_{BR_i} < 0$

Braking energy for one cycle (responsible for average heating of the braking resistor)

$$W_{BRges} = \sum_{N}^{i=1} W_{BR_i}$$

Maximum braking energy within one cycle (determinant variable for selecting the braking resistor value)

$$W_{BRges} = \sum_{N}^{i=1} W_{BR_i}$$

Average brake power for one cycle (determinant variable for the required continuous power of the braking resistor)

$$P_{BRavgAPPL} = \frac{W_{BRges}}{t_{Cycle}}$$

Total braking time within one cycle (determinant variable for determining the duty cycle ratio)

$$t = \sum_{0}^{t_{Cycle}} t_{BRi}$$

Determining the braking resistor data

The following parameters must be determined for the external braking resistor according to the application:

- Resistor value (R_{BR})
- Maximum power (P_{BRmax})
- Nominal continuous power (P_{BRN})

Further parameters for external braking resistors can be taken from the manufacturer's data sheet:

- Thermal capacity (c_{th})
- Thermal resistance (R_{th})
- Maximum temperature of the braking resistor (T_{BRmax})
  or absorbed heat up to T_{BRmax} (Q_{BRmax})

Data for B&R 8B0W braking resistors

Model number	Mounting orientation	R_{BR} [Ω]	T_{BRmax} [°C] 1) 2)	R_{th} [K/W]	c_{th} [J/K]	Q_{BRmax} [J] 1) 2)	P_{BRN} [W] 1) 2)
8B0W0045H000.00x-1	Vertical	50 ±10%	723	1.517	30.88	21,091	424
	Horizontal	50 ±10%	723	1.657	30.88	21,091	388
8B0W0079H000.00x-1	Vertical	33 ±10%	677	0.852	40.68	25,913	701
	Horizontal	33 ±10%	677	0.9395	40.68	25,913	636

Table 419: Overview of braking resistor data - 8B0W

1) T_{BRmax} can be reduced by application-related limitations (contact protection, warming of neighboring components, maximum warming of the control cabinet, installation position, etc.). In this case, the values for Q_{BRmax} and P_{BRN} will also change; these must be recalculated for the maximum value of T_{BRmax} permitted in the application!

2) Values for T_{amb} = 40°C.

Series and parallel connection of braking resistors

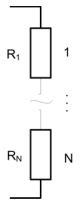
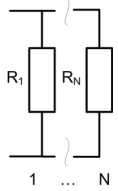
Parameter	Serial connection		Parallel connection	
Resistance value	$R_{ges} = \sum_{i=1}^{N} R_i$		$\frac{1}{R_{ges}} = \sum_{i=1}^{N} \frac{1}{R_i}$	
Thermal resistance	$\frac{1}{R_{thges}} = \sum_{i=1}^{N} \frac{1}{R_{th_i}}$		$\frac{1}{R_{thges}} = \sum_{i=1}^{N} \frac{1}{R_{th_i}}$	
Thermal capacity	$C_{th} = \sum_{i=1}^{N} C_{th_i}$		$C_{th} = \sum_{i=1}^{N} C_{th_i}$	
Max. permissible temperature	$T_{max} = T_{max}$		$T_{max} = T_{max}$	
Absorbed heat up to T_{max}	$Q_{maxges} = \sum_{i=1}^{N} Qmax_i$		$Q_{maxges} = \sum_{i=1}^{N} Qmax_i$	

Table 420: Series and parallel connection of braking resistors

Maximum heat that can be absorbed by the braking resistor:

$$Q_{BRmax} = (T_{BRmax} - T_{amb}).c_{th}$$

Maximum temperature in continuous operation:

$$\Delta T_{Lenght} = P_{avg}.R_{th}$$

Average overtemperature in continuous operation:

$$\Delta T_{BR} = \frac{W_{BRges}}{C_{th}}$$

Thermal time constant of the braking resistor:

$$\tau = R_{th}.c_{th}$$

3.3.2 Example

Scenario

An axis has the following movement and load profile:

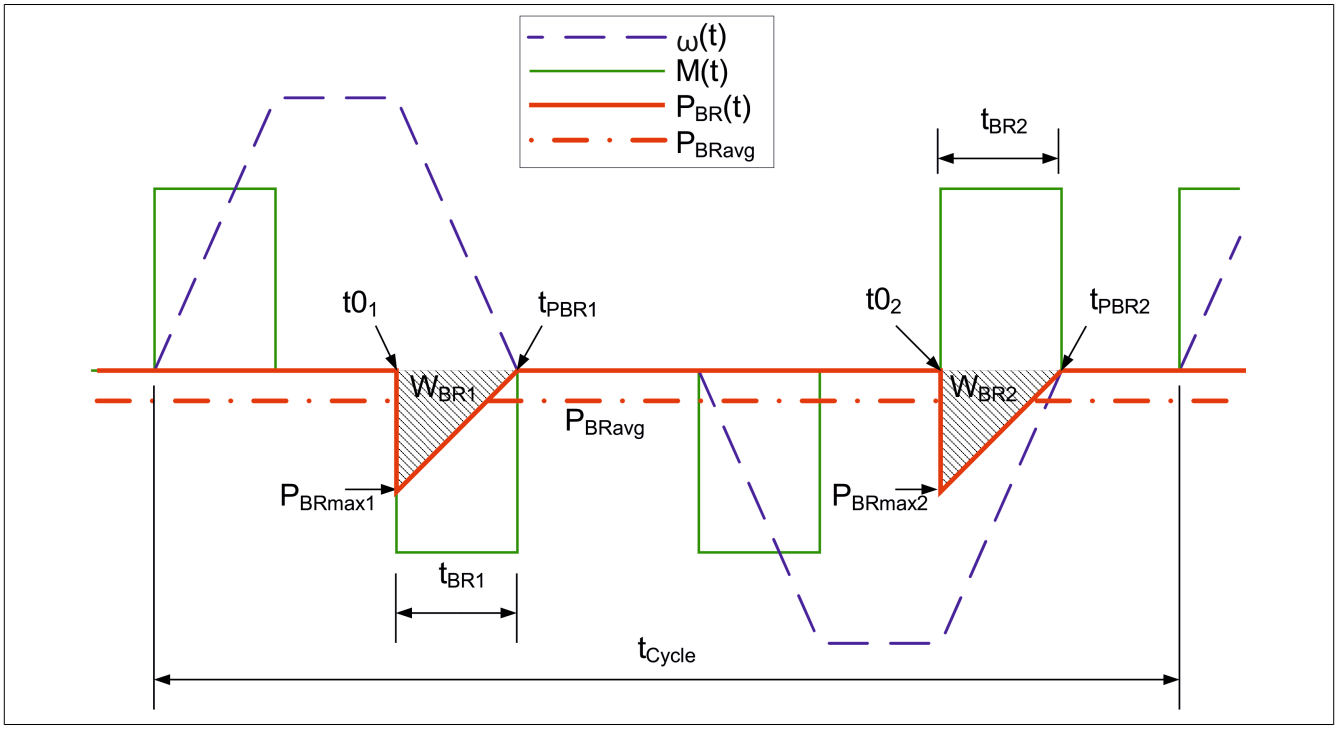


Figure 241: Example: Add movement and load profile

Value
$P_{BRmax1} = P_{BRmax2} = 50$ kW
$t_{BR1} = t_{BR2} = 0.3$ s
$t_{Cycle} = 10$ s

- The ambient temperature is 40°C.
- There are no application-related limitations for the maximum surface temperature of the braking resistor.

Calculation

Step 1: Determine the maximum brake power within one cycle.

$P_{BRmaxAPPL} = P_{BRmax1} = P_{BRmax2} = 50$kW

Step 2: Determine the average brake power for one cycle.

$$W_{BRges} = \frac{P_{BRmax1}.t_{BR1}}{2} + \frac{P_{BRmax2}.t_{BR2}}{2} = \frac{50\text{kW}.0{,}3s}{2} + \frac{50\text{kW}.0{,}3s}{2} = 15\text{kJ}$$

$$P_{BRavgAPPL} = \frac{W_{BRges}}{t_{Cycle}} = \frac{15\text{kJ}}{10\text{s}} = 1{,}5kW$$

Step 3) Determine the right ACOPOSmulti 8B0P power supply module

The following criteria must be met:

$P_{maxServo} \geq P_{BRmaxAPPL} \Rightarrow P_{maxServo} \geq 50$ kW

$$I_{BRServo} \geq \frac{\sqrt{P_{BRavgAPPL}P_{BRmaxAPPL}}}{U_{DC}} \Rightarrow I_{BRservo} \geq \frac{\sqrt{1500W.50000W}}{750V} \Rightarrow I_{BRServo} \geq 11.54A$$

The ACOPOSmulti power supply module 8B0P0440Hx00.000-1 meets these criteria (see "Technical data" on page 95):

- $P_{maxServo} = 65$ kW ≥ 50 kW
- $I_{BRServo} = 22$ A ≥ 11, 54 A

Can the selected ACOPOSmulti 8B0P power supply module conduct the peak power for the required braking duration for each individual braking procedure within the cycle?

This can be checked using the following diagrams:

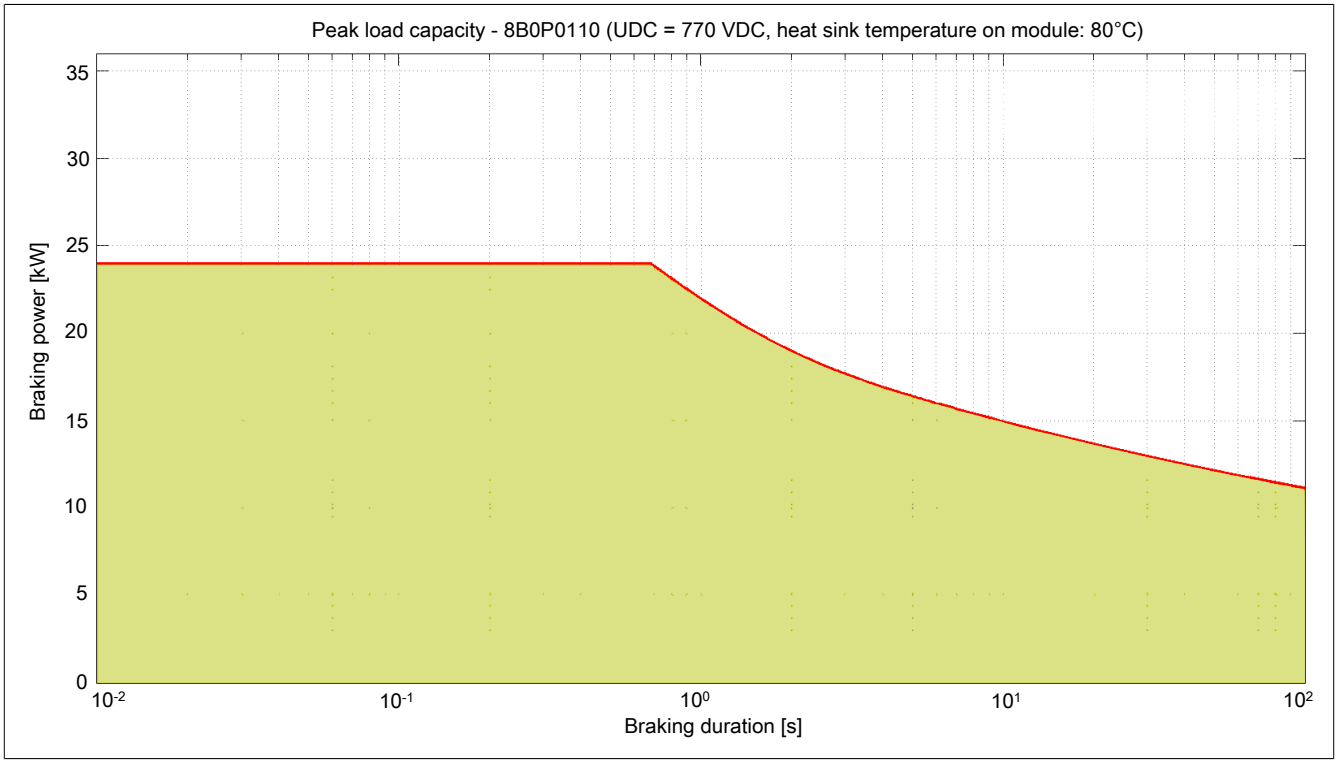


Figure 242: 8B0P0110Hx00.000-1 - Peak load capacity

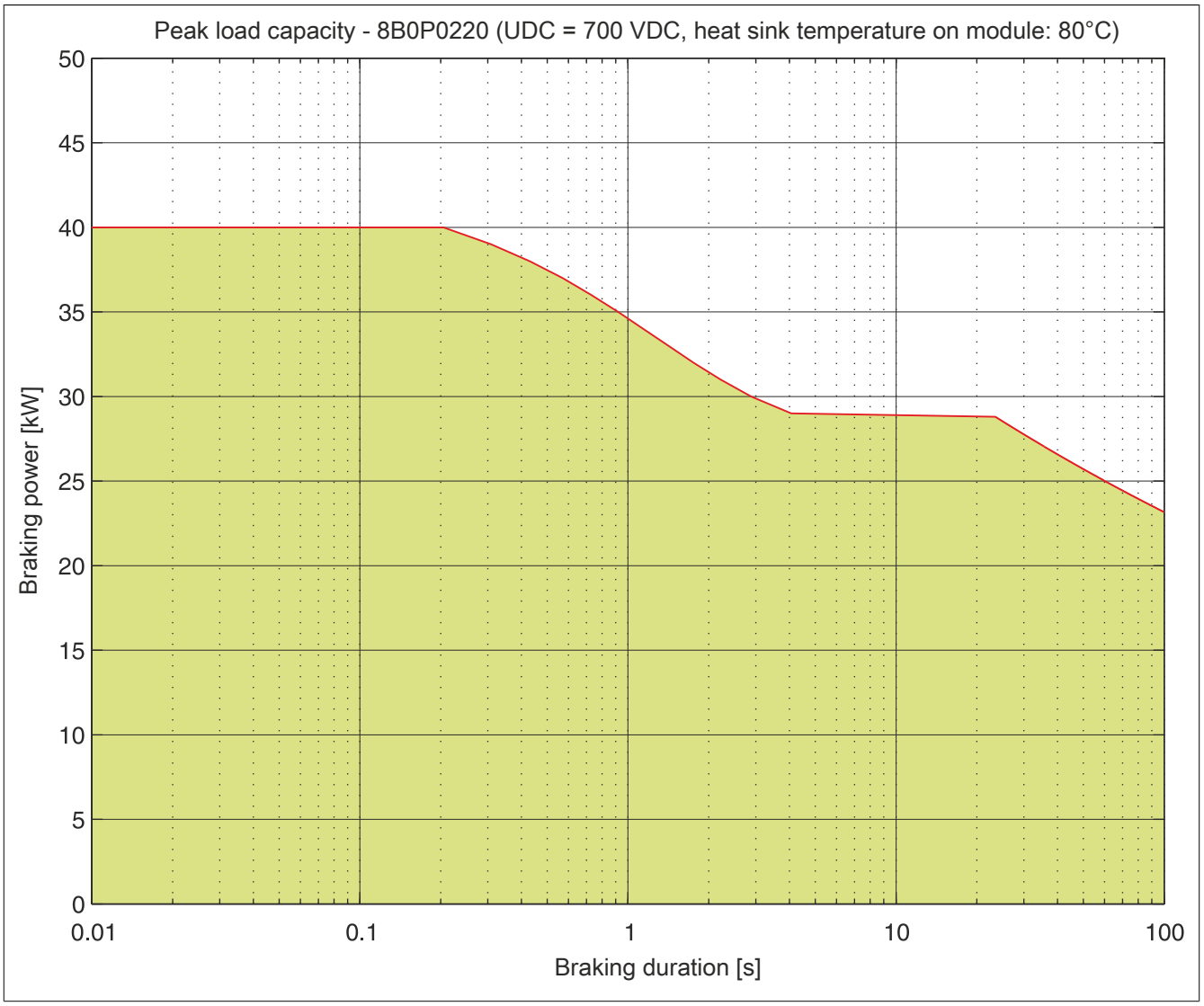


Figure 243: Peak load capacity - 8B0P0220Hx00.00x-1

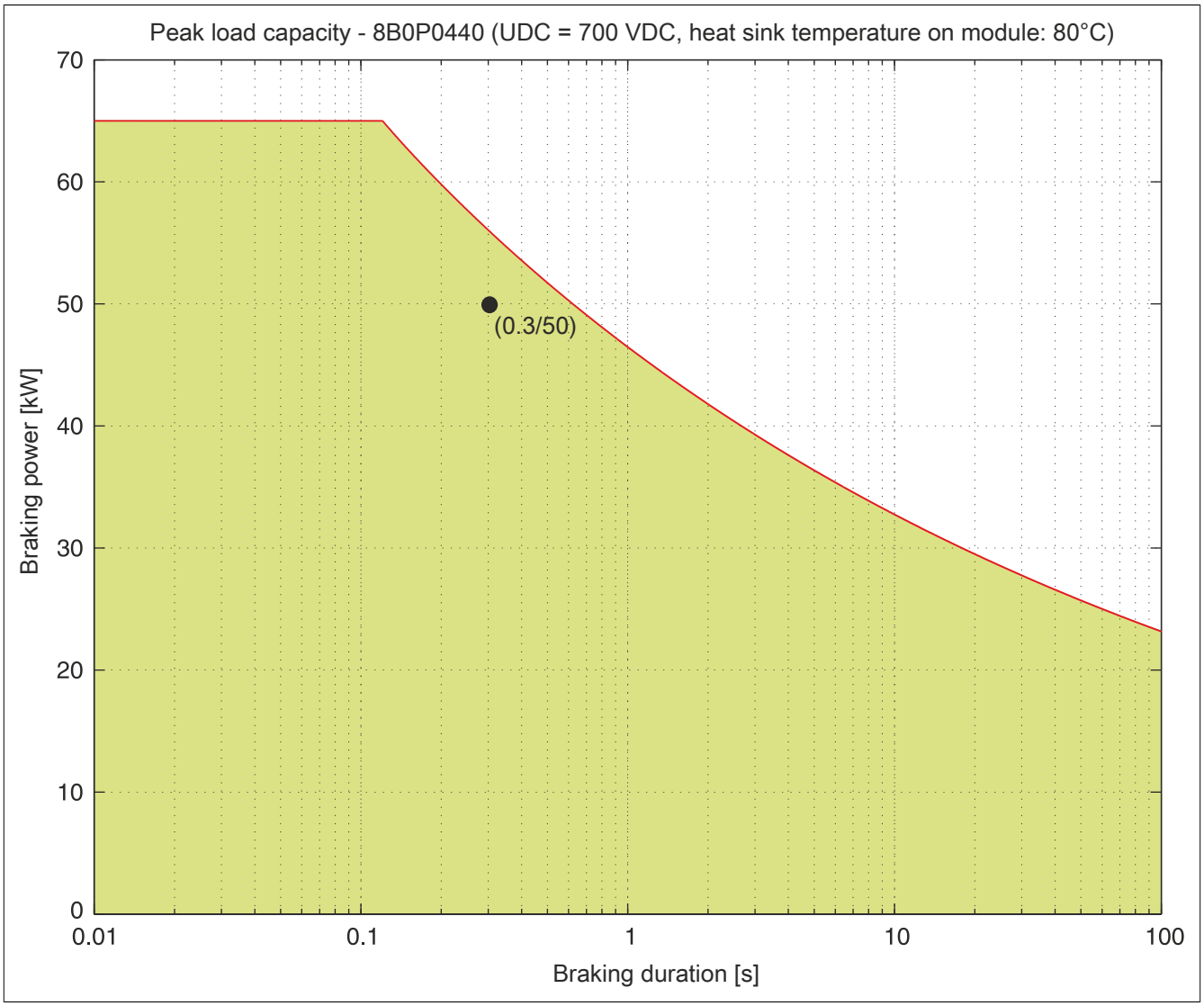


Figure 244: Peak load capacity - 8B0P0440Hx00.00x-1

The individual braking procedures within one cycle are entered in the diagram as points with the coordinates (t_{BR}/P_{BRmax}) and must **all** be within the permissible range (marked green). If this is not the case, then a different ACOPOSmulti 8B0P power supply module must be selected!

Figure "Peak load capacity - 8B0P0440Hx00.00x-1 " on page 528 contains the individual braking of figure procedures from the sample application (t_{BR} = 0.3 s, P_{BRmax} = 50 kW). These are within the permissible range, which indicates that the selected ACOPOSmulti 8B0P power supply module is suitable for the peak power of each individual braking procedure in the application.

Step 4: Determine value of the required external braking resistor.

Maximum permissible braking resistor for the application:

$$R_{BRmaxAPPL} = \frac{U_{DCmax}^2}{P_{BRmaxAPPL}} = \frac{750\text{V}^2}{50000\text{W}} = 11{,}25\,\Omega$$

The value of the external braking resistor must meet the following criteria:

- $R_{BR} \geq R_{minServo} \Rightarrow R_{BR} \geq 7{,}5\,\Omega$ [30)]
- $R_{BR} \geq \frac{P_{BRavgAPPL}}{(I_{BRServo})^2} \Rightarrow R_{BR} \geq \frac{1500\text{W}}{22\text{A}^2} \Rightarrow R_{BR} \geq 7.5\,\Omega$
- $R_{BR} \leq R_{BRmaxAPPL} \Rightarrow R_{BR} \leq 11{,}25\,\Omega$

Therefore, a braking resistor or a combination of braking resistors must be selected with a resistance value between 7.5 Ω and 11.25 Ω.

30) $R_{minServo}$ is listed in the technical data for the 8B0P passive power supply modules (minimum permitted braking resistor).

Step 5) Select external braking resistor

Caution!

If the resistance falls below the minimum permitted value, then the brake chopper in the device could be destroyed!

Danger!

During braking, voltages up to 900 VDC can occur on the external braking resistor. The external braking resistor must be able to handle these voltages.

Information:

We recommend choosing braking resistor value so that its resistance value R_{BR} is as close as possible to the maximum value permissible for the application R_{BRmax}, in order to keep the current low through the fuse on the ACOPOSmulti 8B0P power supply module's braking resistor connection.

This can require a parallel or series connection of individual braking resistors.

3 8B0W0079H000.001-1 braking resistors (R_{BR} = 33 Ω) are connected in parallel to maintain a resistance value that is suitable for the application (for the technical data, see "Basis of the calculation" on page 522):

- Resistance value:

$$\frac{1}{R_{BR}} = \sum_{i=1}^{N} \frac{1}{R_{BR_i}} \Rightarrow R_{BR} = 11\Omega \leq 11{,}25\,\Omega$$

- Thermal capacity:

$$c_{th} = \sum_{i=1}^{N} c_{th_i} \Rightarrow c_{th} = 67{,}8\frac{J}{K}$$

The continuous power P_{BRN} and the thermal resistance R_{th} of the selected combination of braking resistors depends on the mounting orientation:

- Horizontal mounting orientation:

$$\frac{1}{R_{th}} = \sum_{i=1}^{N} \frac{1}{R_{th_i}} \Rightarrow R_{th} = 0{,}355\,\Omega$$

$$P_{BRN} = \sum_{i=1}^{N} P_{BRN} \Rightarrow P_{BRN} = 1896\text{W}$$

- Vertical mounting orientation:

$$\frac{1}{R_{th}} = \sum_{i=1}^{N} \frac{1}{R_{th_i}} \Rightarrow R_{th} = 0{,}284\,\Omega$$

$$P_{BRN} = \sum_{i=1}^{N} P_{BRN} \Rightarrow P_{BRN} = 2370\text{W}$$

Information:

The nominal continuous power P_{BRN} of a braking resistor depends on the ambient temperature and the braking resistor's maximum permissible temperature.

The braking resistor's nominal power will be decreased if, for application reasons, the ambient temperature is increased and/or the braking resistor's maximum permissible temperature is limited (contact protection, warming of neighboring components, maximum warming of the control cabinet, installation position, etc.)!

Is the nominal continuous power P_{BRN} of the selected braking resistor combination sufficient for the application's average brake power $P_{BRavgAPPL}$?

The following condition must be met:

$P_{BRN} \geq P_{BRavgAPPL}$

This condition must be checked for all permissible mounting orientations:

- Horizontal mounting orientation:
  $P_{BRN} \geq P_{BRavgAPPL} \Rightarrow$ 1896W >1500W --> Nominal continuous power P_{BRN} is sufficient.
- Vertical mounting orientation:
  $P_{BRN} \geq P_{BRavgAPPL} \Rightarrow$ 2370W >1500W --> Nominal continuous power P_{BRN} is sufficient.

Can the selected braking resistor conduct the incidental braking energy without exceeding the maximum braking resistor temperature for the application?

The following condition must be met for this to happen:

$$P_{BRN} \geq \frac{W_{BR_i}}{t_i}.k$$

The peak load factor k for any braking resistor can be determined using the following diagram:

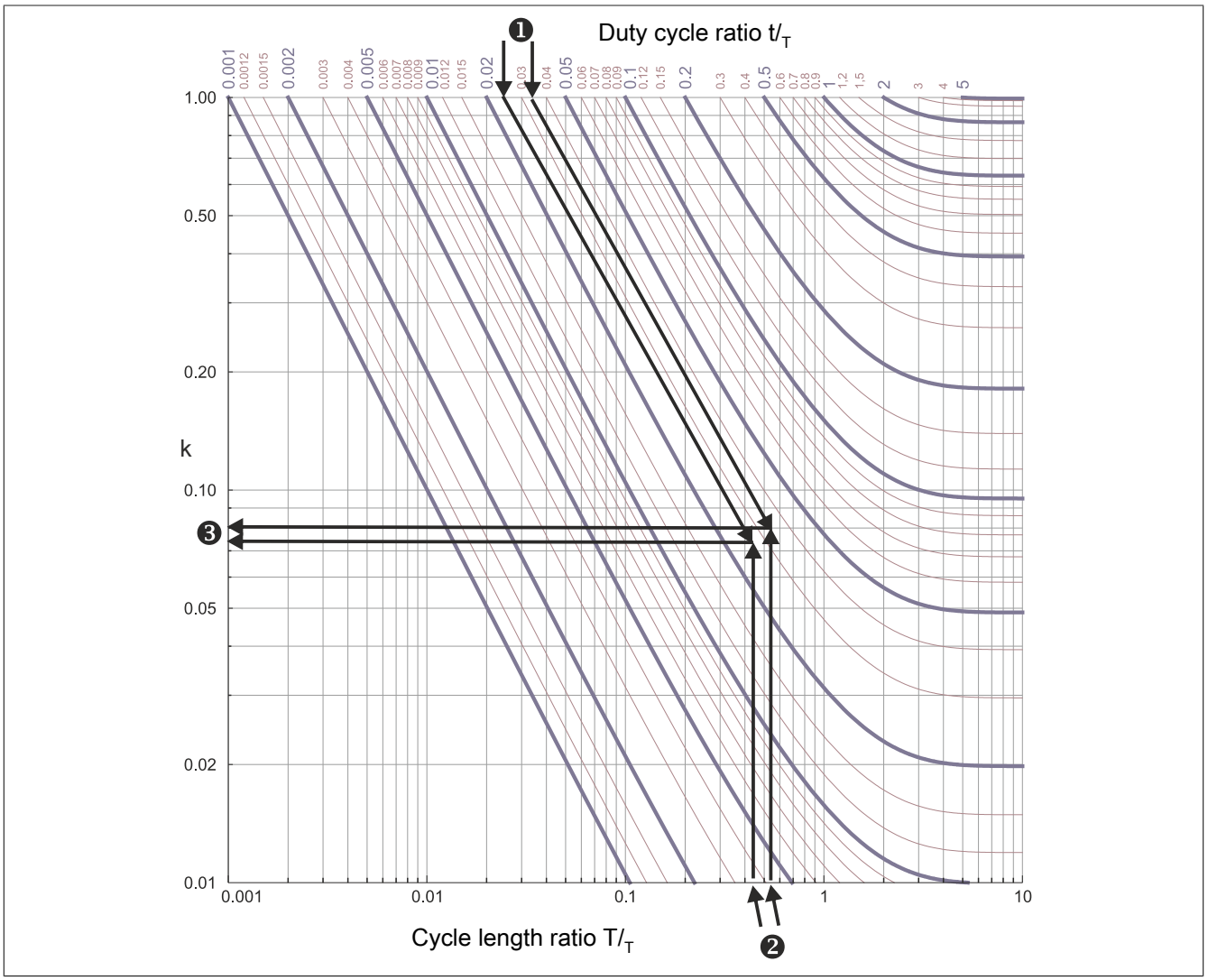


Figure 245: Determining the peak load factor k

k ... Peak load factor for the braking resistor
T ... Application cycle time (= t_{Cycle})
t ... Sum of all braking times (total braking time) within one cycle
τ Thermal time constant of the braking resistor (= $R_{th} * c_{th}$)
...

1. Calculation of the duty cycle ratio

   ° Horizontal mounting orientation:

   $$\frac{t}{T} = \frac{t_{BR1} + t_{BR2}}{R_{th} * c_{th}} = \frac{0.3 + 0.3}{0.355 * 67.8} = 0.025$$

   ° Vertical mounting orientation:

   $$\frac{t}{T} = \frac{t_{BR1} + t_{BR2}}{R_{th} * c_{th}} = \frac{0.3 + 0.3}{0.284 * 67.8} = 0.031$$

2. Calculation of the cycle length ratio

   ° Horizontal mounting orientation:

   $$\frac{T}{T} = \frac{t_{Cycle}}{R_{th} * c_{th}} = \frac{10}{0.355 * 67.8} = 0.415$$

   ° Vertical mounting orientation:

   $$\frac{T}{T} = \frac{t_{Cycle}}{R_{th} * c_{th}} = \frac{10}{0.284 * 67.8} = 0.519$$

3. Reading the peak load factor k based on the values from 1 and 2 in figure "Calculation of the peak load factor k"
    - Horizontal installation: k = 0.075
    - Vertical installation: k = 0.08

This condition must be checked for all permissible mounting orientations:

- Horizontal mounting orientation:

  $$P_{BRN} \geq \frac{W_{BR_i}}{t_i} . k \Rightarrow 1896\text{W} \geq \frac{7500\text{J}}{0{,}3s} . 0{,}075 \Rightarrow 1896\text{W} \geq 1875\text{W}$$

  --> The nominal power P_{BRN} of the braking resistor is barely sufficient for the application - No reserves! Horizontal mounting orientations are therefore not recommended!
- Vertical mounting orientation:

  $$P_{BRN} \geq \frac{W_{BR_i}}{t_i} . k \Rightarrow 2370\text{W} \geq \frac{7500\text{J}}{0{,}3s} . 0{,}08 \Rightarrow 2370\text{W} \geq 2000\text{W}$$

  --> The nominal power P_{BRN} of the braking resistor is sufficient for the application.

Results

Three B&R braking resistors 8B0W0079H000.001-1 connected in parallel and installed vertically on an ACOPOSmulti 8B0P0440Hx00.00x-1 power supply module meet the requirements of the application.

3.4 Configuring brake resistor parameters

When using external braking resistors, the following parameters must be set on the drive system using B&R Automation Studio:

ParID	Name	Formula symbols	Unit
10	Ohmic resistance	R_{BR}	[Ω]
11	Maximum overtemperature on the external braking resistor	T_{BRmax}	[°C]
12	Thermal resistance between braking resistor and the environment [1)]	R_{th}	[°C/W]
13	Heat capacitance of the filament [2)]	c_{th}	[Ws/°C]

Table 421: ParIDs for setting external braking resistor parameters

1) Total thermal resistance $R_{thtotal}$ for series or parallel connection of several (n_{Br}) of the same braking resistors:
$R_{thges} = \frac{R_{th}}{n_{Br}}$

2) Total heat capacitance of filament $c_{thtotal}$ for the serial or parallel connection of several (n_{Br}) of the same braking resistors:
$C_{thtotal} = Cth \cdot nBr$

These parameters are usually listed in the data sheet from the respective manufacturer.[31)]

The parameters are based on the following thermal equivalent circuit diagram of the external braking resistor:

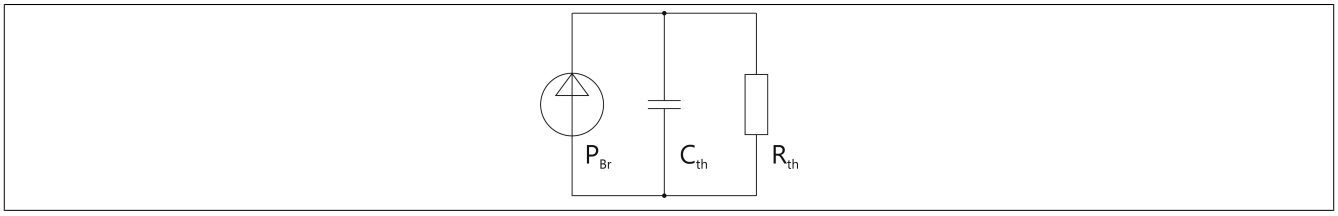


Figure 246: Thermal equivalent circuit diagram of the external braking resistor

If a value for maximum permissible temperature T_{BRmax} of the external braking resistor is not specified, it can be calculated using the following formula:

$$T_{BRmax} = P_{BRN} . R_{th}$$

31) Σ SIGMA braking resistors from Danotherm (www.danotherm.com) are an example of reliable braking resistors.

4 Check the max. chargeable DC bus capacitance

When configuring an ACOPOSmulti drive system, an ACOPOSmulti 8BxP power supply module must be selected. The maximum chargeable DC bus capacitance of the selected 8BxP power supply module must be greater than the sum of the DC bus capacitance values of the modules being used in the drive system.

4.1 Procedure

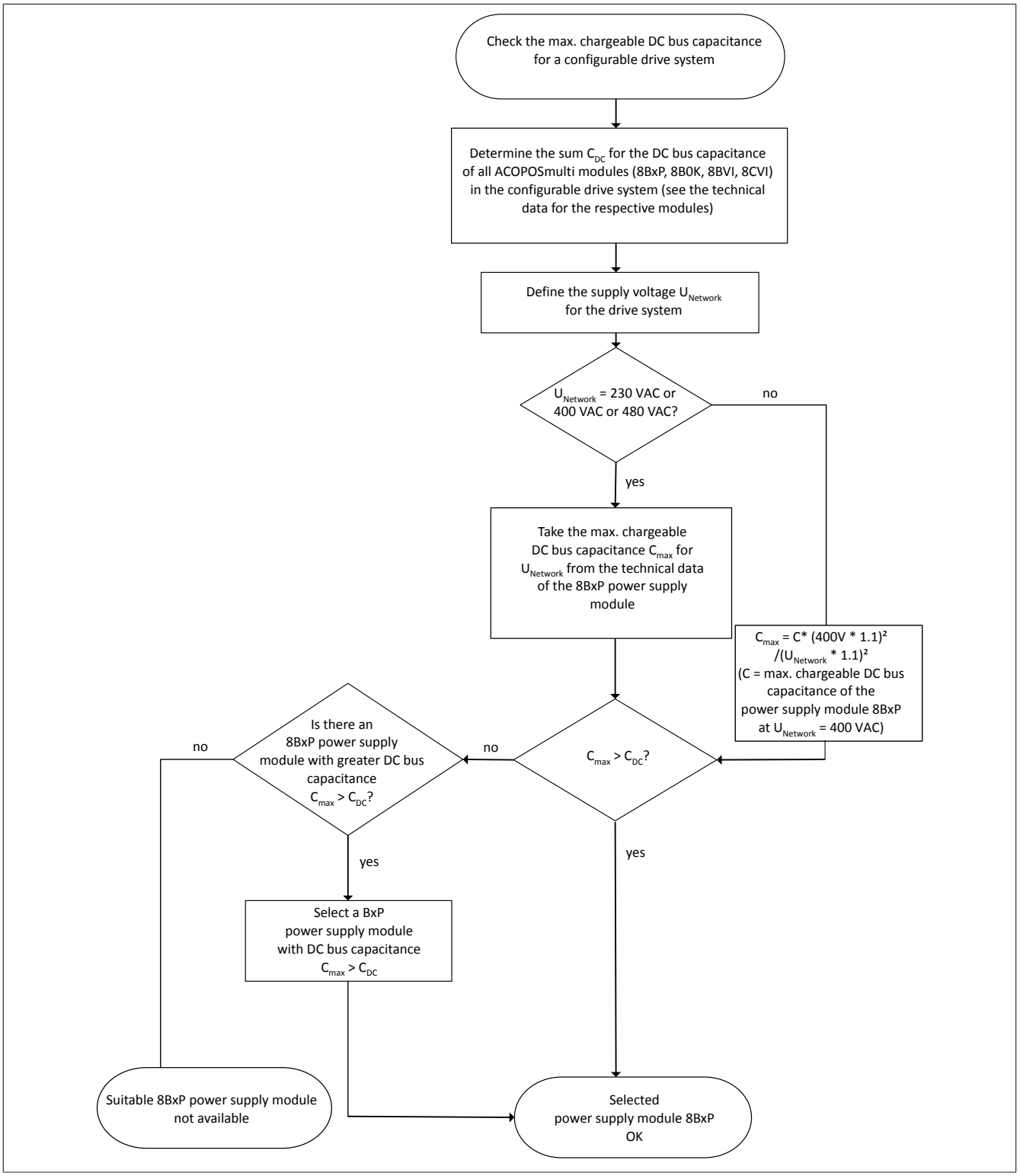


Figure 247: Procedure for checking the max. chargeable DC bus capacitance

4.2 Max. chargeable DC bus capacitance values of 8BxP power supply modules

Model number	Max. DC bus capacitance at 480 VAC mains voltage	Max. DC bus capacitance at 400 VAC mains voltage	Max. DC bus capacitance at 230 VAC mains voltage
8B0P0110HW00.000-1	2 mF	3 mF	9 mF
8B0P0110HC00.000-1	2 mF	3 mF	9 mF
8B0P0220HW00.000-1	10 mF [1]	14.4 mF [2]	43.6 mF [3]
8B0P0220HC00.000-1	10 mF [1]	14.4 mF [2]	43.6 mF [3]
8B0P0220HW00.001-1	10 mF [1]	14.4 mF [2]	43.6 mF [3]
8B0P0220HC00.001-1	10 mF [1]	14.4 mF [2]	43.6 mF [3]
8B0P0440HW00.000-1	10 mF [4]	14.4 mF [5]	43.6 mF [6]
8B0P0440HC00.000-1	10 mF [4]	14.4 mF [5]	43.6 mF [6]
8B0P0440HW00.001-1	10 mF [4]	14.4 mF [5]	43.6 mF [6]
8B0P0440HC00.001-1	10 mF [4]	14.4 mF [5]	43.6 mF [6]
8BVP0220HW00.000-1	4 mF	5.8 mF	17.4 mF
8BVP0220HC00.000-1	4 mF	5.8 mF	17.4 mF
8BVP0440HW00.000-1	4 mF	5.8 mF	17.4 mF
8BVP0440HC00.000-1	4 mF	5.8 mF	17.4 mF
8BVP0880HW00.004-1	8 mF	11.5 mF	34.8 mF
8BVP0880HC00.004-1	8 mF	11.5 mF	34.8 mF
8BVP1650HW00.000-1	16 mF	23 mF	69.7 mF
8BVP1650HC00.000-1	16 mF	23 mF	69.7 mF

1) Up to Revision H0: 4 mF
2) Up to Revision H0: 5.8 mF
3) Up to Revision H0: 17.5 mF
4) Up to Revision F0: 4 mF
5) Up to Revision F0: 5.8 mF
6) Up to Revision F0: 17.5 mF

4.3 Overview of DC bus capacitance values

8B0P passive power supply modules

Model number	DC bus capacitance
8B0P0110HW00.000-1	330 µF
8B0P0110HC00.000-1	330 µF
8B0P0220HW00.000-1	660 µF
8B0P0220HC00.000-1	660 µF
8B0P0220HW00.001-1	660 µF
8B0P0220HC00.001-1	660 µF
8B0P0440HW00.000-1	1320 µF
8B0P0440HC00.000-1	1320 µF
8B0P0440HW00.001-1	1320 µF
8B0P0440HC00.001-1	1320 µF

8BVP power supply modules

Model number	DC bus capacitance
8BVP0220HW00.000-1	495 µF
8BVP0220HC00.000-1	495 µF
8BVP0440HW00.000-1	825 µF
8BVP0440HC00.000-1	825 µF
8BVP0880HW00.004-1	1650 µF
8BVP0880HC00.004-1	1650 µF
8BVP1650HW00.000-1	3630 µF
8BVP1650HC00.000-1	3630 µF

8B0K capacitor modules

Model number	DC bus capacitance
8B0K1650HW00.000-1	1650 µF
8B0K1650HC00.000-1	1650 µF
8B0K3630HW00.001-1	--- [1]
8B0K3630HC00.001-1	--- [1]

1) It is not permissible to include the DC bus capacitance for 8B0K3630 capacitor modules when determining the maximum chargeable DC bus capacitance.

8BVI power inverter modules

Model number	DC bus capacitance
8BVI0014HWSx.000-1	165 µF
8BVI0014HCSx.000-1	165 µF
8BVI0014HWDx.000-1	165 µF
8BVI0014HCDx.000-1	165 µF
8BVI0028HWSx.000-1	165 µF
8BVI0028HCSx.000-1	165 µF
8BVI0028HWDx.000-1	165 µF

Model number	DC bus capacitance
8BVI0028HCDx.000-1	165 µF
8BVI0055HWSx.000-1	165 µF
8BVI0055HCSx.000-1	165 µF
8BVI0055HWDx.000-1	330 µF
8BVI0055HCDx.000-1	330 µF
8BVI0110HWSx.000-1	330 µF
8BVI0110HCSx.000-1	330 µF
8BVI0110HWDx.000-1	660 µF
8BVI0110HCDx.000-1	660 µF
8BVI0220HWSx.000-1	495 µF
8BVI0220HCSx.000-1	495 µF
8BVI0220HWDx.000-1	1320 µF
8BVI0220HCDx.000-1	1320 µF
8BVI0330HWSx.000-1	990 µF
8BVI0330HCSx.000-1	990 µF
8BVI0440HWSx.000-1	990 µF
8BVI0440HCSx.000-1	990 µF
8BVI0660HWSx.000-1	1980 µF
8BVI0660HCSx.000-1	1980 µF
8BVI0880HWSx.004-1	1980 µF
8BVI0880HCSx.004-1	1980 µF
8BVI1650HWSx.000-1	3630 µF
8BVI1650HCSx.000-1	3630 µF

ACOPOSmulti65 8CVI inverter modules

Model number	DC bus capacitance
8CVI045E1HCS0.00-1	35 µF
8CVI045H1HCS0.00-1	35 µF
8CVI045S1HCS0.00-1	35 µF
8CVI088E1HCS0.00-1	35 µF
8CVI088H1HCS0.00-1	35 µF
8CVI088S1HCS0.00-1	35 µF

4.4 Example 1

An ACOPOSmulti drive system should be implemented with 480 V mains voltage and the following modules:

- 1x 8BVF0880H000.000-1
- 1x 8BVR0880H000.100-1
- 1x 8BVP0880HW00.004-1
- 1x 8B0C0320HW00.002-1
- 3x 8BVI0220HWS0.000-1
- 1x 8B0K3630HW00.001-1

1) Determine the DC bus capacitance values for all ACOPOSmulti modules in the drive system

ACOPOSmulti modules	DC bus capacitance for each module
8BVF0880H000.000-1	---
8BVR0880H000.100-1	---
8BVP0880HW00.004-1	1650 µF
8B0C0320HW00.002-1	---
8BVI0220HWS0.000-1	495 µF
8B0K3630HW00.001-1	--- 1)

Table 422: Determining the DC bus capacitance values for all ACOPOSmulti modules in the drive system

1) It is not permissible to include the DC bus capacitance for 8B0K3630 capacitor modules when determining the maximum chargeable DC bus capacitance.

2) Determine the sum of the DC bus capacitance values

ACOPOSmulti modules	Quantity	DC bus capacitance for each module	Total DC bus capacitance
8BVF0880H000.000-1	1	---	---
8BVR0880H000.100-1	1	---	---
8BVP0880HW00.004-1	1	1650 µF	1650 µF
8B0C0320HW00.002-1	1	---	---
8BVI0220HWS0.000-1	3	495 µF	1485 µF
8B0K3630HW00.001-1	1	---	---
Sum of the DC bus capacitance values for all ACOPOSmulti modules:			**3135 µF**

Table 423: Determining the sum of the DC bus capacitance values

3) Compare the sum with the value for the max. chargeable DC bus capacitance of the 8BxP power supply module being used

In this example, the sum of the DC bus capacitance values is 3135 µF and is lower than 8000 µF, which is the max. chargeable DC bus capacitance for the 8BxP power supply module being used (These values can be found in the technical data for the module. See also table "Max. chargeable DC bus capacitance values" on page 534). The max. chargeable DC bus capacitance for the 8BVP0880HW00.004-1 power supply module is sufficient for this ACOPOSmulti drive system.

4.5 Example 2

An ACOPOSmulti drive system with connected ACOPOSmulti65 inverter modules should be implemented with 480 V mains voltage and the following modules:

- 1x 8BVF0880H000.000-1
- 1x 8BVR0880H000.100-1
- 1x 8BVP0880HW00.004-1
- 1x 8B0C0320HW00.002-1
- 3x 8BVI0220HWS0.000-1
- 1x 8B0K3630HW00.001-1
- 1x 8BVE0500HW00.000-1
- 2x 8CVI045S1HCS0.00-1

1) Determine the DC bus capacitance values for all modules in the drive system.

ACOPOSmulti modules	DC bus capacitance for each module
8BVF0880H000.000-1	---
8BVR0880H000.100-1	---
8BVP0880HW00.004-1	1650 µF
8B0C0320HW00.002-1	---
8BVI0220HWS0.000-1	495 µF
8B0K3630HW00.001-1	--- 1)
8BVE0500HW00.000-1	---
8CVI045S1HCS0.00-1	35 µF

Table 424: Determining the DC bus capacitance values for all modules in the drive system

1) It is not permissible to include the DC bus capacitance for 8B0K3630 capacitor modules when determining the maximum chargeable DC bus capacitance.

2) Determine the sum of the DC bus capacitance values

ACOPOSmulti modules	Quantity	DC bus capacitance for each module	Total DC bus capacitance
8BVF0880H000.000-1	1	---	---
8BVR0880H000.100-1	1	---	---
8BVP0880HW00.004-1	1	1650 µF	1650 µF
8B0C0320HW00.002-1	1	---	---
8BVI0220HWS0.000-1	3	495 µF	1485 µF
8B0K3630HW00.001-1	1	---	---
8BVE0500HC00.000-1	1	---	---
8CVI045S1HCS0.00-1	2	35 µF	70 µF
Sum of the DC bus capacitance values in all modules			**3205 µF**

Table 425: Determining the sum of the DC bus capacitance values

3) Compare the sum with the value for the max. chargeable DC bus capacitance of the 8BxP power supply module being used

In this example, the sum of the DC bus capacitance values is 3205 µF and is lower than 8000 µF, which is the max. chargeable DC bus capacitance for the 8BxP power supply module being used (These values can be found in the technical data for the module. See also table "Max. chargeable DC bus capacitance values" on page 534). The max. chargeable DC bus capacitance for the 8BVP0880HW00.004-1 power supply module is sufficient for this ACOPOSmulti drive system.

4.6 Example 3

An ACOPOSmulti drive system should be implemented with 480 V mains voltage and the following modules:

- 1x 8BVF0220H000.000-1
- 1x 8BVR0220H000.100-1
- 1x 8BVP0220HC00.000-1
- 1x 8B0C0320HC00.002-1
- 6x 8BVI0055HCD0.000-1
- 1x 8B0K1650HC00.000-1

1) Determine the DC bus capacitance values for all ACOPOSmulti modules in the drive system

ACOPOSmulti modules	DC bus capacitance for each module
8BVF0220H000.000-1	---
8BVR0220H000.100-1	---
8BVP0220HC00.000-1	495 µF
8B0C0320HC00.002-1	---
8BVI0055HCD0.000-1	330 µF
8B0K1650HC00.000-1	1650 µF

Table 426: Determine the DC bus capacitance values for all ACOPOSmulti modules in the drive system

2) Determine the sum of the DC bus capacitance values

ACOPOSmulti modules	Quantity	DC bus capacitance for each module	Total DC bus capacitance
8BVF0220H000.000-1	1	---	---
8BVR0220H000.100-1	1	---	---
8BVP0220HC00.000-1	1	495 µF	495 µF
8B0C0320HC00.002-1	1	---	---
8BVI0055HCD0.000-1	6	330 µF	1980 µF
8B0K1650HC00.000-1	1	1650 µF	1650 µF
Sum of the DC bus capacitance values for all ACOPOSmulti modules:			**4125 µF**

Table 427: Determine the sum of the DC bus capacitance values

3) Compare the sum with the value for the max. chargeable DC bus capacitance of the 8BxP power supply module being used

In this example, the sum of the DC bus capacitance values, 4125 µF, is **higher** than the max. chargeable DC bus capacitance, 4000 µF, of the 8BpX power supply module being used (these values are listed in the module's technical data; see also table "Max. chargeable DC bus capacitance values" on page 534). The max. chargeable DC bus capacitance for power supply module 8BVP0220HC00.000-1 is **not** sufficient for this ACOPOSmulti drive system.

→ A power supply module with additional chargeable DC bus capacitance is required. For this example, the next largest module 8BVP0880HC00.004-1 would be most suitable. The max. chargeable DC bus capacitance for power supply module 8BVP0880HC00.004-1 is 8000 µF, which is sufficient for this ACOPOSmulti drive system.

5 Selecting the right auxiliary supply module

For the 24 VDC supply on ACOPOSmulti drive systems, two different 8B0C auxiliary supply module power classes are available with different functionalities:

- 24 VDC power supply of the ACOPOSmulti drive system via contact rails in mounting plate 8B0M
- Power supply from external consumers via a connector on the auxiliary supply module
- Connection for supply of 24 VDC to ensure the 24 VDC power supply of the ACOPOSmulti drive system during startup or power failure (UPS)

Overview

Model number	Continuous power	24 VDC power supply of the ACOPOSmulti drive system	Power supply from external consumers	Connection for 24 VDC supply
8B0C0160Hx00.000-1	400 W	Yes	No	No
8B0C0160Hx00.001-1	400 W	Yes	Yes (24 VDC)	No
8B0C0160Hx00.A01-1	800 W	No	Yes (42 VDC)	No
8B0C0320Hx00.000-1	800 W	Yes	No	No
8B0C0320Hx00.002-1	800 W	Yes	Yes (24 VDC)	No
8B0C0320Hx00.00A-1	800 W	Yes	Yes (24 VDC)	Yes

Table 428: Functionalities of 8B0C auxiliary supply modules

Information:

The continuous power listed in the technical data for 8B0C auxiliary supply modules always refers to the total power distributed to the internal 24 VDC supply as well as the power supply from external consumers.

Information:

ACOPOSmulti auxiliary supply modules (8B0C0320Hx00.00A-1) are not permitted to be used in combination with ACOPOSmulti SafeMOTION inverter modules!

5.1 Procedure

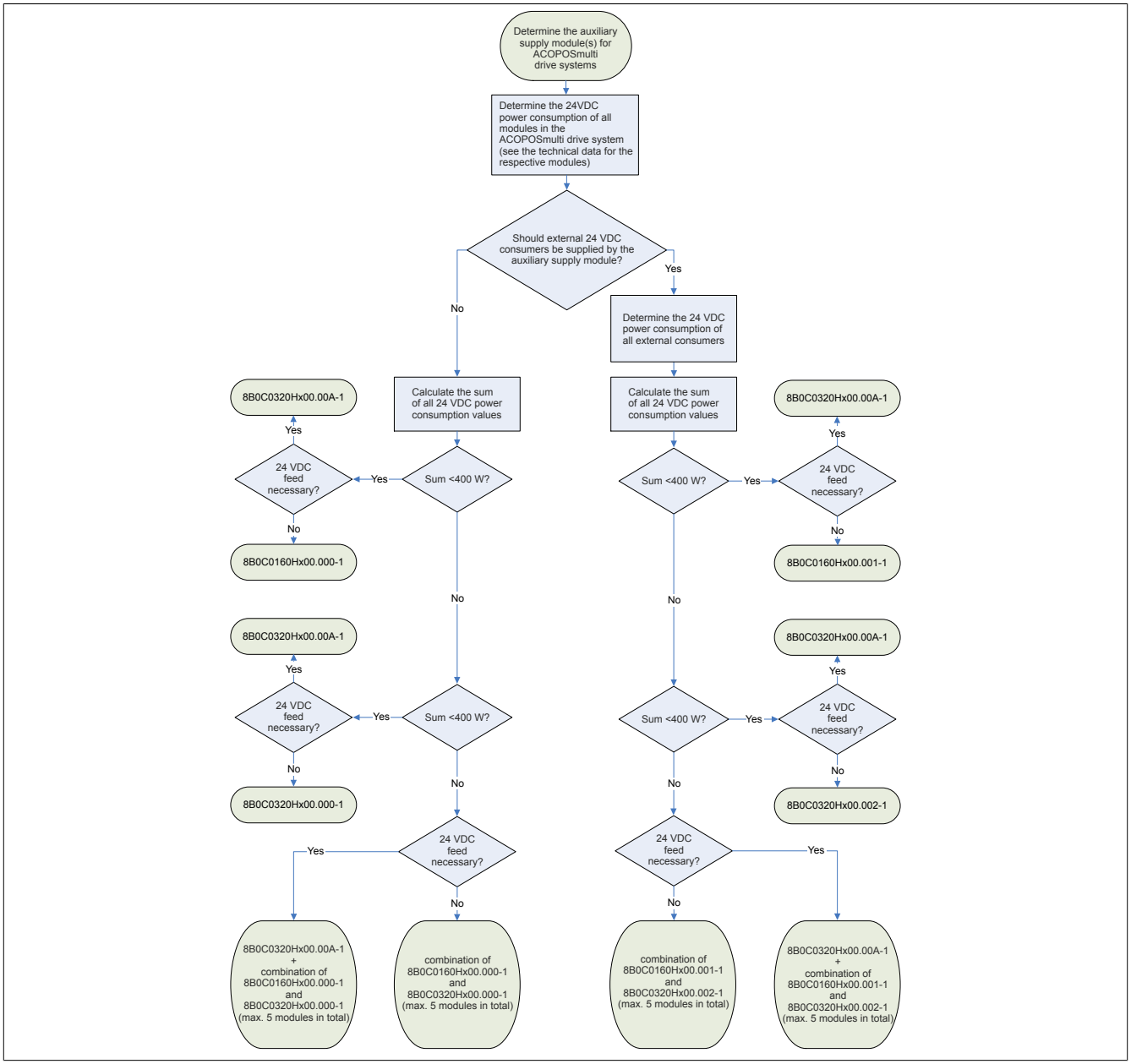


Figure 248: Procedure for selecting auxiliary supply modules

5.2 Examples

5.2.1 Example 1

A suitable auxiliary supply module should be selected for the following ACOPOSmulti drive system:

- 1x 8BVF0880H000.000-1
- 1x 8BVR0880H000.100-1
- 1x 8BVP0880HW00.004-1
- 3x 8BVI0220HWS0.000-1, each with 1x 8BAC0120.000-1 EnDat 2.1 plug-in module and 1x encoder
- 1x 8B0K3630HW00.001-1
- 1x 8B0M0120HW00.000-1

In this example, no external 24 VDC consumers should be connected to the auxiliary supply module.

Determine the 24 VDC power consumption of the individual modules in the ACOPOSmulti drive system

ACOPOSmulti modules	24 VDC power consumption for each module
8BVF0880H000.000-1	--- [1]
8BVR0880H000.100-1	---
8BVP0880HW00.004-1	$P_{24\ V\ Out}$ {0 ... 10 W} [2] + $P_{Fan8BVF...}$ = 10 W + 8.25 W = **18.25 W**
8BAC0120.000-1	P_{SLOT1} / P_{SLOT2} = 4 W + $P_{Encoder}$ [3] = 4 W + 1 W = **5 W**
8BVI0220HWS0.000-1	20 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ [2] + $P_{HoldingBrake}$ = 20 W + 5 W + 0 W [4] + 10 W + 20 W = **55 W**
8B0K3630HW00.001-1	8 W
8B0M0120HW00.000-1	$P_{Fan8B0M...}$ * (Number of slots) = 8.25 W * 12 = **99 W**

1) The 24 VDC power consumption of active 8BVF line filters is included in the value for the 8BVP0880Hx00.00x-1 power supply module (8BVP0880HW00.004-1 in this example).
2) In this example, a value of 10 W is assumed for $P_{24\ V\ Out}$.
3) In this example, a value of 1 W is assumed for $P_{Encoder}$.
4) No plug-in module in SLOT2: P_{SLOT2} = 0 W

$P_{24\ V\ Out}$ Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W)

$P_{Fan8BVF...}$ Power consumption $P_{Fan8BVF...}$ corresponds to the power output on module connections X4A / F- and X4A / F+ and is listed in the technical data for the respective 8BVF... line filter (fan connector).

P_{SLOT1} Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module).

P_{SLOT2} Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).

Calculate the sum of all 24 VDC power consumption values

ACOPOSmulti modules	Quantity	24 VDC power consumption for each module	Total 24 VDC power consumption
8BVF0880H000.000-1	1	---[1]	--- [1]
8BVR0880H000.100-1	1	---	---
8BVP0880HW00.004-1	1	18.25 W	18.25 W
8BVI0220HWS0.000-1	3	55 W	165 W
8B0K3630HW00.001-1	1	8 W	8 W
8B0M0120HW00.000-1	1	99 W	99 W
		Total:	**290.25 W**

1) The 24 VDC power consumption of active 8BVF line filters is included in the value for the 8BVP0880Hx00.00x-1 power supply module (8BVP0880HW00.004-1 in this example).

Make a selection based on the calculated sum

The sum of the 24 VDC power consumption values for the entire ACOPOSmulti drive system is 290.25 W. Flowchart "Procedure for selecting auxiliary supply modules" on page 540 indicates that auxiliary supply module **8B0C0160HW00.000-1** is suitable for this.

5.2.2 Example 2

A suitable auxiliary supply module should be selected for the following ACOPOSmulti drive system:

- 1x 8BVF0880H000.000-1
- 1x 8BVR0880H000.100-1
- 1x 8BVP0880HC00.004-1
- 3x 8BVI0220HCS0.000-1, each with 1x 8BAC0120.000-1 EnDat 2.1 plug-in module and 1x encoder
- 1x 8B0K3630HC00.001-1
- 2x 8BVE0500HC00.000-1
- 2x 8BVI0028HCS0.000-1, each with 1x 8BAC0120.000-1 EnDat 2.1 plug-in module and 1x encoder
- 3x 8BVI0055HCD0.000-1, each with 2x 8BAC0120.000-1 EnDat 2.1 plug-in module and 2x encoder
- 1x 8B0M0200HF00.000-1
- 5x 8B0M0040HFF0.000-1

In this example, external 24 VDC consumers should be connected to the auxiliary supply module. The sum of the 24 VDC power consumption values for these consumers is assumed to be 200 W.

Determine the 24 VDC power consumption of the individual modules in the ACOPOSmulti drive system

ACOPOSmulti modules	24 VDC power consumption for each module
8BVF0880H000.000-1	--- [1]
8BVR0880H000.100-1	---
8BVP0880HC00.004-1	$P_{24\ V\ Out}$ {0 ... 10 W} [2] + $P_{Fan8BVF...}$ = 10 W + 8.25 W = **18.25 W**
8BAC0120.000-1	P_{SLOT1}/P_{SLOT2} = 4 W + $P_{Encoder}$ [3] = 4 W + 1 W = **5 W**
8BVI0220HCS0.000-1	20 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ [2] + $P_{HoldingBrake}$ [4] = 20 W + 5 W + 0 W [5] + 10 W + 20 W = **55 W**
8B0K3630HC00.001-1	8 W
8BVE0500HC00.000-1	5 W
8BVI0028HCS0.000-1	12 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ [2] + $P_{HoldingBrake}$ [4] = 12 W + 5 W + 0 W [5] + 10 W + 20 W = **47 W**
8BVI0055HCD0.000-1	16 W + P_{SLOT1} + P_{SLOT2} + $P_{24\ V\ Out}$ [2] + $P_{HoldingBrake(s)}$ [4] = 16 W + 5 W + 5 W + 10 W + 40 W = **76 W**
8B0M0040HFF0.000-1	32 W
8B0M0200HF00.000-1	---

1) The 24 VDC power consumption of active 8BVF line filters is included in the value for power supply module 8BVP0880Hx00.00x-1 (8BVP0880HC00.004-1 in this example).
2) In this example, a value of 10 W is assumed for $P_{24\ V\ Out}$.
3) In this example, a value of 1 W is assumed for $P_{Encoder}$.
4) In this example, the value 20 W is assumed for $P_{HoldingBrake}$. In this example, the value 40 W (2 x 20 W) is assumed for $P_{HoldingBrake(s)}$.
5) No plug-in module in SLOT2: P_{SLOT2} = 0 W

$P_{24\ V\ Out}$ Power [W] that is output to the connections X2/+24 V Out 1 and X2/+24 V Out 2 on the module (max. 10 W)

$P_{Fan8BVF...}$ Power consumption $P_{Fan8BVF...}$ corresponds to the power output on module connections X4A / F- and X4A / F+ and is listed in the technical data for the respective 8BVF... line filter (fan connector).

P_{SLOT1} Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT1 (see the technical data for the respective plug-in module).

P_{SLOT2} Max. power consumption P_{8BAC} [W] of the plug-in module in SLOT2 (see the technical data for the respective plug-in module).

Determine the 24 VDC power consumption of all external consumers

External 24 VDC consumers	Total
External 24 VDC consumers	200 W

Calculate the sum of all 24 VDC power consumption values

ACOPOSmulti modules	Quantity	24 VDC power consumption for each module	Total 24 VDC power consumption
8BVF0880H000.000-1	1	--- 1)	--- 1)
8BVR0880H000.100-1	1	---	---
8BVP0880HC00.000-1	1	18.25 W	18.25 W
8BVI0220HCS0.000-1	3	55 W	165 W
8B0K3630HC00.001-1	1	8 W	8 W
8BVE0500HC00.000-1	2	5 W	10 W
8BVI0028HCS0.000-1	2	47 W	94 W
8BVI0055HCD0.000-1	3	76 W	228 W
8B0M0040HFF0.000-1	5	32 W	160 W
External 24 VDC consumers	**Quantity**	**24 VDC power consumption per external 24 VDC consumer**	**Total power consumption of external 24 VDC consumers**
External 24 VDC consumers	---	---	200 W
		Total:	**883.25 W**

1) The 24 VDC power consumption of active 8BVF line filters is included in the value for the 8BVP0880HC00.004-1 power supply module.

Make a selection based on the calculated sum

The sum of the 24 VDC power consumption values for the entire ACOPOSmulti drive system is 883.25 W. Flowchart "Procedure for selecting auxiliary supply modules" on page 540 indicates that a combination of multiple auxiliary supply modules must be used. In this example, the most suitable variant is a combination consisting of auxiliary supply modules **8B0C0160HC00.001-1 and 8B0C0320HC00.000-1**.

6 Cooling water circuit

6.1 Cooling system

In principle, both atmospherically open as well as closed cooling systems can be used.

Caution!

Direct contact of the coolant with ambient air should generally be avoided because evaporation can enrich the substance of content in the coolant, which in turn negatively affects the cooling capacity.

Caution!

The technical data for ACOPOSmulti mounting plate 8B0MnnnnHC00.000-1 must be taken into account when dimensioning the cooling system (especially section "Operating conditions" in the technical data for "8B0M mounting plates" on page 77).

Information:

Ensure that the specified service intervals are observed for all components in the cooling water circuit.

6.1.1 Piping

Rust-resistant steel pipes are recommended for use in the cooling system (V2A or V4A).

6.1.2 Gaskets

Gaskets that are free of chloride, graphite and soot and that are made of Viton® or EPDM are recommended.

Information:

Valves in cooling systems must in principle be thread-sealed with respect to the coolant. This must preferably be done using suitable liquid-sealing agents or metal-sealing functions. Suitable sealing agents are Teflon tape or LOCTITE 5331, for example.

Information:

Check the cooling system for leaks after installation is complete and before initial startup of the drive system!

6.1.3 Diagram of the cooling water circuit

Direct connection to an existing cooling circulation system

If the system already contains a cooling water circuit with a coolant that meets the requirements as specified in "Hydrologic data" on page 550, it can be directly connected with the cooling water circuit of the ACOPOSmulti mounting plate 8B0MnnnnHC00.000-1.

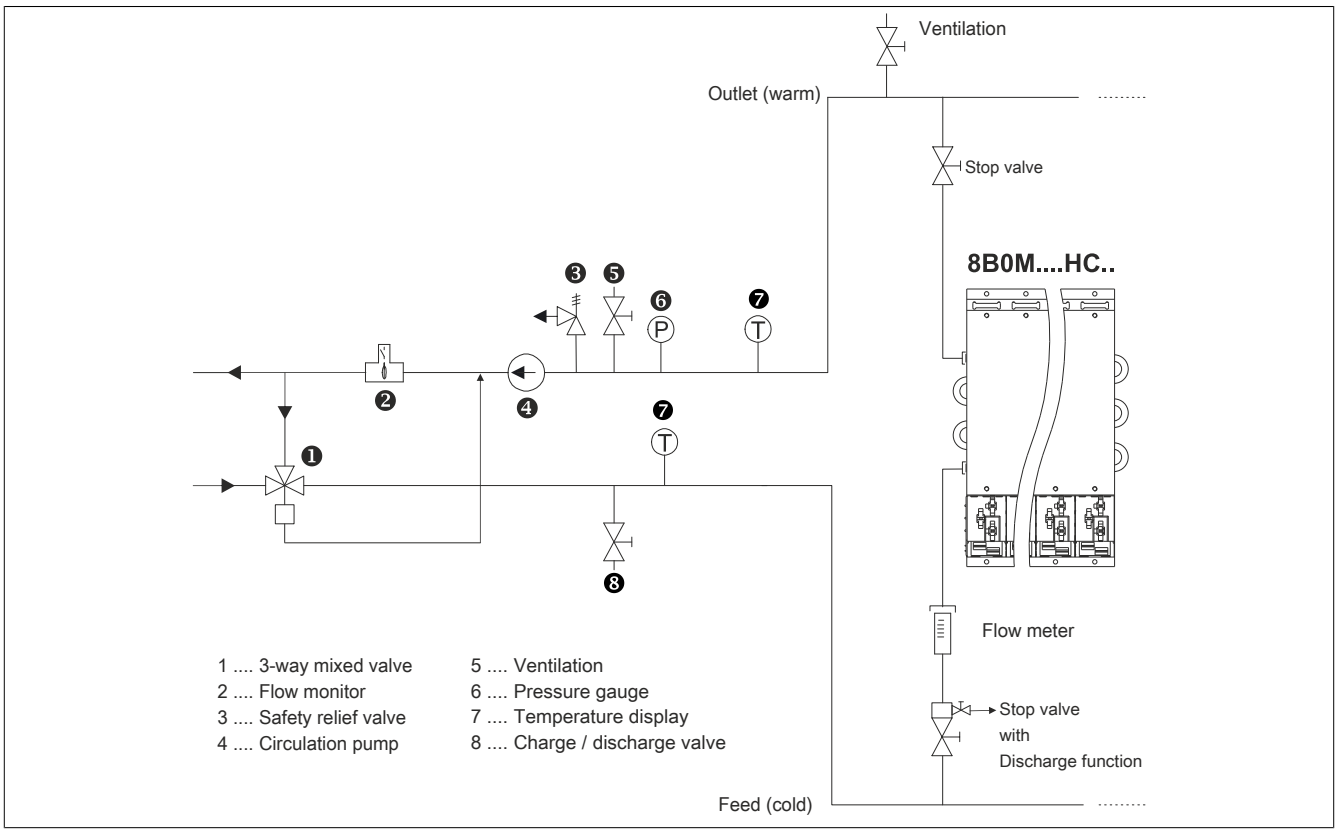


Figure 249: Diagram of the cooling water circuit (direct connection)

Information:

This diagram represents a maximum variant. Depending on local conditions and on design of the existing cooling circulation system, some of the displayed components may be omitted in certain circumstances.

Using stop valves in the feed and outlet to connect the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate makes it possible to replace the mounting plate without completely emptying the cooling system.

Connecting the feed and outlet to the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate:

See "8B0MnnnnHC00.000-1 - Dimension diagram and installation dimensions" on page 468.

Caution!

The feed (cold) must be connected to the bottom connector of the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate.

The drain (warm) must be connected to the top connector of the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate.

Warning!

Parts of the cooling circuit can reach very high temperatures. Handling of the cooling circuit improperly carries the risk of burns!

Because of this, the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate can only be replaced after the cooling water circuit has cooled off! Protective equipment should be used if necessary (protective gloves, etc.).

Information:

B&R recommends using ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plates with ACOPOSmulti 8BXW accessory sets (fittings with tapered R 1/8 Whitworth male pipe thread per EN 10226-1) for the water connections for inlet flow and return flow.

Water-to-water heat exchanger

If the system already contains a cooling water circuit with a cooling medium that does not meet the requirements as specified in "Hydrologic data" on page 550, it can be connected with the cooling water circuit of ACOPOSmulti mounting plate 8B0MnnnnHC00.000-1 using a water-water heat exchanger.

Information:

Please refer to the user documentation of the water-to-water heat exchanger!

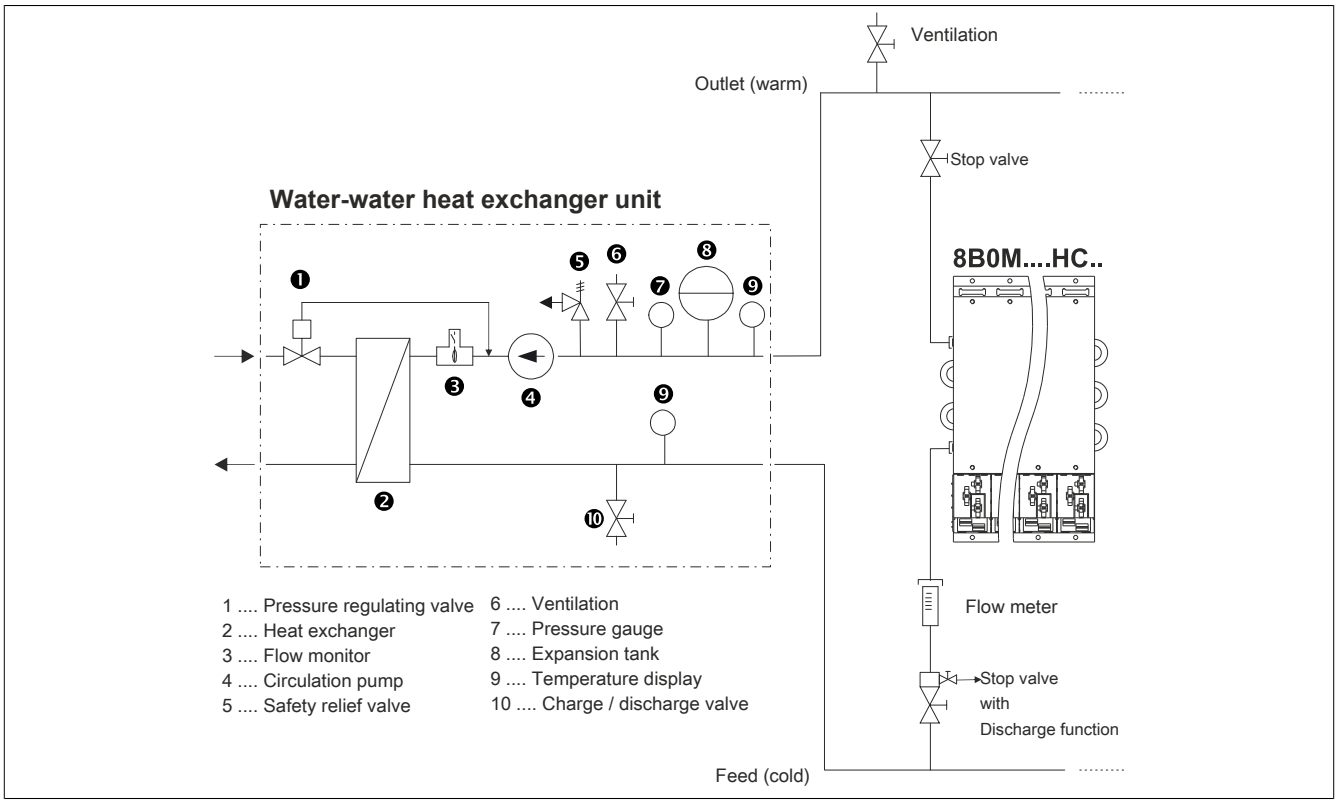


Figure 250: Diagram of the cooling water circuit (water-to-water heat exchanger)

Using stop valves in the feed and outlet to connect the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate makes it possible to replace the mounting plate without completely emptying the cooling system.

Connecting the feed and outlet to the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate:

See "8B0MnnnnHC00.000-1 - Dimension diagram and installation dimensions" on page 468.

Caution!

The feed (cold) must be connected to the bottom connector of the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate.

The drain (warm) must be connected to the top connector of the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate.

Information:

B&R recommends using ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plates with ACOPOSmulti 8BXW accessory sets (fittings with tapered R 1/8 Whitworth male pipe thread per EN 10226-1) for the water connections for inlet flow and return flow.

Connecting the water-to-water heat exchanger:

Please refer to the user documentation provided by manufacturer.

Warning!

Parts of the cooling circuit can reach very high temperatures. Handling of the cooling circuit improperly carries the risk of burns!

Because of this, the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate can only be replaced after the cooling water circuit has cooled off! Protective equipment should be used if necessary (protective gloves, etc.).

Information:

Continuous monitoring of the circulation pump is recommended to ensure proper cooling function.

Air-to-water heat exchanger

If the system does not contain a cooling water circuit, then the ACOPOSmulti mounting plate's coolant can be cooled via an air-to-water heat exchanger.

Information:

Please refer to the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate's technical data and the user documentation of the air-to-water heat exchanger!

The air-to-water heat exchanger unit must be dimensioned in such a way so that the incidental heat can be safely dissipated, even under unfavorable boundary conditions.

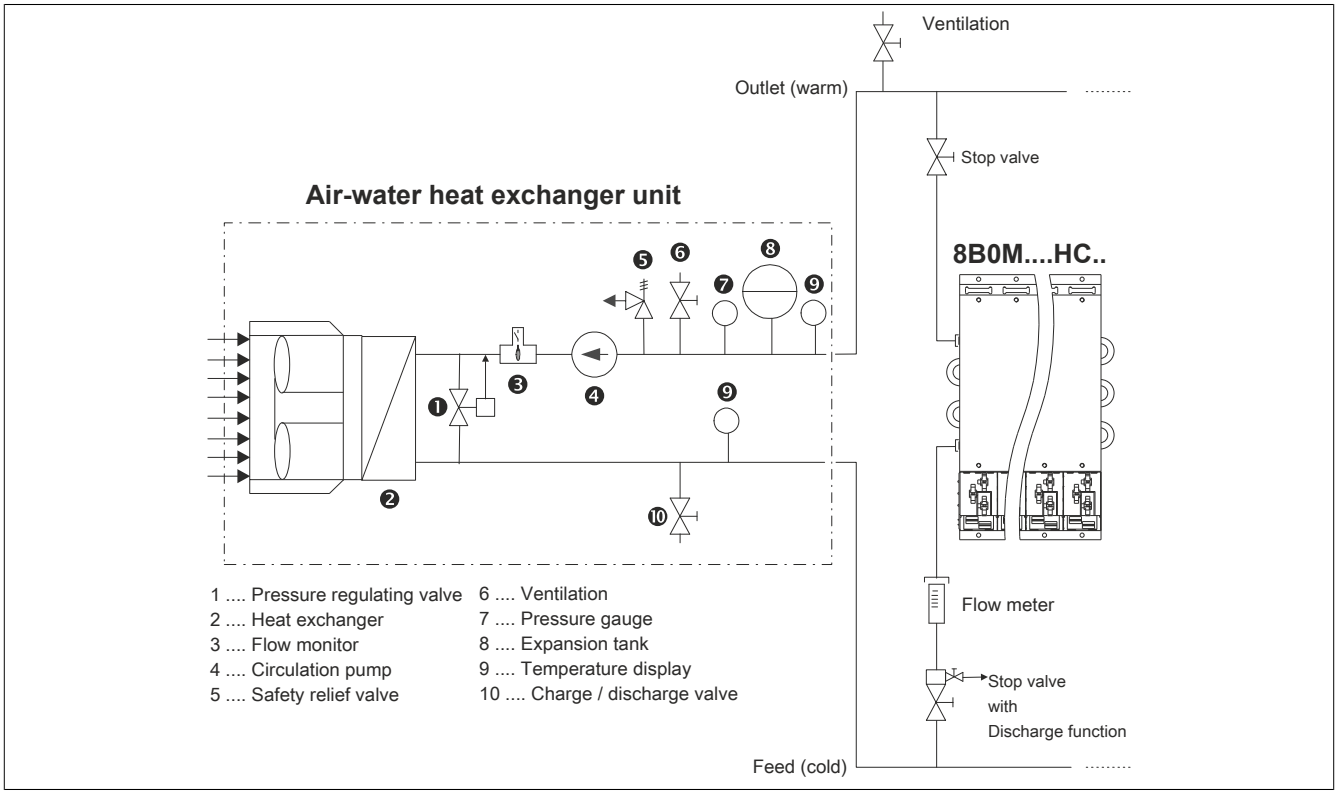


Figure 251: Diagram of the cooling water circuit (air-to-water heat exchanger)

Connecting the feed and outlet to the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate:

See "8B0MnnnnHC00.000-1 - Dimension diagram and installation dimensions" on page 468.

Caution!

The feed (cold) must be connected to the bottom connector of the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate.

The drain (warm) must be connected to the top connector of the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate.

Information:

B&R recommends using ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plates with ACOPOSmulti 8BXW accessory sets (fittings with tapered R 1/8 Whitworth male pipe thread per EN 10226-1) for the water connections for inlet flow and return flow.

Connecting the air-to-water heat exchanger:

Please refer to the user documentation provided by manufacturer.

Warning!

Parts of the cooling circuit can reach very high temperatures. Handling of the cooling circuit improperly carries the risk of burns!

Because of this, the ACOPOSmulti 8B0MnnnnHC00.000-1 mounting plate can only be replaced after the cooling water circuit has cooled off! Protective equipment should be used if necessary (protective gloves, etc.).

Information:

Continuous monitoring of the circulation pump is recommended to ensure proper cooling function.

6.2 Coolant

Coolant must be clean, chemically neutral and free of particulate matter.

The following can be used as a coolant:

- Tap water (an admixture of demineralized water is possible for adhering to the hydrological data - see Tab. 430 "Hydrologic data" in section "Hydrologic data" on page 550).
- Mixture of tap water and antifreeze in a ratio of max. 50:50.

  The following antifreezes can be used:

  - Antifrogen L
  - Antifrogen N
  - SHELL DEX-COOL
  - SHELL Rotella Ultra ELC
  - Mobil Delvac EXTENDED LIFE

Information:

The freezing temperature of the cooling medium must be matched to the conditions where the cooling system is being used.

Warning!

Antifreeze agents are hazardous to your health!
Seek immediate medical attention if swallowed.

Information:

Certain cooling agents cannot be mixed together.

If some of the coolant must be refilled or replaced, then the same coolant must be used that is already being used in the cooling system!

Caution!

A mixture of water and antifreeze is only permitted to be refilled/replaced using in the specified mixing ratio. A concentration of antifreeze in the cooling medium that is too strong can corrode pump seals over time, for example, thereby negatively affecting the impermeability of the cooling system seal!

6.2.1 Preparation and maintenance

Different demands are placed on the purity of the coolant depending on the application. If the coolant does not have a sufficient level of purity, then various methods can be used to remove impurities:

Type of impurity	Method of removal
Mechanical impurity	Filtering the coolant with various types of filters
Hardness degree of coolant is too high	Softening via ion exchange
Minor mechanical impurity and a low percentage of hardness ions	Offsetting the coolant with stabilizers and dispersing agents
Minor chemical impurities	Offsetting the coolant with passivators/inhibitors
Minor biological impurities (algae, bacteria, etc.)	Offsetting the coolant with biocides

Table 429: Overview of methods for removing impurities in the coolant

6.2.2 Hydrologic data

Information:

VEB cooling water guidelines (VGB-R 455 P) must be followed in order to avoid problems in the cooling water circuit.

The amount of solutes in the coolant increases during heat exchange due to evaporation of the coolant. The also increases the conductivity, which causes the coolant to become more corrosive. This effect can be reduced by refilling an appropriate amount of fresh coolant; it is also recommended to remove some of the enriched coolant when doing this.

The coolant should exhibit only minor hardness in order to prevent deposits from building up in the cooling system. On the other hand, water that is too soft negatively affects the materials in the cooling system.

Information:

The quality of the coolant must be checked periodically to prevent impairment of the cooling capacity and/or damage to the cooling circuit!

The coolant properties should not deviate from the following hydrologic data:

Hydrologic data	CuAl
pH value	7 to 8.5
Carbon hardness	3 to 8 °dH [1)]
Free carbonic acids	8 to 15 mg/l
Sulfides	---
Oxygen	<10 mg/l
Chloride ions	<50 mg/l
Sulfate ions	<250 mg/l
Nitrates and nitrites	<10 mg/l
CSB	<7 mg/l
Ammonia	<5 mg/l
Iron	<0.2 mg/l
Manganese	<0.2 mg/l
Conductivity	<2200 µS/cm
Evaporation residue	<500 mg/l
Potassium permanganate consumption	<25 mg/l
Particulate matter	<3 mg/l

Table 430: Hydrologic data

1) Values that are too low (soft water) i.e. less than 3 °dH, result in biologic contamination - myxobacteria and algae. This negatively affects materials. In order to prevent this, a biocide immunization must be used to return to the specified range.

6.2.3 Corrosion protection

Metal objects in the cooling circuit (e.g. screw connections) must be made of a material that has a small voltage difference to the material of the mounting plate; otherwise, contact corrosion and/or pitting will occur (see Tab. 431 "Electrochemical series, standard potential against hydrogen" on page 550).

Material	Refined ion	Standard potential	Material	Refined ion	Standard potential
Lithium	Li+	-3.04 V	Cobalt	Co2+	-0.28 V
Potassium	K+	-2.39 V	Nickel	Ni2+	-0.25 V
Calcium	Ca2+	-2.87 V	Tin	Sn2+	-0.14 V
Sodium	Na+	-2.71 V	Lead	Pb3+	-0.13 V
Magnesium	Mg2+	-2.38 V	Iron	FE3+	-0.037 V
Titanium	Ti2+	-1.75 V	Hydrogen	2H+	0.00 V
Aluminum	Al3+	-1.67 V	Copper	Cu2+	0.34 V
Manganese	Mn2+	-1.05 V	Carbon	C2+	0.74 V
Zinc	Zn2+	-0.76 V	Silver	Ag+	0.80 V
Chrome	Cr3+	-0.71 V	Platinum	Pt2+	1.20 V
Iron	Fe2+	-0.44 V	Gold	Au3+	1.42 V
Cadmium	Cd2+	-0.40 V	Gold	Au+	1.69 V

Table 431: Electrochemical series, standard potential against hydrogen

Information:

B&R recommends the use of brass or plastic screw connections. Other materials must be checked by the user based on the application. B&R assumes no liability for damage caused by corrosion due to incorrectly used materials.

Warning!

Corrosion can cause damages in the coolant circuit, which can result in failure of the entire cooling system!

The coolant used must have suitable properties to prevent corrosion (see Tab. 430 "Hydrologic data" in section "Hydrologic data" on page 550).

Information:

If the antifreeze agent Antifrogen N is used in the recommended concentration (20 - 30%), then the assumption can be made that the corrosion protection is sufficient.

6.2.4 Biocide additive

Information:

If the antifreeze agent Antifrogen N is used in the recommended concentration (20 - 30%), then the assumption can be made that the level of biocide effectiveness is sufficient.

6.2.5 Condensation

Condensation can occur if the input temperature of the coolant in the mounting plate is below the ambient temperature. The occurrence of condensation depends on the dew point of the air around the mounting point.

The dew point temperature depends on humidity and installation altitude and can be determined using the following diagram:

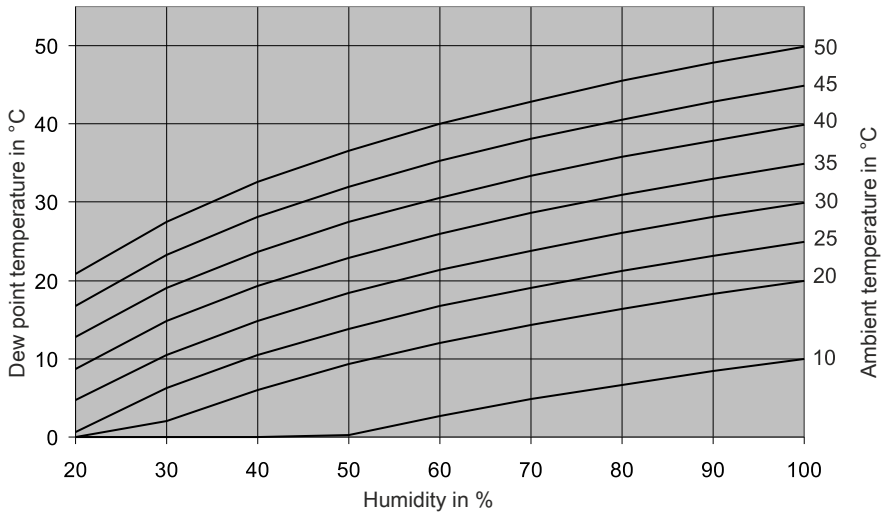


Figure 252: Dew point temperature characteristic (installation altitude: 0 ... 500 m)

The diagram illustrates characteristic curves for the dew point temperature at different ambient temperatures. A reading can now be made of the corresponding value for the dew point temperature according to the ambient temperature.

Example

According to the diagram, the dew point temperature at an ambient temperature of 40°C and a relative humidity of 60% is approximately 31°C.

The input temperature of the coolant in the mounting plate must therefore be higher than 31°C to safely eliminate condensation.

Information:

Condensation does not occur in environments with common air temperatures and air pressures when the input temperature of the coolant is >35 ... 40°C.

Potential measures for preventing condensation

- Include a temperature-controlled valve device in the cooling circuit.
- The temperature of the coolant is adjusted according to the ambient temperature (coolant temperature regulation, preferably at high room temperatures and high relative humidity).
- Dehumidify the ambient air:
  Condensation of air moisture on an air-to-water heat exchanger that is operated with cold coolant.
- Use control cabinet heaters.

7 Dimensioning cooling systems for cooling control cabinets

7.1 General dimensioning criteria

- What are the environmental conditions where the control cabinet will be located (ambient temperature T_A, humidity, installation altitude above sea level)?
- How is the air circulation (intake and outlet) where the control cabinet will be located? Particularly small spaces can become significantly warmer due to the heat dissipation from a cooling device.
- Is the ambient air clean or contaminated with dust, oil, etc?
- Which type of control cabinet installation is intended according to DIN 57660, Part 500?
- Is the control cabinet open (allowing air flow) or closed (no air flow)? Control cabinets that are closed (no air flow) can only dissipate power loss via the control cabinet walls.
- What kind of material are the control cabinet walls made of (specification of the heat transfer coefficient k)?
- What is the control cabinet's minimum required level of protection in accordance with EN 60529?
- How high is the specified internal temperature T_{Iset} of the control cabinet? This value must be lower than the lowest permissible ambient temperature of all components used in the control cabinet.
- Is a coolant circulation available where the control cabinet is located?
- Is the maximum ambient temperature T_{Amax} lower than the desired internal temperature T_{Iset} of the control cabinet?

7.1.1 Basic selection of the cooling system

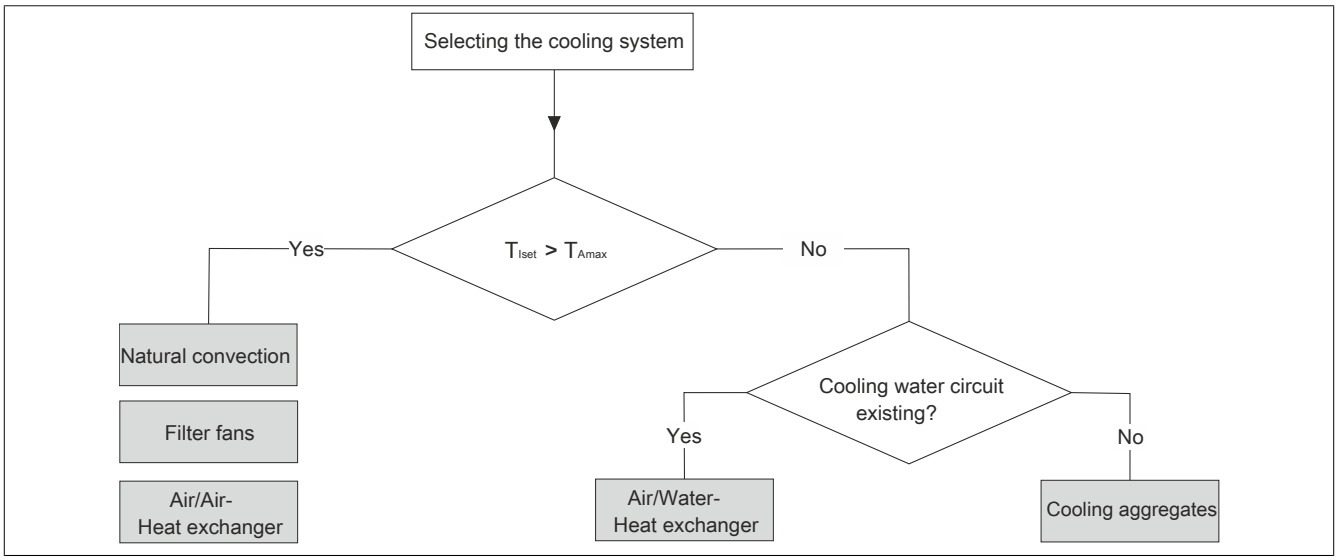


Figure 253: Basic selection of the cooling system

7.2 Natural convection

In this case, the power loss is emitted outwards through the control cabinet walls.

Information:

The ambient temperature T_A must be considerably lower than the internal temperature T_I of the control cabinet.

The heat capacity emitted from the control cabinet to the environment strongly depends on how the control cabinet is installed: A housing located in an open space can emit more heat to its environment than a housing that is mounted to a wall or built into a recess.

The calculation of the effective control cabinet surface A depending on the type of control cabinet installation is determined in DIN VDE 57 660 part 500 or IEC 890 (and VDE 0660 part 890):

Mounting arrangement in accordance with IEC 890		Formula for calculating A [m²] 1)
	Detached single cabinet, free-standing on all sides	A = 1.8 x H x (W + D) + 1.4 x W x D
	Single cabinet, against a wall	A = 1.4 x W x (H + D) + 1.8 x D x H
	First or last cabinet, detached on three sides	A = 1.4 x D x (H + W) + 1.8 x W x H
	First or last cabinet, against a wall	A = 1.4 x H x (W + D) + 1.4 x W x D
	Middle cabinet, detached on two sides	A = 1.8 x W x H + 1.4 x W x D + D x H
	Middle cabinet, against a wall	A = 1.4 x W x (H + D) + D x H
	Middle cabinet, against a wall, with covered roof	A = 1.4 x W x H + 0.7 x W x D + D x H

Table 432: Calculation of the effective control cabinet surface A (DIN VDE 57 660 part 500 or IEC 890)

1) W... Control cabinet width [m]; H ... Control cabinet height [m]; D ... Control cabinet depth [m].

7.2.1 Dimensioning

1. Determine the heat dissipation Q_v of all devices in the control cabinet.
2. Calculate the effective control cabinet surface area A.
3. Calculate the maximum control cabinet temperature T_{Imax}: 32)

$$T_{Imax} = \frac{Q_V}{k.A} + T_U$$

The control cabinet's maximum internal temperature T_{Imax} must be lower than the maximum permissible ambient temperature of the components used inside the control cabinet.

32) k ... Heat transfer coefficient [W/m²K]; for steel panel: k = 5.5
If the heat dissipation Q_V in the control cabinet is unknown, the actual power loss can be calculated by measuring T_A and T_I: $Q_V = A \cdot k \cdot (T_{Imax} - T_A)$

7.2.2 Example

Information:

This example is calculated for wall-mounted ACOPOSmulti drive systems. When using ACOPOSmulti modules with cold plate or feed-through mounting, a correction value of 0.33 must be factored into the heat dissipation.

An ACOPOSmulti drive system with the following modules is installed in a control cabinet:

- 1x 8BVF0880H000.000-1
- 1x 8BVR0880H000.100-1
- 1x 8BVP0880HW00.000-1
- 1x 8B0C0320HW00.002-1
- 3x 8BVI0220HWS0.000-1

The ACOPOSmulti drive system is run at a switching frequency of 5 kHz. The heat dissipation for all other active devices in the control cabinet is 500 W.

The steel control cabinet is 2 m wide, 2 m high, 1 m deep and is free-standing on all sides. The internal temperature of the control cabinet should not exceed 40°C. The ambient temperature is 30°C.

Now determine whether the heat dissipation occurring in the control cabinet can be diverted by its own natural convection.

1) Determine the heat dissipation of all devices in the control cabinet.

Components in the control cabinet	Quantity	Heat dissipation per component [W] 1)	Total heat dissipation [W]
8BVF0880H000.000-1	1	980	980
8BVR0880H000.100-1	1	420	420
8BVP0880HW00.000-1	1	1008	1008
8B0C0320HW00.002-1	1	80	80
8BVI0220HWS0.000-1	3	163	489
All other active devices	---	---	500
		Total:	**3477**

Table 433: Determining the heat dissipation of all devices in the control cabinet

1) Heat dissipation values can be found and calculated using the information in the "Technical data" section (observe the derating specifications!). Maximum values are used in this example (continuous power and continuous current).

2) Calculate the effective control cabinet surface area A

A = 1.8 x H x (W + D) + 1.4 x W x D = 1.8 x 2 x (2+1) + 1.4 x 2 x 1 = 13.6 m²

3) Calculate the control cabinet inside temperature T_I

$$T_I = \frac{Q_V}{k.A} + T_U = \frac{3200}{5.5.13.6} + 30 = 73°C$$

The control cabinet's calculated internal temperature considerably exceeds the desired internal temperature of 40°C. Therefore, the heat dissipation occurring inside the control cabinet cannot be diverted by its own natural convection. Another method must be used for cooling the control cabinet.

7.3 Filter fans

Filter fans are also a simple type of control cabinet cooling. The heat is dissipated by adding ambient air circulation and simultaneously allowing the heated air inside the control cabinet to be diverted.

Information:

To use filter fans, the ambient temperature T_A must be considerably lower than the internal temperature T_I of the control cabinet.

7.3.1 Dimensioning

1. Determine the heat dissipation Q_v of all devices in the control cabinet.
2. Determine the control cabinet's maximum internal temperature T_{Imax} at nominal load or identify it using the maximum ambient temperature of the components being used.
3. Specify the ambient temperature T_A of the control cabinet.
4. Specify the control cabinet's installation altitude h.
   Depending on the control cabinet's installation altitude, a compensation factor f might be required, which can be found in the following table:

Installation altitude h [m]	Compensation factor f [m³K/Wh]
0 ≤ h ≤ 100	3.1
100 < h ≤ 250	3.2
250 < h ≤ 500	3.3
500 < h ≤ 750	3.4
750 < h ≤ 1000	3.5

Table 434: Compensation factor f depending on the control cabinet's installation altitude

5. Calculate the air flow volume V:

$$V[m^3/h] = f.\frac{Q_V}{T_{Imax} - T_A}$$

The correct filter fan can now be selected based on the calculated air flow volume V.

Information:

The required protection level of the control cabinet in accordance with EN 60529 must also be taken into consideration when selecting a filter fan.

7.3.2 Example

Information:

This example is calculated for wall-mounted ACOPOSmulti drive systems. When using ACOPOSmulti modules with cold plate or feed-through mounting, a correction value of 0.33 must be factored into the heat dissipation.

An ACOPOSmulti drive system with the following modules is installed in a control cabinet:

- 1x 8BVF0880H000.000-1
- 1x 8BVR0880H000.100-1
- 1x 8BVP0880HW00.000-1
- 1x 8B0C0320HW00.002-1
- 3x 8BVI0220HWS0.000-1

The ACOPOSmulti drive system is run at a switching frequency of 5 kHz. The heat dissipation for all other active devices in the control cabinet is 500 W.

The steel control cabinet is 2 m wide, 2 m high, 1 m deep and is free-standing on all sides. The internal temperature of the control cabinet should not exceed 40°C. The ambient temperature is 30°C.

The right filter fan must be selected for this control cabinet.

1) Determine the heat dissipation of all devices in the control cabinet.

Components in the control cabinet	Quantity	Heat dissipation per component [W] 1)	Total heat dissipation [W]
8BVF0880H000.000-1	1	980	980
8BVR0880H000.100-1	1	420	420
8BVP0880HW00.000-1	1	1008	1008
8B0C0320HW00.002-1	1	80	80
8BVI0220HWS0.000-1	3	163	489
All other active devices	---	---	500
		Total:	**3477**

Table 435: Determining the heat dissipation of all devices in the control cabinet

1) Heat dissipation values can be found and calculated using the information in the "Technical data" section (observe the derating specifications!). Maximum values are used in this example (continuous power and continuous current).

2) Determine the control cabinet's maximum internal temperature T_{Imax} at nominal load or identify it using the maximum ambient temperature of the components being used

The internal temperature of the control cabinet should not exceed 40°C.

3) Specify the ambient temperature T_A of the control cabinet.

The ambient temperature is 30°C.

4) Specify the control cabinet's installation altitude h.

In this example, the installation elevation of the control cabinet is 1000 m above sea level. Compensation factor f can be taken from "Compensation factor f depending on the control cabinet's installation altitude" on page 556 and is equal to 3.5 m³ K/Wh.

5) Calculate the air flow volume V.

This results in an air flow volume of

$$V = f.\frac{Q_V}{T_{Imax}} = 3{,}5.\frac{3200}{40-30} = 1120 m^3/h$$

The correct filter fan can now be selected based on the determined air flow volume.

7.4 Air/air heat exchanger

Air/Air heat exchangers dissipate the heat from the control cabinet using two hermetically isolated air currents in the opposing current principle. This prevents dust, oil and other (aggressive) materials in the ambient air from penetrating the control cabinet.

Information:

To use air/air heat exchangers, the ambient temperature T_A must be considerably lower than the internal temperature T_I of the control cabinet.

7.4.1 Dimensioning

1. Determine the heat dissipation Q_v of all devices in the control cabinet.
2. Determine the control cabinet's maximum internal temperature T_{Imax} at nominal load or identify it using the maximum ambient temperature of the components being used.
3. Specify the ambient temperature T_A of the control cabinet.
4. Calculate the effective control cabinet surface area A.
5. Calculate the specific heat capacity q_W: [33)]

$$q_w[\frac{W}{K}] = \frac{Q_V - (A.(T_{Imax} - T_A).k)}{T_{Imax} - T_A}$$

The right air/air heat exchanger can be selected based on the specific heat capacity q_W.

Information:

The required protection level of the control cabinet in accordance with EN 60529 must also be taken into consideration when selecting an air/air heat exchanger.

7.4.2 Example

Information:

This example is calculated for wall-mounted ACOPOSmulti drive systems. When using ACOPOSmulti modules with cold plate or feed-through mounting, a correction value of 0.33 must be factored into the heat dissipation.

An ACOPOSmulti drive system with the following modules is installed in a control cabinet:

- 1x 8BVF0880H000.000-1
- 1x 8BVR0880H000.100-1
- 1x 8BVP0880HW00.000-1
- 1x 8B0C0320HW00.002-1
- 3x 8BVI0220HWS0.000-1

The ACOPOSmulti drive system is run at a switching frequency of 5 kHz. The heat dissipation for all other active devices in the control cabinet is 500 W.

The steel control cabinet is 2 m wide, 2 m high, 1 m deep and is free-standing on all sides. The internal temperature of the control cabinet should not exceed 40°C. The ambient temperature is 30°C.

The right air/air heat exchanger must be selected for this control cabinet.

1) Determine the heat dissipation of all devices in the control cabinet.

Components in the control cabinet	Quantity	Heat dissipation per component [W] [1)]	Total heat dissipation [W]
8BVF0880H000.000-1	1	980	980
8BVR0880H000.100-1	1	420	420
8BVP0880HW00.000-1	1	1008	1008

Table 436: Determining the heat dissipation of all devices in the control cabinet

[33)] k ... Heat transfer coefficient [W/m²K]; for steel panel: k = 5.5

Components in the control cabinet	Quantity	Heat dissipation per component [W] 1)	Total heat dissipation [W]
8B0C0320HW00.002-1	1	80	80
8BVI0220HWS0.000-1	3	163	489
All other active devices	---	---	500
		Total:	**3477**

Table 436: Determining the heat dissipation of all devices in the control cabinet

1) Heat dissipation values can be found and calculated using the information in the "Technical data" section (observe the derating specifications!). Maximum values are used in this example (continuous power and continuous current).

2) Determine the control cabinet's maximum internal temperature T_{Imax} at nominal load or identify it using the maximum ambient temperature of the components being used.

The internal temperature of the control cabinet should not exceed 40°C.

3) Specify the ambient temperature T_A of the control cabinet.

The ambient temperature is 30°C.

4) Calculate the effective control cabinet surface area A

A = 1.8 x H x (W + D) + 1.4 x W x D = 1.8 x 2 x (2 + 1) + 1.4 x 2 x 1 = 13.6 m²

5) Calculate the specific heat capacity q_W

The heat transfer coefficient k for steel panels is 5.5 W/m²K.

This results in a specific heat capacity q_W of

$$q_w[\frac{W}{K}] = \frac{Q_V - (A.(T_{Imax} - T_A).k)}{T_{Imax} - T_A} = \frac{3200 - (13,6.(40 - 30).5,5)}{40 - 30} = 245,2\frac{W}{K}$$

The right air/air heat exchanger can be selected based on the determined specific heat capacity q_W.

7.5 Air-to-water heat exchangers, cooling units

Air/water heat exchangers and cooling units dissipate heat via a cooling circulation system. This prevents dust, oil and other (aggressive) materials in the ambient air from penetrating the control cabinet.

7.5.1 Dimensioning

1. Determine the heat dissipation Q_v of all devices in the control cabinet.
2. Determine the control cabinet's maximum internal temperature T_{Imax} at nominal load or identify it using the maximum ambient temperature of the components being used.
3. Specify the ambient temperature T_A of the control cabinet.
4. Calculate the effective control cabinet surface area A.
5. Calculate the required cooling capacity Q_E: [34)]
   $Q_E[W] = Q_V - (A \cdot (T_{Imax} - T_A) \cdot k)$

The right air/water heat exchanger or cooling unit can now be selected based on the required cooling capacity Q_E.

Information:

The required protection level of the control cabinet in accordance with EN 60529 must also be taken into consideration when selecting an air/water heat exchanger or cooling unit.

7.5.2 Example

Information:

This example is calculated for wall-mounted ACOPOSmulti drive systems. When using ACOPOSmulti modules with cold plate or feed-through mounting, a correction value of 0.33 must be factored into the heat dissipation.

An ACOPOSmulti drive system with the following modules is installed in a control cabinet:

- 1x 8BVF0880H000.000-1
- 1x 8BVR0880H000.100-1
- 1x 8BVP0880HW00.000-1
- 1x 8B0C0320HW00.002-1
- 3x 8BVI0220HWS0.000-1

The ACOPOSmulti drive system is run at a switching frequency of 5 kHz. The heat dissipation for all other active devices in the control cabinet is 500 W.

The steel control cabinet is 2 m wide, 2 m high, 1 m deep and is free-standing on all sides. The internal temperature of the control cabinet should not exceed 40°C. The ambient temperature is 30°C.

The right air-to-water heat exchanger or cooling unit must be selected for this control cabinet.

1) Determine the heat dissipation of all devices in the control cabinet.

Components in the control cabinet	Quantity	Heat dissipation per component [W] [1)]	Total heat dissipation [W]
8BVF0880H000.000-1	1	980	980
8BVR0880H000.100-1	1	420	420
8BVP0880HW00.000-1	1	1008	1008
8B0C0320HW00.002-1	1	80	80
8BVI0220HWS0.000-1	3	163	489
All other active devices	---	---	500
		Total:	**3477**

Table 437: Determining the heat dissipation of all devices in the control cabinet

1) Heat dissipation values can be found and calculated using the information in the "Technical data" section (observe the derating specifications!). Maximum values are used in this example (continuous power and continuous current).

2) Determine the control cabinet's maximum internal temperature T_{Imax} at nominal load or identify it using the maximum ambient temperature of the components being used

The internal temperature of the control cabinet should not exceed 40°C.

34) k ... Heat transfer coefficient [W/m²K]; for steel panel: k = 5.5

3) Specify the ambient temperature T_A of the control cabinet.

The ambient temperature is 30°C.

4) Calculate the effective control cabinet surface area A

A = 1.8 x H x (W + D) + 1.4 x W x D = 1.8 x 2 x (2 + 1) + 1.4 x 2 x 1 = 13.6 m²

5) Calculate the required cooling capacity Q_E

The heat transfer coefficient k for steel panels is 5.5 W/m²K.

This results in a required cooling capacity Q_E of

$Q_E = Q_v – (A \cdot (T_{Imax} – T_A) \cdot k) = 3200 – (13.6 \cdot (40 – 30) \cdot 5.5) = 3171$ W

The right air-to-water heat exchanger or cooling unit can now be selected based on the determined required cooling capacity Q_E.

Chapter 5 • Wiring

1 General information

1.1 Electromagnetic compatibility of the installation

1.1.1 General information

If the guidelines for electromagnetic compatibility installation are followed, the ACOPOSmulti drive system meets the requirements of the EMC Directive (2014/30/EU) and Low Voltage Directive (2014/35/EU). It also meets the requirements for EMC product standard EN 61800-3 for industrial environments (second environment).

Additional EMC measures must be implemented by the machine or system manufacturer in the event that the product standard for the machine includes lower limit values or the machine conforms to the basic standard IEC 61000-6-4. Proof of conformity to required limit values must be provided by the manufacturer or distributor of the machine or system in accordance with the guidelines for implementing the EMC directive.

Additional EMC measures are required when operating ACOPOSmulti drive systems in a residential area or when connecting ACOPOSmulti drive systems to a low voltage system that also supplies buildings in a residential area (first environment) without an intermediate transformer.

1.1.2 Installation notes

1. The control cabinet or system must be set up in a functional and appropriate manner. The devices must be installed such that they are stationary (i.e. in the control cabinet).
2. To prevent the effects of disturbances, the following lines must be properly shielded:
    - Motor cables
    - Encoder cables
    - Control cables
    - Data cables
    - Braking resistor cables
3. Inductive switching elements such as contactors or relays must be equipped with corresponding interference suppressors such as varistors, RC elements or damping diodes.
4. All electrical connections must be kept as short as possible.
5. Cable shields must always be connected as close as possible to the respective connection with the appropriate conductive shielding clamps and connector housings. Twisting the braided shield or extending it with single conductors (pigtail) is not permitted!
6. Shielded cables with copper braiding or tinned copper braiding with coverage >75% (85%) must be used.
7. Unused cable conductors must be grounded on both sides whenever possible.

> **Information:**
>
> **To meet UL/CSA requirements, components of ACOPOSmulti drive systems are only permitted to be wired with copper wires with a permissible cable temperature of at least 60°C (up to 40°C ambient temperature) or 75°C (up to 55°C ambient temperature)!**

1.1.3 Overview

1.1.3.1 Passive power supply

8B0P0110 without 8B0C auxiliary supply module

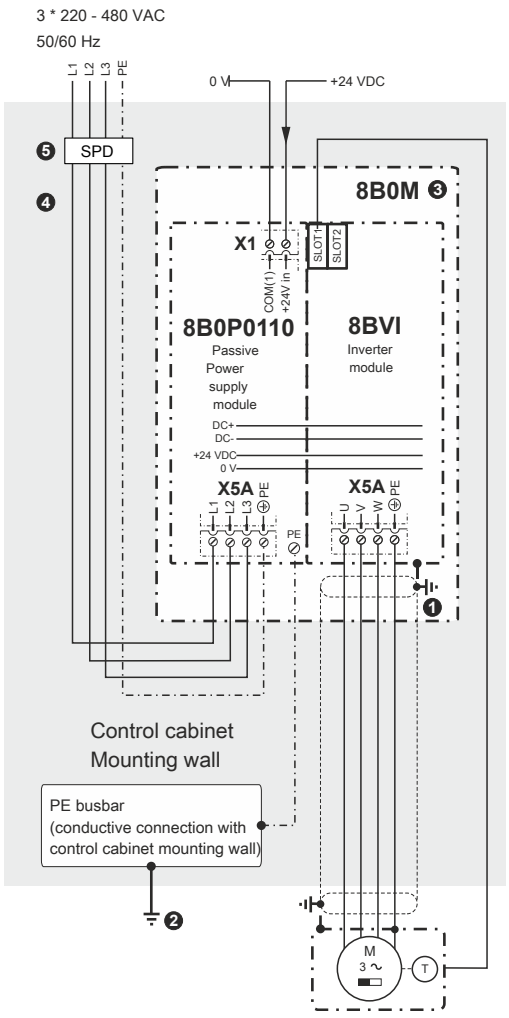


Figure 254: Overview of ground/shield for the ACOPOSmulti drive system (passive power supply 8B0P0110 without 8B0C auxiliary supply module)

1) Shielding connection via module-specific shield component set.
2) Central grounding point.
3) 8B0M mounting plate, large-surface conductive connection with control cabinet mounting wall.
4) The mains power input must be kept as short as possible inside the control cabinet.
5) For use in Canada only:
   Transient surge suppression shall be installed on the line side of this equipment and shall be rated 277 V (phase to ground), 480 V (phase to phase), suitable for overvoltage category III, and shall provide protection for a rated impulse withstand voltage peak of 4 kV.

8B0P0110 with 8B0C auxiliary supply module

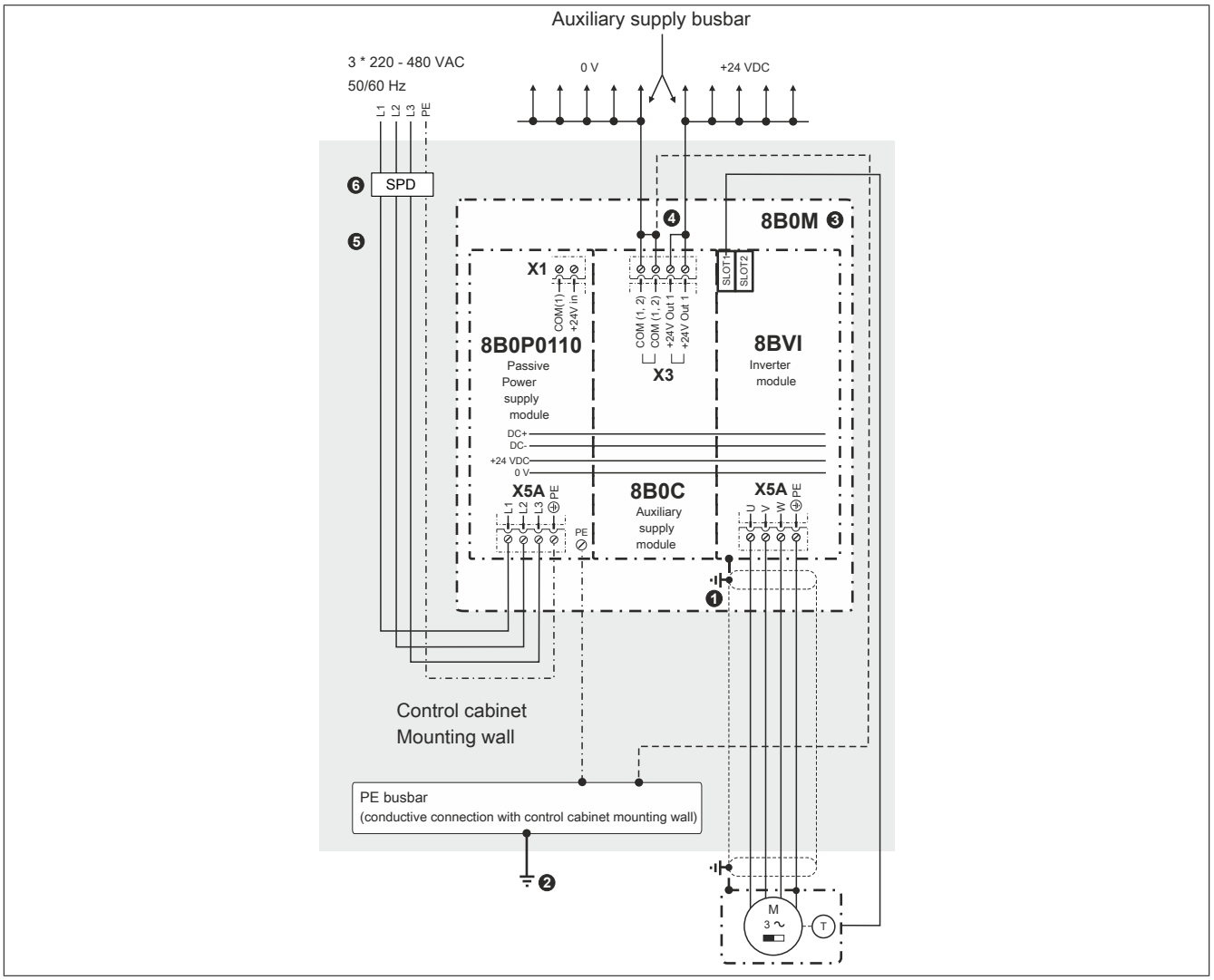


Figure 255: Overview of ground/shield for the ACOPOSmulti drive system (passive power supply 8B0P0110 with 8B0C auxiliary supply module)

1) Shielding connection via module-specific shield component set.
2) Central grounding point.
3) 8B0M mounting plate, large-surface conductive connection with control cabinet mounting wall.
4) B&R recommends grounding both COM connections (1, 2) on connector X3 to achieve a defined relationship between the mass and ground potential.
5) The mains power input must be kept as short as possible inside the control cabinet.
6) For use in Canada only:
   Transient surge suppression shall be installed on the line side of this equipment and shall be rated 277 V (phase to ground), 480 V (phase to phase), suitable for overvoltage category III, and shall provide protection for a rated impulse withstand voltage peak of 4 kV.

8B0P0220/0440

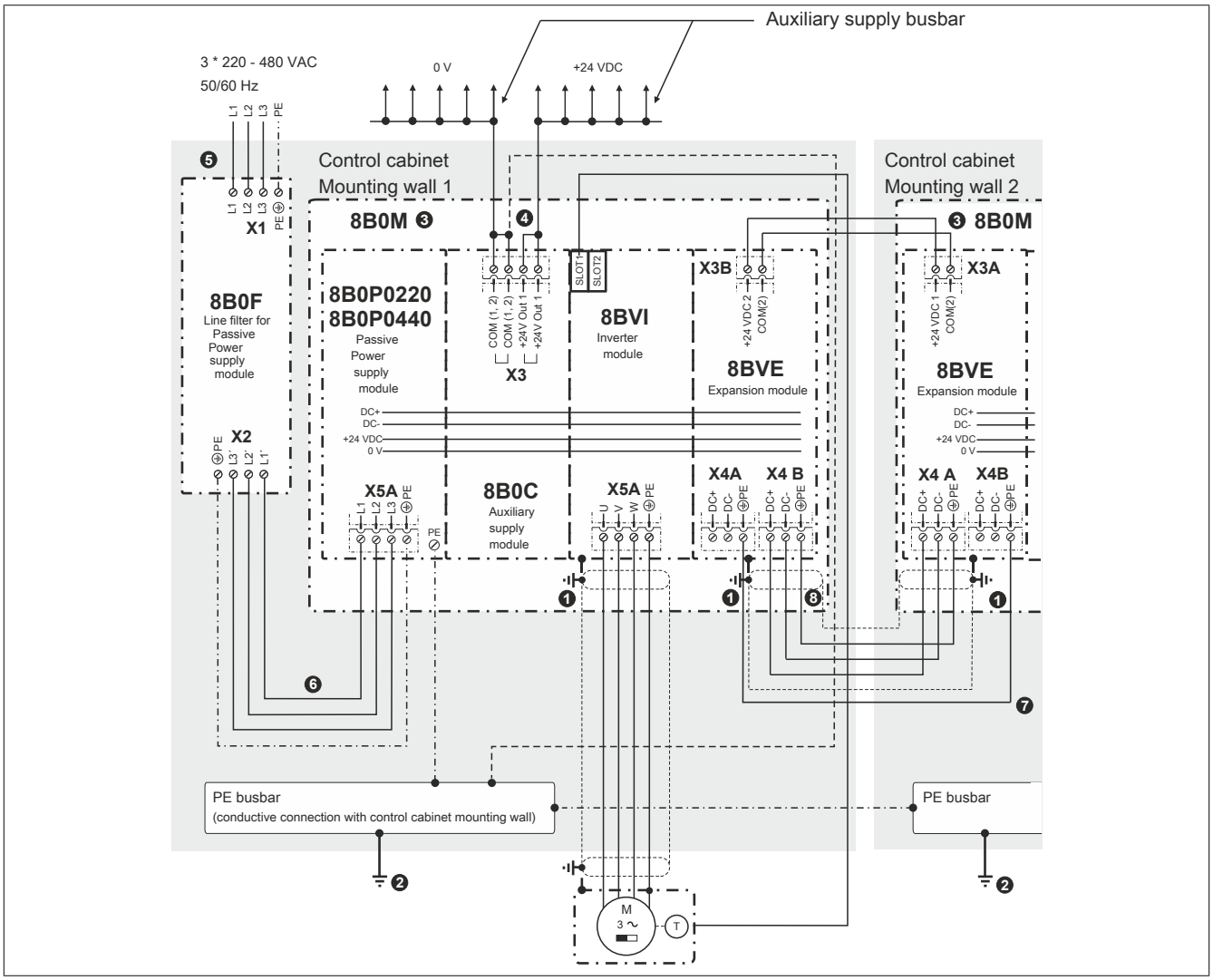


Figure 256: Overview of ground/shield for ACOPOSmulti drive system (passive power supply 8B0P0220/0440)

1) Shielding connection via module-specific shield component set.
2) Central grounding point.
3) 8B0M mounting plate, large-surface conductive connection with control cabinet mounting wall.
4) B&R recommends grounding both COM connections (1, 2) on connector X3 to achieve a defined relationship between the mass and ground potential.
5) The mains power input must be kept as short as possible inside the control cabinet.
6) The connection between line filter 8B0F and power supply module 8B0P is never shielded. To avoid disturbances in the mains power input (❺), the mains power input is not permitted to be routed parallel to the connection between line filter 8B0F and power supply module 8B0P.
7) An additional PE connection must be made between two 8BVE expansion modules in order to meet the conditions necessary for the ACOPOSmulti drive systems mains connection on all 8B0M mounting plates that are connected using 8BVE expansion modules. This additional PE connection must be made with the same wire cross section as the PE wire (❽) routed in the expansion cable (at least 2.5 mm² with protected wiring or 4 mm² with unprotected wiring).

Caution!

No additional consumers/components are permitted to be connected between the 8B0F line filter and the 8B0P passive power supply module!

Warning!

ACOPOSmulti drive systems are only permitted to be used with specially designed line filters. Line filters from third-party manufacturers are not permitted to be used under any circumstances; there is a risk of irreparable damage to these line filters or components of the ACOPOSmulti drive system.

1.1.3.2 Active power supply

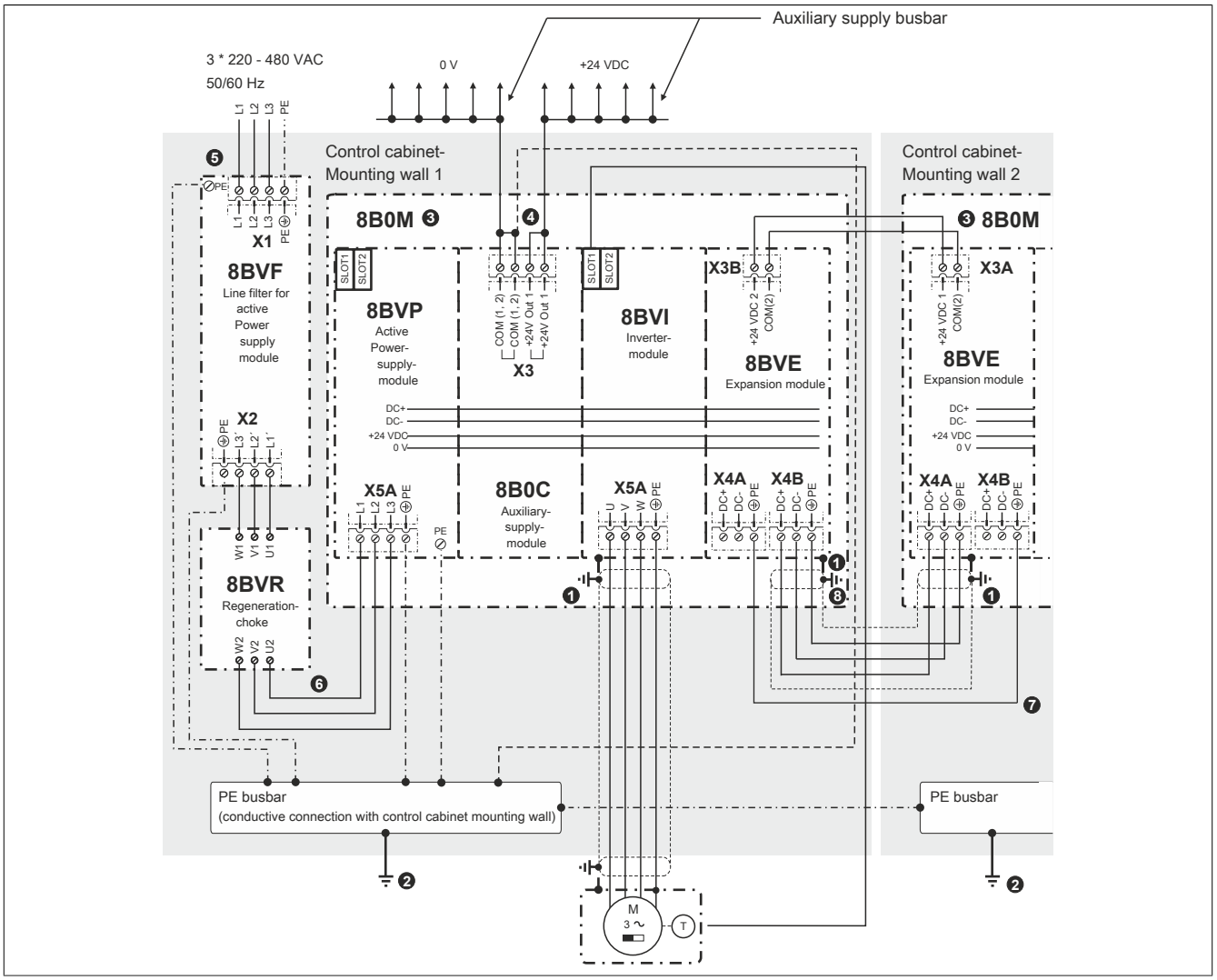


Figure 257: Overview of ground/shield for ACOPOSmulti drive system (active power supply)

1) Shielding connection via module-specific shield component set.
2) Central grounding point.
3) 8B0M mounting plate, large-surface conductive connection with control cabinet mounting wall.
4) B&R recommends grounding both COM connections (1, 2) on connector X3 to achieve a defined relationship between the mass and ground potential.
5) The mains power input must be kept as short as possible inside the control cabinet.
6) The connection between line filter 8BVF and power supply module 8BVP is never shielded. To avoid disturbances in the mains power input (❻), the mains power input is not permitted to be routed parallel to the connection between line filter 8BVF and power supply module 8BVP.
7) An additional PE connection must be made between two 8BVE expansion modules in order to meet the conditions necessary for the ACOPOSmulti drive systems mains connection on all 8B0M mounting plates that are connected using 8BVE expansion modules. This additional PE connection must be made with the same wire cross section as the PE wire (❽) routed in the expansion cable (at least 2.5 mm² with protected wiring or 4 mm² with unprotected wiring).

Caution!

No additional consumers/components are permitted to be connected between the 8BVF line filter, 8BVR regeneration choke and the 8BVP power supply module!

Warning!

ACOPOSmulti drive systems are only permitted to be used with specially designed line filters. Line filters from third-party manufacturers are not permitted to be used under any circumstances; there is a risk of irreparable damage to these line filters or components of the ACOPOSmulti drive system.

1.1.3.3 8BVP1650 power mains connection

There are two variants for implementing the power mains connection for 8BVP1650 ACOPOSmulti power supply modules.

Variant 1

The power mains connection is made using two 8BVR0880 regeneration chokes connected in parallel and two 8BVF0880 line filters, also connected in parallel.

Wiring

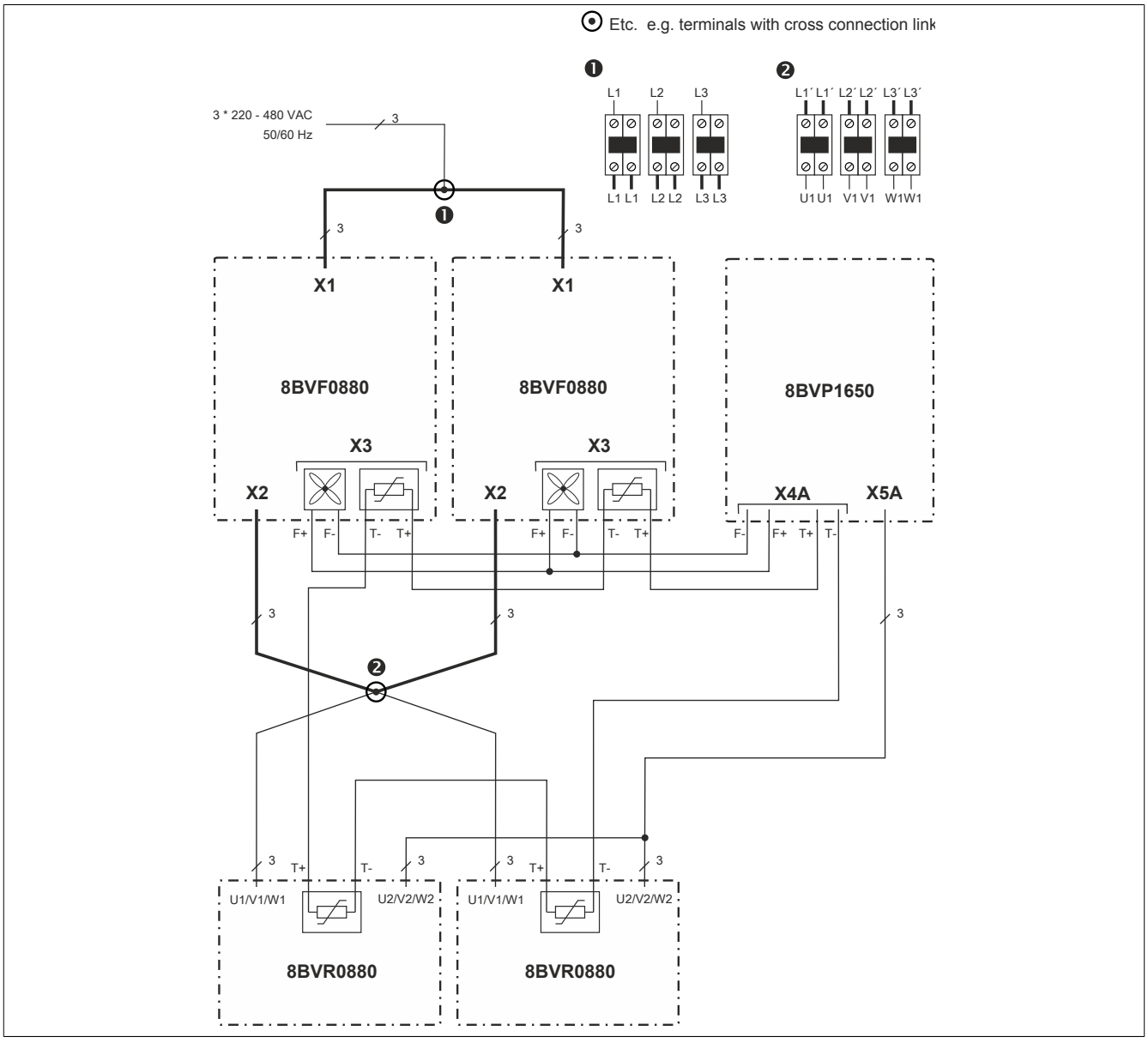


Figure 258: 8BVP1650 power mains connection with 2x 8BVR0880 and 2x 8BVF0880

Caution!

Cables of the same type and length should be used between mains connection point 1 and the X1 connections on the mains side of the 8BVF0880 line filter as well as between the X2 connections on the load side of the 8BVF0880 line filter and point 2 as shown in image "8BVP1650 power mains connection with 2x 8BVR0880 and 2x 8BVF0880"! This is the only way to ensure symmetric distribution of current through the two 8BVF0880 line filters connected in parallel.

Caution!

The factory parameter settings for the 8BVP1650 power supply module are intended for use of one 8BVF line filter and one 8BVR regeneration choke. However, two 8BVF0880 line filters connected in parallel and two 8BVR regeneration chokes connected in parallel are used here.

Therefore, the following settings must be adjusted in Automation Studio:

- **Set the value of ParID 64 (MOTOR_TEMPSENS_PAR1) to 6000.00**
- **Set the value of ParID 65 (MOTOR_TEMPSENS_PAR2) to 2500.00**
- **Set the value of ParID 66 (MOTOR_TEMPSENS_PAR3) to 155.00**

Caution!

Temperature sensors are built into the 8BVF line filters and 8BVR regeneration chokes. These temperature sensors must be connected in series according to image "8BVP1650 power mains connection with 2x 8BVR0880 and 2x 8BVF0880"!

If the wiring in not installed properly, error 9010 or 9012 is indicated. Check the wiring!

Variant 2

The power mains connection is made using one 8BVR1650 regeneration choke and two 8BVF0880 line filters connected in parallel.

Wiring

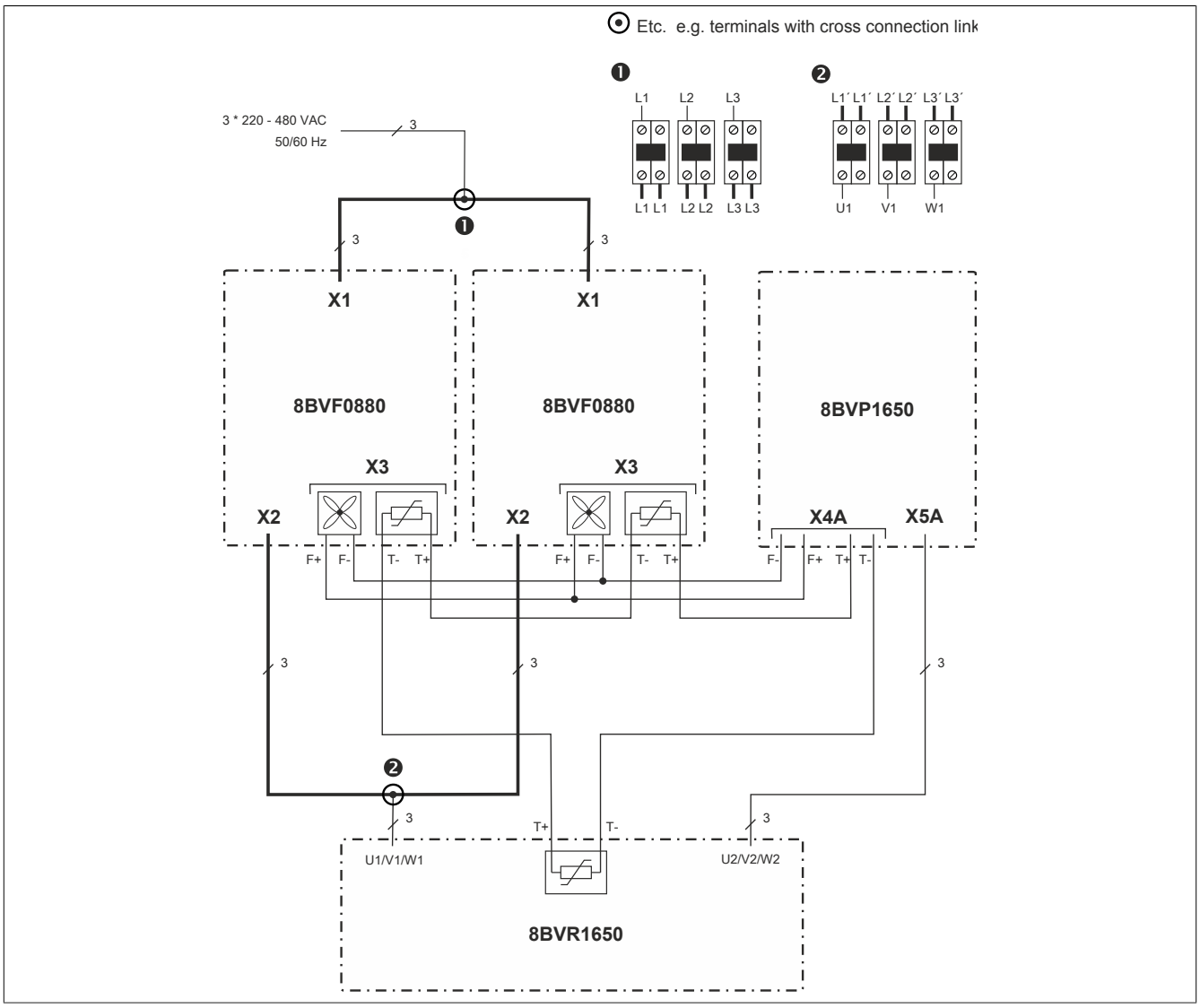


Figure 259: 8BVP1650 power mains connection with 8BVR1650 and 2x 8BVF0880

Caution!

Cables of the same type and length should be used between mains connection point 1 and the X1 connections on the mains side of the 8BVF0880 line filter and also between the X2 connections on the load side of the 8BVF0880 line filter and point 2 as shown in image "8BVP1650 power mains connection with 8BVR1650 and 2x 8BVF0880"! This is the only way to ensure symmetric distribution of current through the two 8BVF0880 line filters, which are connected in parallel.

Caution!

The factory parameter settings for the 8BVP1650 power supply module are intended for use of one 8BVF line filter and one 8BVR regeneration choke. However, two 8BVF0880 line filters connected in parallel and one 8BVR regeneration choke are used here.

The following settings have to be adapted in Automation Studio:

- **Set the value of ParID 64 (MOTOR_TEMPSENS_PAR1) to 4500.00**
- **Set the value of ParID 65 (MOTOR_TEMPSENS_PAR2) to 1800.00**
- **Set the value of ParID 66 (MOTOR_TEMPSENS_PAR3) to 155.00**

Caution!

Temperature sensors are built into the 8BVF line filters and 8BVR regeneration chokes. These temperature sensors must be connected in series according to image "8BVP1650 power mains connection with 8BVR1650 and 2x 8BVF0880"!

If the wiring in not installed properly, error 9010 or 9012 is indicated. Check the wiring!

1.1.3.4 Additional PE connection on 8BVE expansion modules

An additional PE connection must be made between two 8BVE expansion modules in order to meet the conditions necessary for the ACOPOSmulti drive systems mains connection on all 8B0M mounting plates that are connected using 8BVE expansion modules. This additional PE connection must be made with the same wire cross section as the PE wire used for the DC connection (at least 2.5 mm² with protected wiring or 4 mm² with unprotected wiring).

Information:

If the wiring of the X4 connectors between 8BVE expansion modules is carried out with a wire cross section 10 mm² copper or higher, an additional PE connection is not required.

The PE connection must always be made between the first and last 8BVE expansion modules in the ACOPOSmulti drive system.

DC connection between 2 8BVE expansion modules

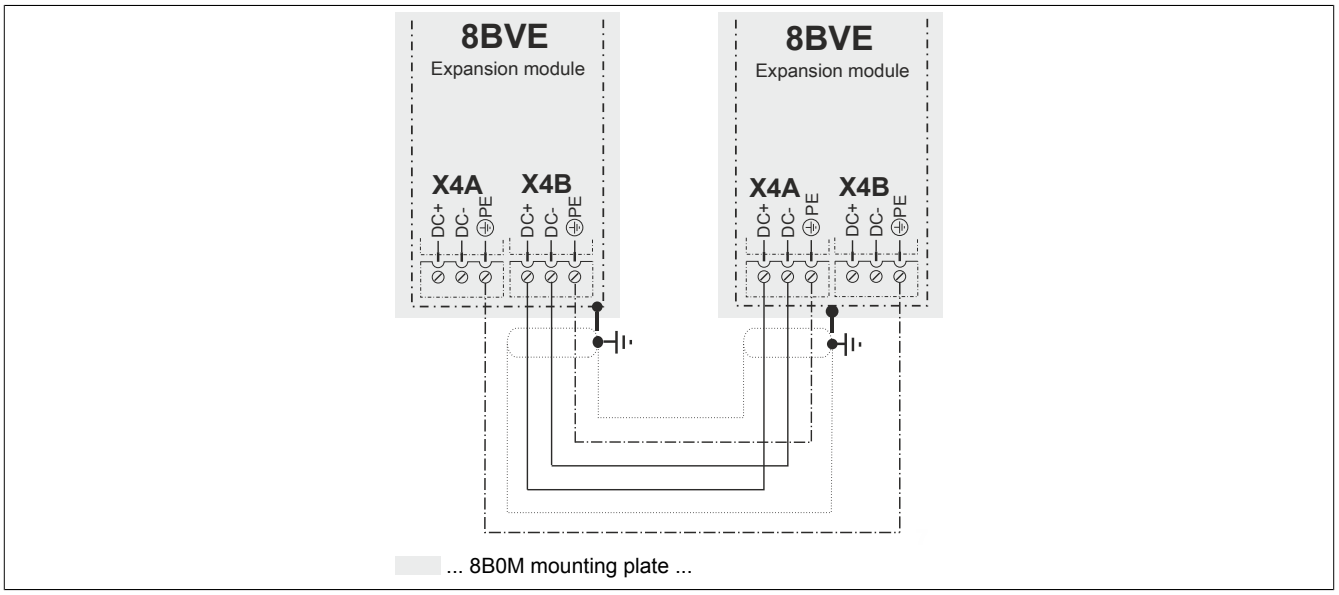


Figure 260: DC connection between 2 8BVE expansion modules

DC connection between 8BVE expansion modules

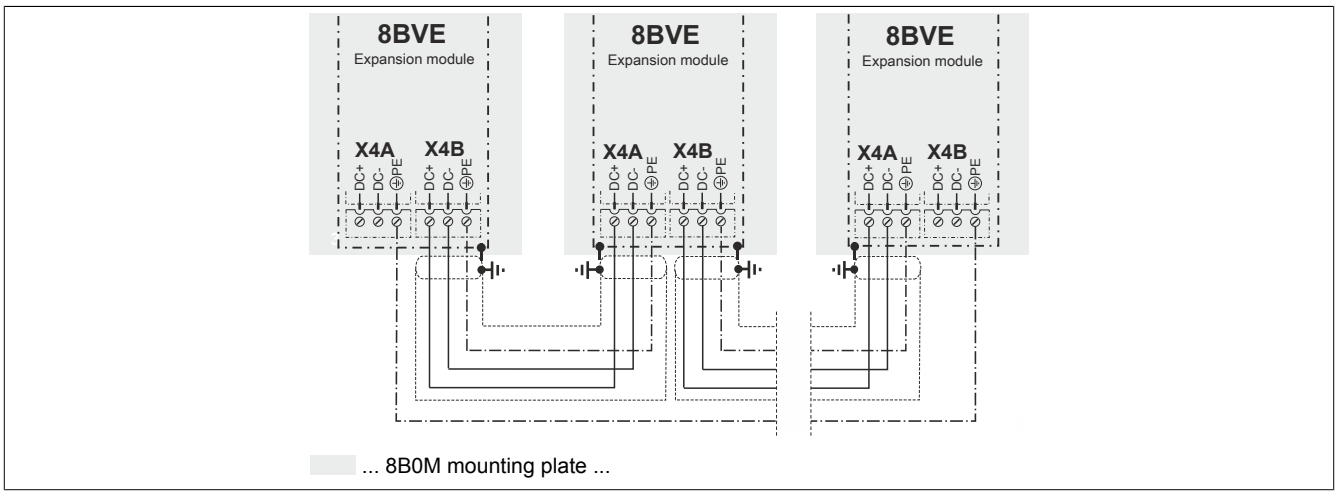


Figure 261: DC connection between 8BVE expansion modules

Connection between two 8BVE expansion modules in combination with 8CVI inverter modules

Variant 1: 8CVI inverter modules to both 8BVE expansion modules

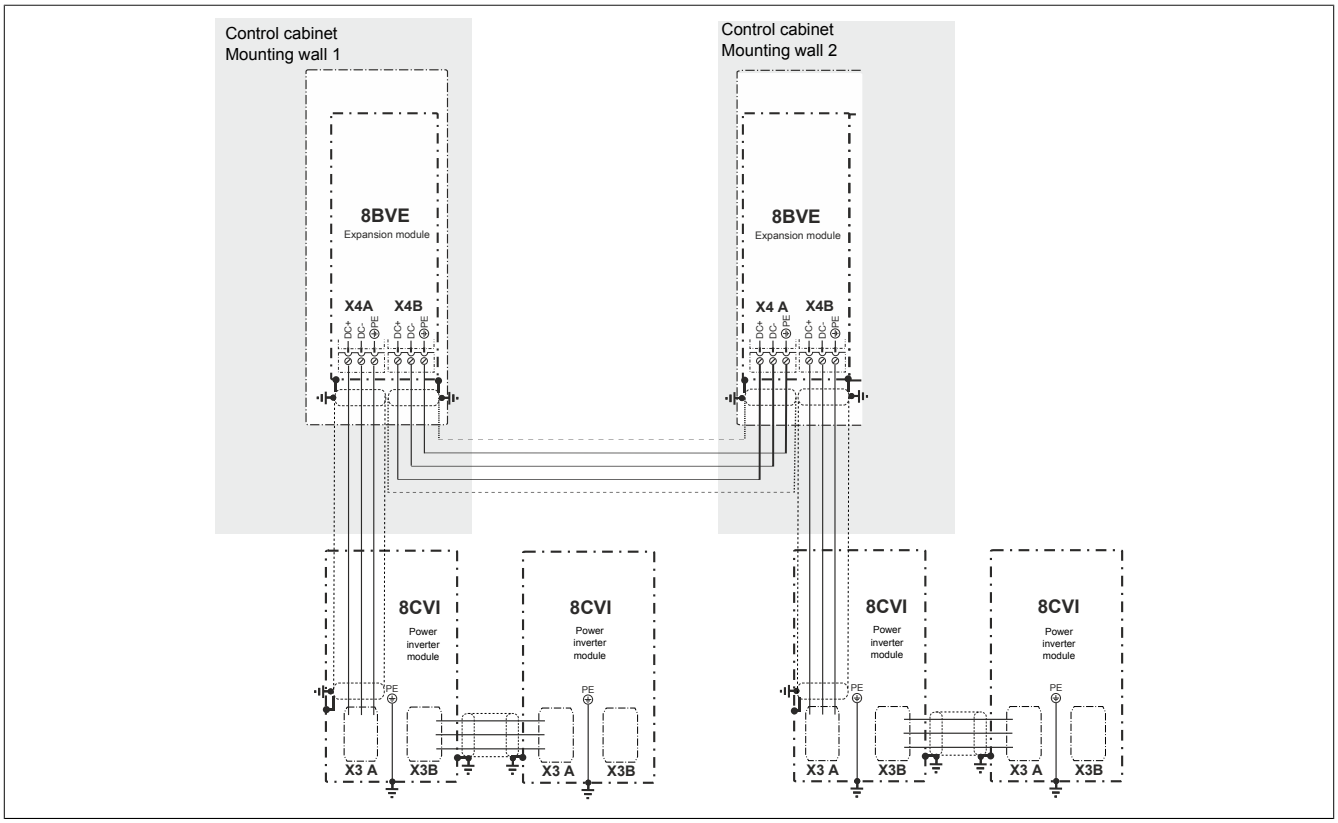


Figure 262: 8CVI inverter module to both 8BVE expansion modules

Variant 2: 8CVI inverter modules to the last 8BVE expansion module

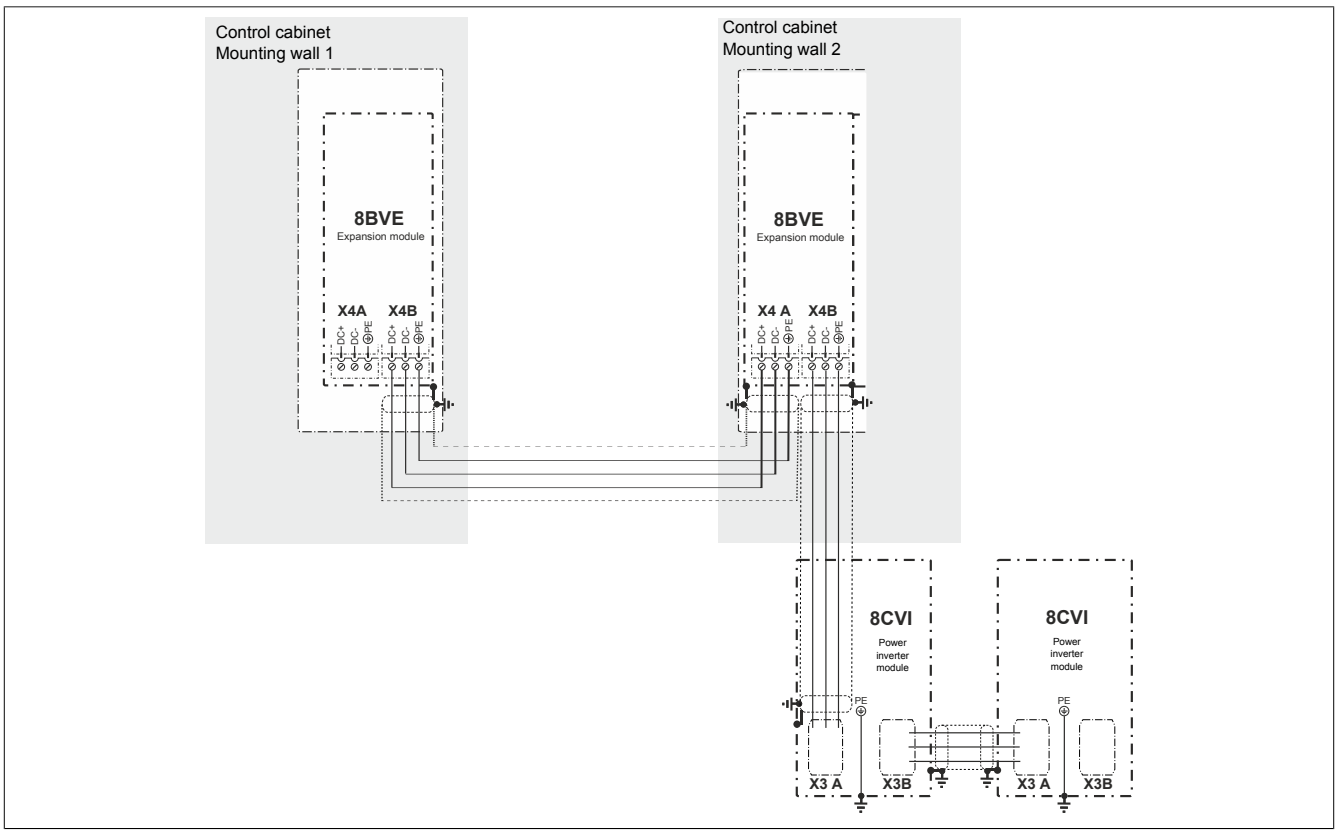


Figure 263: 8CVI inverter modules to the last 8BVE expansion module

1.1.3.5 Wiring CR_OK

Information:

When connecting signal CR_OK, capacitor module 8B0K3630Hx00.001-1 is not permitted to be connected between power supply module 8BVP and the first 8B0C auxiliary supply module of the ACOPOSmulti drive system.

Information:

When wiring signal CR_OK in power supply module 8BxP, one or more 8B0C auxiliary supply modules must be wired first before one or more 8B0K capacitor modules are wired. Failure to do so can prevent the ACOPOSmulti drive system from starting up!

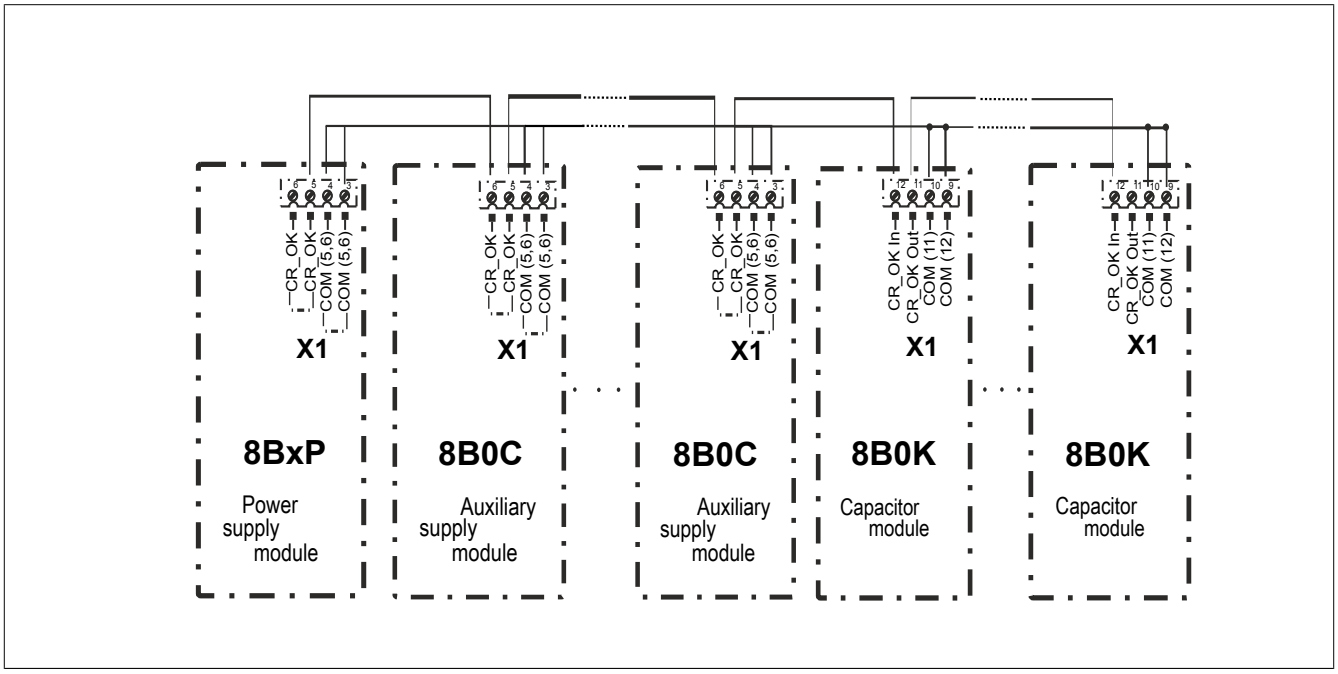


Figure 264: Permissible wiring of CR_OK In and CR_OK Out

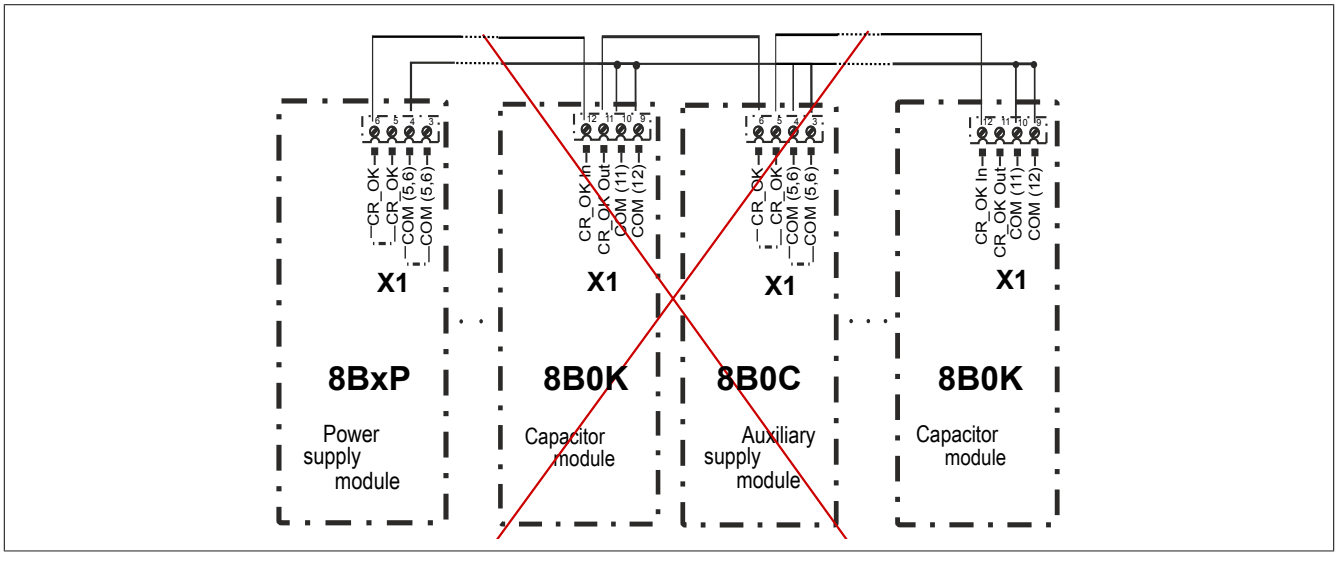


Figure 265: Impermissible wiring of CR_OK In and CR_OK Out

1.1.4 Connection diagrams for ground connections and shield connections

The ground connections and shield connections for ACOPOSmulti drive systems must be made according to the following connection diagrams.

Information:

To avoid disturbances, B&R recommends wiring the temperature sensor connectors T+ and T- on 8BVF/8BVR/8BVP modules with the shortest possible wires. Install wires between individual modules as parallel with one another as possible.

8B0F line filters

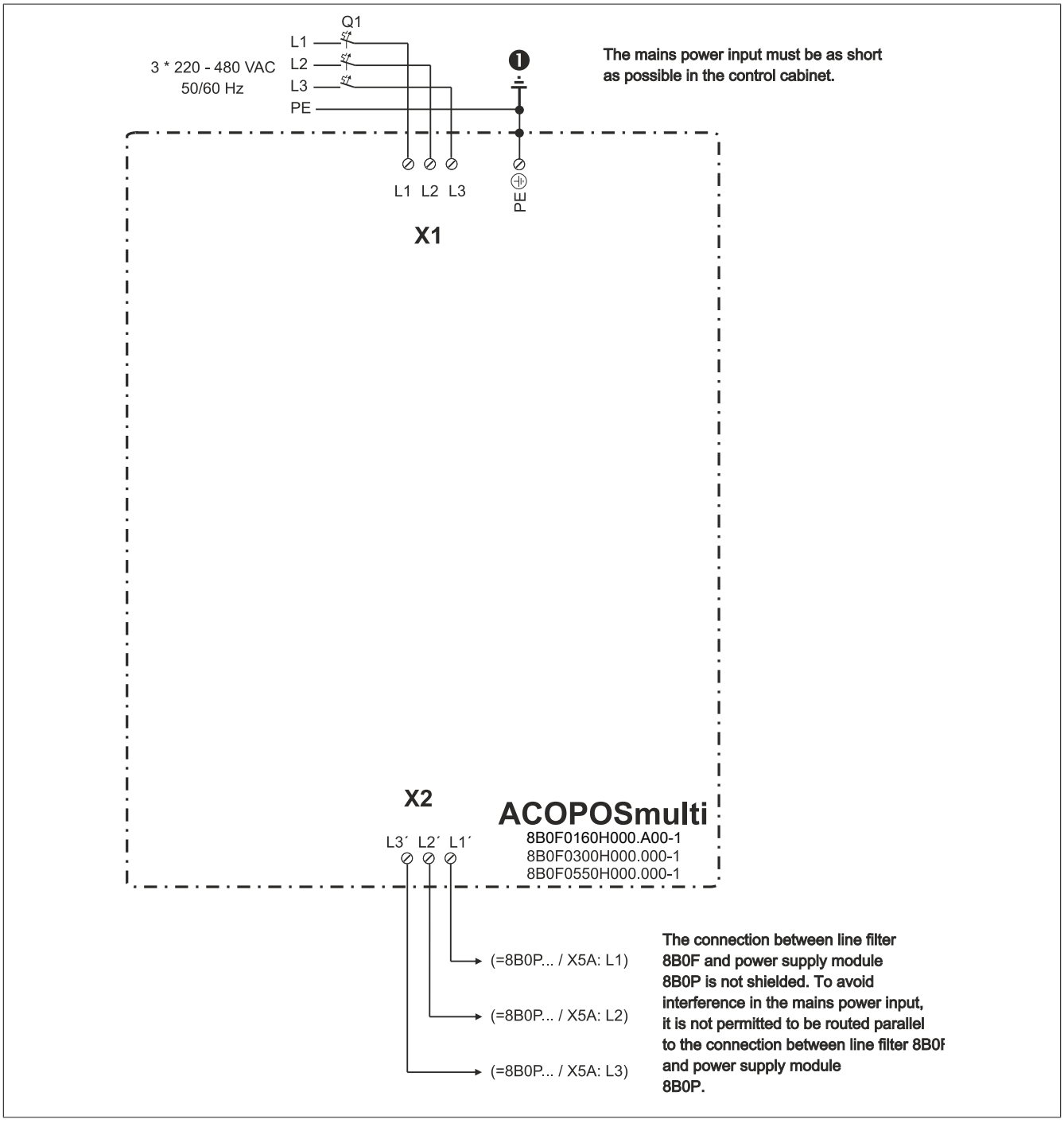


Figure 266: 8B0F line filters - Ground connections and shield connections

8B0P0110 power supply modules

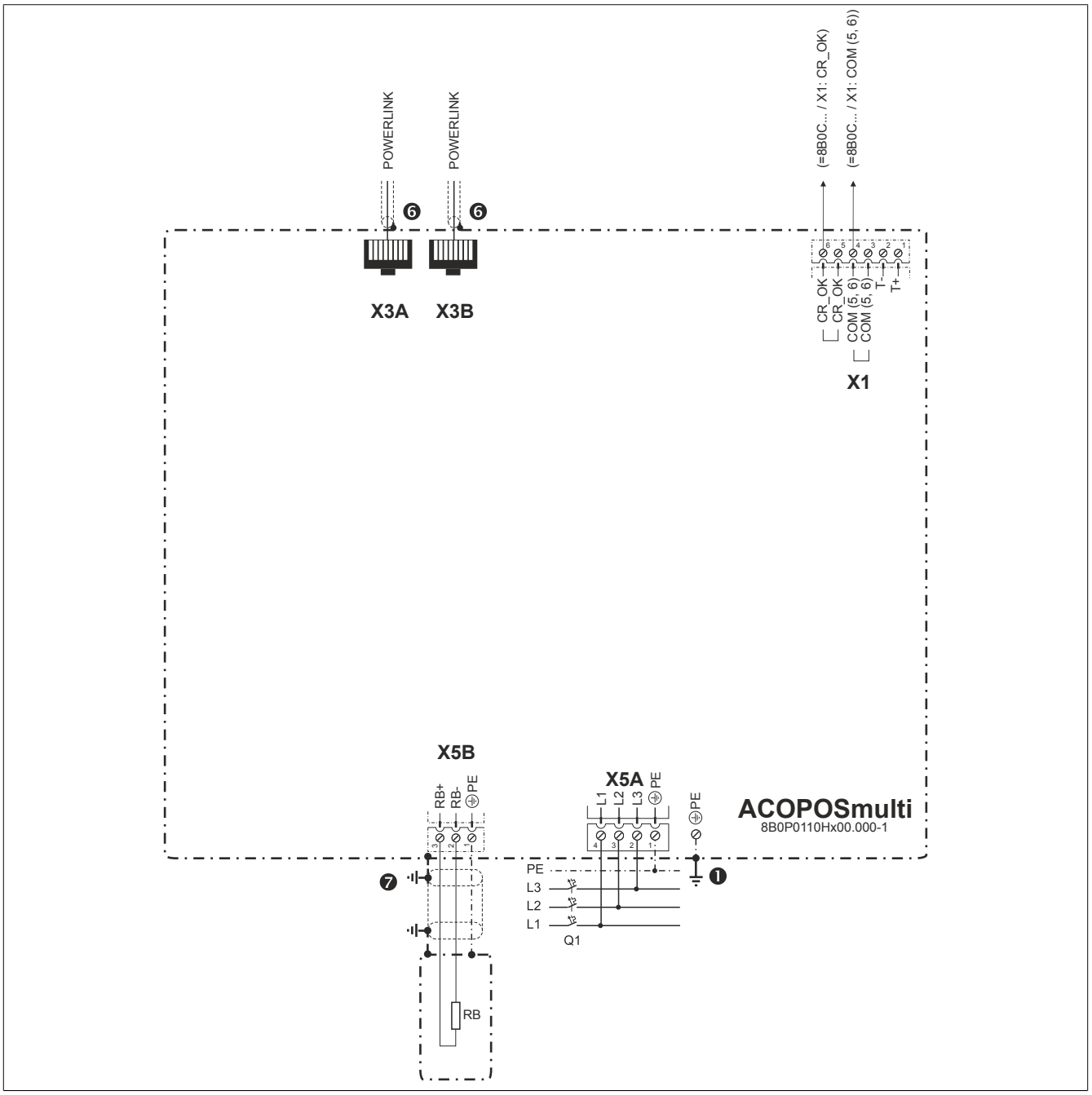


Figure 267: 8B0P0220/0440 power supply modules - Ground connections and shield connections

8B0P0220/0440 power supply modules

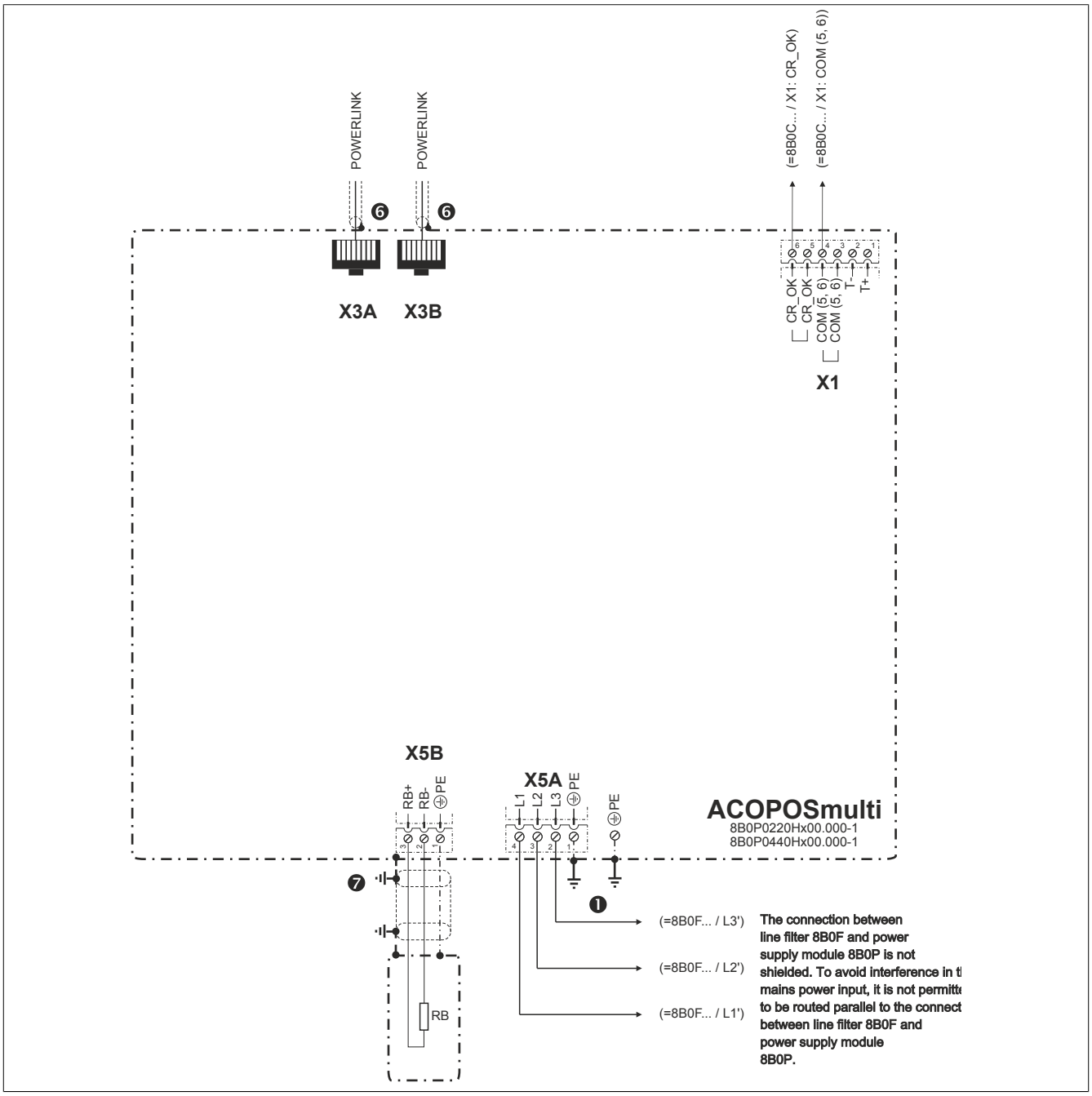


Figure 268: 8B0P0220/0440 power supply modules - Ground connections and shield connections

8BVF line filters

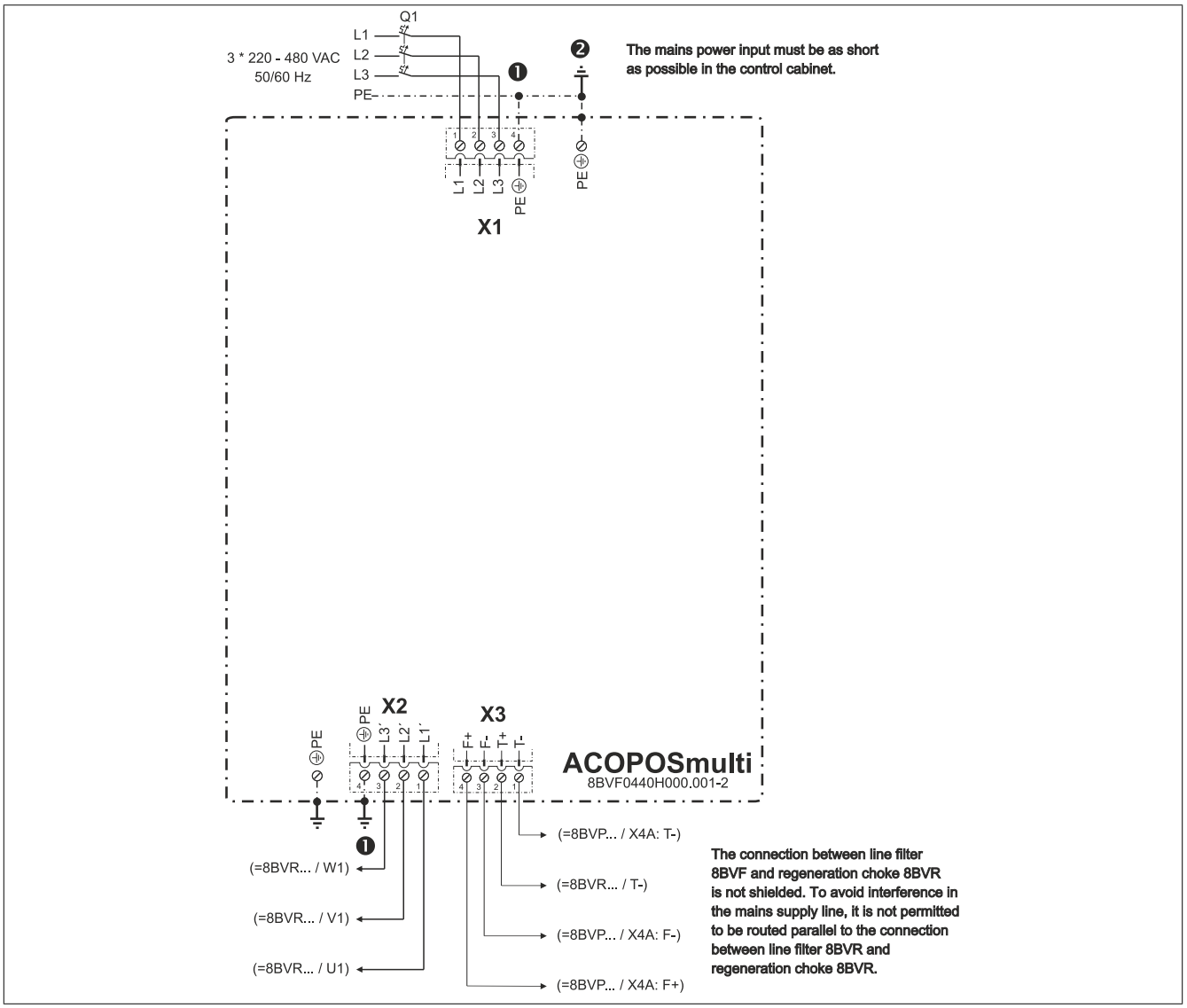


Figure 269: 8BVF line filters - Ground connections and shield connections

8BVP power supply modules

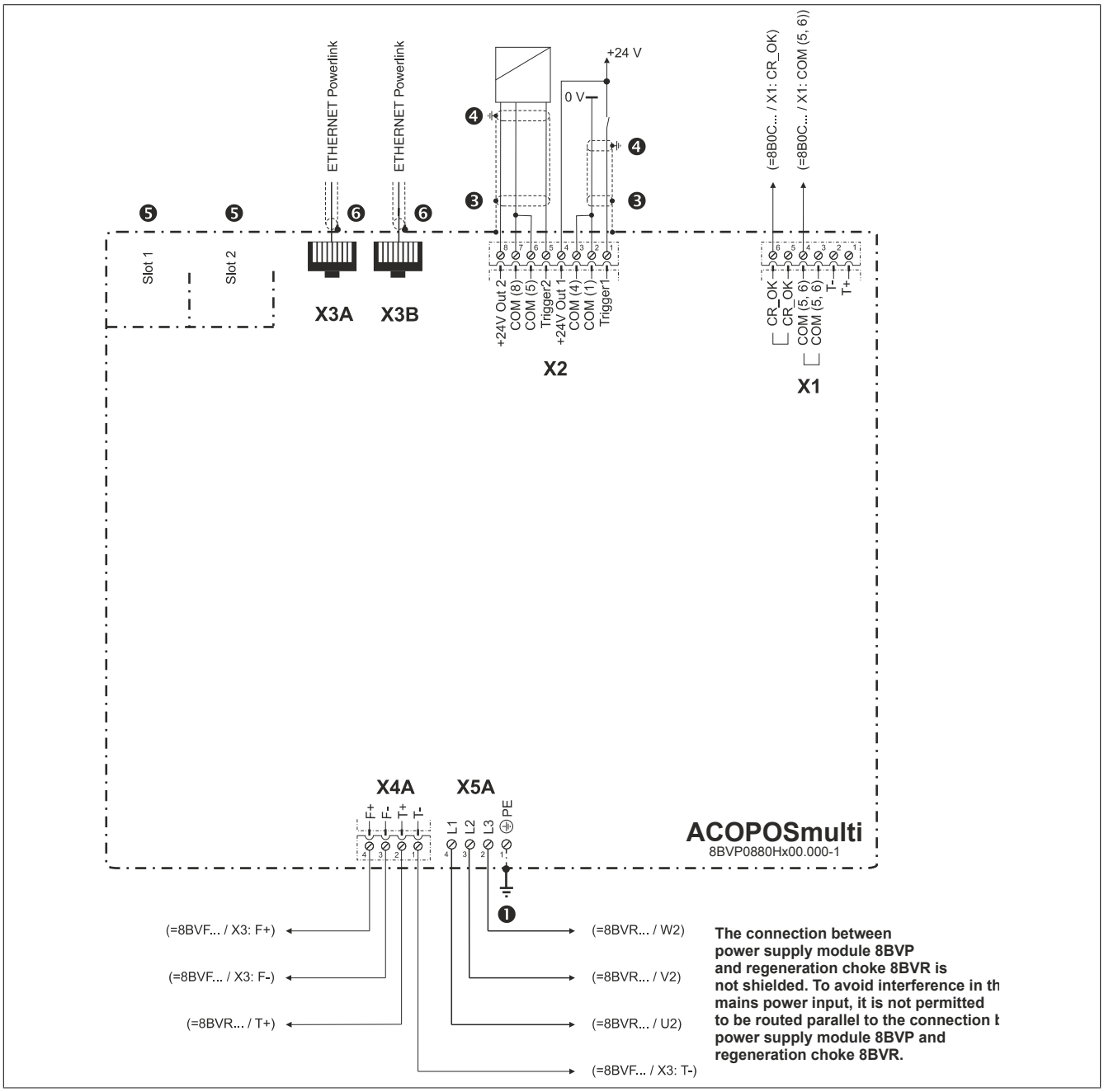


Figure 270: 8BVP power supply modules - Ground connections and shield connections

8BVR regeneration chokes

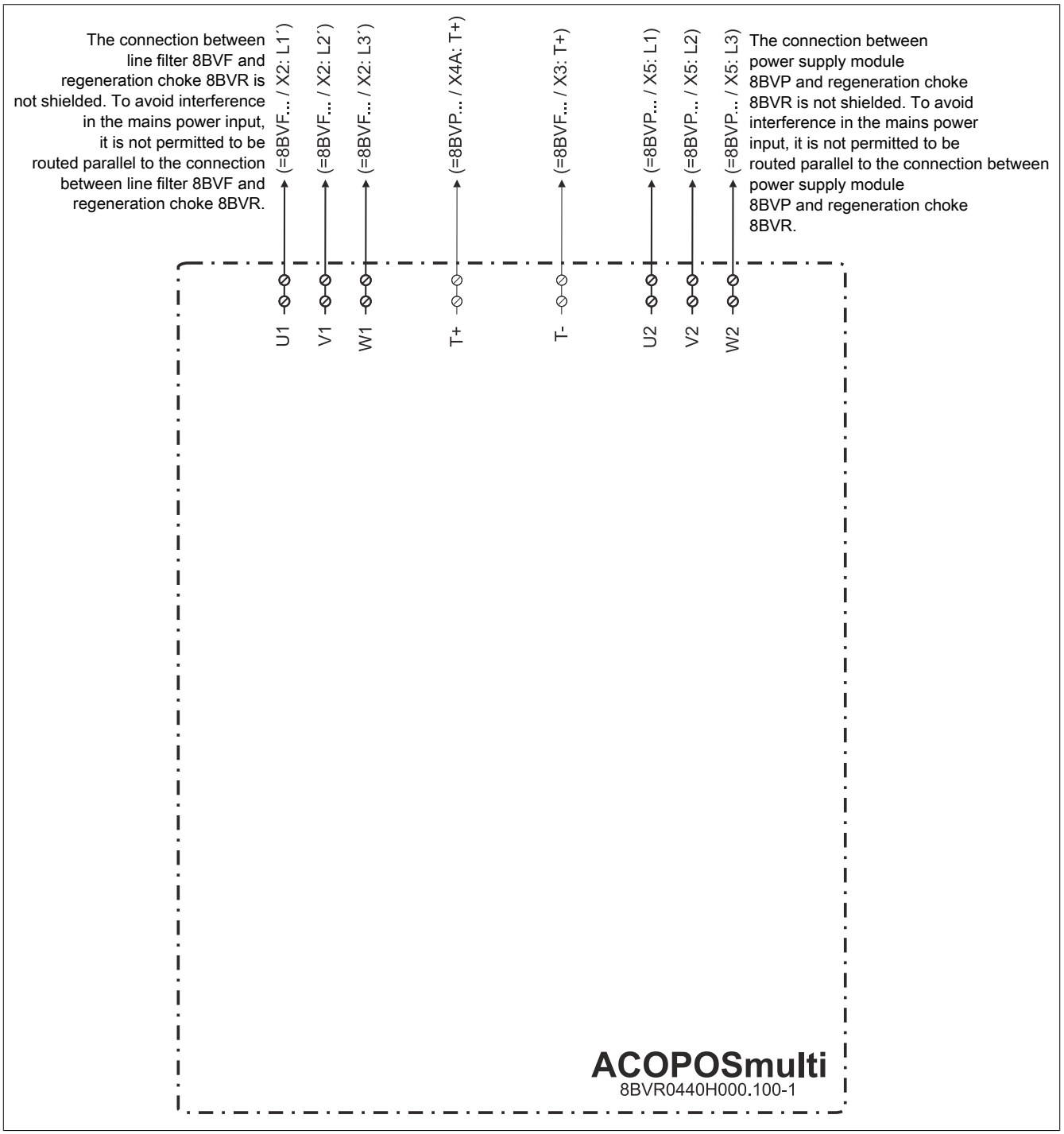


Figure 271: 8BVR regeneration chokes - Ground connections and shield connections

8B0C auxiliary supply modules

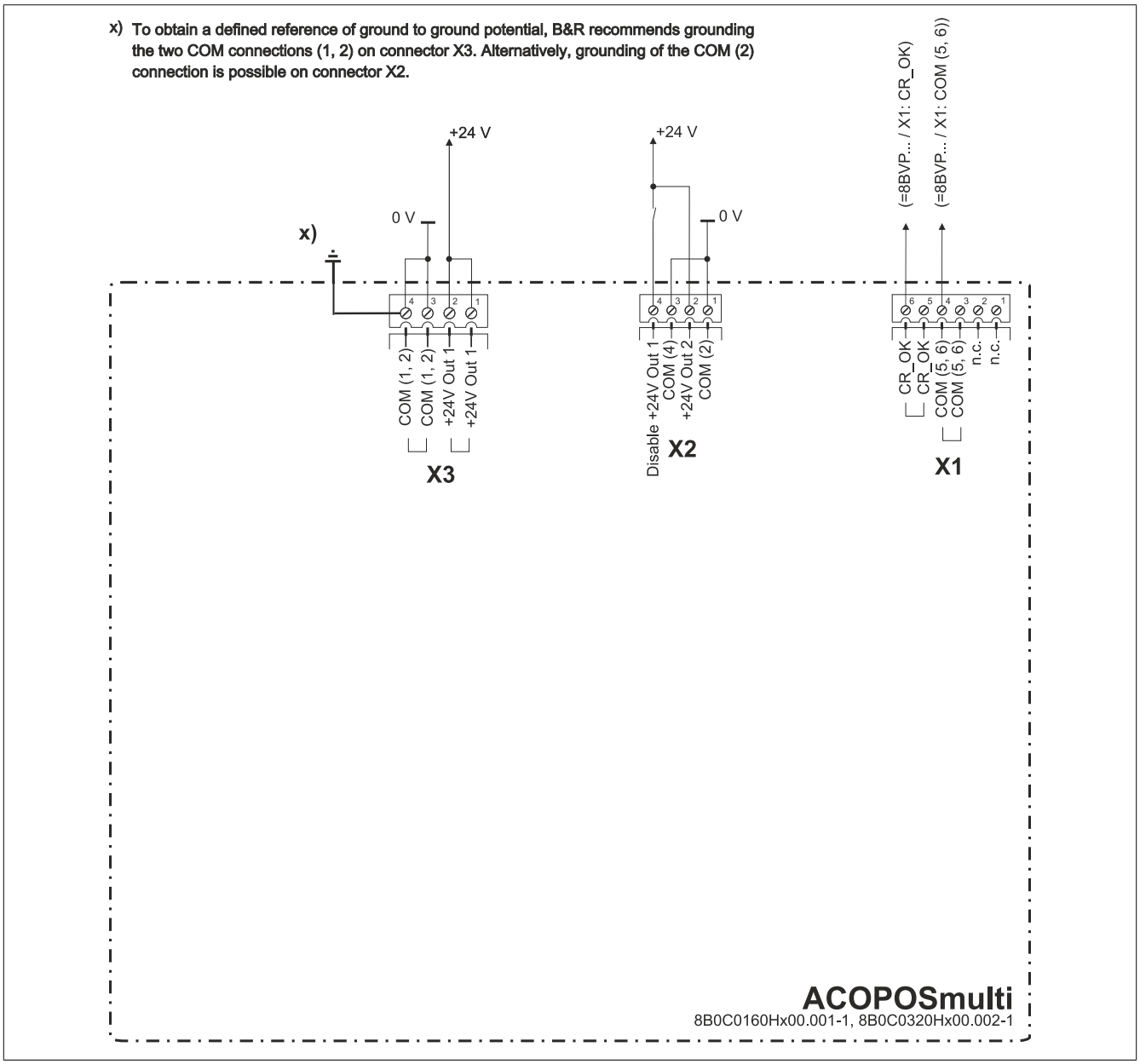


Figure 272: 8B0C auxiliary supply modules - Ground connections and shield connections

8BVI inverter modules

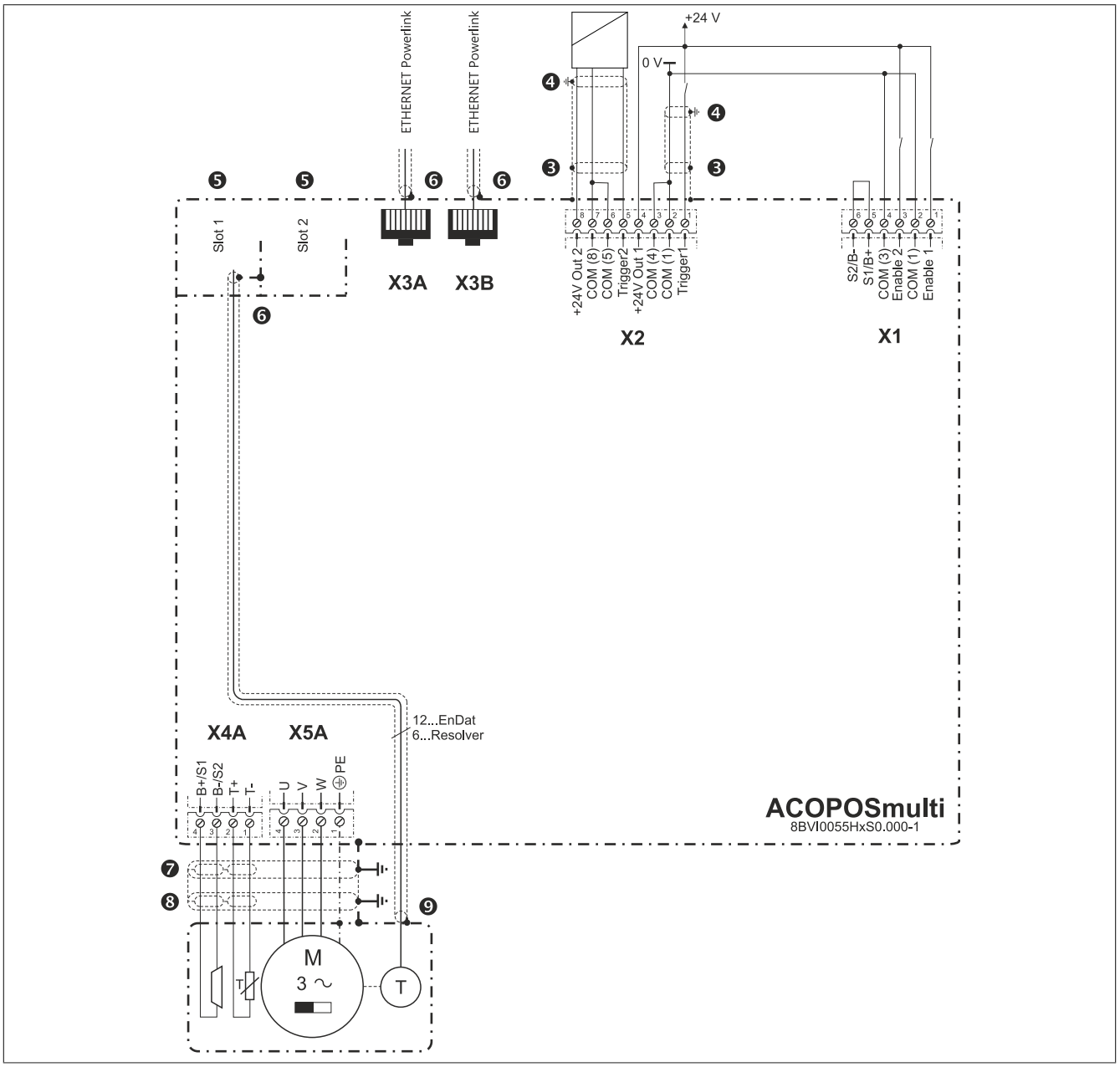


Figure 273: 8BVI inverter modules - Ground connections and shield connections

8BVE expansion modules

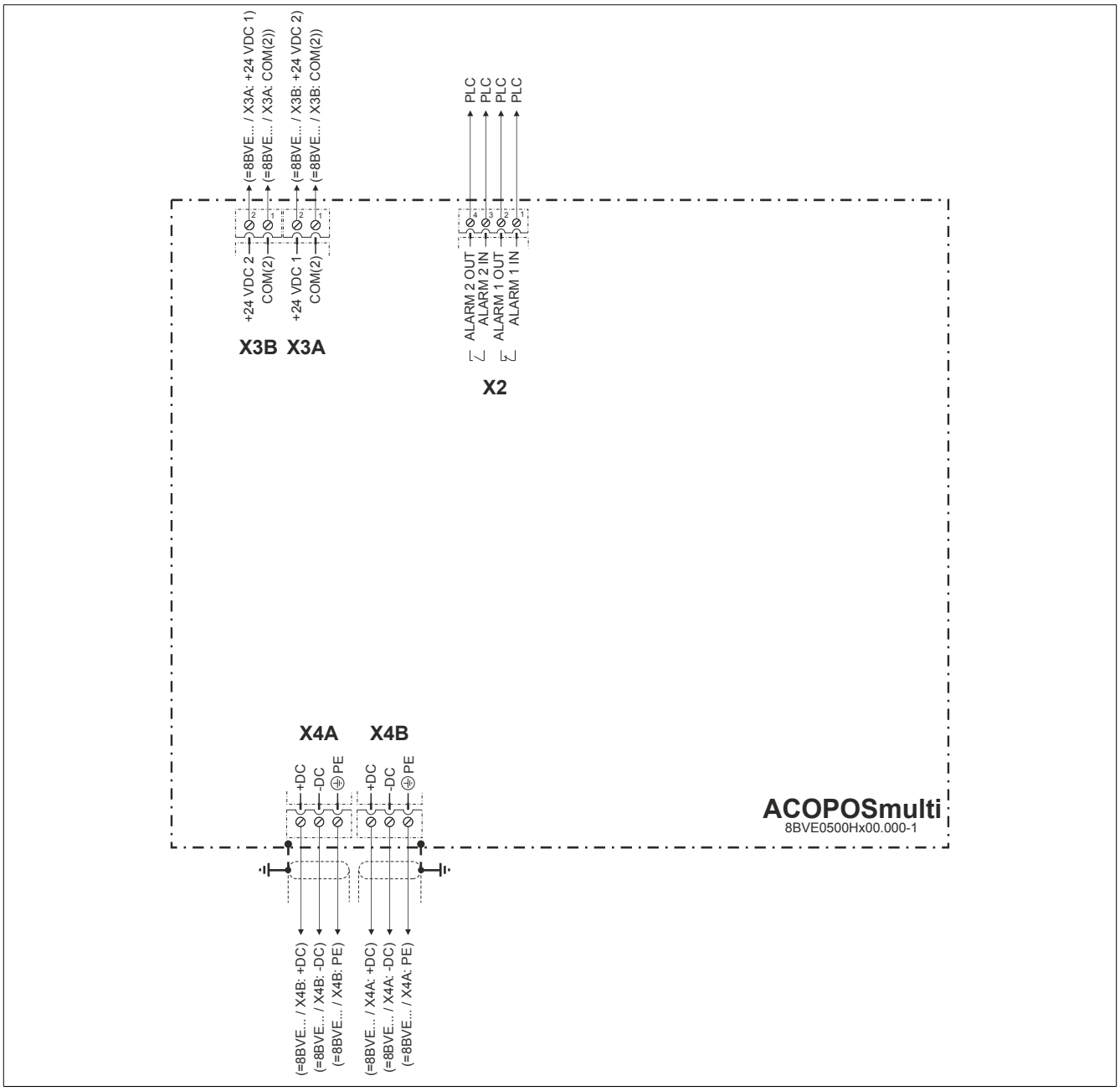
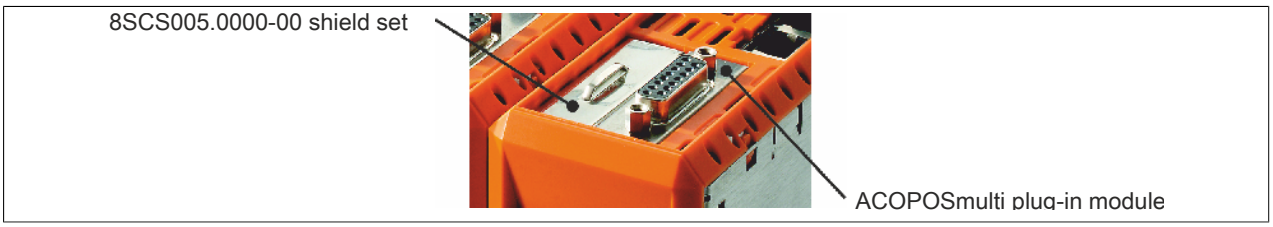


Figure 274: 8BVE expansion modules - Ground connections and shield connections

1. The protective ground connection (PE) is internally connected to the respective module housing.
2. Due to the increased discharge current (>3.5 mA), the second protective ground connection is necessary for the following ACOPOSmulti modules and must have the same cross section as the protective ground conductor of the mains power input:
   Line filters: 8BVF0220H000.000-1, 8BVF0440H000.000-1
   Power supply modules: 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1
3. Both trigger inputs are only filtered internally with approx. 50 µs. Make sure the cable shield is grounded properly. The optional 8SCS002.0000-00 shield set can be used for this.
4. The cable shield must be attached to the shield connector.

5. ACOPOSmulti plug-in modules automatically come in contact with the housing when inserted in the module slot:



Open module slots on ACOPOSmulti modules can be closed with the optional 8SCS005.0000-00 shield set available from B&R. The standard shield set for closing open module slots on ACOPOSmulti SafeMOTION inverter modules is the 8SCS005.0000-00.

6. Cable connection with DSUB connector:
The cable shield must be secured over a wide area in the metallic or metal-plated DSUB housing using the clamp provided for this purpose. The fastening screws on the DSUB housing must be tightened.

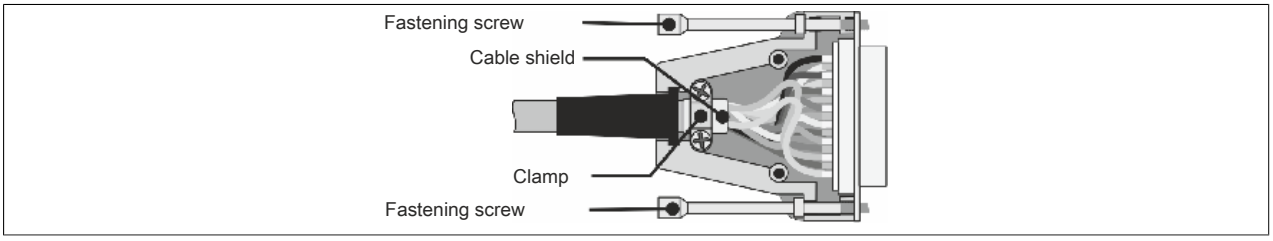


Figure 275: Cable shield in DSUB housing

Cable connection with terminals:
The cable shield must be connected to the housing of the ACOPOSmulti module using optional shielding set 8SCS002.0000-00.

Cable connection with RJ45 connector:
Additional grounding of the cable shield improves the EMC resistance. Grounding should take place on both sides, over a large area and near the connector. The optional 8SCS002.0000-00 shield set, available from B&R, can be used on the ACOPOSmulti module for this.

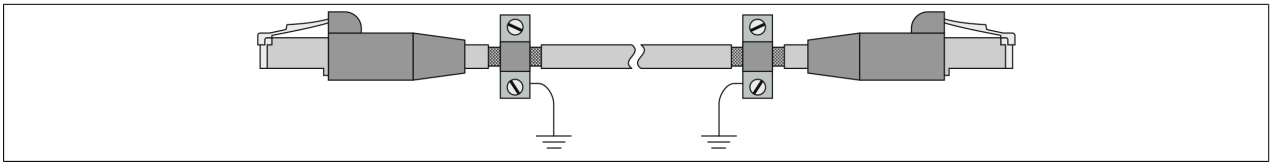


Figure 276: Male RJ45 connector - Grounding the cable shield

Information:

When cabling POWERLINK networks with B&R POWERLINK cables, no additional grounding of the cable shield is required to ensure resistance to disturbances per EN 61800-3!

7. The cable shield can be connected to the ACOPOSmulti module housing using the optional shield sets available from B&R.
8. On the motor side, the cable shield of the motor line is connected to the motor housing via the motor connector and connected to ground via the machine.
9. The cable shield of the encoder cable must be connected to the motor housing on the motor side via the encoder connector and subsequently to ground potential via the machine.

   With external encoders, the cable shield of the encoder cable must be connected to the machine on the encoder side via the encoder connector and subsequently to ground potential.

1.2 Insulation and high voltage testing

1.2.1 Insulation resistance testing in accordance with EN 60204

In accordance with EN 60204, the insulation resistance of electrical equipment is measured with 500 VDC between the main circuit conductors and the protective ground conductor system and is not permitted to be below a value of 1 MΩ. Testing individual sections of the system is permitted.

Power mains connection (mains side) for ACOPOSmulti line filters (X1)

The insulation resistance test can be carried out on the ACOPOSmulti line filter power mains connection (X1) as described above; however, values > 1 MΩ are not expected because of the overvoltage protection connection of the power mains. The 50 kΩ minimum value required as specified in EN 60204, Section 18.3 is exceeded anyway.

Power mains connection (load side) for ACOPOSmulti line filters (X2)

The insulation resistance test can be carried out on the ACOPOSmulti line filter power mains connection (X2) as described above; however, values > 1 MΩ are not expected because of the overvoltage protection connection of the power mains. The 50 kΩ minimum value required as specified in EN 60204, Section 18.3 is exceeded anyway.

Connections U1 / V1 / W1 of ACOPOSmulti regeneration chokes

The insulation resistance test can be carried out on the ACOPOSmulti regeneration choke U1 / V1 / W1 connections as described above. However, values > 1 MΩ should not be expected. The 50 kΩ minimum value required as specified in EN 60204, Section 18.3 is exceeded anyway.

Connections U2 / V2 / W2 of ACOPOSmulti regeneration chokes

The insulation resistance test can be carried out on the ACOPOSmulti regeneration choke U2 / V2 / W2 connections as described above. However, values > 1 MΩ should not be expected. The 50 kΩ minimum value required as specified in EN 60204, Section 18.3 is exceeded anyway.

Power mains connection of ACOPOSmulti power supply modules (X5A)

The insulation resistance test can be carried out on the power mains connection (X5A) of ACOPOSmulti power supply modules as described above; however, values > 1 MΩ are not expected because of the overvoltage protection connection of the power mains. The 50 kΩ minimum value required as specified in EN 60204, Section 18.3 is exceeded anyway.

Motor connection of ACOPOSmulti inverter modules (X5A / X5B)

Warning!

An insulation test is not permitted to be carried out on the motor connection (X5A / X5B) of ACOPOSmulti inverter modules because that would destroy the ACOPOSmulti inverter modules!

The motor cable must be removed from the motor connection (X5A / X5B) of the ACOPOSmulti inverter module before the insulation resistance is measured!

B&R motors and B&R motor cables

In principle, an insulation resistance measurement can be carried out on B&R motor cables and B&R motors. However, the insulation resistance can be lower than 1 MΩ depending on the motor that is connected. The 50 kΩ minimum value required as specified in EN 60204, Section 18.3 is exceeded anyway.

Warning!

An insulation test is not permitted to be carried out on the motor connection (X5A / X5B) of ACOPOSmulti inverter modules because that would destroy the ACOPOSmulti inverter modules!

The motor cable must be removed from the motor connection (X5A / X5B) of the ACOPOSmulti inverter module before the insulation resistance is measured!

1.2.2 High voltage testing

In accordance with EN 60204, the electrical equipment must be able to withstand a test voltage connected between the conductors of all circuits and the protective ground conductor system for at least 1 s (exception: all circuits with a voltage < PELV voltage). The test voltage must be twice the rated voltage for the equipment and at least 1000 VAC (50/60 Hz). Components that cannot handle this test voltage must be disconnected before carrying out the high voltage test.

Power mains connection (mains side) for ACOPOSmulti line filters (X1)

Warning!

A high voltage test is not permitted to be carried out on the power mains connection (X1) of ACOPOSmulti line filters because that would destroy the ACOPOSmulti line filter!

Power mains connection (load side) for ACOPOSmulti line filters (X2)

Warning!

A high voltage test is not permitted to be carried out on the power mains connection (X2) of ACOPOSmulti line filters because that would destroy the ACOPOSmulti line filter!

Connections U1 / V1 / W1 of ACOPOSmulti regeneration chokes

The high voltage test can be carried out on the ACOPOSmulti regeneration choke U1 / V1 / W1 connections as described above.

Warning!

Before performing the high voltage test on the U1 / V1 / W1 connections of the ACOPOSmulti regeneration choke, the cable between the X2 connection of the ACOPOSmulti line filter and the U1 / V1 / W1 connections of the ACOPOSmulti regeneration choke must be removed from the X2 connection of the ACOPOSmulti line filter. Otherwise the ACOPOSmulti line filter will be severely damaged!

Connections U2 / V2 / W2 of ACOPOSmulti regeneration chokes

The high voltage test can be carried out on the ACOPOSmulti regeneration choke U2 / V2 / W2 connections as described above.

Warning!

Before performing the high voltage test on the U2 / V2 / W2 connections of the ACOPOSmulti regeneration choke, the cable between the X5A connection of the ACOPOSmulti power supply module and the U2 / V2 / W2 connections of the ACOPOSmulti regeneration choke must be removed from the X5A connection of the ACOPOSmulti power supply module. Otherwise the ACOPOSmulti power supply module will be severely damaged!

Power mains connection of ACOPOSmulti power supply modules (X5A)

Warning!

A high voltage test cannot be carried out on the power mains connection (X5A) of the ACOPOSmulti power supply modules because sparks can occur that are caused by the internal wiring.

Motor connection of ACOPOSmulti inverter modules (X5A / X5B)

Warning!

A high voltage test is not permitted to be carried out on the motor connection (X5A / X5B) of ACOPOSmulti inverter modules because that would destroy the ACOPOSmulti inverter modules!

B&R motors and B&R motor cables

In principle, high voltage testing can be carried out on B&R motor cables and B&R motors. Depending on the size of the motor and length of the motor cable, increased measurement currents can occur because of capacitive coupling.

Warning!

A high voltage test is not permitted to be carried out on the motor connection (X5A / X5B) of ACOPOSmulti inverter modules because that would destroy the ACOPOSmulti inverter modules!

The motor cable must be removed from the motor connection (X5A / X5B) of the ACOPOSmulti inverter module before the high voltage measurement is made!

1.2.3 Typical procedure

Insulation test

1. Remove the motor cable from the X5A / X5B connectors on the ACOPOSmulti inverter module.
2. Perform the insulation test on the X1 power mains connector (mains side) of the ACOPOSmulti line filter.
3. Perform the insulation test on the B&R motor.

High voltage test

1. Remove the connection cable between the X2 connection of the ACOPOSmulti line filter and the U1 / V1 / W1 connectors of the ACOPOSmulti regeneration choke on the X2 connector of the ACOPOSmulti line filter.
2. Remove the connection cable between the X5A connector of the ACOPOSmulti power supply module and the U2 / V2 / W2 connectors of the ACOPOSmulti regeneration choke on the X5A connector of the ACOPOSmulti power supply module.
3. Perform the high voltage test on the U1 / V1 / W1 connectors of the ACOPOSmulti regeneration choke.
4. Remove the motor cable from the X5A / X5B connectors on the ACOPOSmulti inverter module.
5. Perform the high voltage test on the B&R motor.

1.3 Overview of terminal cross sections

1.3.1 8BVF line filters

Connection	Wire types Approbation data	8BVF0220, 8BVF0440		8BVF0880	
		[mm²]	[AWG]	[mm²]	[AWG]
X1	Solid core / multiple-conductor lines	0.75 - 16	20 - 6	16 - 50	6 - 0
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.75 - 16 0.5 - 16	 20 - 6 18 - 6	 16 - 50 10 - 50	 6 - 0 8 - 0
	Approbation data UL/C-UL-US CSA	 --- ---	 20 - 6 ---	 --- ---	 6 - 1/0 ---
Tightening torque for the terminal screws [Nm]		1.2 to 1.5		Min. 6	
X2	Solid core / multiple-conductor lines	0.75 - 16	20 - 6	16 - 50	6 - 0
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.75 - 16 0.5 - 16	 20 - 6 18 - 6	 16 - 50 10 - 50	 6 - 0 8 - 0
	Approbation data UL/C-UL-US CSA	 --- ---	 20 - 6 ---	 --- ---	 6 - 1/0 ---
Tightening torque for the terminal screws [Nm]		1.7 to 1.8		Min. 6	
X3	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 28 - 12	 --- ---	 30 - 12 28 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6		0.5 to 0.6	

Table 438: 8BVF line filters - Terminal cross sections

1.3.2 8BVR regeneration chokes

Connection	Wire types Approbation data	8BVR0220H000.100-1, 8BVR0440H000.100-1		8BVR0880H000.100-1		8BVR1650H000.100-1	
		[mm²]	[AWG]	[mm²]	[AWG]	[mm²]	[AWG]
U1, V1, W1 U2, V2, W2	Solid core / multiple-conductor lines	1.5 - 25	14 - 2	2.5 - 50	12 - 1/0	---	---
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 1.5 - 25 1.5 - 16	 14 - 2 14 - 4	 2.5 - 35 2.5 - 35	 12 - 1 12 - 2	 6 - 120 6 - 120	 10 - 250 10 - 250
	Approbation data UL/C-UL-US CSA	 --- ---	 18 - 4 14 - 6	 --- ---	 12 - 1 12 - 1	 --- ---	 10 - 250 10 - 250
Tightening torque for the terminal screws [Nm]		2 to 4		4 to 5		10 to 20	
T+, T-	Solid core / multiple-conductor lines	0.5 - 4	18 - 10	0.5 - 4	18 - 10	---	---
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.5 - 4 0.5 - 2.5	 18 - 10 14 - 12	 0.5 - 4 0.5 - 2.5	 18 - 10 14 - 12	 0.5 - 4 0.5 - 2.5	 18 - 10 14 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 26 - 12	 --- ---	 30 - 12 26 - 12	 --- ---	 30 - 12 26 - 12
Tightening torque for the terminal screws [Nm]		0.4 to 0.6		0.4 to 0.6		0.4 to 0.6	

Table 439: 8BVR regeneration chokes - Terminal cross sections

1.3.3 8B0P power supply modules

Connection	Wire types Approbation data	8B0P0110		8B0P0220, 8B0P0440	
		[mm²]	[AWG]	[mm²]	[AWG]
X1	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6			
X5A	Solid core / multiple-conductor lines	0.2 - 10	24 - 8	0.75 - 16	20 - 6
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 6 0.2 - 6	 24 - 10 24 - 10	 0.75 - 16 0.5 - 16	 20 - 6 18 - 6
	Approbation data UL/C-UL-US CSA	 --- ---	 24 - 10 ---	 --- ---	 20 - 6 ---
Tightening torque for the terminal screws [Nm]		0.7 to 0.8		1.7 to 1.8	
X5B	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 10	0.5 - 10	20 - 7
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 4 0.25 - 4	 24 - 10 24 - 10	 0.5 - 6 0.5 - 6	 20 - 9 20 - 9
	Approbation data UL/C-UL-US CSA	 --- ---	 24 - 8 24 - 8	 --- ---	 20 - 8 20 - 8
Tightening torque for the terminal screws [Nm]		0.7 to 0.8		1.2 to 1.5	

Table 440: 8B0P power supply units - Terminal cross sections

1.3.4 8BVP power supply modules

Connection	Wire types Approbation data	8BVP0220, 8BVP0440		8BVP0880		8BVP1650	
		[mm²]	[AWG]	[mm²]	[AWG]	[mm²]	[AWG]
X1	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6	
X2	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 16 - 50 10 - 50	 6 - 0 8 - 0	 16 - 50 10 - 50	 6 - 0 8 - 0
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6	
X4A	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 28 - 12	 --- ---	 30 - 12 28 - 12	 --- ---	 30 - 12 28 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6	
X5A	Solid core / multiple-conductor lines	0.75 - 16	20 - 6	6 - 50	10 - 0	6 - 95	3 - 0
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.75 - 16 0.5 - 16	 20 - 6 18 - 6	 6 - 50 6 - 50	 10 - 0 10 - 0	 6 - 95 6 - 95	 3 - 0 3 - 0
	Approbation data UL/C-UL-US CSA	 --- ---	 20 - 6 ---	 --- ---	 --- ---	 --- ---	 --- ---
Tightening torque for the terminal screws [Nm]		1.7 to 1.8		--- 1)		--- 1)	

Table 441: 8BVP power supply units - Terminal cross sections

1) The connection is made with cable lugs using an M8 threaded bolt (0.32").

1.3.5 8B0C auxiliary supply modules

Connection	Wire types Approbation data	8B0C0160 8B0C0320	
		[mm²]	[AWG]
X1	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6	
X2 [1]	Solid core / multiple-conductor lines	0.2 - 2.5 [1]	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6	
X3 [1]	Solid core / multiple-conductor lines	0.2 - 6	24 - 10
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.25 - 6 0.25 - 4	 24 - 10 24 - 11
	Approbation data UL/C-UL-US CSA	 --- ---	 24 - 10 ---
Tightening torque for the terminal screws [Nm]		0.7 to 0.8	

Table 442: 8B0C auxiliary supply modules - Terminal cross sections

1) Only for 8B0C0160Hx00.001-1, 8B0C0160HC00.A01-1 and 8B0C0320Hx00.002-1.

1.3.6 8BVI inverter modules

Connection	Wire types Approbation data	8BVI0014 8BVI0028 8BVI0055 8BVI0110 8BVI0220HxD		8BVI0220HxS		8BVI0330 8BVI0440		8BVI0660 8BVI0880 8BVI1650		8BVI1650	
		[mm²]	[AWG]	[mm²]	[AWG]	[mm²]	[AWG]	[mm²]	[AWG]	[mm²]	[AWG]
X1	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6	
X2	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6	
X4A, X4B	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 28 - 12	 --- ---	 30 - 12 28 - 12	 --- ---	 30 - 12 28 - 12	 --- ---	 30 - 12 28 - 12	 --- ---	 30 - 12 28 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6		0.5 to 0.6	
X5A, X5B	Solid core / multiple-conductor lines	0.2 - 10	24 - 8	0.5 - 10	20 - 7	0.75 - 16	20 - 6	6 - 50	10 - 0	6 - 95	3 - 0
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 6 0.2 - 6	 24 - 10 24 - 10	 0.5 - 6 0.5 - 6	 20 - 9 20 - 9	 0.75 - 16 0.5 - 16	 20 - 6 18 - 6	 6 - 50 6 - 50	 10 - 0 10 - 0	 6 - 95 6 - 95	 3 - 0 3 - 0
	Approbation data UL/C-UL-US CSA	 --- ---	 24 - 10 ---	 --- ---	 20 - 8 20 - 8	 --- ---	 20 - 6 ---	 --- ---	 --- ---	 --- ---	 --- ---
Tightening torque for the terminal screws [Nm]		0.7 to 0.8		1.2 to 1.5		1.7 to 1.8		--- [1]		--- [1]	

Table 443: 8BVI inverter modules - Terminal cross sections

1) The connection is made with cable lugs using an M8 threaded bolt (0.32").

1.3.7 8BVE expansion modules

Connection	Wire types Approbation data	8BVE0500	
		[mm²]	[AWG]
X2	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6	
X3A, X3B	Solid core / multiple-conductor lines	0.2 - 6	24 - 10
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.25 - 6 0.25 - 4	 24 - 10 24 - 11
	Approbation data UL/C-UL-US CSA	 --- ---	 24 - 10 ---
Tightening torque for the terminal screws [Nm]		0.7 to 0.8	
X4A, X4B	Solid core / multiple-conductor lines	0.75 - 16	20 - 6
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.75 - 16 0.5 - 16	 20 - 6 18 - 8
	Approbation data UL/C-UL-US CSA	 --- ---	 20 - 6 ---
Tightening torque for the terminal screws [Nm]		1.7 to 1.8	

Table 444: 8BVE expansion modules - Terminal cross sections

1.3.8 8B0K3630Hx00.001-1 capacitor modules

Connection	Wire types Approbation data	8B0K3630Hx00.001-1	
		[mm²]	[AWG]
X1	Solid core / multiple-conductor lines	0.2 - 2.5	24 - 12
	Flexible and fine wire lines Without wire end sleeves With wire end sleeves	 0.2 - 2.5 0.25 - 2.5	 24 - 12 24 - 12
	Approbation data UL/C-UL-US CSA	 --- ---	 30 - 12 22 - 12
Tightening torque for the terminal screws [Nm]		0.5 to 0.6	

Table 445: 8B0K3630Hx00.001-1 capacitor modules - Terminal cross sections

Chapter 6 • Safety technology

1 Standard safety technology ("hardwired safety technology")

Danger!

Especially in the area of safety technology, always consult the latest version of this document on the B&R website for valid specifications (www.br-automation.com)! The specifications in this version of the document are not necessarily current. The user must verify the correctness of specifications before implementing safety functions!

1.1 General information

ACOPOSmulti inverter modules use integrated safe pulse disabling for secure shutdowns and to prevent unexpected startup. This is designed to satisfy the following safety classifications depending on the external circuit: [35)]

Criteria	Characteristic dependent on module width [1)]			
	1	2	4	8
Maximum Safety Category in accordance with EN ISO 13849 and EN 954-1 [2)]	CAT 4			
Maximum Performance Level in accordance with EN ISO 13849	PL e			
Maximum Safety Integrity Level in accordance with IEC 62061	SIL 3			
Maximum Safety Integrity Level in accordance with IEC 61508	SIL 3			
PFH (probability of dangerous failure per hour)	$< 6 * 10^{-11}$	$< 8 * 10^{-11}$	$< 2 * 10^{-10}$	$< 4 * 10^{-10}$
PFD (probability of dangerous failure on demand) dependent on the proof test interval (PTI) With a PTI of 10 years With a PTI of 20 years	 $< 5 * 10^{-6}$ $< 1 * 10^{-5}$	 $< 7 * 10^{-6}$ $< 2 * 10^{-5}$	 $< 1 * 10^{-5}$ $< 2 * 10^{-5}$	 $< 4 * 10^{-5}$ $< 7 * 10^{-5}$
PTI (proof test interval)[3)]	Max. 20 years			
DC (diagnostic coverage)	99%			
MTTFd (mean time to dangerous failure)[4)]	2500 years			

Table 446: Safety classifications, criteria and characteristics for safe pulse disabling

1) ACOPOSmulti inverter modules have different module widths according to their performance class. Different components and/or switching elements are used depending on the performance class / module width, which has a direct effect on the characteristics of the safe pulse disabling. The module width is listed in the technical data for the respective ACOPOSmulti inverter module.
2) EN 954-1 is no longer valid and has been replaced by EN ISO 13849.
3) Corresponds to the mission time of the module
4) Values determined according to Apfeld, R.; Bömer, T.; Hauke, M.; Huelke, M.; Schaefer, M.: Practical experience with DIN EN ISO 13849-1. openautomation (2009) No. 6, pp. 34-37 (www.dguv.de/medien/ifa/de/pub/grl/pdf/2009_249.pdf).

The following table provides an overview of the individual safety functions that can be implemented:

Name according to standard		Short description
EN 61800-5-2	EN 60204-1	
STO (Safe Torque Off)	Stop category 0	Cuts off the power supply
SS1 (Safe Stop 1)	Stop category 1	Initiates active braking and activates function STO after a defined amount of time has passed
SS2 (Safe Stop 2)	Stop category 2	Initiates active braking and activates function SOS after a defined amount of time has passed
SLS (Safely Limited Speed)	---	Protection against exceeding a defined speed limit
SOS (Safe Operating Stop)	---	Protection against impermissible position deviation

Table 447: Overview of safety functions according to standards

Safe pulse disabling interrupts the supply to the motor by preventing the pulses to the IGBTs over two channels. In this way, a rotating field can no longer be created in the synchronous and induction motors controlled by the ACOPOSmulti inverter modules.

Integrated safe pulse disabling therefore meets the requirements for preventing unexpected startup in accordance with EN 1037 as well as the requirements concerning Category 0 and 1 stop functions in accordance with EN 60204-1. Both stop functions require the power supply to the machine actuators to be switched off (immediately for Category 0 and after reaching standstill for Category 1). The requirements concerning the STO, SS1, SS2, SLS and SOS safety functions are also met in accordance with EN 61800-5-2.

The terminology of EN 61800-5-2 (STO, SS1, SS2, SLS, SOS) will be used in the following.

[35)] For detailed information about the listed standards and safety functions, see chapter "Standards and certifications".

Danger!

If the safety functions integrated in the drive system are used in an application, then they must be fully validated before the drive system is switched on for the first time. This could lead to death, severe injury or damage to property.

1.2 Principle - Implementing the safety function

Secure pulse disabling is obtained by removing the IGBT driver power supply in the ACOPOSmulti inverter modules. Terminals X1 / Enable 1 and X1 / COM (1) as well as X1 / Enable 2 and X1 / COM (3) are used to supply the two integrated DC-DC converters with 24 VDC. The two DC-to-DC converters generate the supply voltage for the IGBT drivers from this voltage.

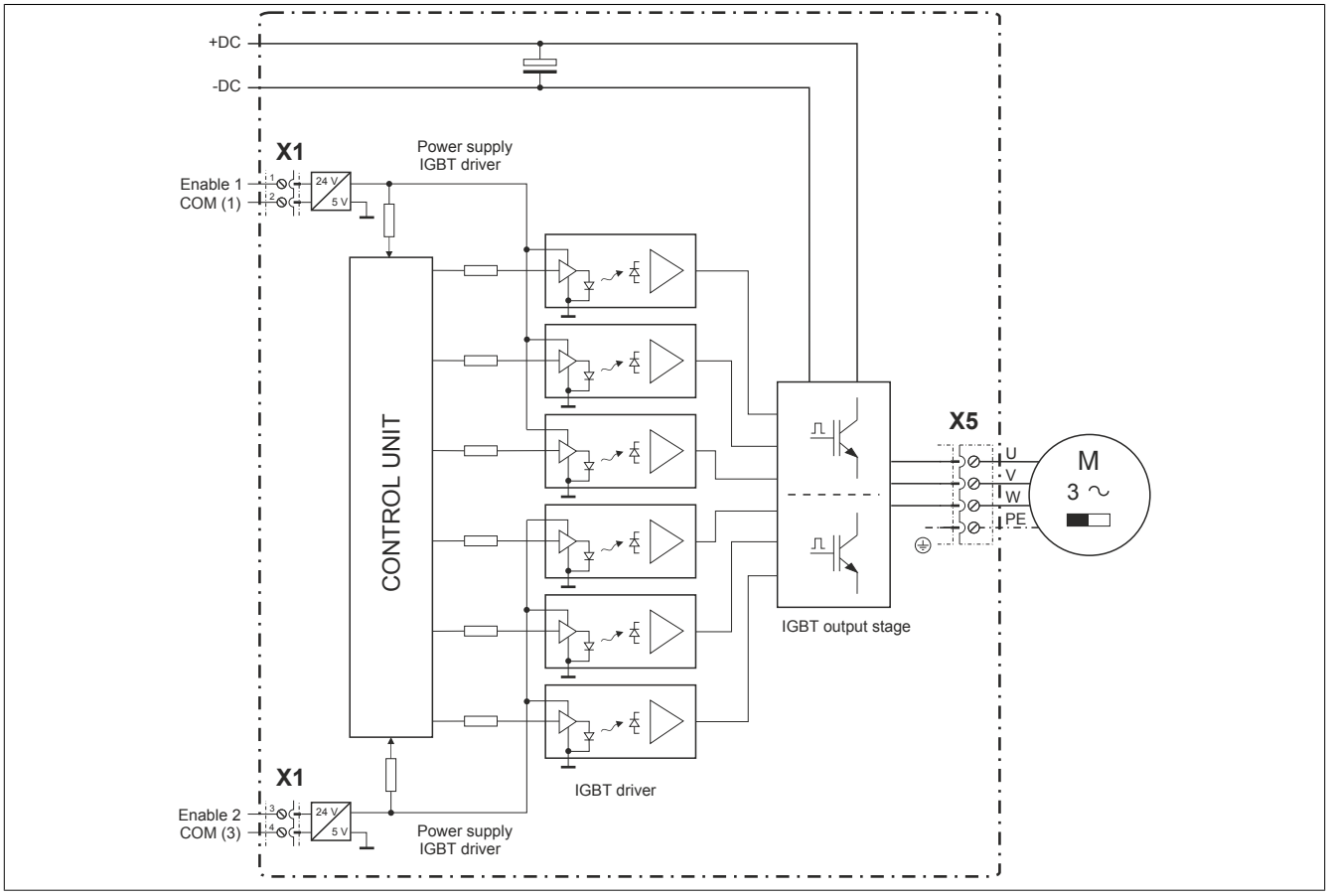


Figure 277: Block diagram of safe pulse disabling

If the 24 VDC voltage supply for one of the DC-to-DC converters is interrupted, the corresponding IGBT drivers are also no longer supplied. It is then no longer possible to transfer the modulation pattern needed to generate the rotating field on the IGBT output stage. This cuts off the supply of power to the motor.

1.2.1 Additional function

The control unit performs a query to check if the output voltage of the two DC-to-DC converters is present. If voltage is not present on the output of one of the two DC-to-DC converters, then the control unit suppresses the generation of the modulation pattern.

Danger!

After activating safe pulse disabling using terminals X1 / Enable 1 and X1/ COM (1) or X1 / Enable 2 and X1 / COM (3), the motor is de-energized and therefore torque-free. If the motor was moving before activation of safe pulse disabling, it is only stopped by a safe operational brake (available under certain conditions) or from the friction of the entire system. The motor is therefore not able to hold hanging loads. Safe holding brakes must be used for this purpose.

Danger!

The switch-off time for the enable inputs must be taken into consideration since it has a substantial effect on the response time of the safety functions and therefore the remaining distances and times to be considered. In order to calculate the total safety response time, the user must validate the lag time throughout the entire system.

The switch-off times for the enable inputs can be found in the technical data for the respective ACOPOSmulti inverter module.

Danger!

Activating safe pulse disabling via the terminals X1 / Enable1 and X1 / COM (1) or X1 / Enable 2 and X1 / COM (3) is not sufficient for achieving a de-energized drive and therefore does not provide sufficient protection against electrical shock!

Danger!

Depending on the application, it is possible for the drive to restart after safe pulse disabling is deactivated.

Danger!

The brake controller integrated in ACOPOSmulti inverter modules and the holding brake integrated in B&R standard motors fulfill the criteria up to Category B in accordance with EN ISO 13849-1.

Additional measures are necessary to achieve higher safety categories.

Danger!

The C standards relevant to applications must be observed!

Information:

It is important to note that multiple errors in the IGBT bridge can cause a brief forward movement. The maximum angle of rotation φ of the motor shaft during this forward movement depends on the motor being used. For permanent magnet synchronous motors, $\varphi = 360°/2p$ (for B&R standard motors, p=3 so the angle is 60°). For three-phase induction motors, there is a relatively small angle of rotation between 5° and 15°.

This short forward movement can be excluded as a fault per EN ISO 13849-1, among other things due to the improbability that this would occur and due to general technical experience.

1.3 Wiring the enable inputs to the required Safety Category / SIL / PL

Using the example of the STO safety function, different circuit variations for the Enable inputs of ACOPOSmulti inverter modules are given here with regard to the required safety category / SIL / PL (see "SafeMOTION user's manual MAACPMSAFEMC").

Danger!

Any faults (e.g. cross faults) that are not detected can lead to the loss of safety functionality.

Appropriate measures must be taken to justify the exclusion of faults. For instance, faults caused by a short circuit between any two wires can be excluded per EN ISO 13849-2, appendix D.5, if one of the following conditions is met:

- **The wires are permanently installed and protected against external damage (e.g. using a cable duct or armored conduit).**
- **The wires are installed in different plastic-sheathed cables or within an area for electrical equipment**[36)]**.**
- **The wires are each individually protected by a ground connection.**

For more fault exclusions, see EN ISO 13849-2, appendix D.5.

Danger!

To achieve Safety Category 4 / SIL 3 / PL e, it must be ensured that a buildup of errors does not lead to a loss of safety functionality. Monitoring can be canceled after the third error if the likelihood that more errors will occur can be considered low.

To achieve Safety Category 3 / SIL 2 / PL d, it must be ensured that a single error does not lead to a loss of safety functionality.

[36)] Prerequisite: Both the wires and the area for electrical equipment must meet the respective requirements (see IEC 60204-1).

1.3.1 STO, Category 4 / SIL 3 / PL e (Variant A)

An enable input on the ACOPOSmulti inverter module is supplied with +24 V via a switching contact of a safe emergency stop device. The COM of the second enable input on the ACOPOSmulti inverter module is supplied with 0 V via an additional switching contact of a safe emergency stop device. If emergency switching-off device S1 is actuated, both switching contacts on the emergency stop device are opened, cutting off the enable input as well as the COM of the second enable input.

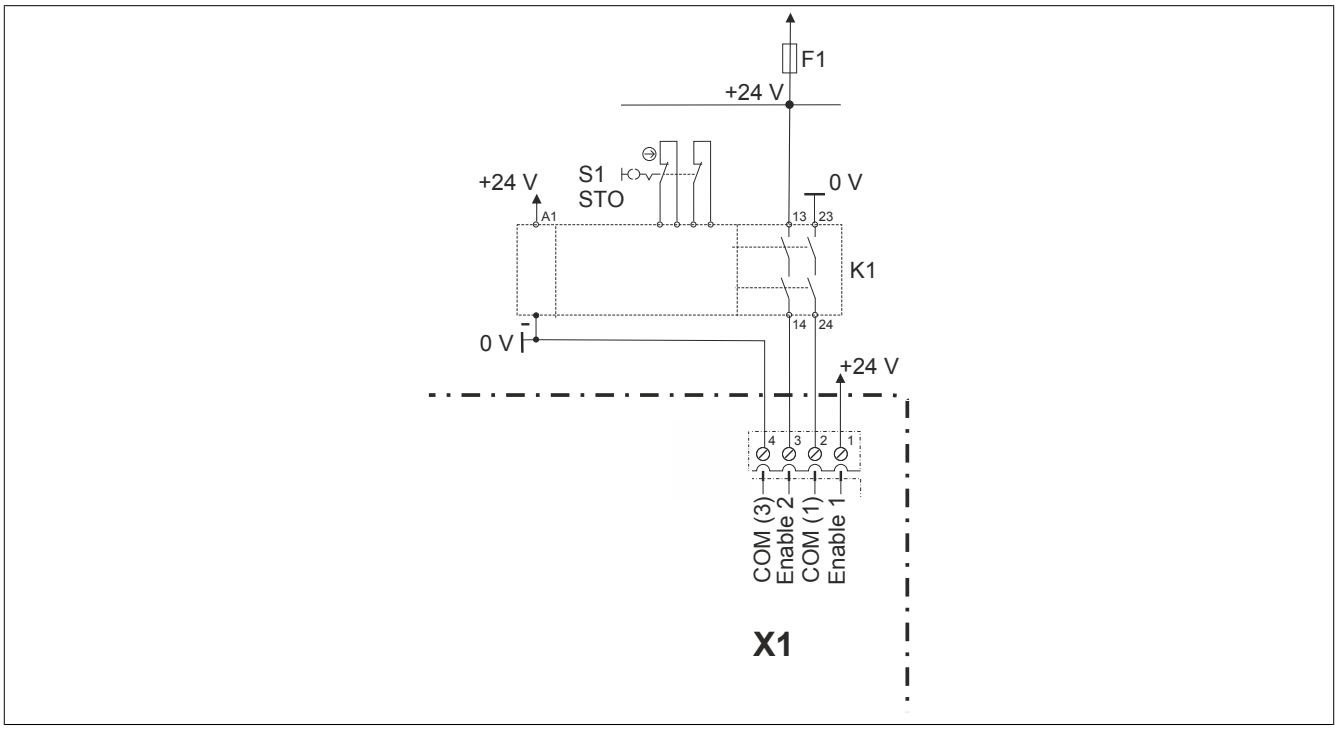


Figure 278: STO, Category 4 / SIL 3 / PL e (Variant A)

This circuit covers a majority of the wiring and isolation errors in the area of supply lines to the E-stop switching device and to the enable inputs.

The following fault events can occur in the external wiring:[37)]

Error	Error description	Effects	Safety functionality in accordance with Category 4 / SIL 3 / PL e maintained?
1	Interruption of the supply line to connection 13	Power to the motor is cut off	Yes
2	Interruption of the supply line to connection 23	Power to the motor is cut off	Yes
3	Short circuit between connection 13 and 23	F1 fuse triggered immediately	Yes
4	Short circuit between connection 13 and 0 V	F1 fuse triggered immediately	Yes
5	Short circuit between connection 23 and +24 V	F1 fuse triggered immediately	Yes
6	Short circuit between connection 13 and 24	F1 fuse triggered by requesting safety function	Yes
7	Short circuit between connection 23 and 14	F1 fuse triggered by requesting safety function	Yes
8	**Short circuit between connection 13 and 14**	**Unknown error**	**No, safety function reverts to Category 3 / SIL 2 / PL d**
9	**Short circuit between connection 23 and 24**	**Unknown error**	**No, safety function reverts to Category 3 / SIL 2 / PL d**
10	Interruption of the supply line to connection 14	Power to the motor is cut off	Yes
11	Interruption of the supply line to connection 24	Power to the motor is cut off	Yes
12	Short circuit between connection 14 and 0 V	F1 fuse triggered by requesting safety function	Yes
13	Short circuit between connection 24 and +24 V	F1 fuse triggered by requesting safety function	Yes
14	**Short circuit between connection 14 and +24 V**	**Unknown error**	**No, safety function reverts to Category 3 / SIL 2 / PL d**
15	**Short circuit between connection 24 and +0 V**	**Unknown error**	**No, safety function reverts to Category 3 / SIL 2 / PL d**
16	Short circuit between connection 14 and 24	F1 fuse triggered by requesting safety function	Yes

Table 448: List of possible errors

[37)] The numbers for the connections refer to "STO, Category 4 / SIL 3 / PL e (Variant A)" on page 595.

Danger!

The S1 switch shown requires the use of a two-pin Category 4 / SIL 3 / PL e switching device with a positively driven NC contact in accordance with EN 60947-5-1. A two-pin Category 4 / SIL 3 / PL e switching device must be used for the K1 relay shown.

The instructions in the switching device's user documentation must be observed!

It must be possible to exclude the following fault events according to "List of possible errors" on page 595 by taking sufficient wiring measures (short circuit protected wiring):

- **Error 8**
- **Error 9**
- **Error 14**
- **Error 15**

1.3.2 STO, Category 4 / SIL 3 / PL e (Variant B)

The two enable inputs on the ACOPOSmulti inverter module are supplied via a safe digital output (Out1+, Out1-). If the safety function is requested, then the safe digital output disconnects the two enable inputs.

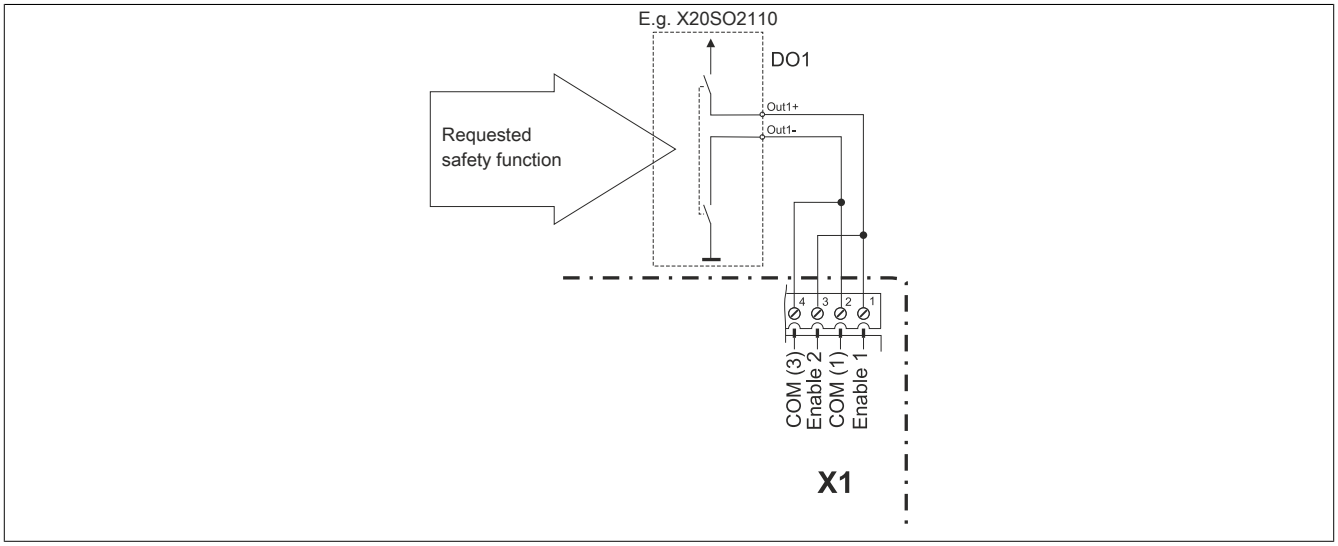


Figure 279: STO, Category 4 / SIL 3 / PL e (Variant B)

Errors in the external wiring do not have to be monitored because they are detected by the safe digital output.

Danger!

A safe digital Category 4 / SIL 3 / PL e output module must be used for the DO1 safe digital output shown.

The guidelines listed in the safe digital output module's user documentation must be observed!

1.3.3 STO, Category 3 / SIL 2 / PL d

When an E-stop button is pressed, one or both enable inputs on the ACOPOSmulti inverter module is cut off from the +24 V supply by a switch, thereby cutting off the motor's power supply.

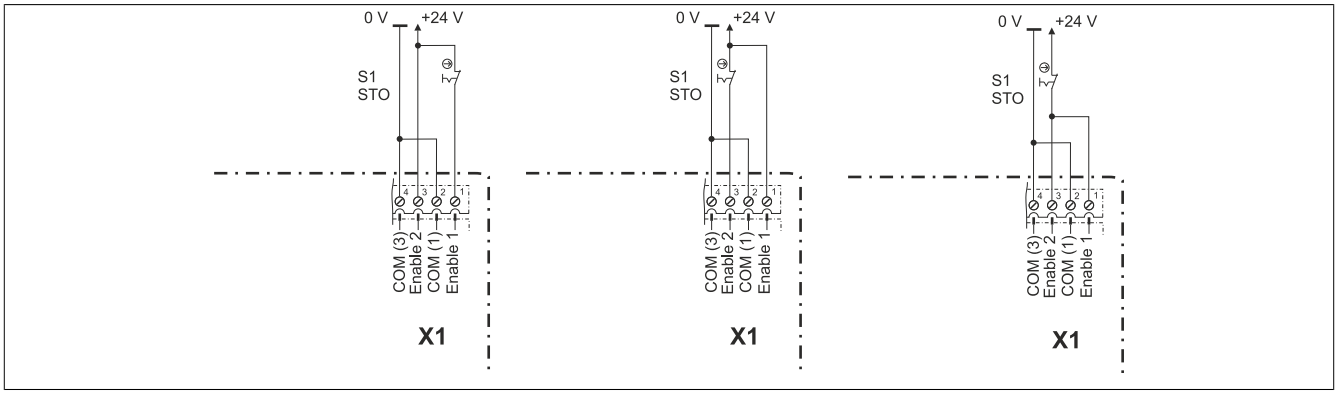


Figure 280: STO, Category 3 / SIL 2 / PL d

Danger!

If only one of the two enable inputs is cut off from the +24 V supply using a switch, suitable wiring measures must be taken to rule out a short circuit between the X1 / Enable1 and X1 / Enable2 connections in order to guarantee compliance with the safety category!

Danger!

A 1-pole category 3 / SIL 2 / PL d switching device with a positively driven normally closed contact must be used for the shown S1 switch per EN 60947-5-1.

The information in the user documentation for the switching device must be observed!

1.4 Wiring the enable inputs to the required Safety Category / SIL / PL and functionality (STO, SS1, SS2, SLS, SOS)

The following illustrates example wiring suggestions for the external wiring of the enable inputs on ACOPOSmulti inverter modules. They vary in their safety classification in accordance with EN 60204-1, ISO 13849 and EN 61800-5-2 as well as with regard to the safety function (STO, SS1, SS2, SLS, SOS).

Information:

The following wiring suggestions do not include a line contactor because it is not needed to comply with the required Safety Category / SIL / PL.

1.4.1 STO, SLS, SOS - Safety Category 4 / SIL 3 / PL e

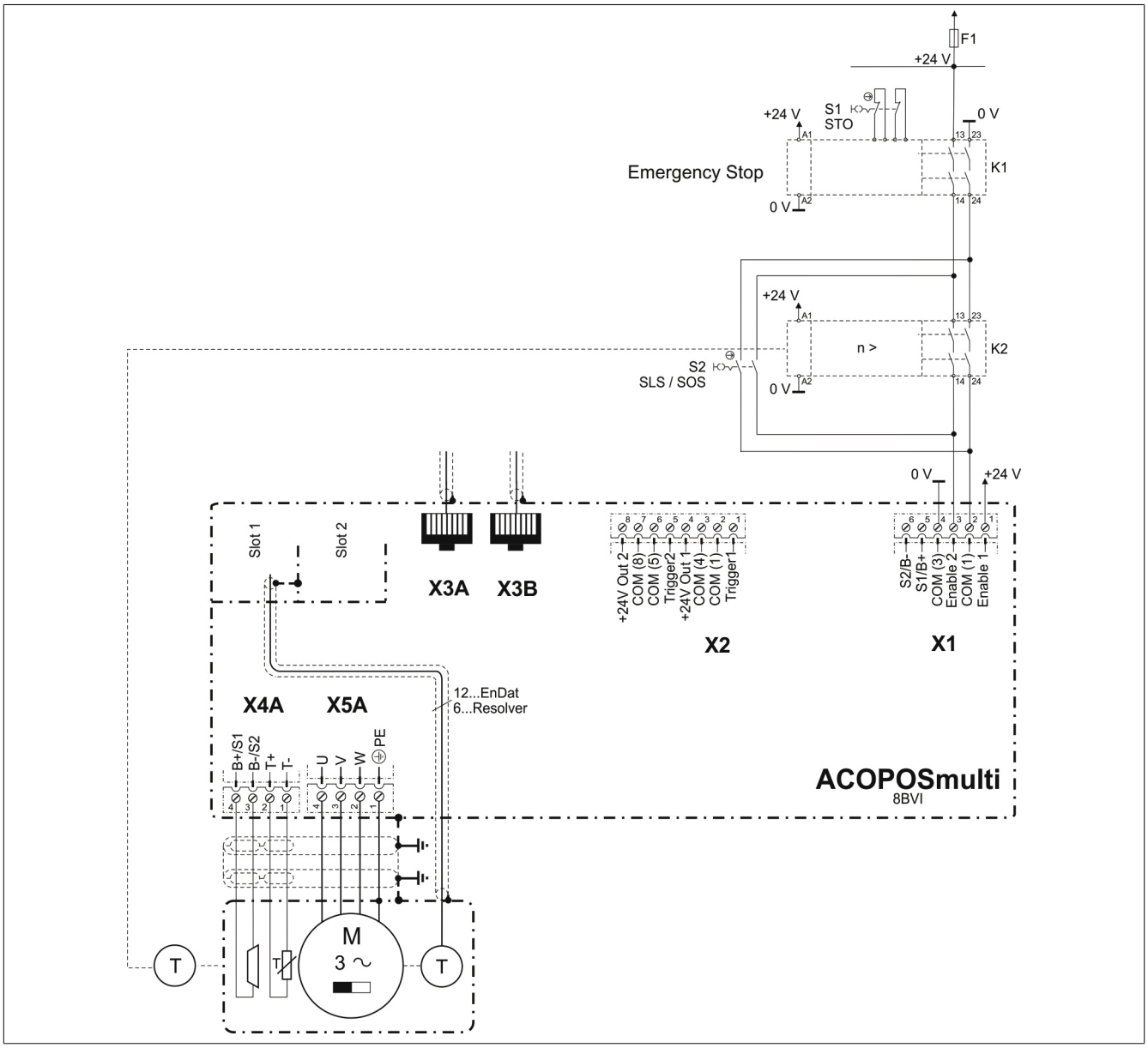


Figure 281: STO, SLS, SOS - Safety Category 4 / SIL 3 / PL e

Danger!

The brake shown in this image and the brake control from the ACOPOSmulti inverter module are not included in the safety function!

Description:

STO

Pressing the S1 E-stop button de-energizes the switching contacts of the K1 E-stop switching device. This cuts off the two enable inputs on the ACOPOSmulti inverter module. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately.

Secure restart interlock

Opening and latching emergency stop switch S1 prevents unexpected startup.

SLS

Opening the S2 switch activates the SLS safety function. The switching contacts of the K2 overspeed monitor are opened if the monitor's configured speed limit is exceeded. This cuts off the two enable inputs on the ACOPOSmulti inverter module. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the speed limit set on the K2 overspeed monitor is exceeded.

SOS

Opening the S2 switch activates the SOS safety function. The switching contacts of the standstill monitor are opened when the K2 standstill monitor is activated. This cuts off the two enable inputs on the ACOPOSmulti inverter module. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the K2 standstill monitor is activated.

Information:

Either the SLS or the SOS safety function can be implemented depending on the function of the K2 switching device (overspeed monitor or standstill monitor).

Danger!

The S1 and S2 switches shown require the use of two-pin Category 4 / SIL 3 / PL e switching devices with a positively-driven NC contact in accordance with EN 60947-5-1. A two-pin Category 4 / SIL 3 / PL e switching device must be used for the K1 and K2 relays shown.

The instructions in the switching device's user documentation must be observed!

1.4.2 SS1, SLS, SS2 - Safety Category 4 / SIL 3 / PL e (Variant A)

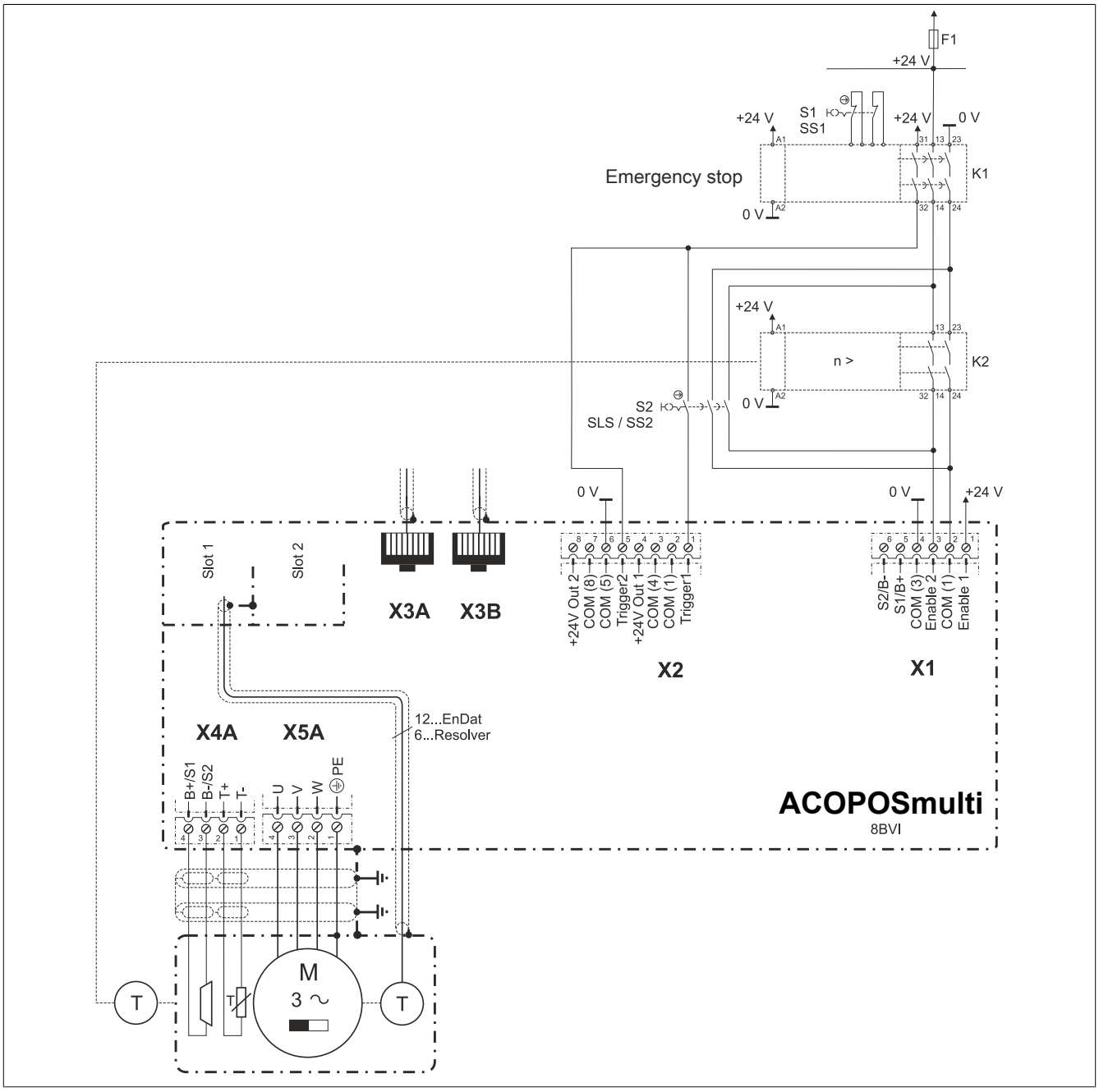


Figure 282: SS1, SLS, SS2 - Safety Category 4 / SIL 3 / PL e (Variant A)

Danger!

The brake shown in this image and the brake control from the ACOPOSmulti inverter module are not included in the safety function!

Description:

SS1

Pressing the S1 E-stop switch triggers an active braking procedure using an undelayed switching contact of the K1 E-stop switching device on the X2 / Trigger2 input of the ACOPOSmulti inverter module. The delayed switching contacts of the K1 E-stop switching device are de-energized after a defined amount of time. This cuts off the two enable inputs on the ACOPOSmulti inverter module. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off after a defined amount of time.

Secure restart interlock

Opening and latching emergency stop switch S1 prevents unexpected startup.

SLS

Opening the S2 switch activates the SLS safety function and triggers an active braking procedure on the ACOPOSmulti inverter module's X2 / Trigger1 input. After a defined amount of time, speed monitoring will be activated on the K2 speed monitor. If the speed limit is exceeded, then the two enable inputs of the ACOPOSmulti inverter module are disconnected via the undelayed switching contacts of the K2 speed monitor. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the speed limit set on the K2 overspeed monitor is exceeded.

SS2

Opening the S2 switch activates the SS2 safety function and triggers an active braking procedure on the ACOPOSmulti inverter module's X2 / Trigger1 input. After a defined amount of time, standstill monitoring will be activated on the K2 standstill monitor. If the tolerance limit is exceeded (standstill monitor K2 is activated), then the enable inputs of the ACOPOSmulti inverter module are disconnected via the undelayed switching contacts of the K2 standstill monitor. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the K2 standstill monitor is activated.

Information:

Either the SLS or the SS2 safety function can be implemented depending on the function of the K2 switching device (overspeed monitor or standstill monitor).

Danger!

The S1 and S2 switches shown require the use of two-pin Category 4 / SIL 3 / PL e switching devices with a positively-driven NC contact in accordance with EN 60947-5-1. A two-pin Category 4 / SIL 3 / PL e switching device must be used for the K1 and K2 relays shown.

The instructions in the switching device's user documentation must be observed!

1.4.3 SS1, SLS, SS2 - Safety Category 4 / SIL 3 / PL e (Variant B)

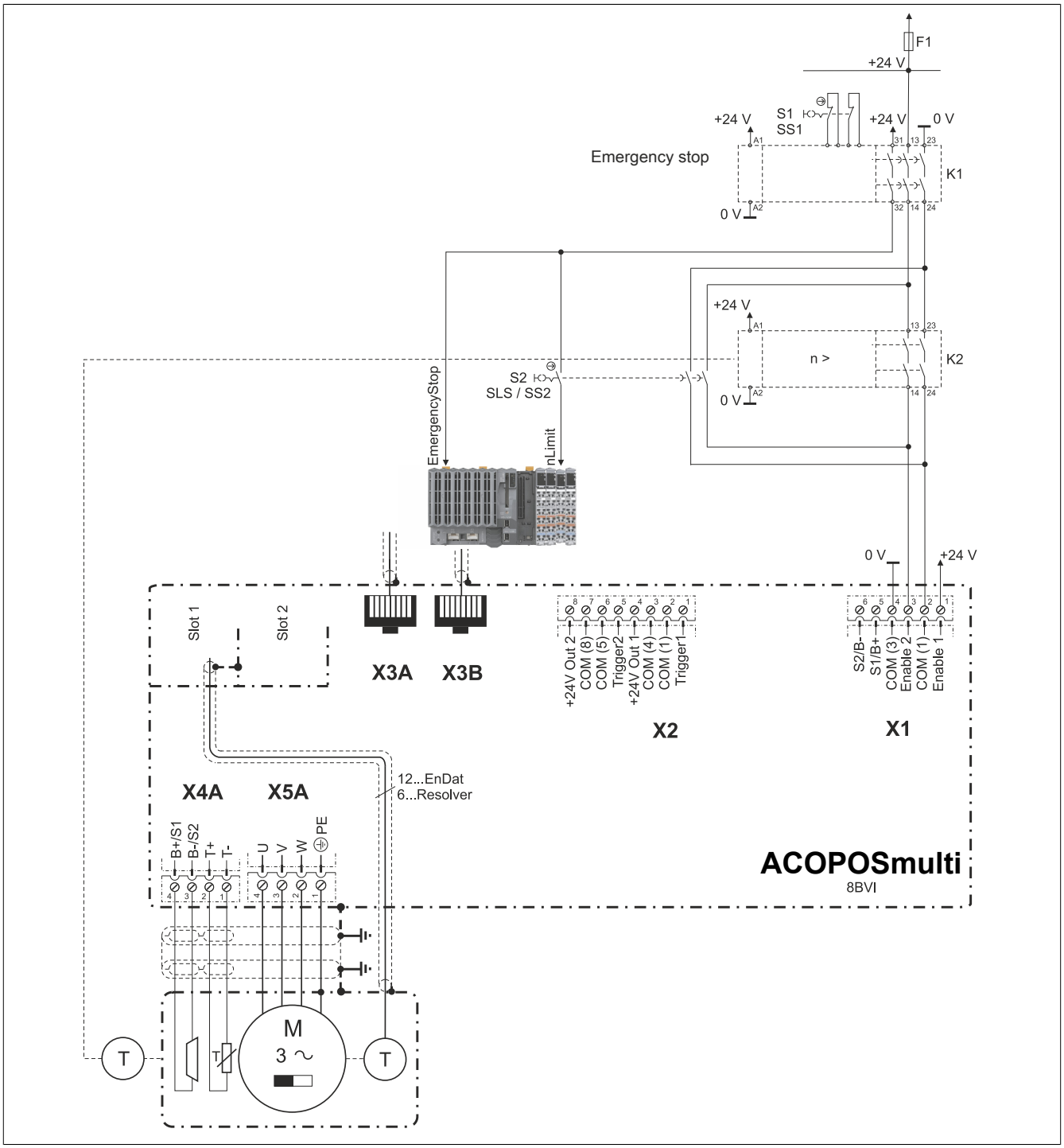


Figure 283: SS1, SLS, SS2 - Safety Category 4 / SIL 3 / PL e (Variant B)

Danger!

The brake shown in this image and the brake control from the ACOPOSmulti inverter module are not included in the safety function!

Description:

SS1

Activating the S1 emergency stop switch triggers an active braking procedure over the POWERLINK network via an undelayed switching contact of the K1 emergency stop switching device on the controller's "EmergencyStop" digital input (see "Code example" on page 604). After a defined amount of time, the delayed switching contacts of the K1 emergency stop switching device are de-energized. Both Enable inputs on the ACOPOSmulti inverter module are separated. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is always cut off after a defined amount of time.

Secure restart interlock

Opening and latching emergency stop switch S1 prevents unexpected startup.

SLS

Opening the S2 switch activates the SLS safety function and triggers an active braking procedure over the POWERLINK network on the controller's "nLimit" digital input (see "Code example" on page 604). After a defined amount of time, speed monitoring is activated on the K2 overspeed monitor. If the configured speed limit is exceeded, then the 2 enable inputs of the ACOPOSmulti inverter module are disconnected via the undelayed switching contacts of the K2 speed monitor. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is always cut off immediately when the speed limit set on the K2 overspeed monitor is exceeded.

SS2

Opening the S2 switch activates the SS2 safety function and triggers an active braking procedure over the POWERLINK network on the controller's "nLimit" digital input (see "Code example" on page 604). After a defined amount of time, standstill monitoring is activated on the K2 standstill monitor. If the tolerance limit is exceeded (standstill monitor K2 is activated), then the enable inputs of the ACOPOSmulti inverter module are disconnected via the undelayed switching contacts of the K2 standstill monitor. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is always cut off immediately when the K2 standstill monitor is activated.

Information:

Either the SLS or the SS2 safety function can be implemented depending on the function of the K2 switching device (overspeed monitor or standstill monitor).

Danger!

The S1 and S2 switches shown require the use of two-pin Category 4 / SIL 3 / PL e switching devices with a positively-driven NC contact in accordance with EN 60947-5-1. A two-pin Category 4 / SIL 3 / PL e switching device must be used for the K1 and K2 relays shown.

The instructions in the switching device's user documentation must be observed!

Code example

Issuing the stop command via POWERLINK:

```
if ( ! statStopActive )
{
    /* Move stop not active: check move stop inputs */
    if ( DI_EmergencyStop == INPUT_LEVEL_LOW )
    {
        /* Move stop with emergency stop deceleration */
        MC_Stop_0.Deceleration = E_STOP_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
    else if ( cmdStopAxis1 )
    {
        /* Move stop with application deceleration */
        MC_Stop_0.Deceleration = APPLICATION_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
}
else
{
    /* Move stop is active, wait until it is finished */
    if ( DI_EmergencyStop == INPUT_LEVEL_HIGH &&
        cmdStopAxis1 == 0 &&
        MC_Stop_0.Done == 1 )
    {
        /* Move stop complete */
        MC_Stop_0.Execute = 0;
        statStopActive = 0;
    }
}
...
MC_Stop_0.Axis = AxisRef1;
MC_Stop( &MC_Stop_0 );
...
```

1.4.4 STO, SLS, SOS - Safety Category 3 / SIL 2 / PL d

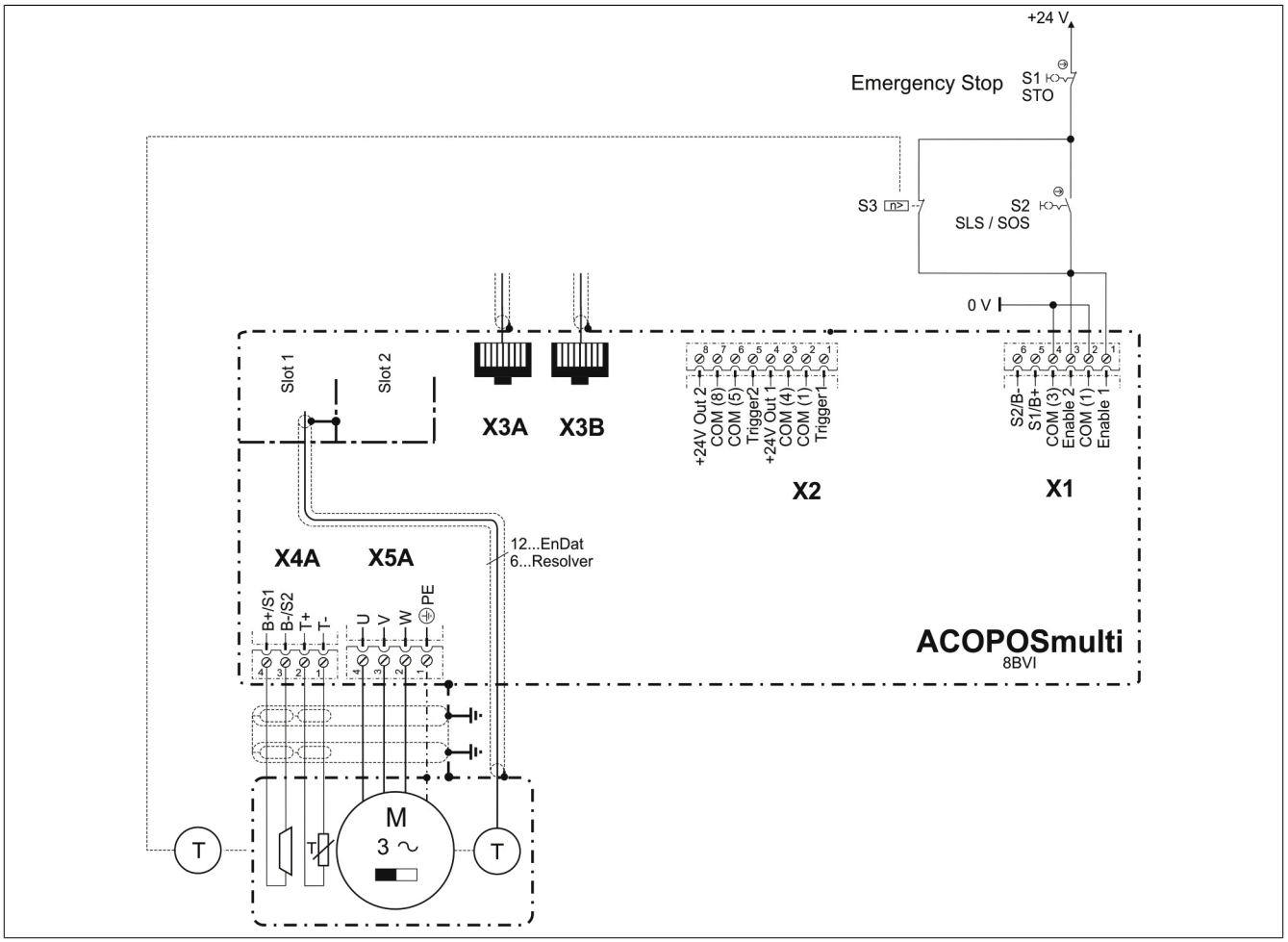


Figure 284: STO, SLS, SOS - Safety Category 3 / SIL 2 / PL d

Danger!

The brake shown in this image and the brake control from the ACOPOSmulti inverter module are not included in the safety function!

Description:

STO

When the S1 E-stop button is pressed, both of the ACOPOSmulti inverter module's enable inputs are de-energized. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately.

Secure restart interlock

Opening and latching emergency stop switch S1 prevents unexpected startup.

SLS

Opening the S2 switch activates the SLS safety function. The switching contact of the S3 overspeed monitor is opened if the monitor's configured speed limit is exceeded. This cuts off the two enable inputs on the ACOPOSmulti inverter module. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the speed limit set on the S3 overspeed monitor is exceeded.

SOS

Opening the S2 switch activates the SOS safety function. The switching contact of the overspeed monitor is opened when the S3 standstill monitor is activated. This cuts off the two enable inputs on the ACOPOSmulti inverter module. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the S3 standstill monitor is activated.

Information:

Either the SLS or the SOS safety function can be implemented depending on the function of the S3 switching device (overspeed monitor or standstill monitor).

Danger!

The S1 and S2 switches shown require the use of one-pin Category 3 / SIL 2 / PL d switching devices with a positively-driven NC contact in accordance with EN 60947-5-1. A one-pin Category 3 / SIL 2 / PL d switching device must be used for the S3 switching device shown.

The guidelines in the switching device's user documentation must be observed!

1.4.5 SS1, SLS, SS2 - Safety Category 3 / SIL 2 / PL d (Variant A)

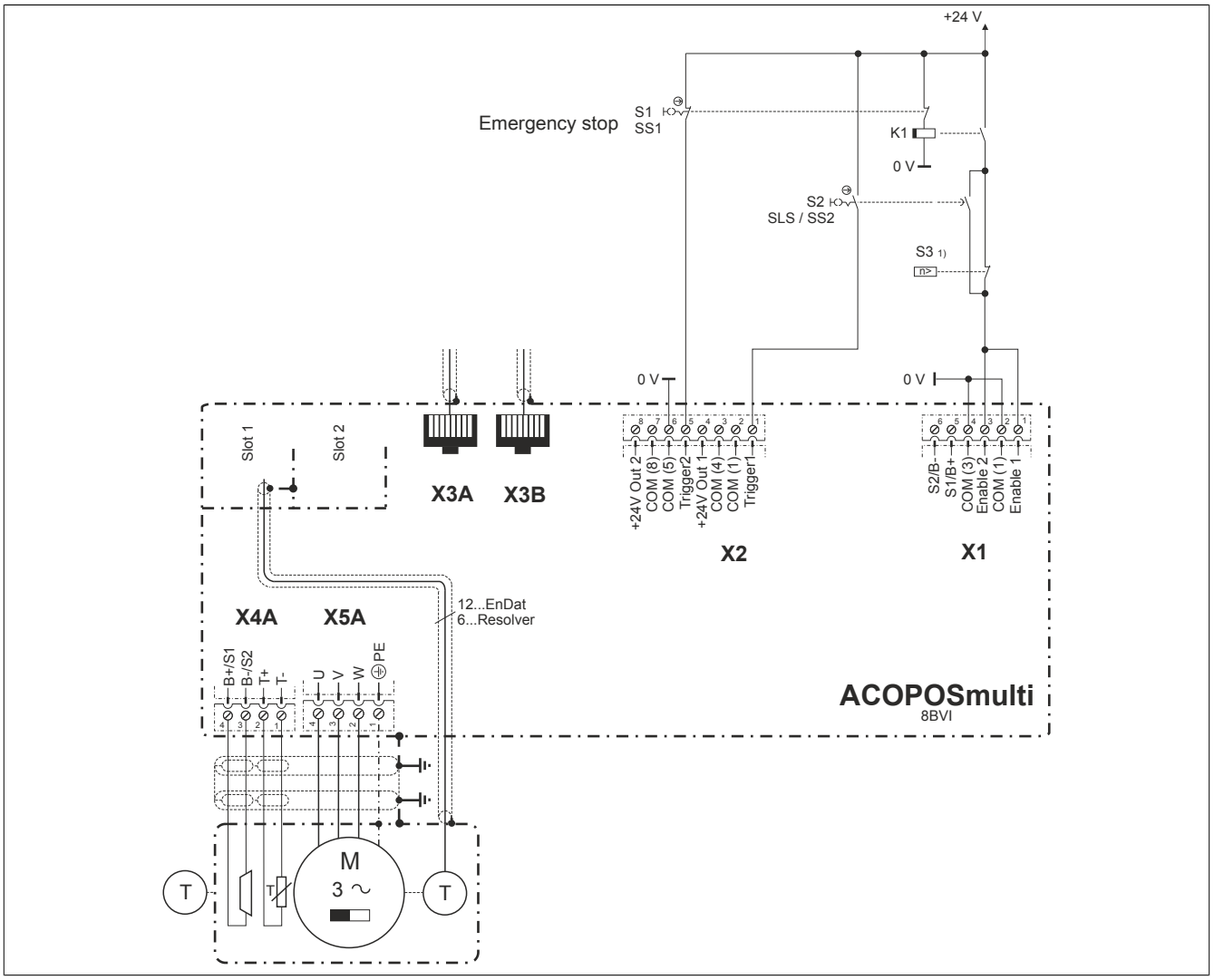


Figure 285: SS1, SLS, SS2 - Safety Category 3 / SIL 2 / PL d (Variant A)

Danger!

The brake shown in this image and the brake control from the ACOPOSmulti inverter module are not included in the safety function!

Information:

For this circuit, the X2 / Trigger2 input on the ACOPOSmulti inverter module must be configured as a quick-stop for the affected axis.

Description:

SS1

Pressing the S1 E-stop button de-energizes the K2 relay. As a result, an active braking procedure is triggered via the X2 / Trigger2 input of the ACOPOSmulti inverter module.

The K1 auxiliary drop-out delay relay is de-energized after a defined amount of time. This cuts off the two enable inputs on the ACOPOSmulti inverter module. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off after a defined amount of time.

Secure restart interlock

Opening and latching emergency stop switch S1 prevents unexpected startup.

SLS

Opening the switch S2 will activate the SLS safety function and trigger an active braking procedure via the input X2 / Trigger1 of the ACOPOSmulti inverter module. After a defined amount of time, speed monitoring is activated on the S3 overspeed monitor. If the set speed limit is exceeded, then the enable inputs of the ACOPOSmulti inverter module are disconnected via the undelayed switching contact of the S3 speed monitor. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the speed limit set on the S3 overspeed monitor is exceeded.

SS2

Opening the switch S2 will activate the SS2 safety function and trigger an active braking procedure via the input X2 / Trigger1 of the ACOPOSmulti inverter module. After a defined amount of time, standstill monitoring is activated on the S3 standstill monitor. If the tolerance limit is exceeded (S3 standstill monitor is activated), then the enable inputs of the ACOPOSmulti inverter module are disconnected via the undelayed switching contact of the S3 standstill monitor. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the S3 standstill monitor is activated.

Information:

Either the SLS or the SS2 safety function can be implemented depending on the function of the S3 switching device (overspeed monitor or standstill monitor).

Danger!

The S1 and S2 switches shown require the use of one-pin Category 3 / SIL 2 / PL d switching devices with a positively-driven NC contact in accordance with EN 60947-5-1. A one-pin Category 3 / SIL 2 / PL d switching device must be used for the K1 relay shown and the S3 switching device.

The instructions in the switching device's user documentation must be observed!

1.4.6 SS1, SLS, SS2 - Safety Category 3 / SIL 2 / PL d (Variant B)

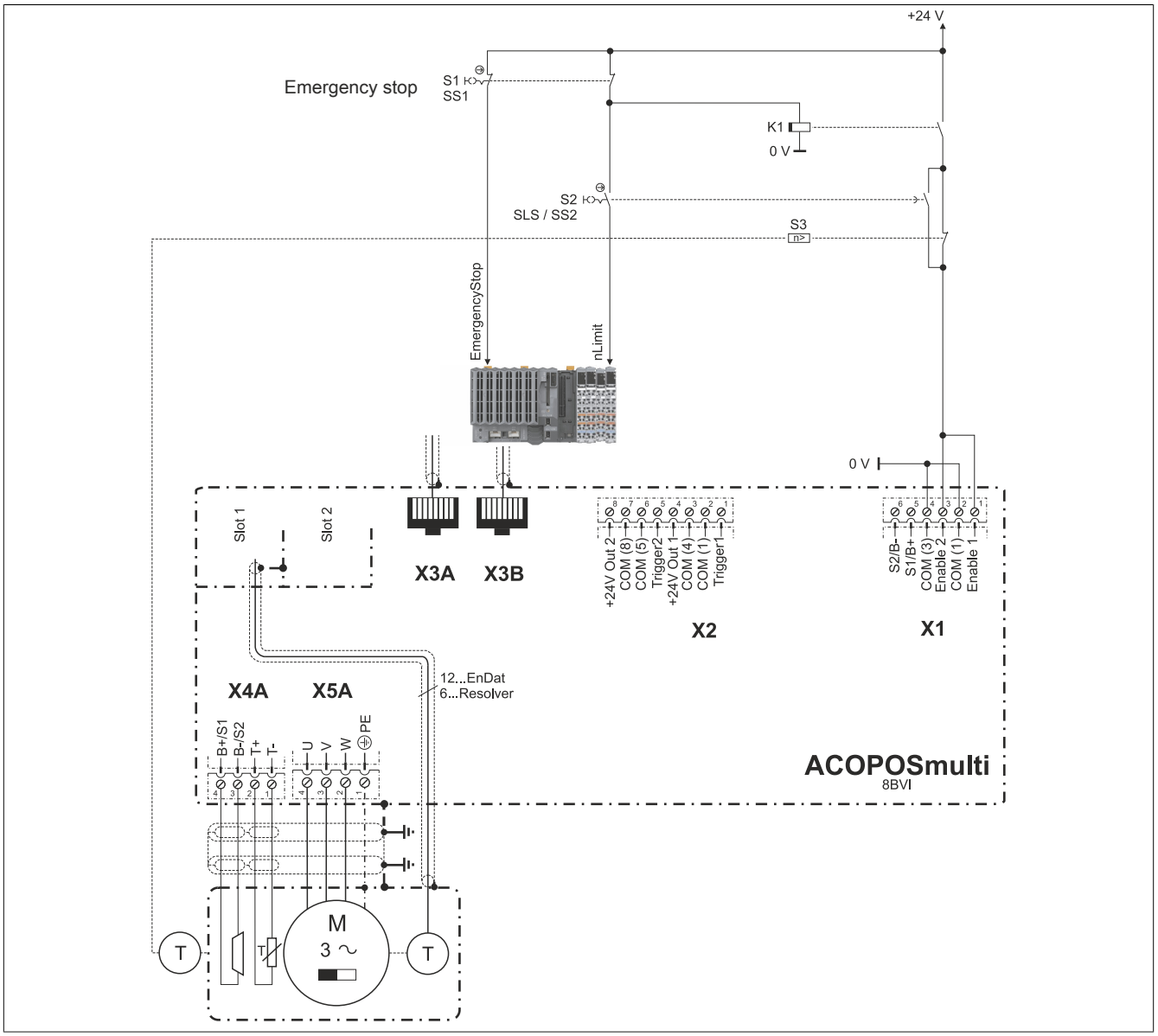


Figure 286: SS1, SLS, SS2 - Safety Category 3 / SIL 2 / PL d (Variant B)

Danger!

The brake shown in this image and the brake control from the ACOPOSmulti inverter module are not included in the safety function!

Description:

SS1

When the S1 E-stop switch is pressed, the "EmergencyStop" digital input on the controller triggers an active braking procedure (see "Code example" on page 611).

The K1 auxiliary drop-out delay relay is de-energized after a defined amount of time. This cuts off the two enable inputs on the ACOPOSmulti inverter module. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off after a defined amount of time.

Secure restart interlock

Opening and latching emergency stop switch S1 prevents unexpected startup.

SLS

Opening the S2 switch activates the SLS safety function and triggers an active braking procedure via the controller's "nLimit" digital input (see "Code example" on page 611). After a defined amount of time, speed monitoring is activated on the S3 overspeed monitor. If the set speed limit is exceeded, then the enable inputs of the ACOPOSmulti inverter module are disconnected via the undelayed switching contact of the S3 rotation speed monitor. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the speed limit set on the S3 overspeed monitor is exceeded.

SS2

Opening the S2 switch activates the SS2 safety function and triggers an active braking procedure via the controller's "nLimit" digital input (see "Code example" on page 611). After a defined amount of time, standstill monitoring is activated on the S3 standstill monitor. If the tolerance limit is exceeded (S3 standstill monitor is activated), then the enable inputs of the ACOPOSmulti inverter module are disconnected via the undelayed switching contact of the S3 standstill monitor. As a result, the supply of power to the motor is cut off.

This ensures that the supply of power to the motor is always cut off immediately when the S3 standstill monitor is activated.

Information:

Either the SLS or the SS2 safety function can be implemented depending on the function of the S3 switching device (overspeed monitor or standstill monitor).

Danger!

The S1 and S2 switches shown require the use of two or one-pin switching devices (Category 3 / SIL 2 / PL d) with a positively driven NC contact in accordance with EN 60947-5-1. A one-pin Category 3 / SIL 2 / PL d switching device must be used for the K1 relay shown and the S3 switching device.

The instructions in the switching device's user documentation must be observed!

Code example

Issuing the stop command via POWERLINK:

```
if ( ! statStopActive )
{
    /* Move stop not active: check move stop inputs */
    if ( DI_EmergencyStop == INPUT_LEVEL_LOW )
    {
        /* Move stop with emergency stop deceleration */
        MC_Stop_0.Deceleration = E_STOP_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
    else if ( cmdStopAxis1 )
    {
        /* Move stop with application deceleration */
        MC_Stop_0.Deceleration = APPLICATION_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
}
else
{
    /* Move stop is active, wait until it is finished */
    if ( DI_EmergencyStop == INPUT_LEVEL_HIGH &&
        cmdStopAxis1 == 0 &&
        MC_Stop_0.Done == 1 )
    {
        /* Move stop complete */
        MC_Stop_0.Execute = 0;
        statStopActive = 0;
    }
}
...
MC_Stop_0.Axis = AxisRef1;
MC_Stop( &MC_Stop_0 );
...
```

Chapter 7 • Standards and certifications

1 Applicable European directives

- EMC Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU
- Machinery Directive 2006/42/EC[38)]

2 Applicable standards

Standard	Description
EN 61800-2:2016	Adjustable speed electrical power drive systems • Part 2: General requirements; Rating specifications for low voltage adjustable frequency AC power drive systems
EN 61800-3:2004 +A1:2012	Adjustable speed electrical power drive systems • Part 3: EMC requirements and specific test methods
EN 61800-5-1:2007 +A1:2017	Adjustable speed electrical power drive systems • Part 5-1: Safety requirements - Electrical, thermal and energy
EN 61800-5-2:2007	Adjustable speed electrical power drive systems • Part 5-2: Safety requirements - Functional
EN 61131-2:2007	Programmable logic controllers • Part 2: Equipment requirements and tests
EN 60204-1:2006 +AC:2010	Safety of machinery - Electrical equipment of machines • Part 1: General requirements
EN 61508:2010	Functional safety of electrical / electronic / programmable electronic safety-related systems
EN 1037:1995 +A1:2008	Safety of machinery - Prevention of unexpected startup
EN 13849-1:2016	Safety of machinery - Safety-related parts of control systems • Part 1: General principles for design
EN 62061:2005 +Cor.:2010 +A1:2013 +A2:2015	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances (RoHS)
UL 508c Ed.3:2002 +Rev.:2013	Power conversion equipment
CSA-C22.2 No. 274 Ed.2:2017	Adjustable speed drives

Table 449: Applicable standards

The limit values specified from section "Environmental limit values" to section "Additional environmental limit values in accordance with EN 61800-2" are taken from the product standard EN 61800 (or IEC 61800) for servo drives in industrial environments (category C3[39)]).

[38)] This machinery directive only applies to logic units for safety functions that are initially made available by B&R for sale or use.

[39)] Limit values from CISPR11, group 2, class A (second environment).

3 Environmental limit values

3.1 Mechanical conditions per EN 61800-2

3.1.1 Operation

IEC 60721-3-3, class 3M1	
	EN 61800-2
Vibration during operation 2 ≤ f < 9 Hz 9 ≤ f < 200 Hz	 0.3 mm amplitude 1 m/s² acceleration

Table 450: Mechanical conditions during operation

3.1.2 Transport

IEC 60721-3-2, class 2M1	
	EN 61800-2
Vibration during transport [1)2)] 2 ≤ f < 9 Hz 9 ≤ f < 200 Hz 200 ≤ f < 500 Hz	 3.5 mm amplitude 10 m/s² acceleration 15 m/s² acceleration
Drop height in free fall [1)] Weight < 100 kg	 0.25 m

Table 451: Mechanical conditions during transport

1) Only valid for components in original packaging.
2) The values for "Vibration during operation" apply to components that are not in their original packaging.

3.2 Climate conditions per EN 61800-2

3.2.1 Operation

IEC 60721-3-3, class 3K3	
	EN 61800-2
Ambient temperature during operation	5 to 55°C
Relative humidity during operation	5 - 85%, non-condensing

Table 452: Climate conditions during operation

3.2.2 Storage

IEC 60721-3-1, class 1K4	
	EN 61800-2
Storage temperature	-25 to +55°C

Table 453: Climate conditions during storage (temperature)

IEC 60721-3-1, class 1K3	
	EN 61800-2
Relative humidity during storage	5 to 95%, non-condensing

Table 454: Climate conditions during storage (relative humidity)

3.2.3 Transport

IEC 60721-3-2, class 2K3	
	EN 61800-2
Transport temperature	-25 to +70°C
Relative humidity during transport	Max. 95% at +40°C

Table 455: Climate conditions during transport

4 Requirements for immunity to disturbances (EMC)

- EN 61800-3 requirements apply.
- For all modules that have certified safety functions, stricter requirements apply for section 4.3 "High-frequency disturbances per EN 61800-3" per IEC 61800-5-2.

4.1 Evaluation criteria (performance criteria)

Performance criteria (PC)	Description
A	The test object is not interfered with during testing.
B	The test object is only interfered with temporarily during testing.
C	The system does not reboot itself automatically (reset required).
FS	Functional safety - Behavior of test object per EN 61800-5-2, item 6.2.5.3

Table 456: Evaluation criteria (performance criteria) for immunity to disturbances

4.2 Low-frequency disturbances in accordance with EN 61800-3

The following limit values are applicable for industrial environments (category C3).

Power mains harmonics and commutation notches / voltage distortions

IEC 61000-2-4, class 3		
	EN 61800-3	**Performance criteria**
Harmonics	THD = 12%	A

Table 457: Limit values for power mains harmonics

IEC 60146-1-1, class B		
	EN 61800-3	**Performance criteria**
Commutation notches	Depth = 40%, Total area = 250% in % degrees	A

Table 458: Limit values for commutation notches / voltage distortions

Voltage deviations, voltage dips and short-term interruptions

IEC 61000-2-4, class 2		
	EN 61800-3	**Performance criteria**
Voltage deviations (>60 s)	±10%	A

Table 459: Limit values for voltage deviations

IEC 61000-4-34, class 3			
	EN 61800-3		**Performance criteria**
	Remaining voltage	Periods	
Voltage dips	0% 40% 70% 80%	1 10/12 [1)] 25/30 [1)] 250/300 [1)]	C
Short-term interruptions	0%	250/300 [1)]	

Table 460: Limit values for voltage dips and short-term interruptions

1) "x/y periods" means "x periods for 50 Hz test" and "y periods for 60 Hz test".

Voltage unbalance and frequency changes

IEC 61000-2-4, class 3		
	EN 61800-3	**Performance criteria**
Voltage unbalance	3% of negative component	A

Table 461: Limit values for voltage unbalance

IEC 61000-2-4		
	EN 61800-3	**Performance criteria**
Frequency changes	±2% (±4% if the power supply is isolated from public power supply networks)	A
Speed of frequency change	1%/s (2%/s if the power supply is isolated from public power supply networks)	

Table 462: Limit values for frequency changes

4.3 High-frequency disturbances in accordance with EN 61800-3

These immunity tests are applicable for industrial environments (category C3).

Electrostatic discharge

Tests in accordance with EN 61000-4-2				
	EN 61800-3		Increased immunity to disturbances	
	Requirement	PC	Requirement [1]	PC
Contact discharge to powder-coated and bare metal housing parts	4 kV	B	6 kV	FS
Discharge through the air to plastic housing parts	8 kV		15 kV	

Table 463: Limit values for electrostatic discharge

1) The total number of discharges depends on the required safety integrity level (SIL) and can be found in IFA (formerly BGIA): EMC and functional safety for power drive systems 2/2012.

Electromagnetic fields

Tests in accordance with EN 61000-4-3				
	EN 61800-3		Increased immunity to disturbances	
	Requirement	PC	Requirement	PC
Housing	80 MHz to 1000 MHz 10 V/m 80% amplitude modulation (1 kHz)	A	80 MHz to 1000 MHz 20 V/m 80% amplitude modulation (1 kHz)	FS
	1.4 GHz to 2.0 GHz 3 V/m 80% amplitude modulation (1 kHz)		1.4 GHz to 2.0 GHz 10 V/m 80% amplitude modulation (1 kHz)	
	2.0 GHz to 2.7 GHz 1 V/m 80% amplitude modulation (1 kHz)		2.0 GHz to 2.7 GHz 3 V/m 80% amplitude modulation (1 kHz)	

Table 464: Limit values for electromagnetic fields

Burst

Tests in accordance with EN 61000-4-4				
	EN 61800-3		Increased immunity to disturbances	
	Requirement	PC	Requirement [1]	PC
Power supply connections	2 kV, 1 min, direct coupling	B	4 kV, direct coupling	FS
Connections for process measurement, open-loop and closed-loop process control	2 kV, 1 min		4 kV	
Signal interfaces	1 kV, 1 min		2 kV	

Table 465: Limit values for burst

1) The duration of the effect depends on the required safety integrity level (SIL) and can be found in IFA (formerly BGIA): EMC and functional safety for power drive systems 2/2012.

Surge

Tests in accordance with EN 61000-4-5				
	EN 61800-3		Increased immunity to disturbances	
	Requirement	PC	Requirement [1]	PC
Power supply connections	1 kV, DM, symmetrical 2 kV, CM, asymmetrical	B	2 kV, DM, symmetrical 4 kV, CM, asymmetrical	FS
Connections for process measurement, open-loop and closed-loop process control	1 kV, CM, asymmetrical		2 kV, CM, asymmetrical	
Signal interfaces	---		0.5 kV, CM, asymmetrical	

Table 466: Limit values for surge

1) The number of pulses depends on the required safety integrity level (SIL) and can be found in IFA (formerly BGIA): EMC and functional safety for power drive systems 2/2012.

High-frequency conducted disturbances

Tests in accordance with EN 61000-4-6				
	EN 61800-3		Increased immunity to disturbances	
	Requirement	PC	Requirement	PC
Power supply connections	0.15 MHz to 80 MHz 10 V 80% amplitude modulation (1 kHz)	A	0.15 MHz to 80 MHz 20 V 80% amplitude modulation (1 kHz)	FS
Connections for process measurement, open-loop and closed-loop process control				
Signal interfaces				

Table 467: Limit values for high-frequency conducted disturbances

5 Requirements for emissions (EMC)

5.1 High-frequency emissions per EN 61800-3

These emission tests are applicable for industrial environments (category C3). [40)]

5.1.1 Disturbance voltages on the power mains connection

Tests in accordance with EN 55011			
Continuous current I	**Frequency band [MHz]**	**Quasi-peak value [dB (µV)]**	**Average value [dB (µV)]**
I ≤ 100 A	0.15 ≤ f < 0.5	100	90
	0.5 ≤ f < 5	86	76
	5 ≤ f < 30	90 Decreases with the logarithm of the frequency to 70	80 Decreases with the logarithm of the frequency to 60
100 A < I	0.15 ≤ f < 0.5	130	120
	0.5 ≤ f < 5	125	115
	5 ≤ f < 30	115	105

Table 468: Limit values for disturbance voltages on power mains connection

Tests in accordance with IEC 55011			
Continuous current on motor	**Frequency range [MHz]**	**Quasi-peak value**	**Average**
I ≤ 100 A	0.15 ≤ f < 0.5	100 dB (µV)	90 dB (µV)
	0.5 ≤ f < 5	86 dB (µV)	76 dB (µV)
	5 ≤ f < 30	90 dB (µV) Decreases with the logarithm of the frequency to 70	80 dB (µV) Decreases with the logarithm of the frequency to 60
100 A < I	0.15 ≤ f < 0.5	130 dB (µV)	120 dB (µV)
	0.5 ≤ f < 5	125 dB (µV)	115 dB (µV)
	5 ≤ f < 30	115 dB (µV)	105 dB (µV)

Table 469: Limits for disturbance voltages on the power connections

5.1.2 Radiated emissions

Tests in accordance with EN 55011	
Frequency band [MHz]	**Limit values of the quasi-peak value [dB (µV/m)]**
30 ≤ f ≤ 230	50 [1)]
230 < f < 1000	60 [1)]

Table 470: Limit values for radiated emissions

1) Test distance 10 m.

6 Additional environmental limit values

Pollution degree in accordance with EN 61800-5-1	2 (non-conductive pollution)
Overvoltage category in accordance with EN 61800-5-1	III
EN 60529 protection	IP20 [2)]
Reduction of the continuous current at installation elevations over 500 m above sea level	10% per 1,000 m
Maximum installation elevation	4000 m [1)]

Table 471: Additional environmental limit values

1) Requirements that go beyond this must be arranged with B&R.
2) The value specified in the technical data of the respective module is always valid.

40) Limit values from CISPR 11, Group 2, Class A (second environment).

7 International certifications

B&R products and services comply with applicable standards. This includes international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We are committed to ensuring the reliability of our products in an industrial environment.

Certifications	
Europe 	B&R products with this mark satisfy all harmonized EN standards for the applicable guidelines.
USA and Canada  E225616	B&R products with this mark are tested and listed by Underwriters Laboratories and checked quarterly by a UL inspector. This mark is valid for the USA and Canada and simplifies the certification of your machines and systems in these regions.
	Products with this mark have been tested by an accredited testing laboratory and approved for import to the Russian Federation.
	Products with this mark have been tested by an accredited testing laboratory and approved for import to the Eurasian Economic Union.
	Products with this mark have been tested by an accredited testing laboratory and approved for import to the Korean market.
open SAFETY certified product	Products with this mark were designed, developed and manufactured for special applications for machine and personnel protection. The products are certified by the recognized authorities (TÜV Rheinland, TÜV Süd).

Table 472: International certifications

8 Standards and definitions for safety technology

Stop functions per EN 60204-1 (Electrical equipment of machines, Part 1: General requirements)

There are three categories of stop functions:

Category	Description
0	Stopping by immediate removal of power to the machine actuators (i.e. an uncontrolled stop).
1	A controlled stop with power left available to the machine actuators to allow for stopping. Power is only interrupted when standstill is achieved.
2	A controlled stop with power left available to the machine actuators.

Table 473: Overview of stop function categories

The necessary stop functions must be determined based on a risk assessment of the machine. Category 0 and category 1 stop functions must be functional regardless of operating mode. A category 0 stop must have priority. Stop functions must have priority over assigned start functions. Resetting the stop function is not permitted to trigger a dangerous state.

Emergency stops per IEC 60204-1:2006 (Electrical equipment of machines, Part 1: General requirements)

In addition to the requirements for stop functions, the emergency stop function has the following requirements:

- It shall override all other functions and operations in all modes.
- Power to the machine actuators that can cause a hazardous situation shall be removed as quickly as possible without creating other hazards.
- A reset is not permitted to initiate a restart.

Emergency stops must be category 0 or category 1 stop functions. The necessary stop function must be determined based on a risk assessment of the machine.

Performance levels (PL) per EN ISO 13849-1 (Safety of machinery - Safety-related parts of control systems, Part 1: General principles for design)

The safety-related parts of control systems must meet one or more of the requirements for five defined performance levels. These performance levels define the required behavior of safety-related controller parts with regard to their resistance to errors.

Performance level (per EN ISO 13849-1)	Safety integrity level - SIL (per IEC 61508-2)	Short description	System behavior
a	---	Safety-related components must be designed and built in such away that they can meet the expected operational requirements (no specific safety measures are implemented).	**Caution!** **The occurrence of a fault can lead to the loss of safety functionality.**
b	1	Safety-related components must be designed and built in such a way that only reliable components and safety principles are used (e.g. preventing short circuits by using sufficient distances, reducing the probability of errors by using oversized components, defining the failure route, idle current principle, etc.).	**Caution!** **The occurrence of a fault can lead to the loss of safety functionality.**
c	1	Safety related parts shall be designed so that their safety functions shall be checked at suitable intervals by the machine control system. (e.g. automatic or manual check during start-up)	**Caution!** **An error between checks can cause the loss of safety functionality. The loss of safety functionality will be detected during the check.**
d	2	Safety-related parts shall be designed so that a single fault does not lead to the loss of the safety function. Individual errors should – if possible – be detected the next time (or before) the safety function is required.	**Caution!** **Safety functionality remains active when an error occurs. Some but not all errors are detected. A buildup of undetected errors can cause safety functionality to fail.**
e	3	Safety-related parts shall be designed so that a single fault does not lead to the loss of the safety function. Individual errors must be detected the next time (or before) the safety function is required. If this type of detection is not possible, a buildup of errors is not permitted to cause safety functionality to fail.	**Information:** **Safety functionality remains active when an error occurs. Errors are detected in time to prevent safety functionality from failing.**

Table 474: Overview of performance levels (PL)

A suitable performance level must be selected separately for each drive system (or for each axis) based on a risk assessment. This risk assessment is a part of the total risk assessment for the machine.

The following risk graph (per EN ISO 13849-1, appendix A) provides a simplified procedure for risk assessment:

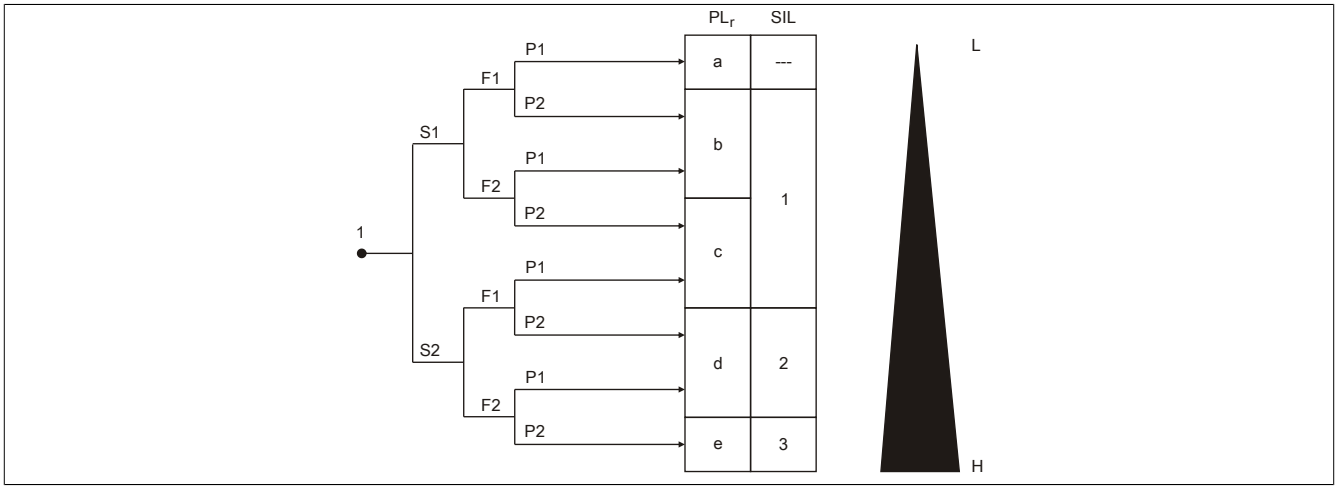


Figure 287: Risk diagram for determining the PL_r for each safety function per EN ISO 13849-1, appendix A

Legend:

1	Starting point for assessing the impact on risk reduction
L	Low contribution to risk reduction
H	High contribution to risk reduction
PL_r	Required performance level
SIL	Safety Integrity Level per IEC 61508-2

Risk parameters

S	Severity of injury
S1	Slight (normally reversible injury)
S2	Serious (normally irreversible injury or death)
F	Frequency and/or duration of the exposure to the hazard
F1	Seldom to less often and/or exposure time is short.
F2	Frequent to continuous and/or exposure time is long.
P	Possibility of avoiding hazard or limiting harm
P1	Possible under specific conditions
P2	Scarcely possible

The performance level to be used is determined by starting at the specified starting point and taking the risk parameters S, F and P into consideration.

Restart interlock per EN 1037/04.96 (Safety of machinery - Prevention of unexpected startup)

Keeping a machine in a state of rest while personnel are working in the danger zone is one of the most important requirements for safely operating machines.

Startup refers to the transition of a machine or its parts from a state of rest to a moving state. A startup is considered unexpected if caused by one of the following:

- A startup command generated due to controller failure or external influences on the controller.
- A startup command generated due to incorrect operation of a startup control actuator or another part of the machine.
- Restoration of the power supply after an interruption.
- External/Internal influences on parts of the machine.

To prevent unexpected startup of machines or parts of machines, power should be removed and dissipated. If this is not practical (e.g. frequent brief interventions in danger zones), other measures must be taken:

- Measures to prevent randomly generated startup commands.
- Measures to prevent randomly generated startup commands from causing unexpected startup.
- Measures to automatically stop the dangerous part of the machine before a dangerous situation can be caused by unexpected startup.

Appendix A • ACOPOSmulti overload characteristics

1 Inverter module 8BVI0014HCSx.000-1_8BVI0014HCDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

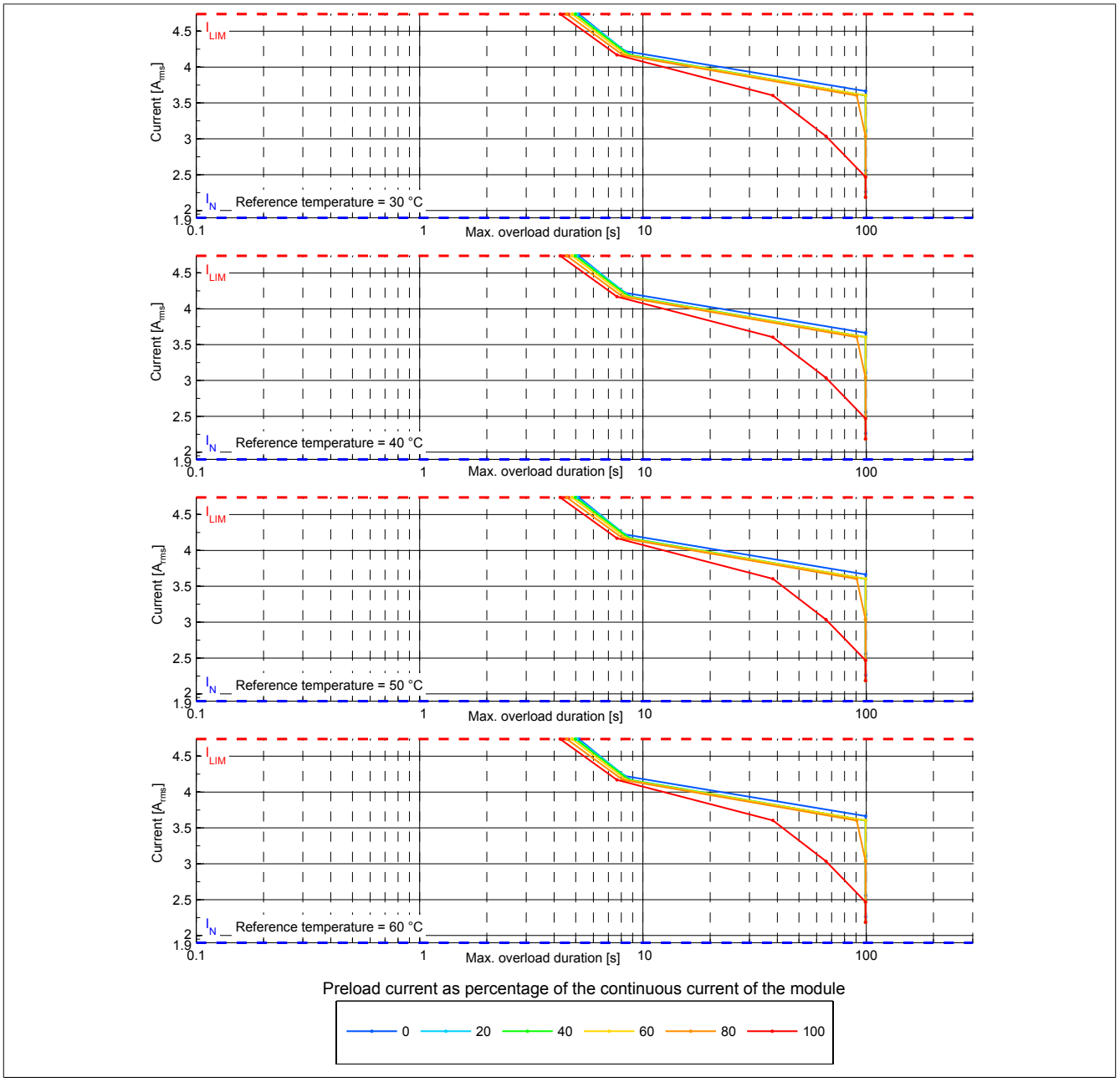


Figure 288: Overload characteristics of 8BVI0014HCSx.000-1_8BVI0014HCDx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

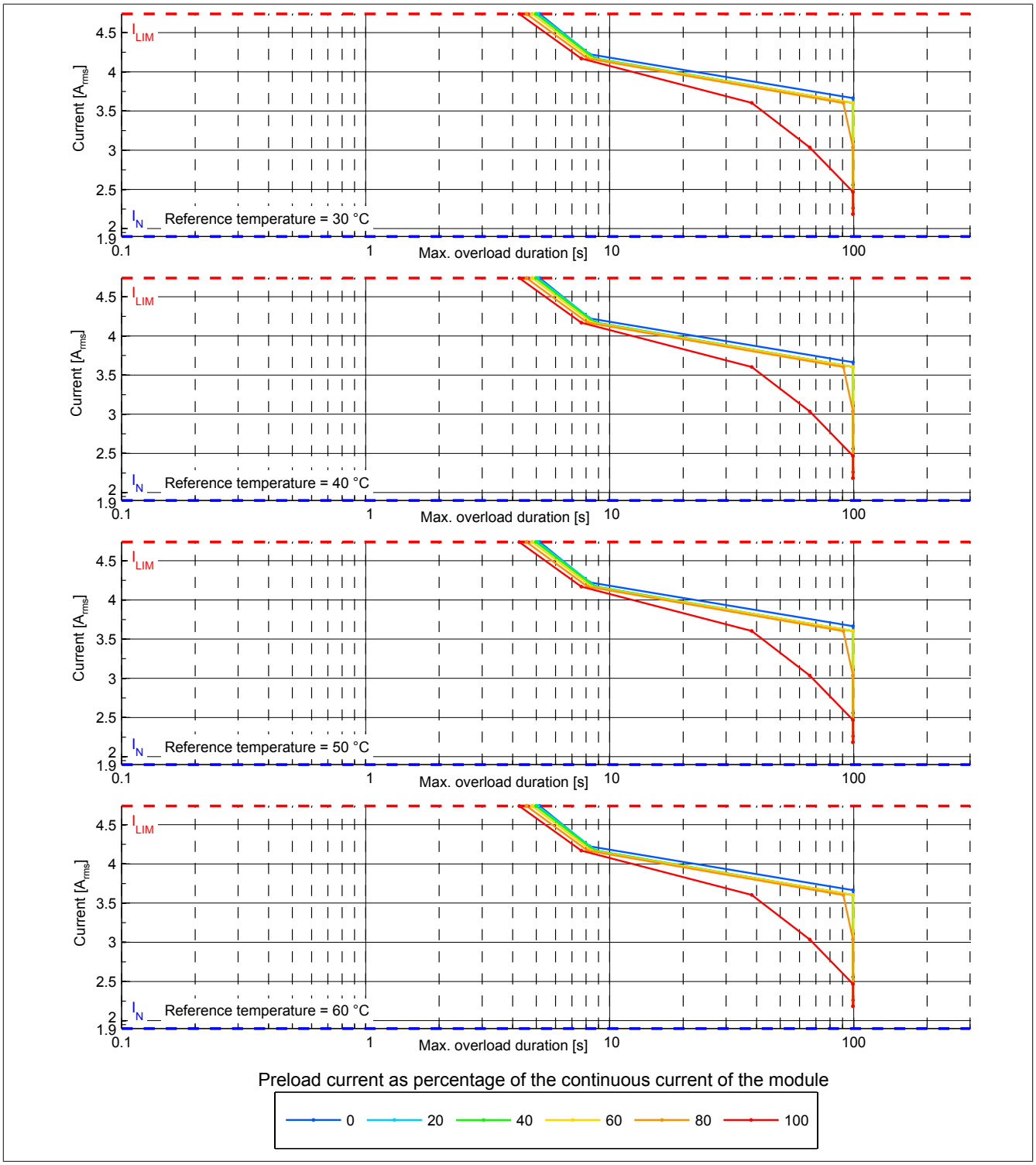


Figure 289: Overload characteristics of 8BVI0014HCSx.000-1_8BVI0014HCDx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

2 Inverter module 8BVI0014HWSx.000-1_8BVI0014HWDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

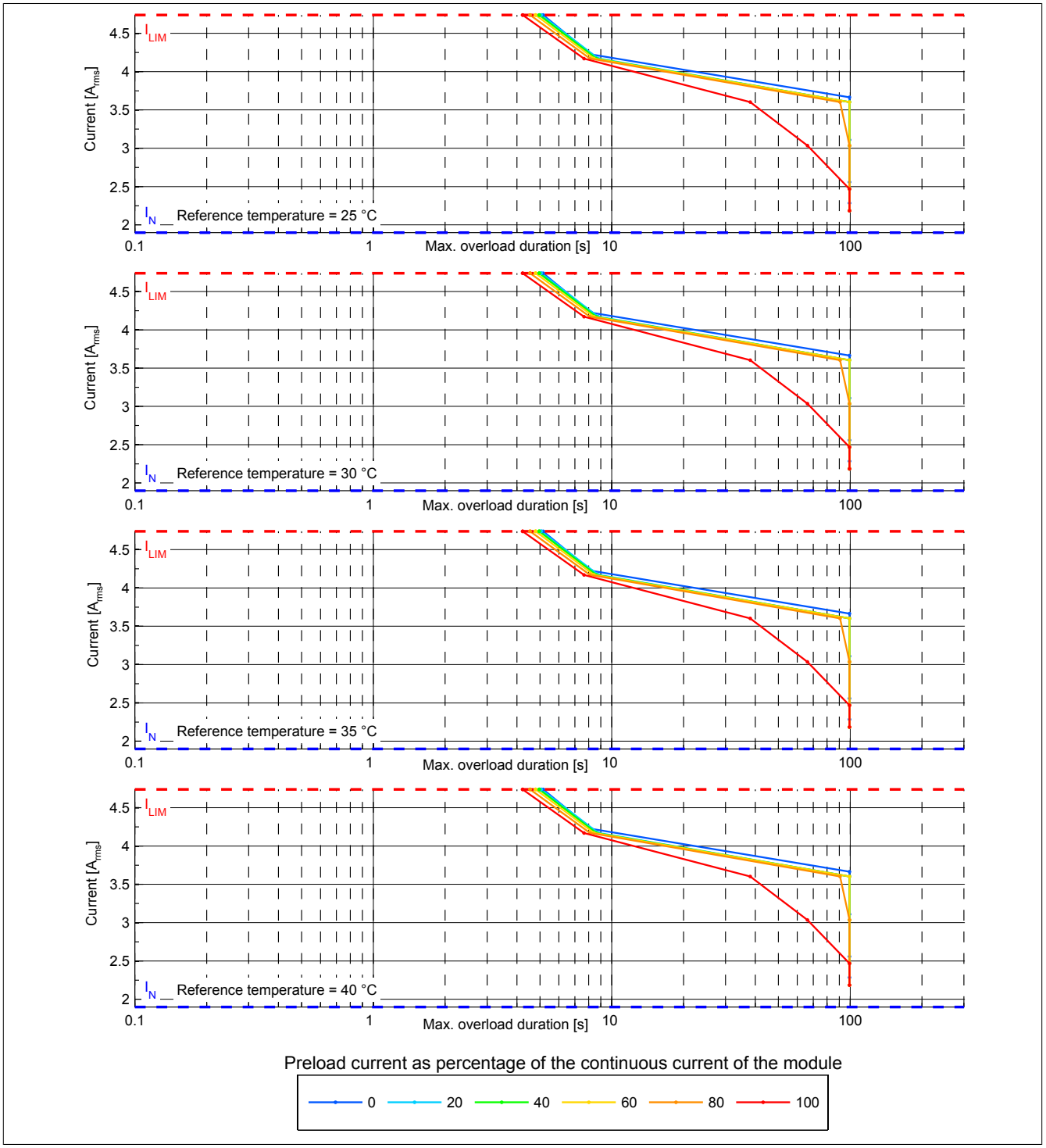


Figure 290: Overload characteristics of 8BVI0014HWSx.000-1_8BVI0014HWDx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

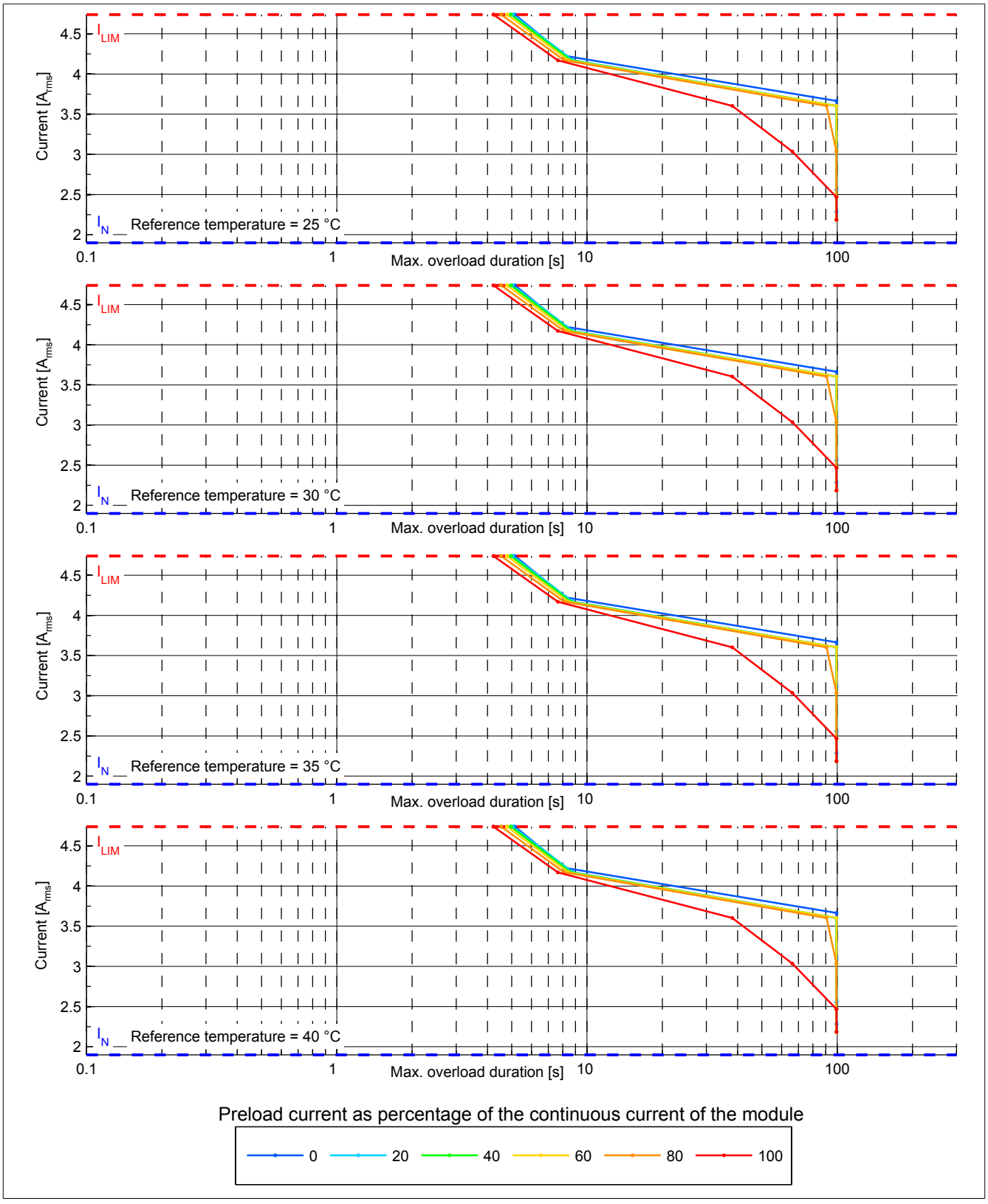


Figure 291: Overload characteristics of 8BVI0014HWSx.000-1_8BVI0014HWDx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

3 Inverter module 8BVI0028HCSx.000-1_8BVI0028HCDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

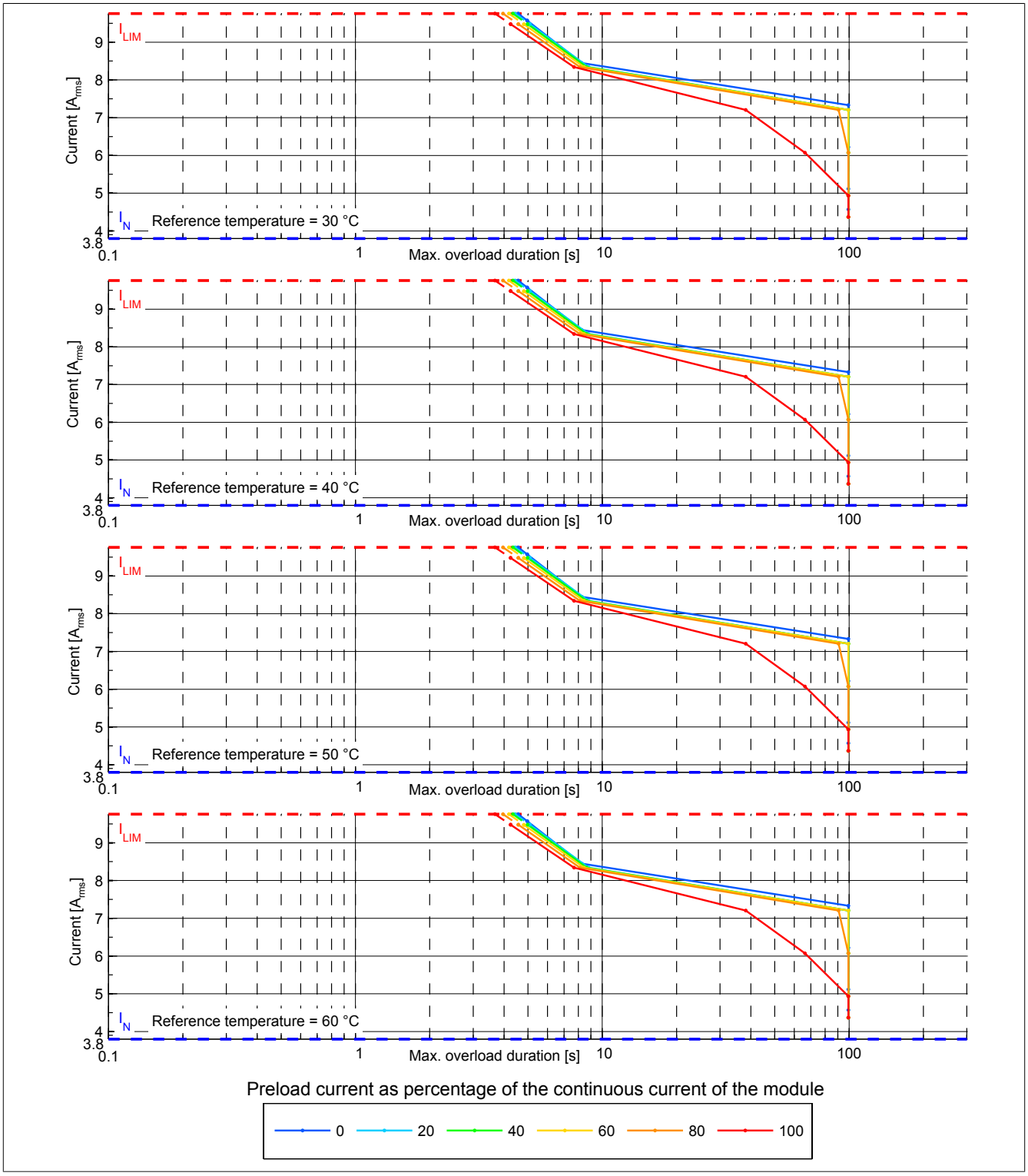


Figure 292: Overload characteristic 8BVI0028HCSx.000-1_8BVI0028HCDx.000-1, Overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

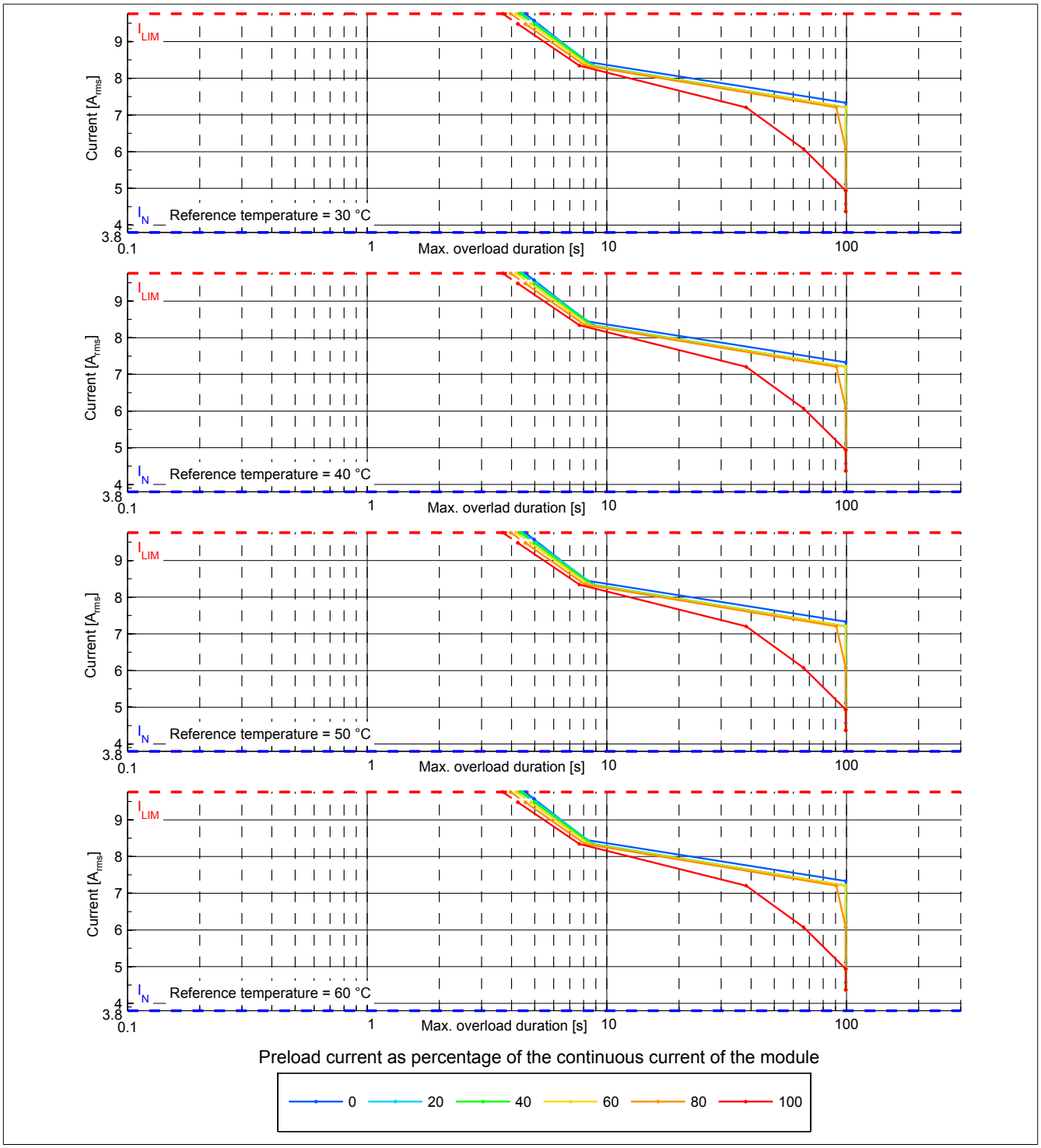


Figure 293: Overload characteristic 8BVI0028HCSx.000-1_8BVI0028HCDx.000-1, Overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

4 Inverter module 8BVI0028HWSx.000-1_8BVI0028HWDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

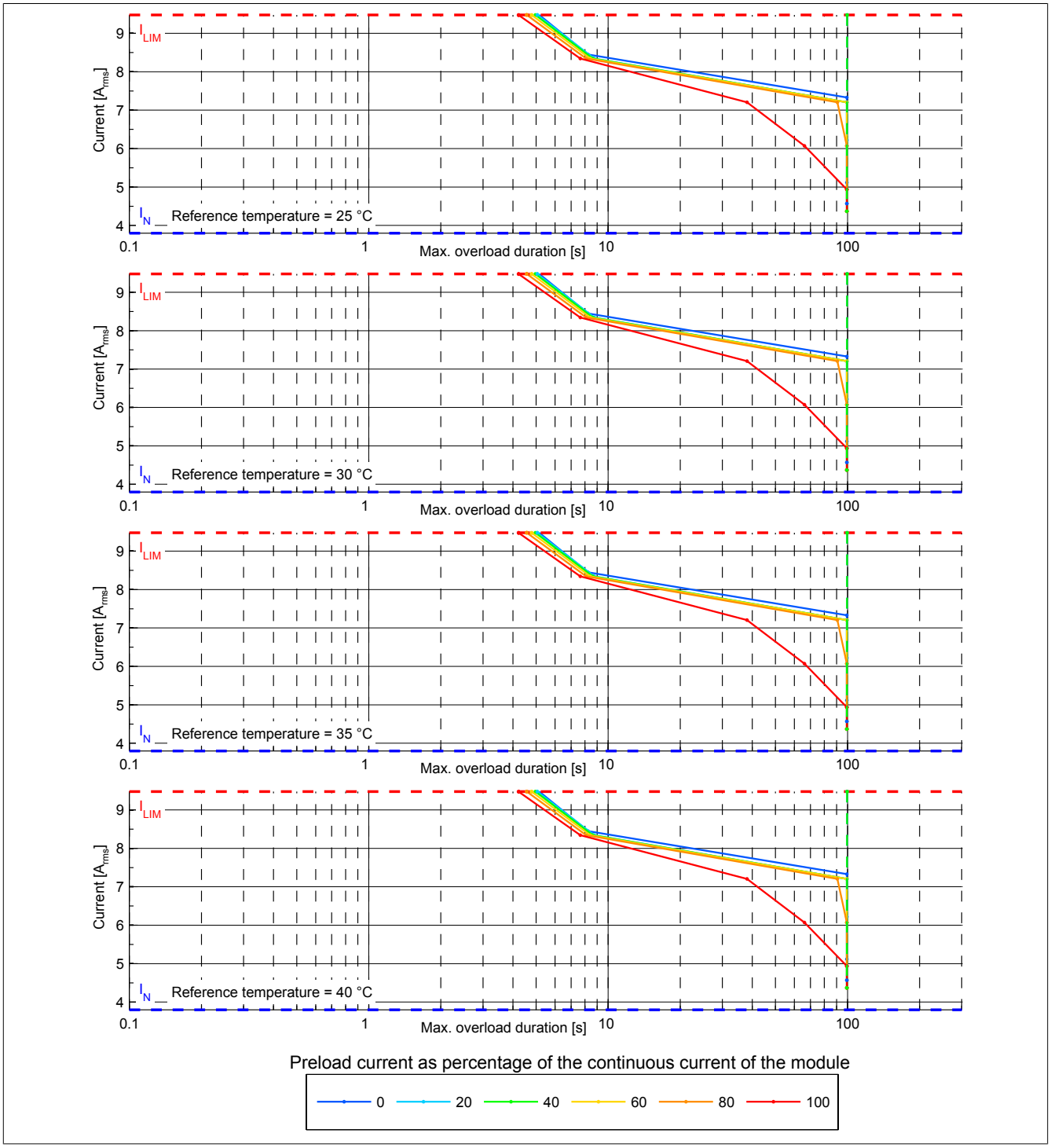


Figure 294: Overload characteristics of 8BVI0028HWSx.000-1_8BVI0028HWDx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

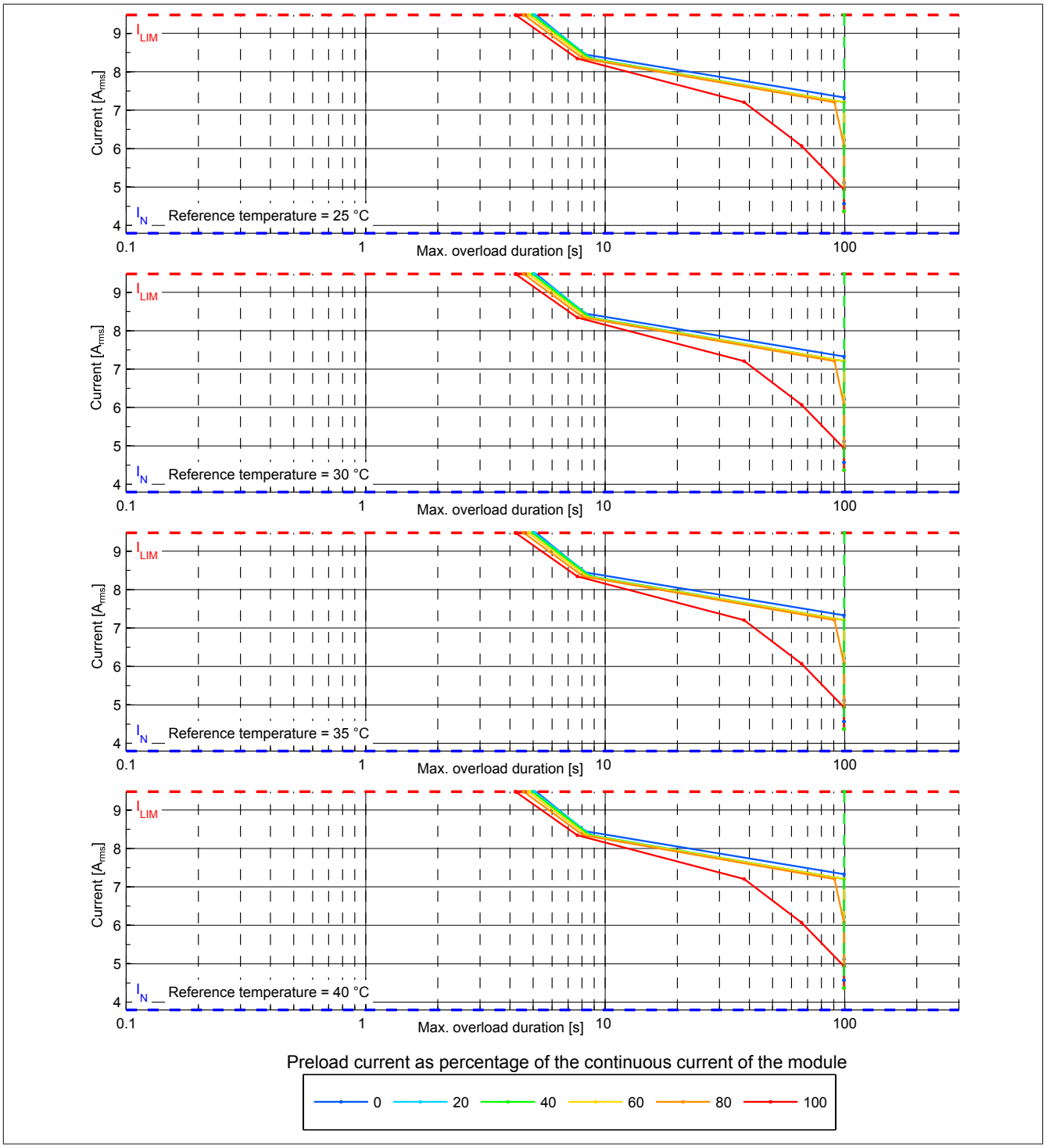


Figure 295: Overload characteristics of 8BVI0028HWSx.000-1_8BVI0028HWDx.000-1, overload response ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

5 Inverter module 8BVI0055HCSx.000-1_8BVI0055HCDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

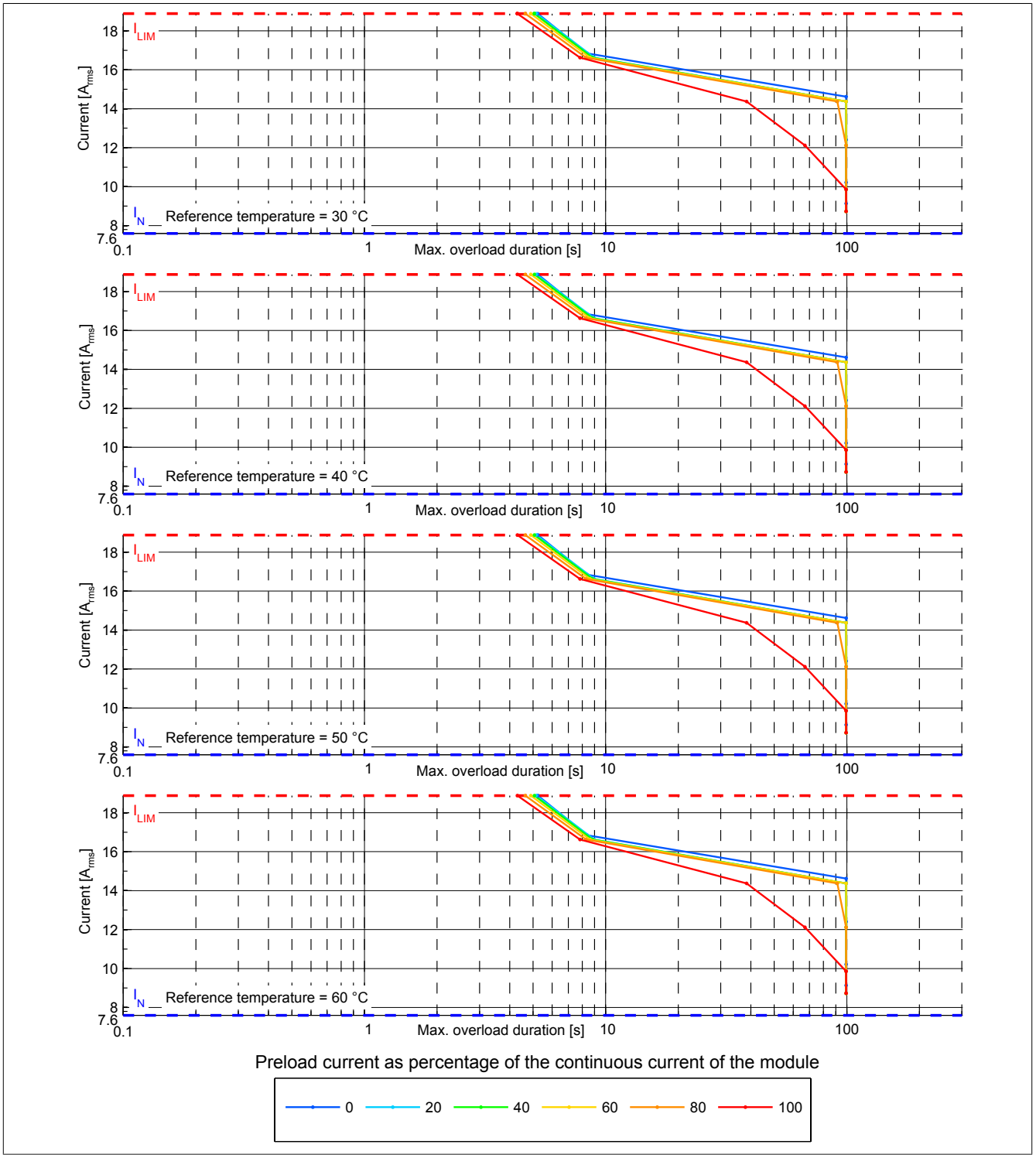


Figure 296: Overload characteristic 8BVI0055HCSx.000-1_8BVI0055HCDx.000-1, Overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

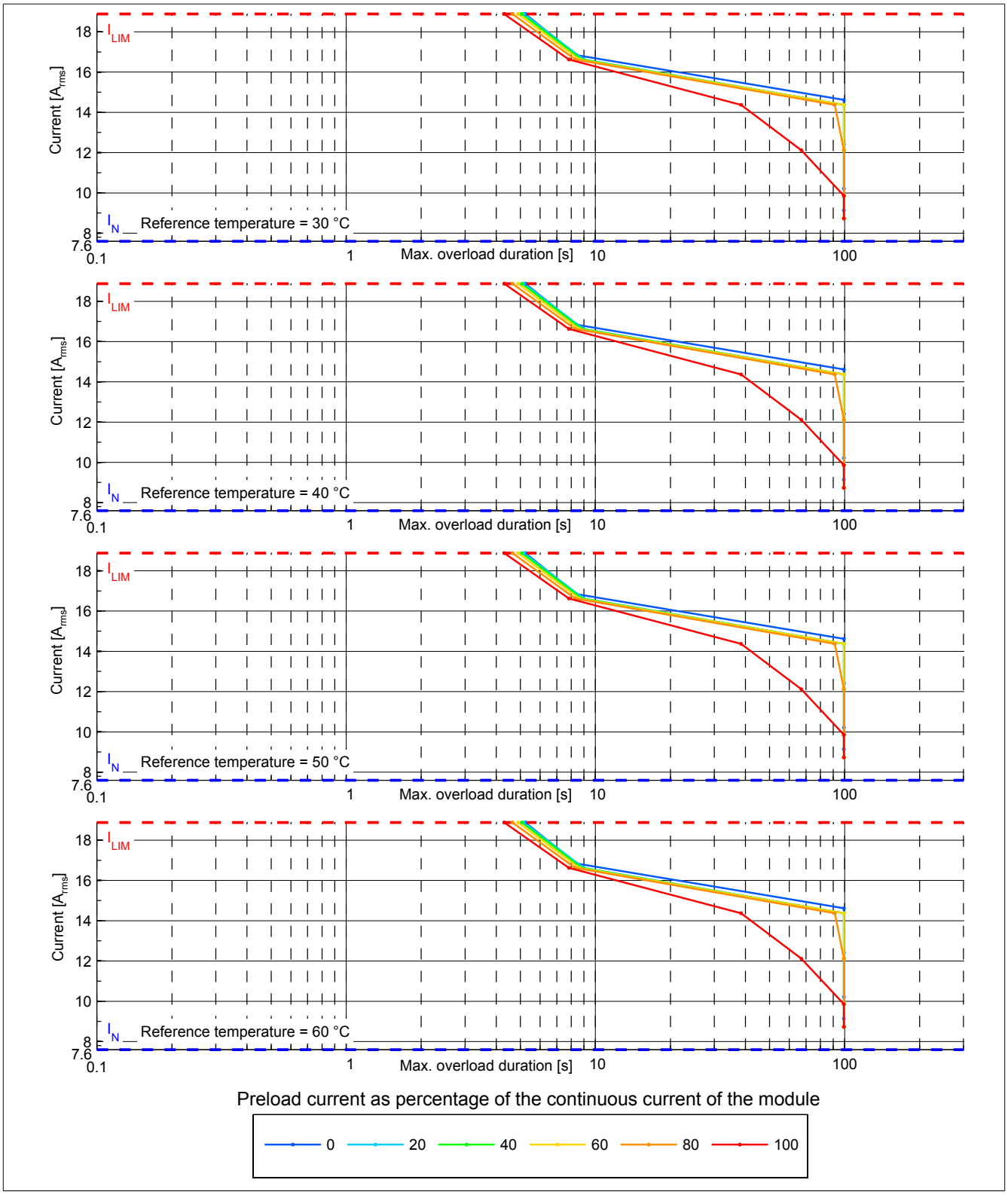


Figure 297: Overload characteristic 8BVI0055HCSx.000-1_8BVI0055HCDx.000-1, Overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

6 Inverter module 8BVI0055HWSx.000-1_8BVI0055HWDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

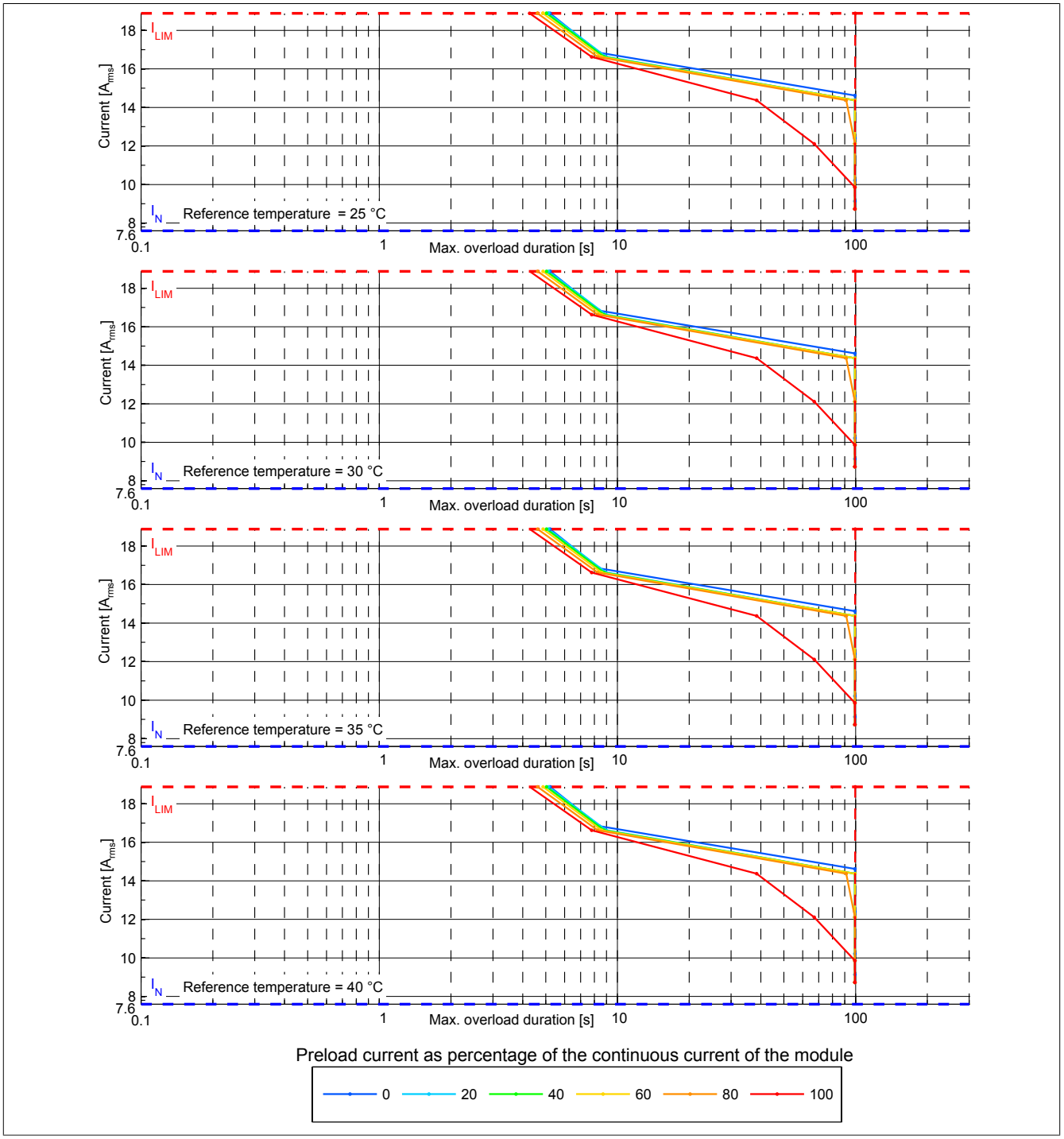


Figure 298: Overload characteristics of 8BVI0055HWSx.000-1_8BVI0055HWDx.000-1, overload response WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

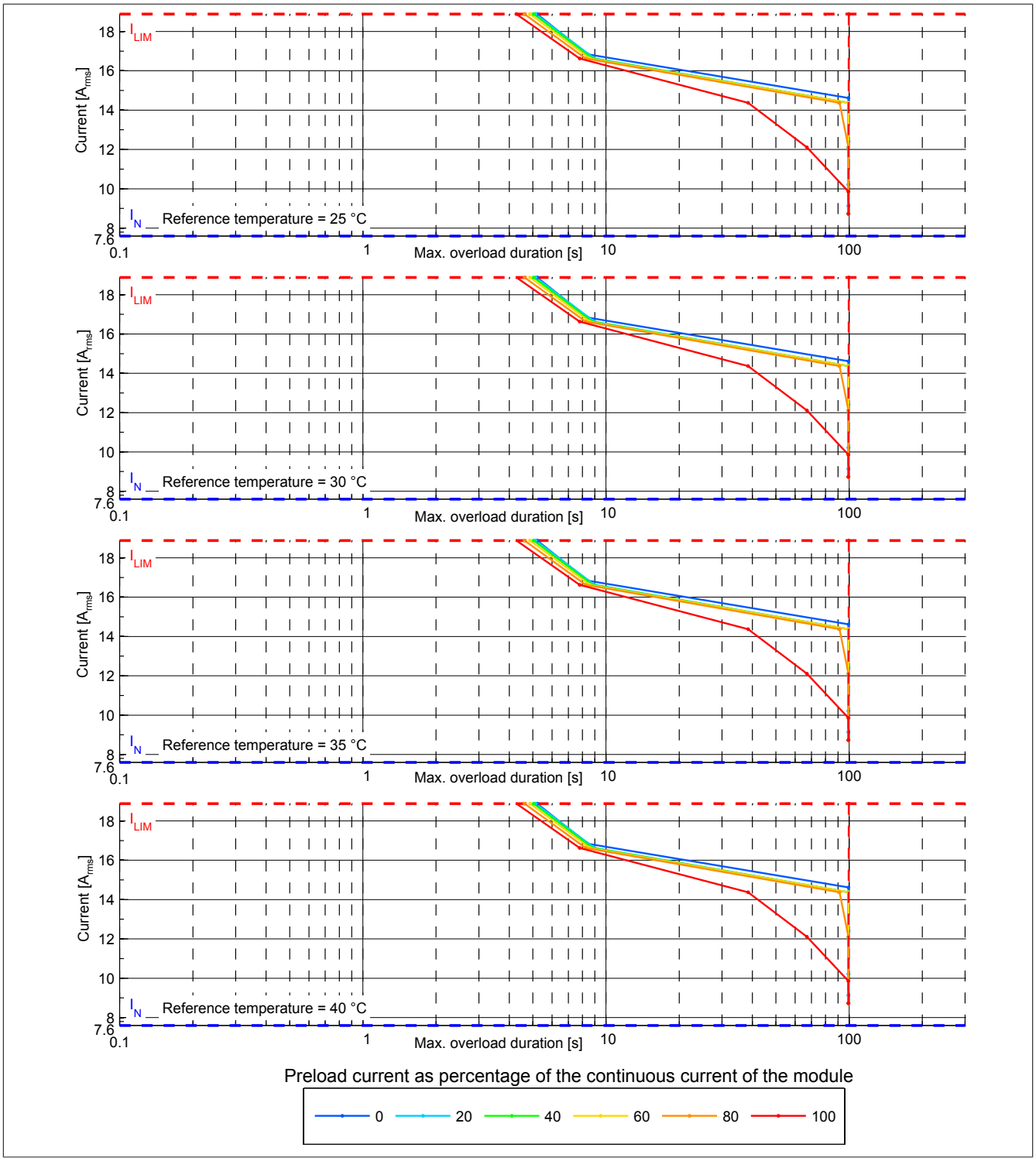


Figure 299: Overload characteristics of 8BVI0055HWSx.000-1_8BVI0055HWDx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

7 Inverter module 8BVI0110HCSx.000-1_8BVI0110HCDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

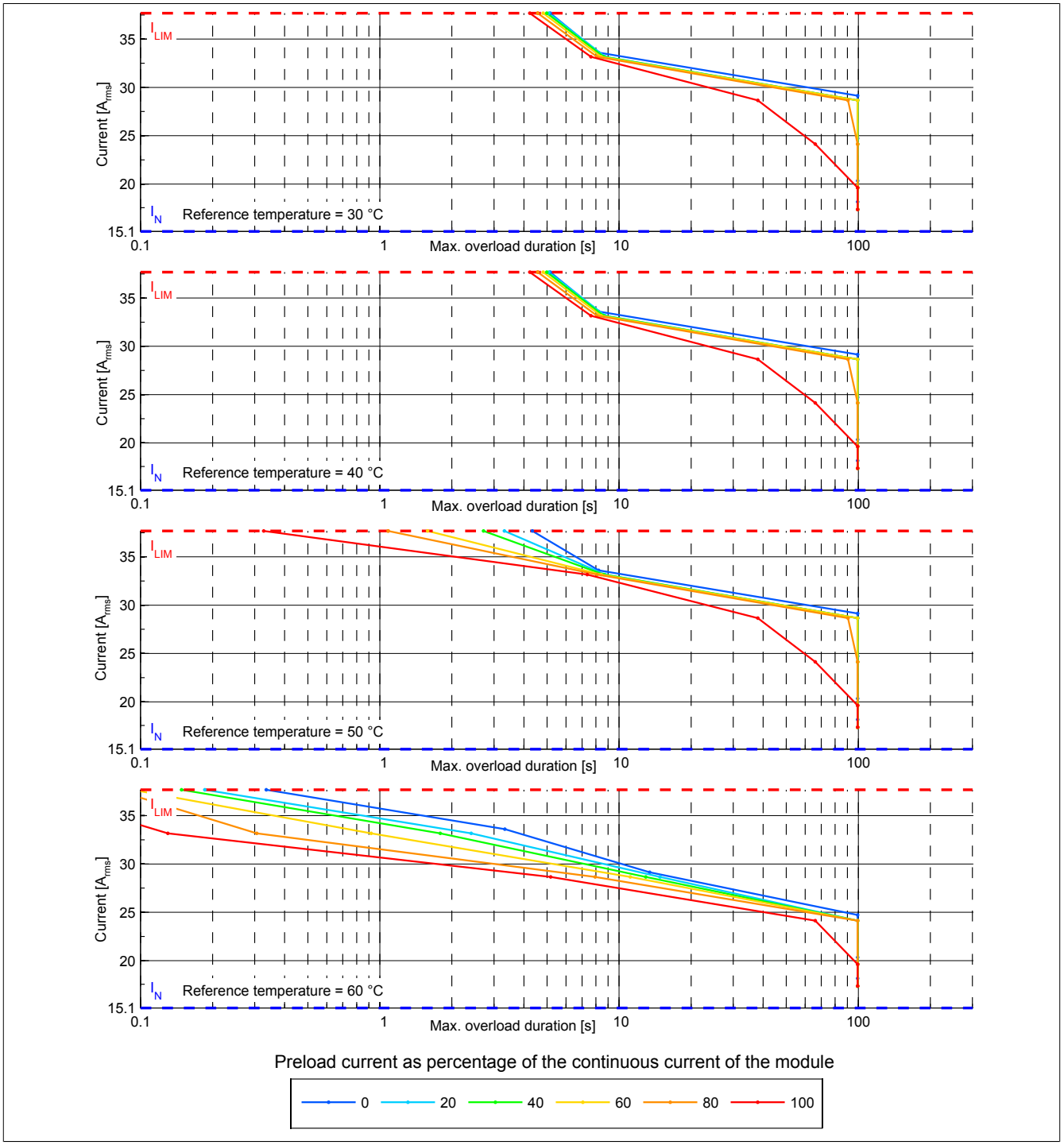


Figure 300: Overload characteristics of 8BVI0110HCSx.000-1_8BVI0110HCDx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

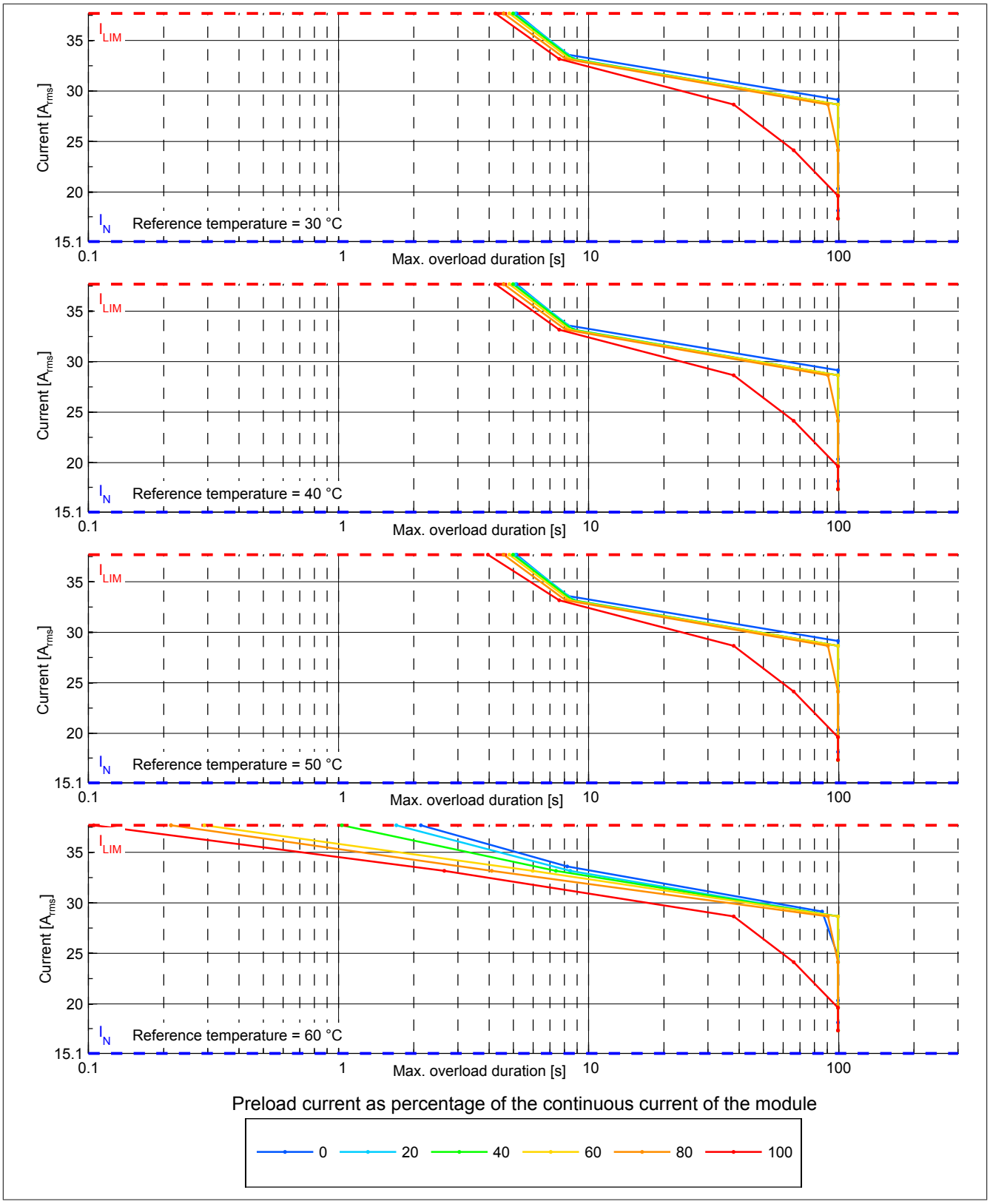


Figure 301: Overload characteristics of 8BVI0110HCSx.000-1_8BVI0110HCDx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

8 Inverter module 8BVI0110HWSx.000-1_8BVI0110HWDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

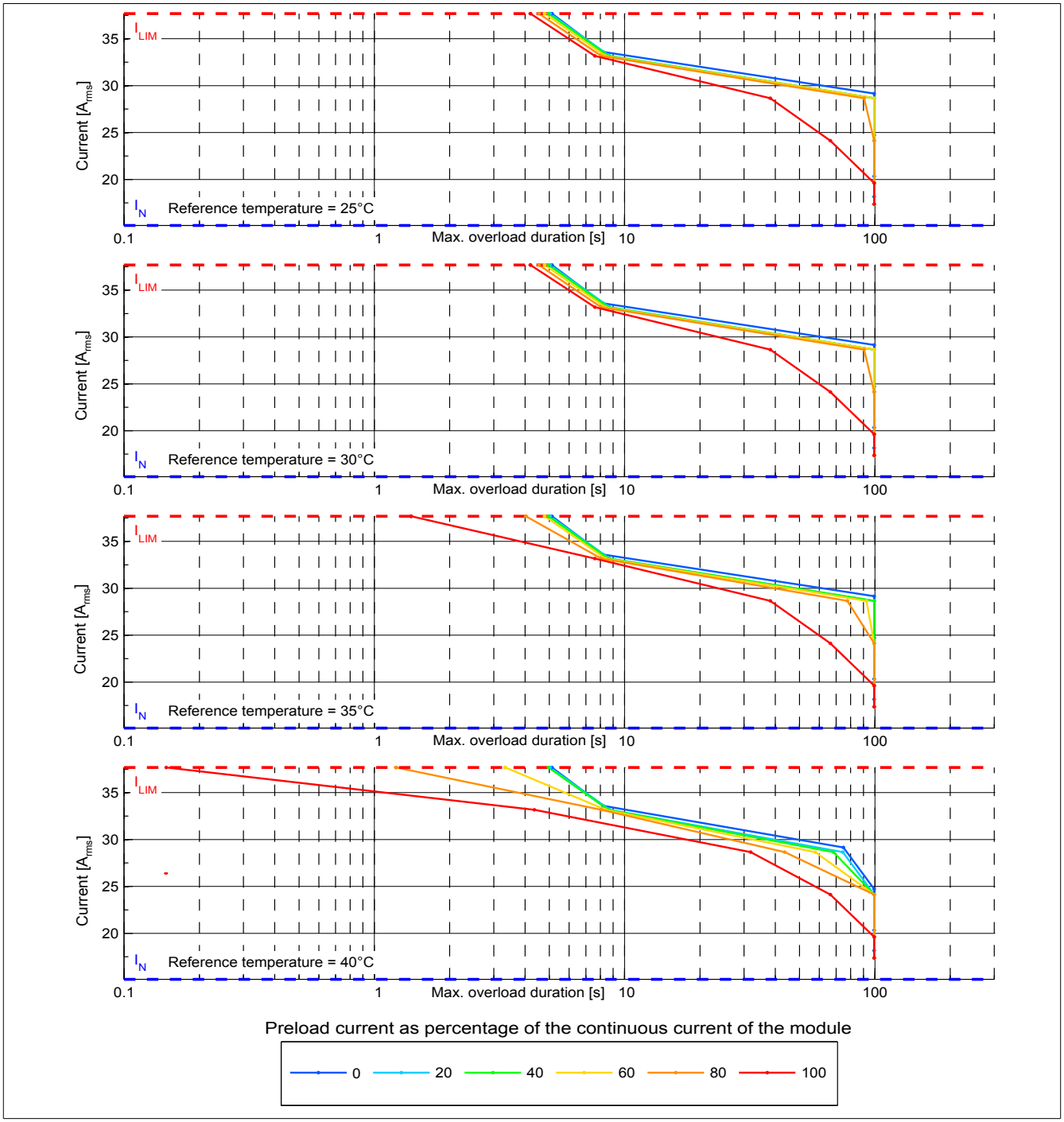


Figure 302: Overload characteristics of 8BVI0110HWSx.000-1_8BVI0110HWDx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

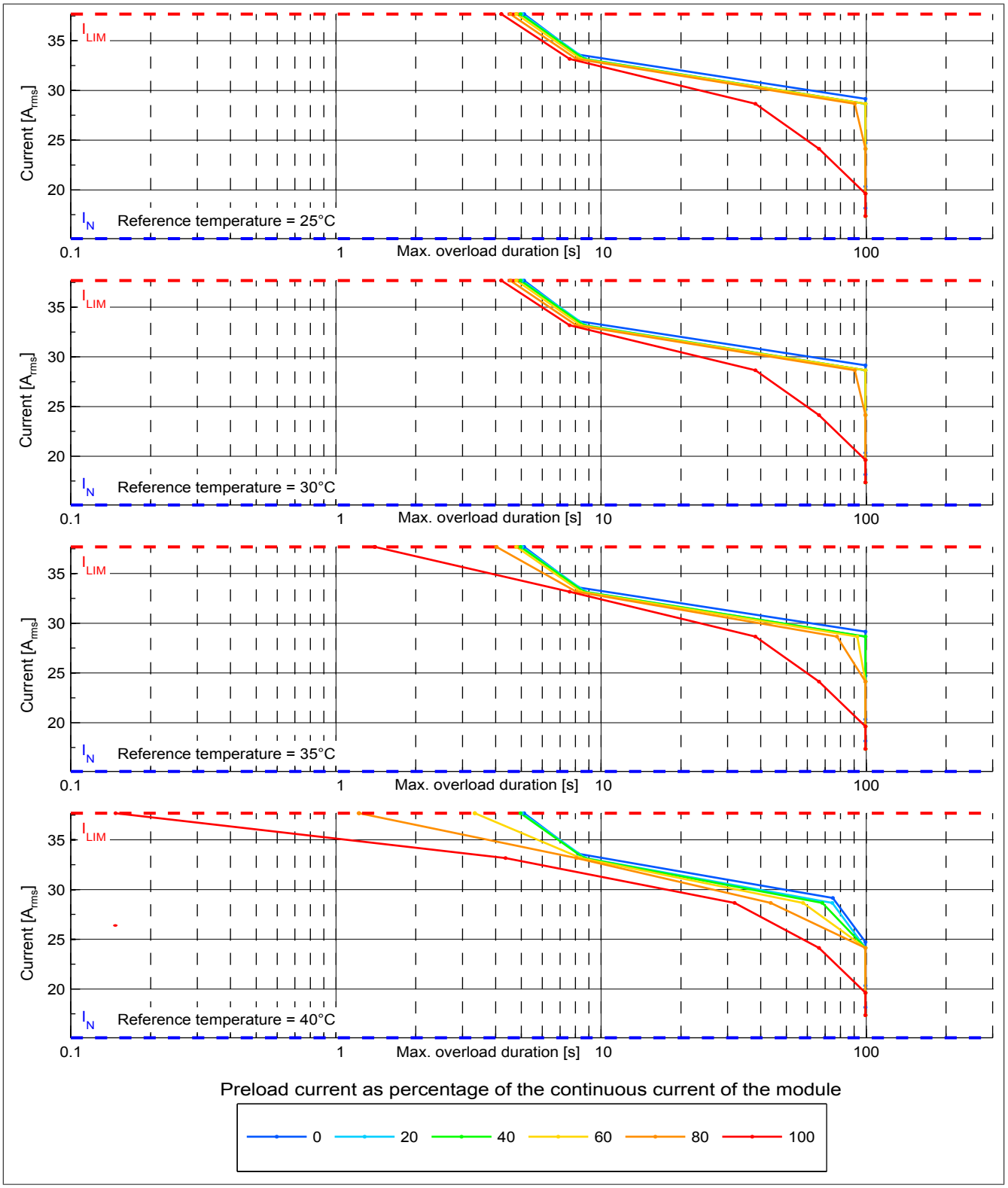


Figure 303: Overload characteristics of 8BVI0110HWSx.000-1_8BVI0110HWDx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

9 Inverter module 8BVI0220HCSx.000-1_8BVI0220HCDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

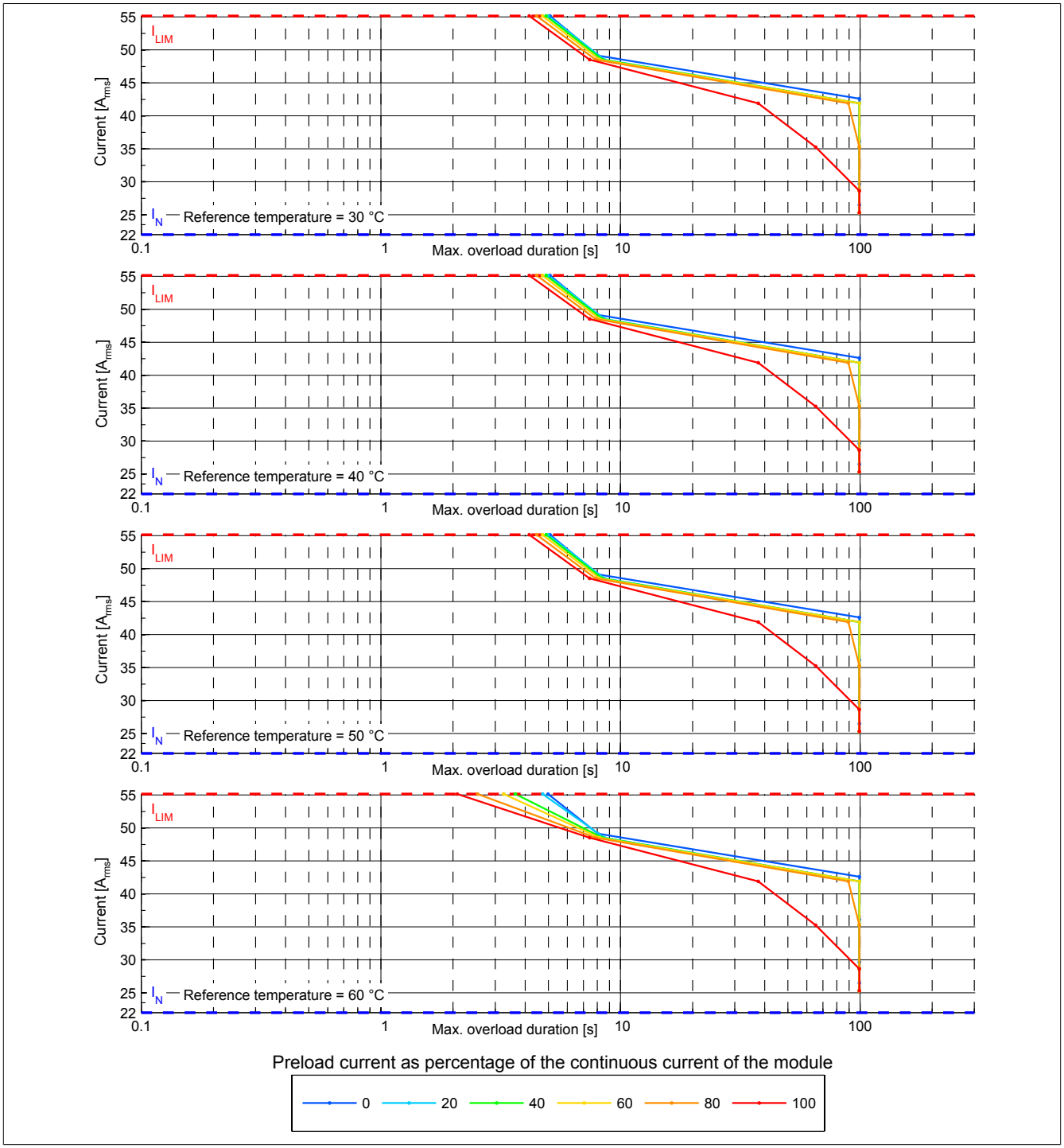


Figure 304: Overload characteristics of 8BVI0220HCSx.000-1_8BVI0220HCDx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

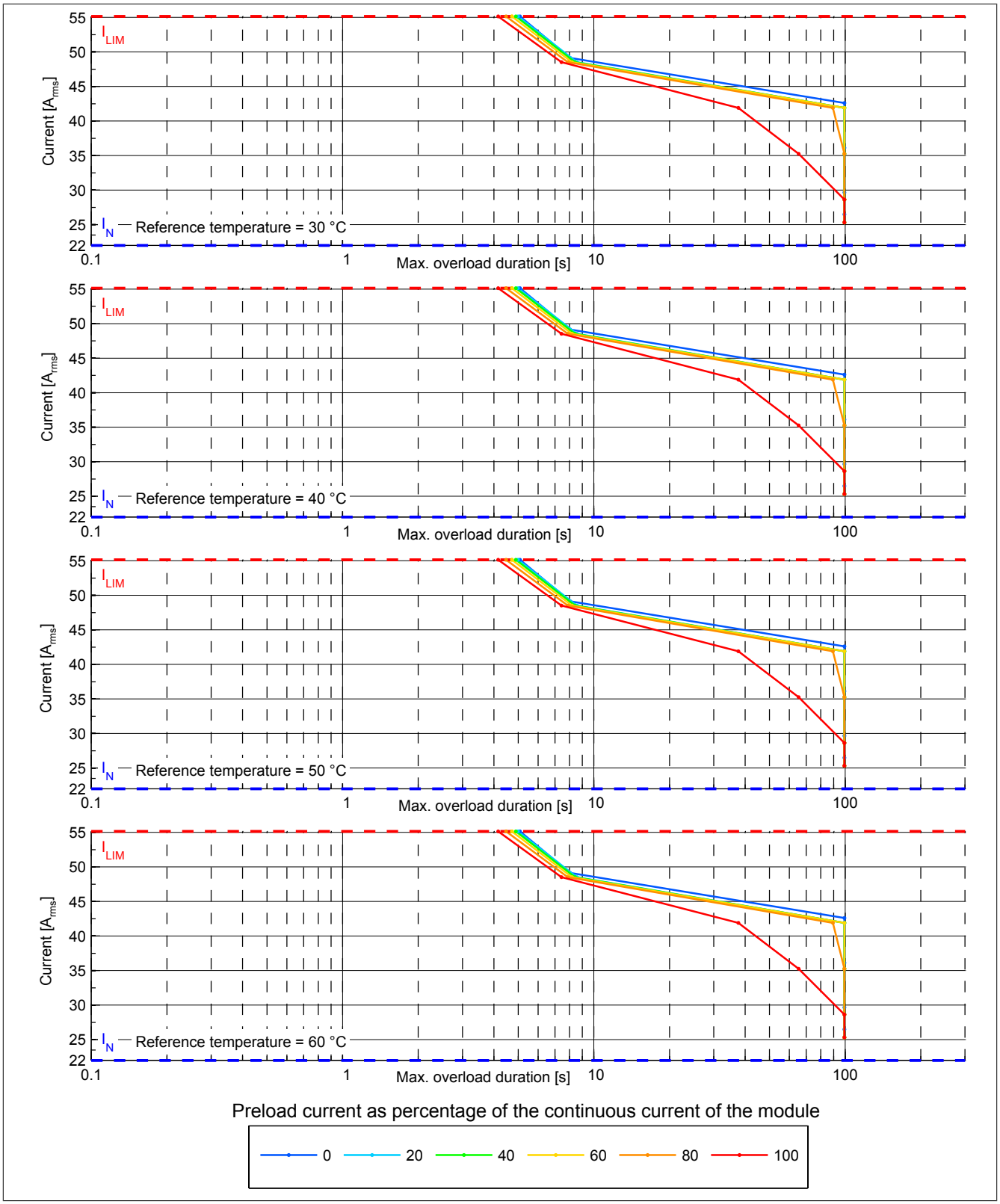


Figure 305: Overload characteristics of 8BVI0220HCSx.000-1_8BVI0220HCDx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

10 Inverter module 8BVI0220HWSx.000-1_8BVI0220HWDx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

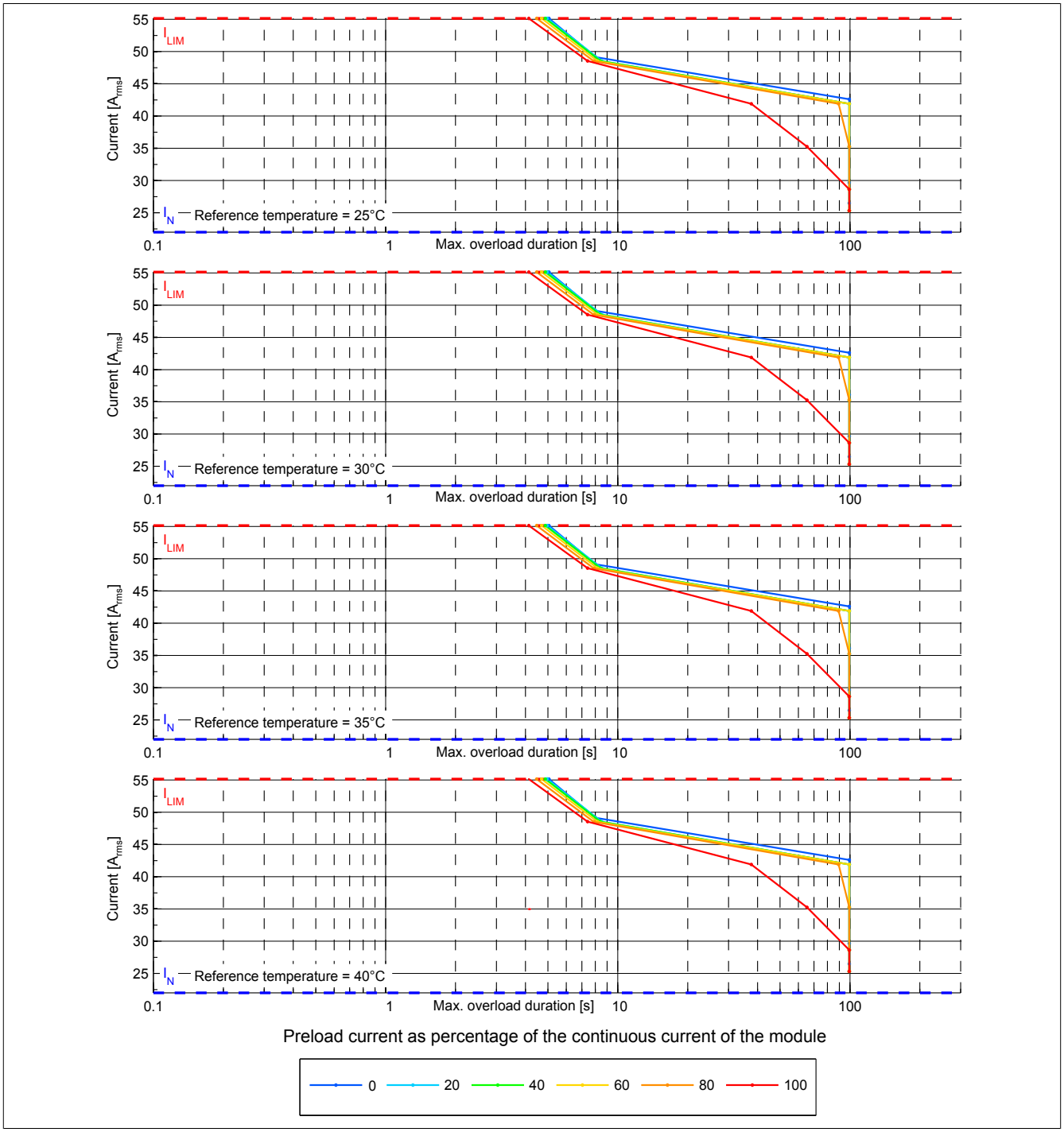


Figure 306: Overload characteristics of 8BVI0220HWSx.000-1_8BVI0220HWDx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

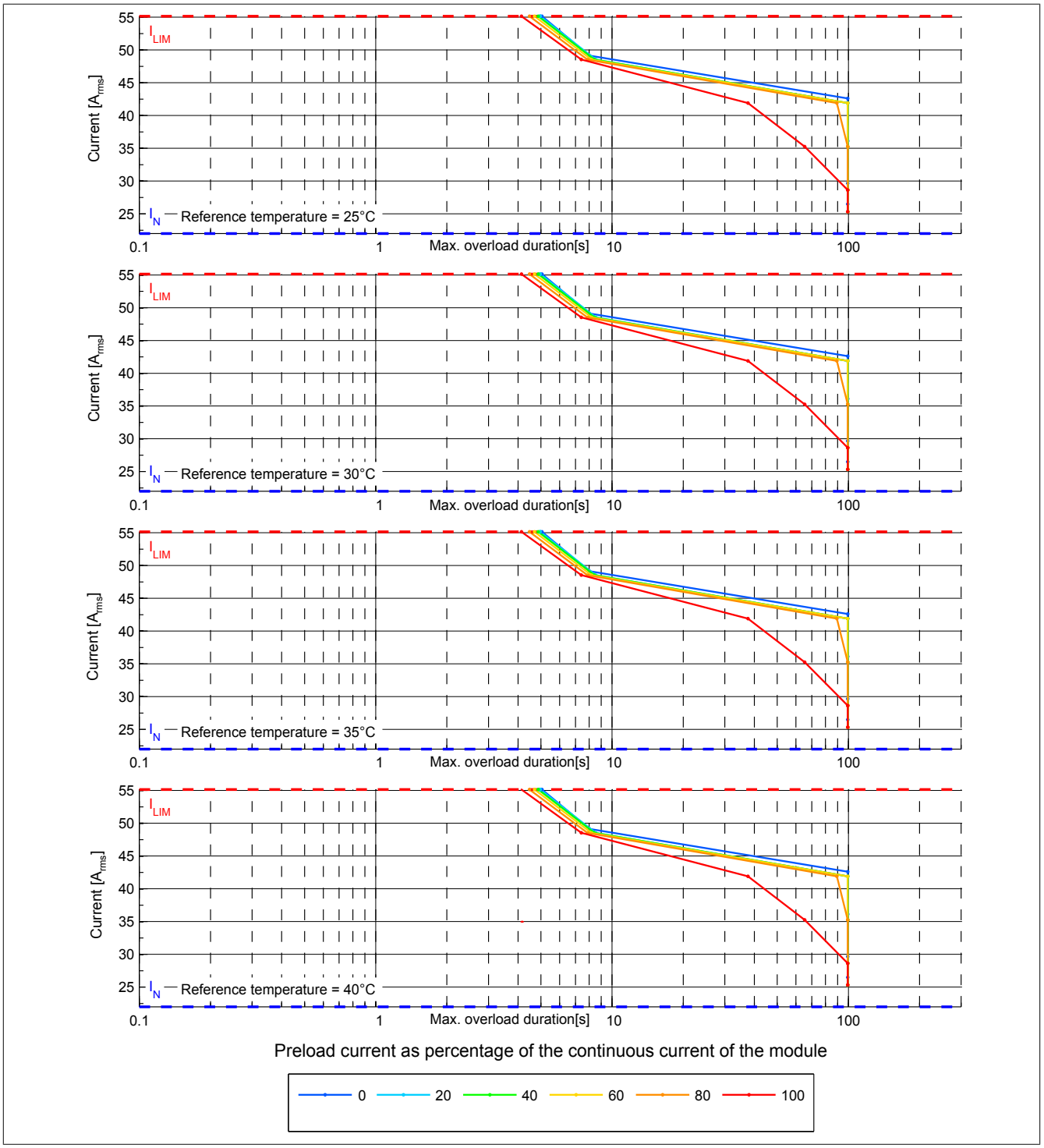


Figure 307: Overload characteristics of 8BVI0220HWSx.000-1_8BVI0220HWDx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

11 Inverter module 8BVI0330HCSx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

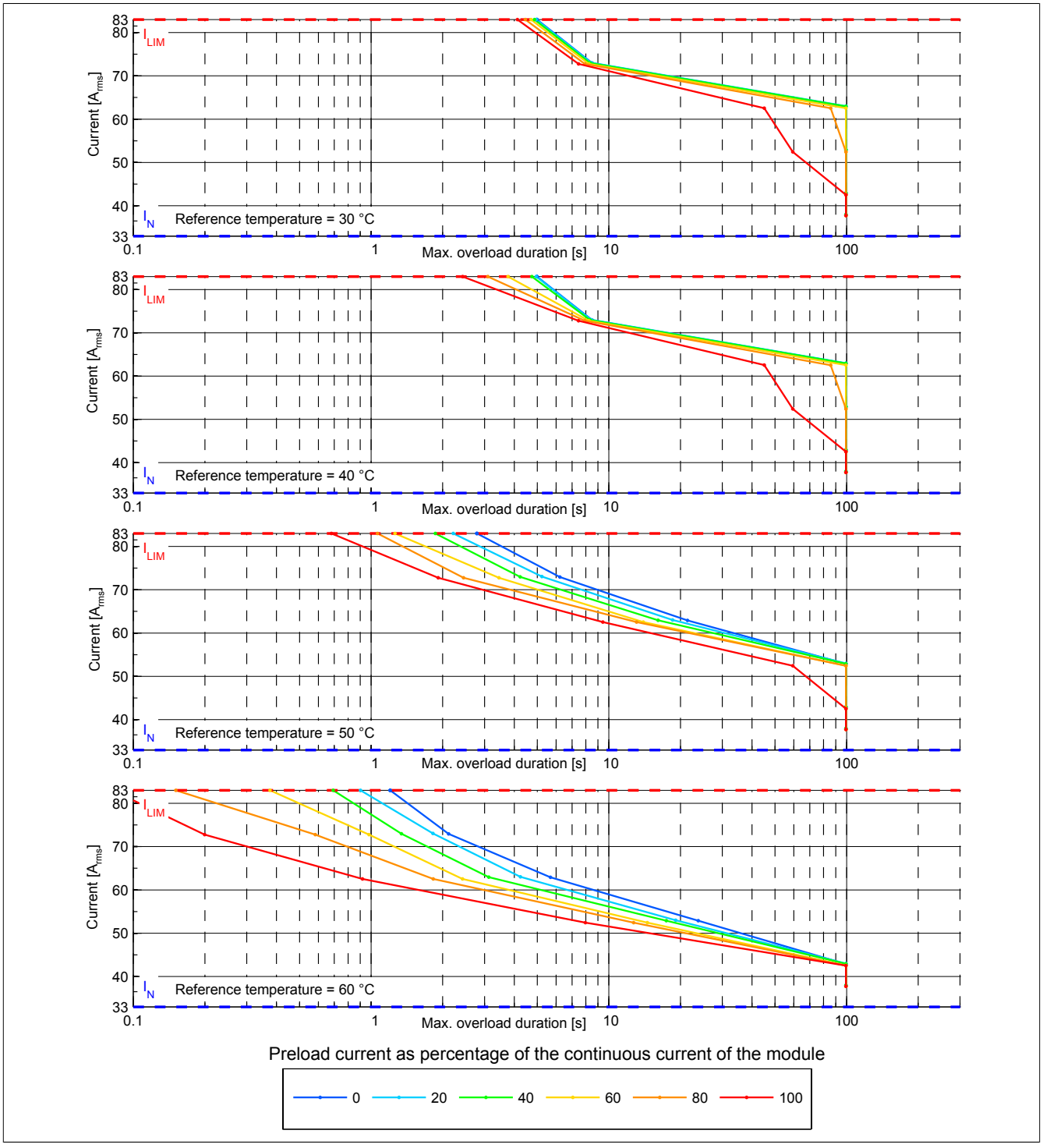


Figure 308: Overload characteristics of 8BVI0330HCSx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

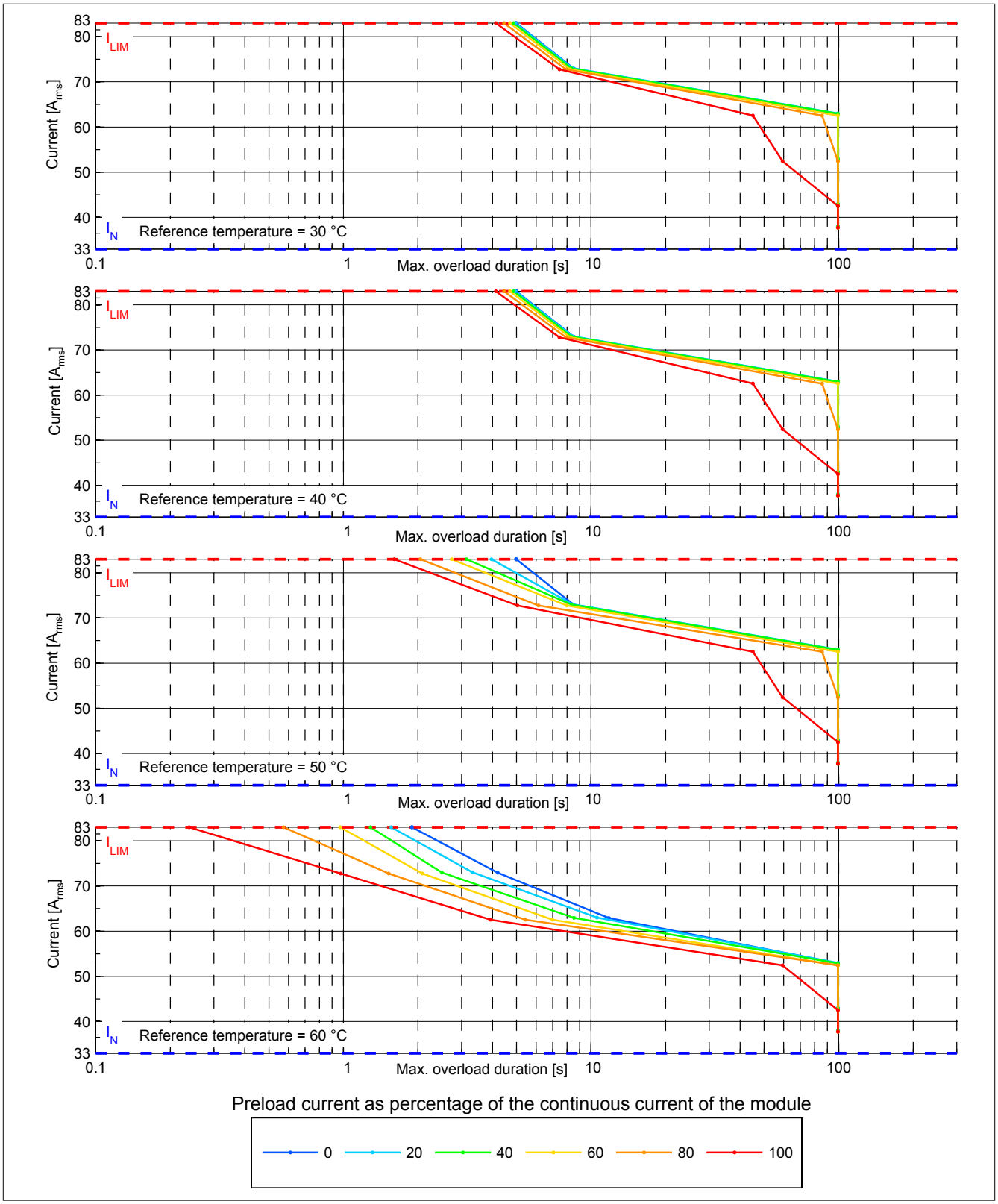


Figure 309: Overload characteristics of 8BVI0330HCSx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

12 8BVI0330HWSx.000-1 inverter modules

The continuous current for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

If the module exceeds the maximum overload duration, it outputs a warning (WARNING).

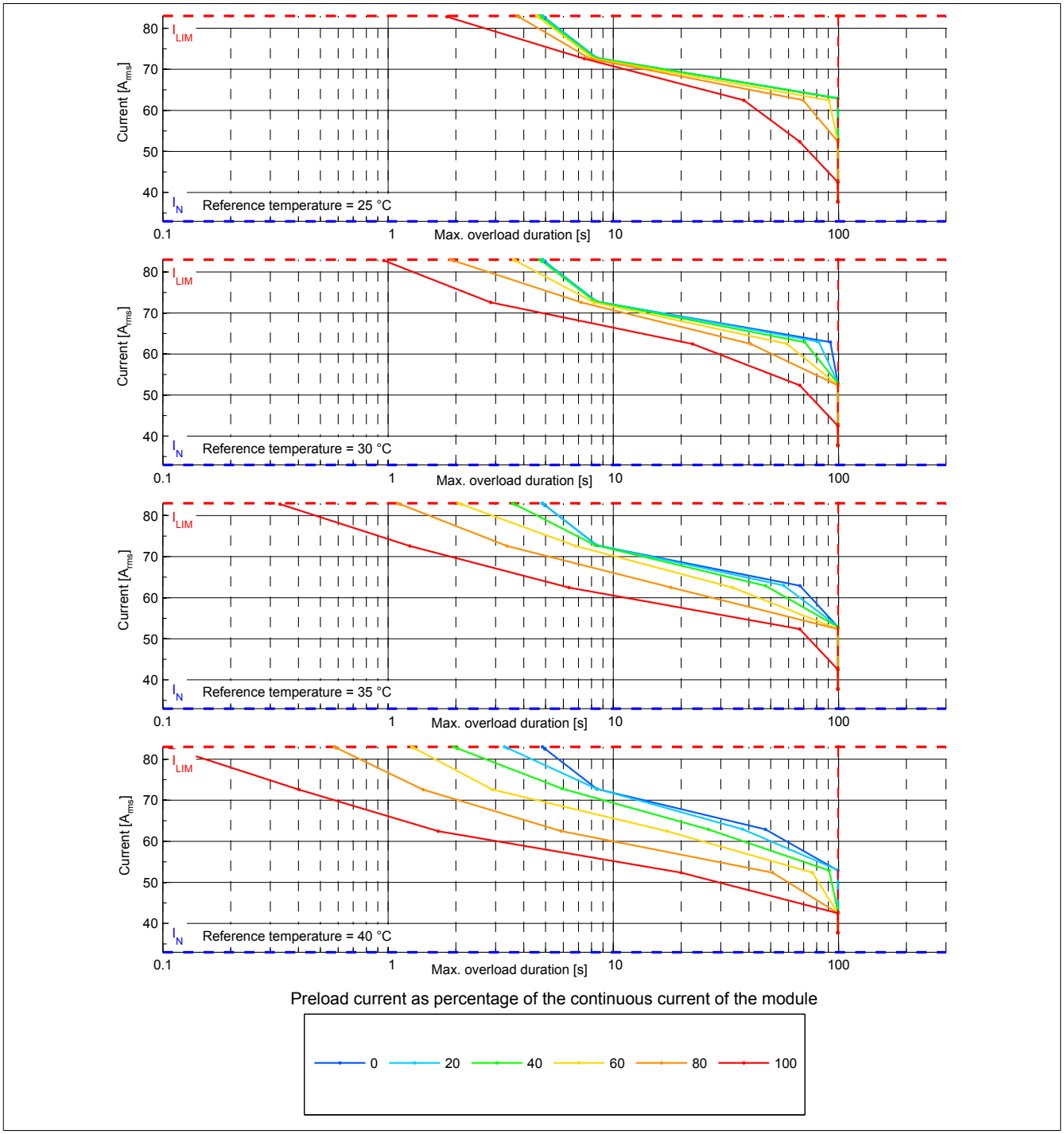


Figure 310: Overload characteristics of 8BVI0330HWSx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Ambient temperature of the module

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

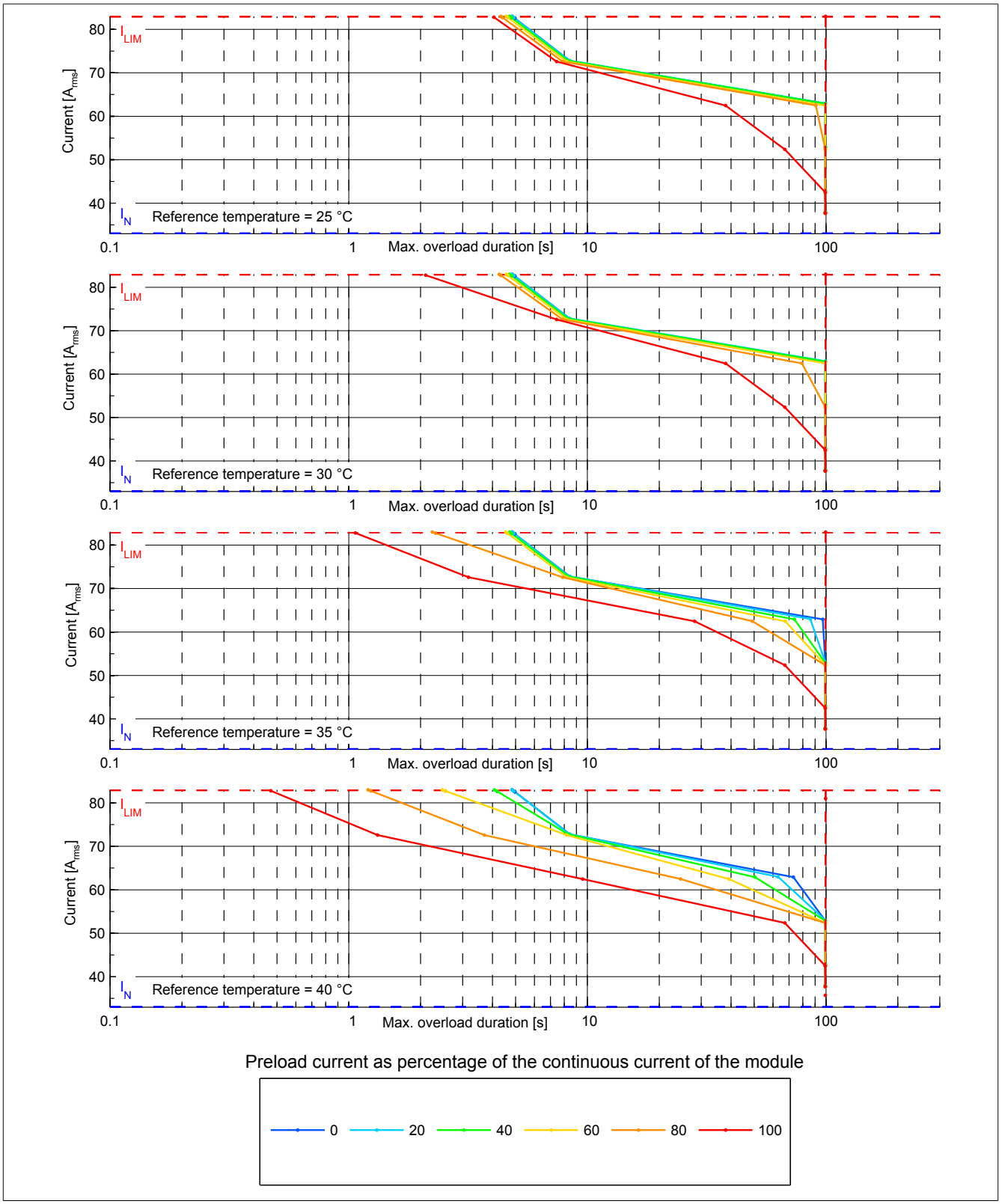


Figure 311: Overload characteristics of 8BVI0330HWSx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Ambient temperature of the module

13 Inverter module 8BVI0440HCSx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

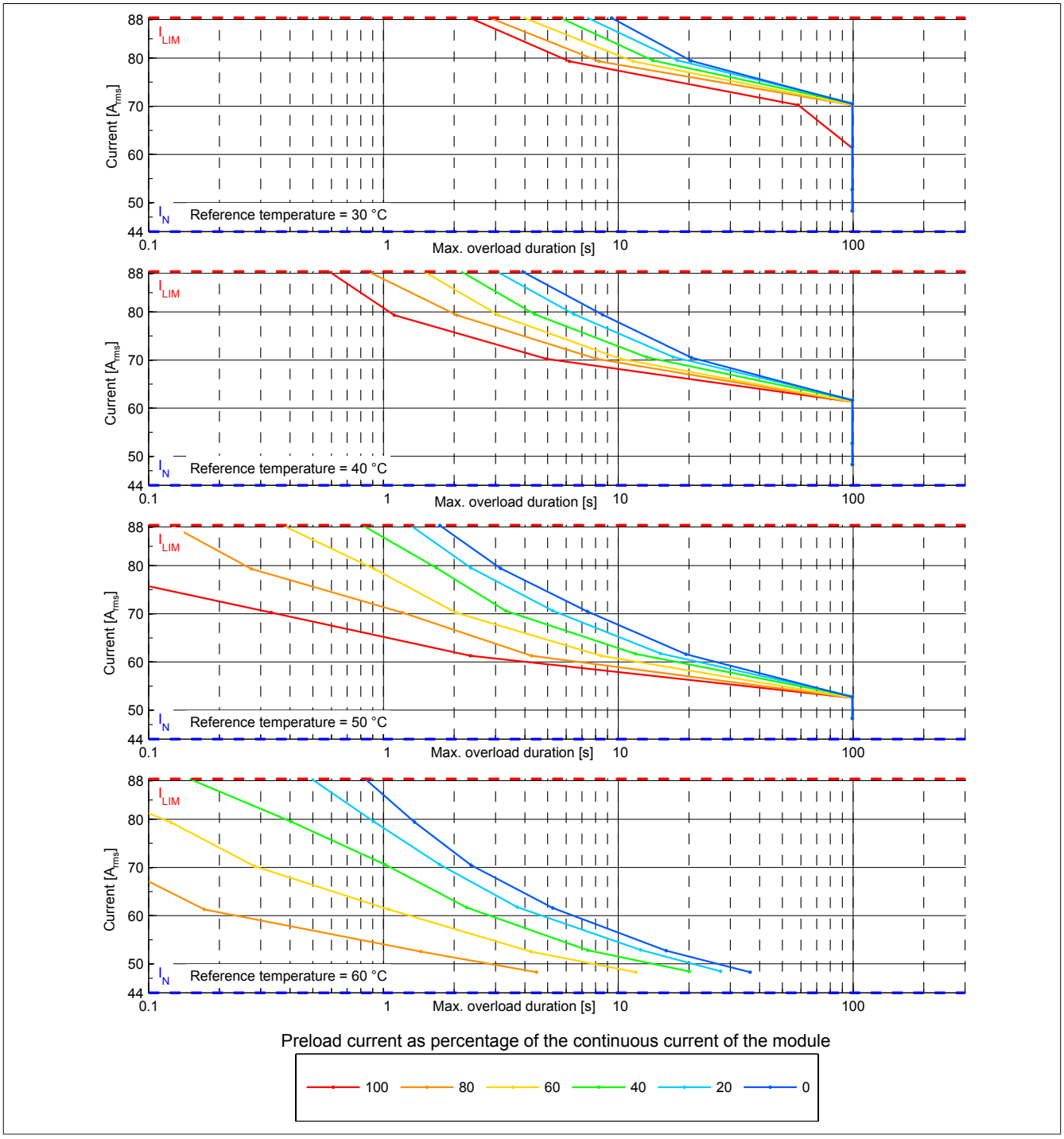


Figure 312: Overload characteristics of 8BVI0440HCSx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

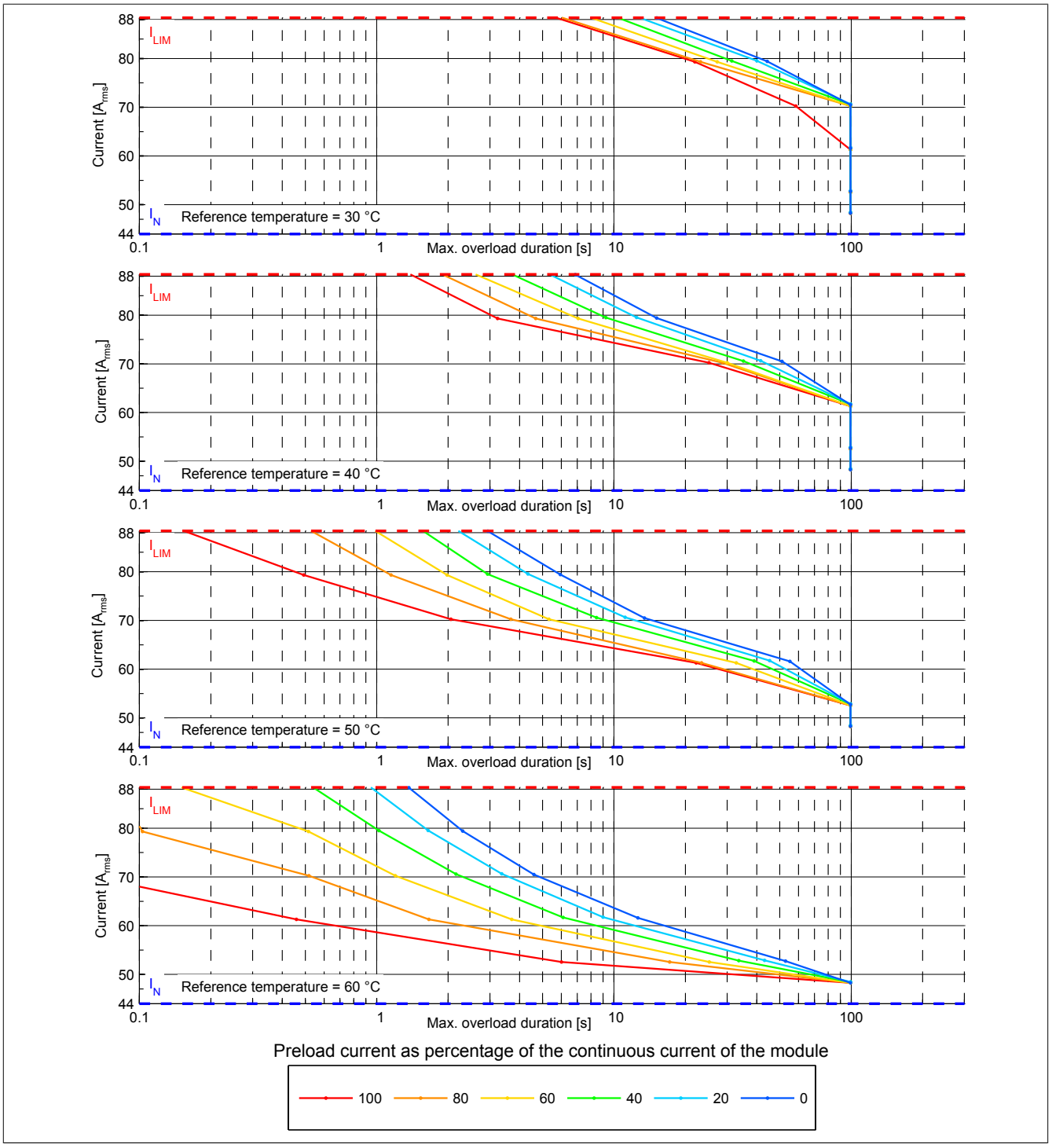


Figure 313: Overload characteristics of 8BVI0440HCSx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

14 Inverter module 8BVI0440HWSx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

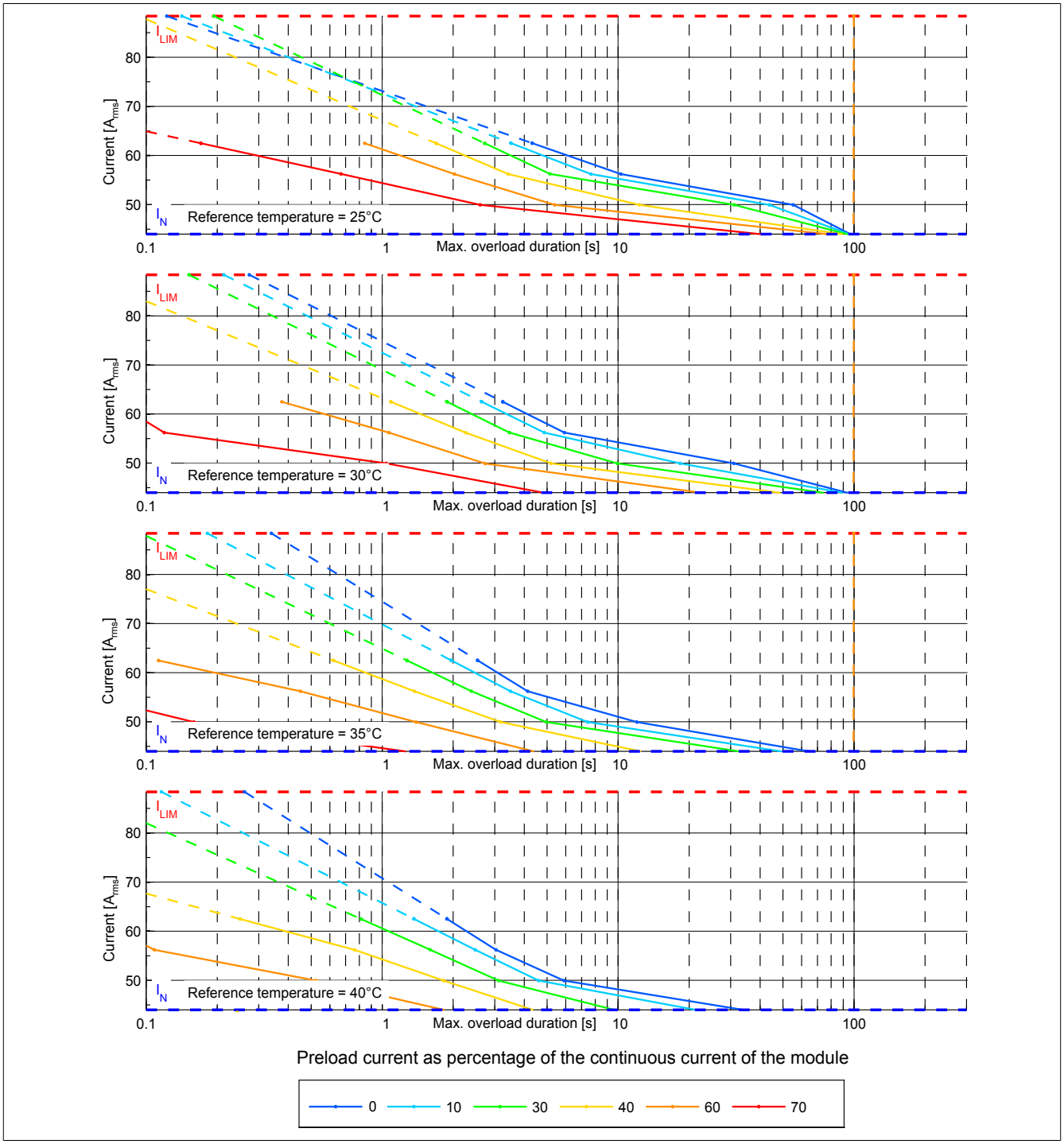


Figure 314: Overload characteristic 8BVI0440HWSx.000-1, Overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

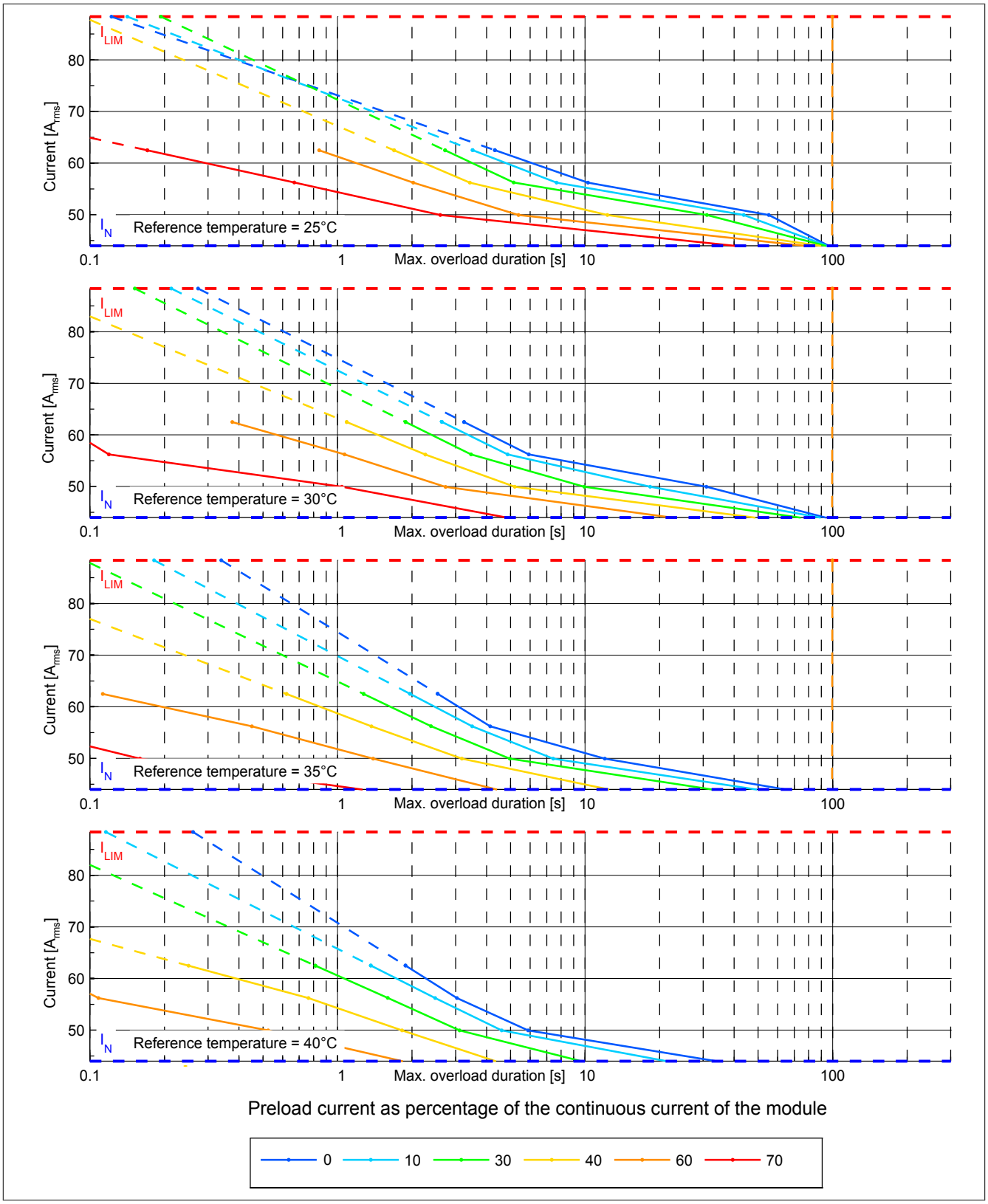


Figure 315: Overload characteristic 8BVI0440HWSx.000-1, Overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Room temperature on device fan

15 Inverter module 8BVI0660HCSx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

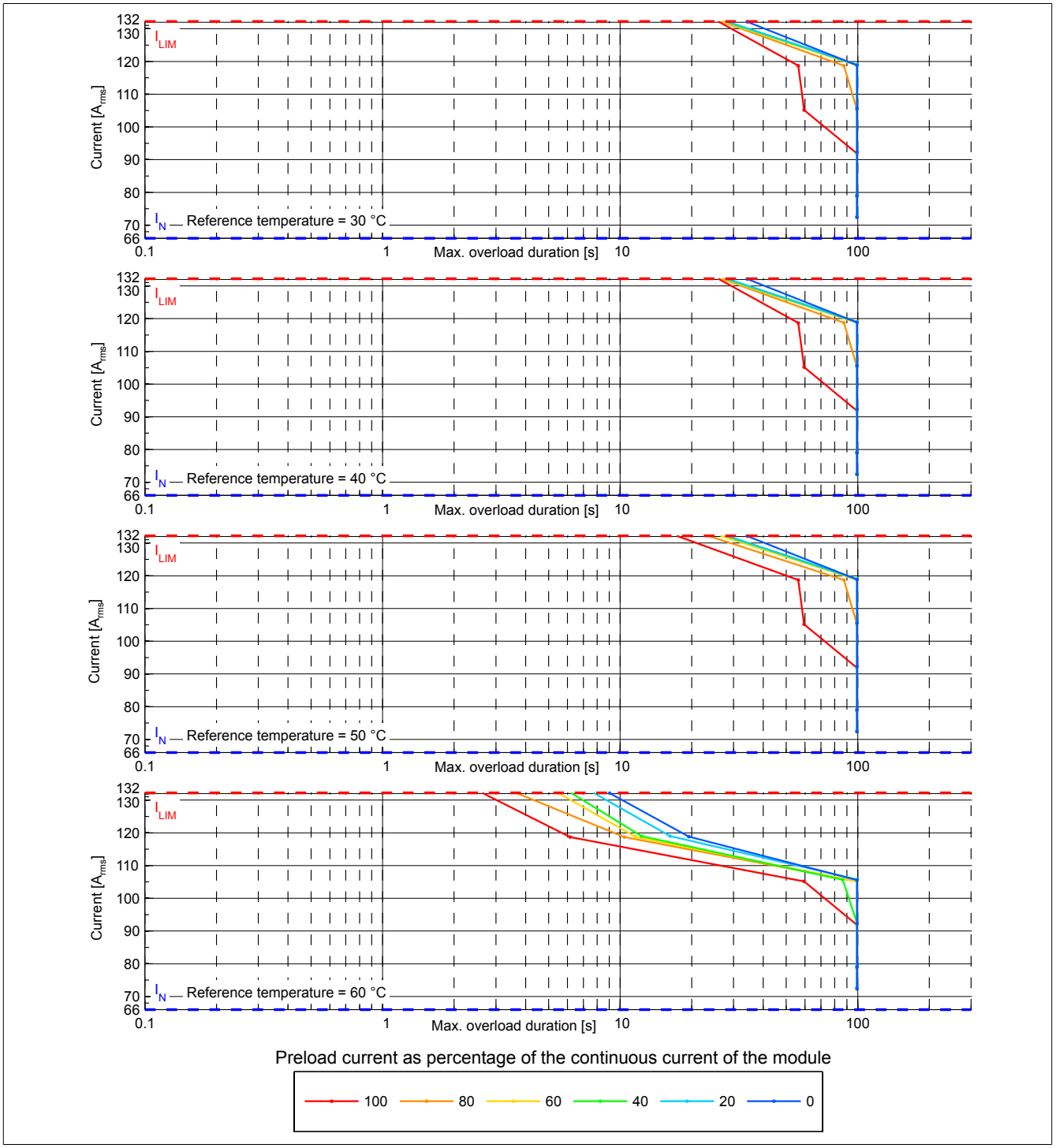


Figure 316: Overload characteristics of 8BVI0660HCSx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

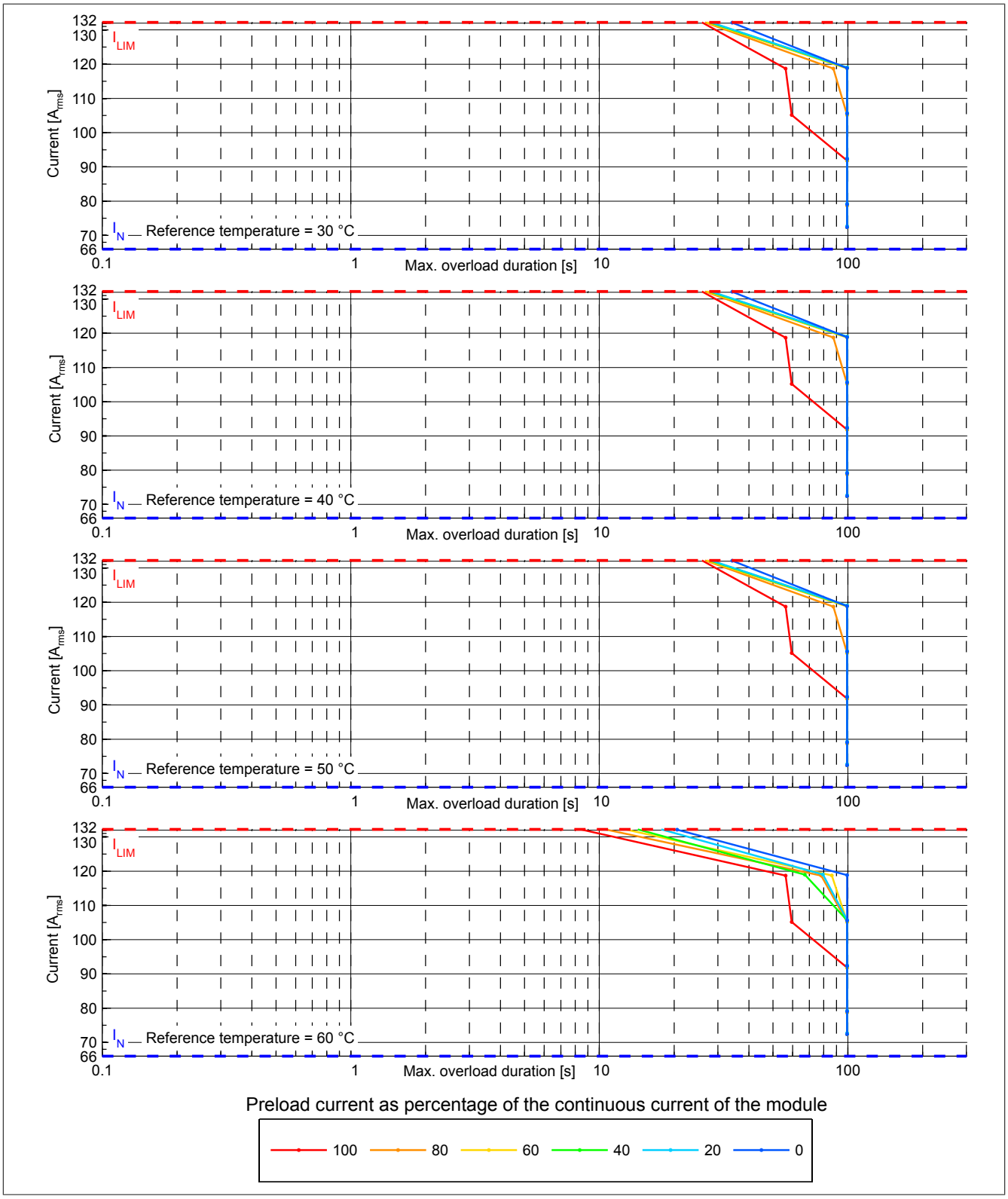


Figure 317: Overload characteristics of 8BVI0660HCSx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

16 Inverter module 8BVI0660HWSx.000-1

The continuous current for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

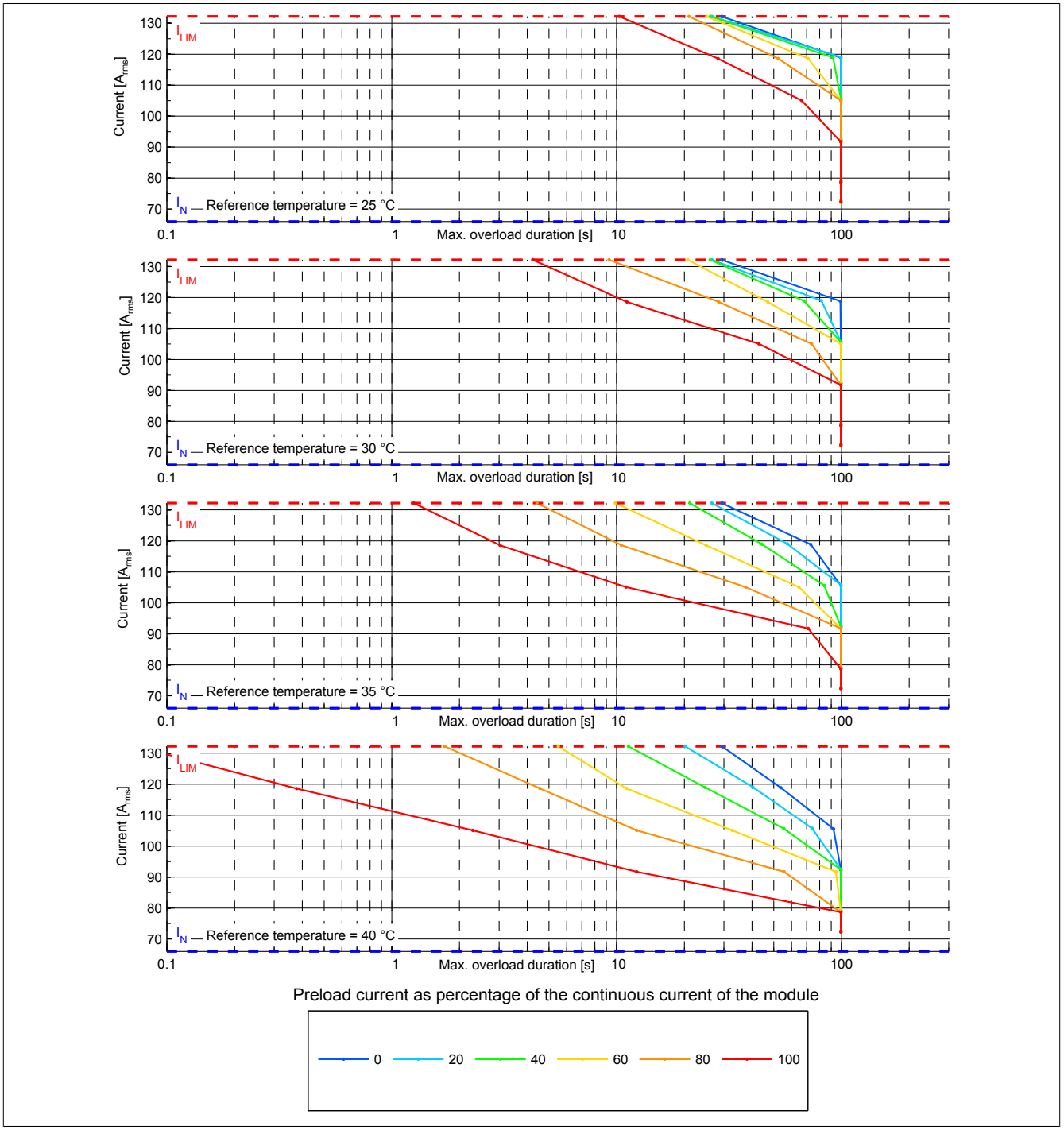


Figure 318: Overload characteristics of 8BVI0660HWSx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Ambient temperature of the module

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

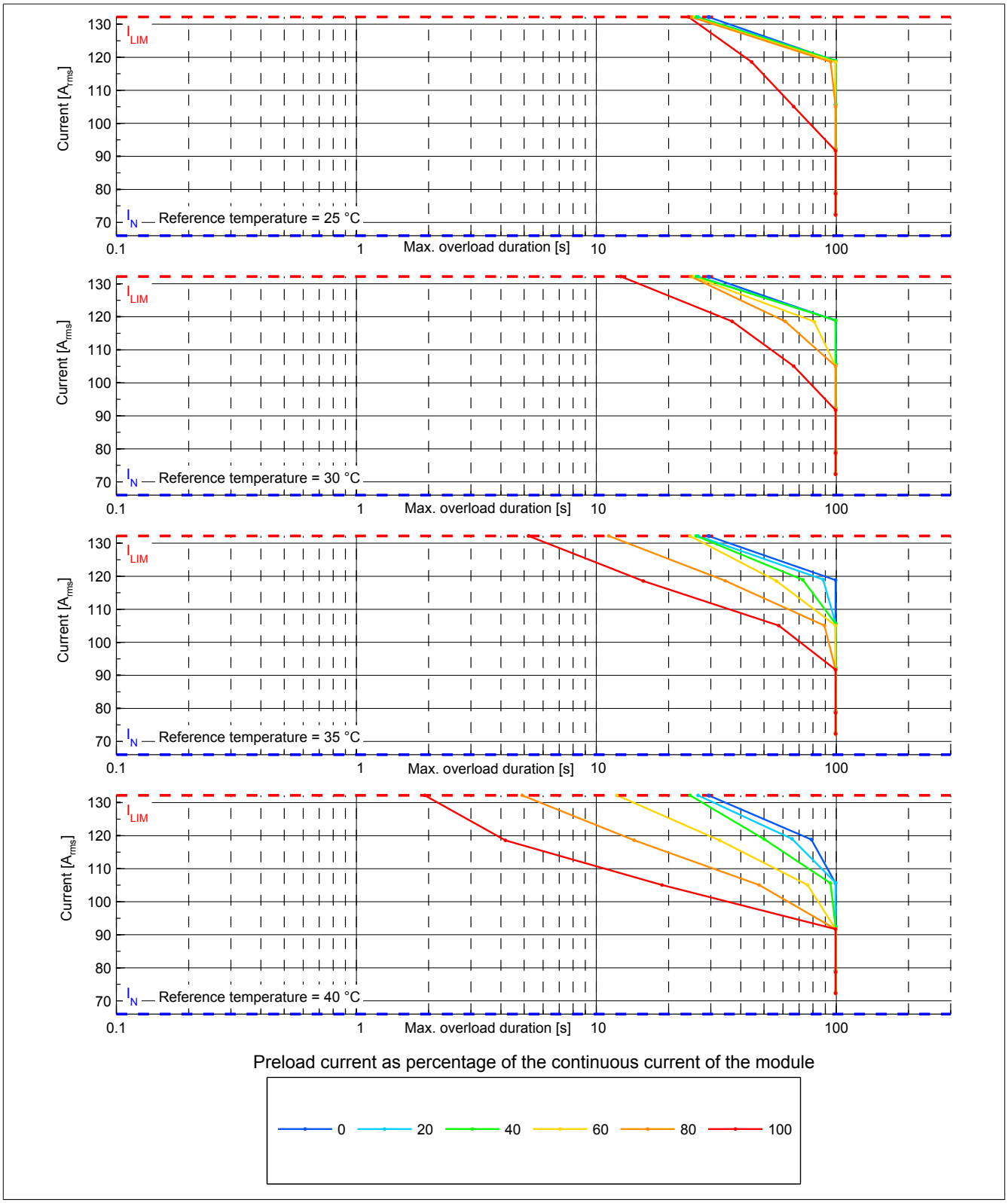


Figure 319: Overload characteristics of 8BVI0660HWSx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Ambient temperature of the module

17 Inverter module 8BVI0880HCSx.004-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

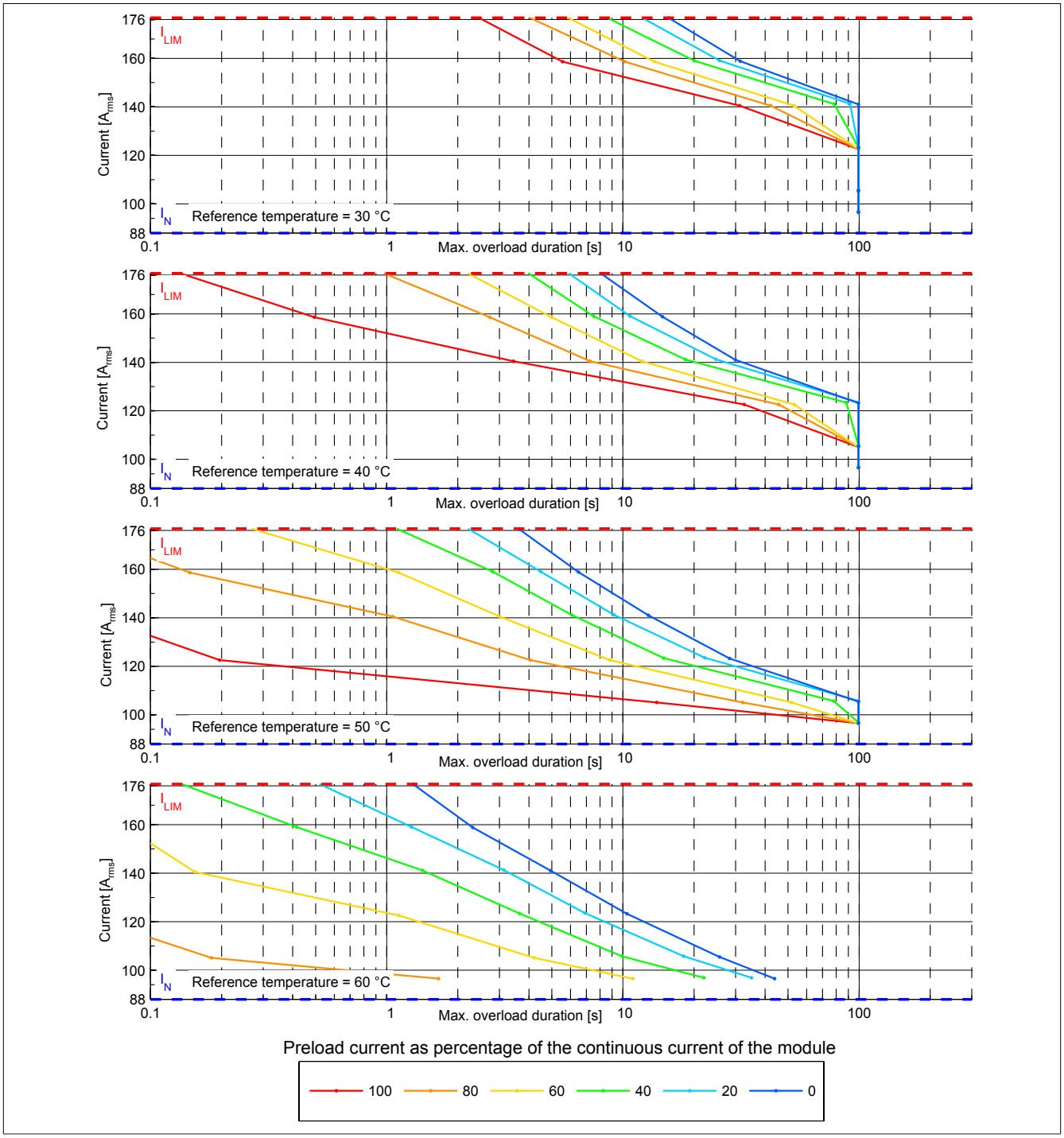


Figure 320: Overload characteristics of 8BVI0880HCSx.004-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

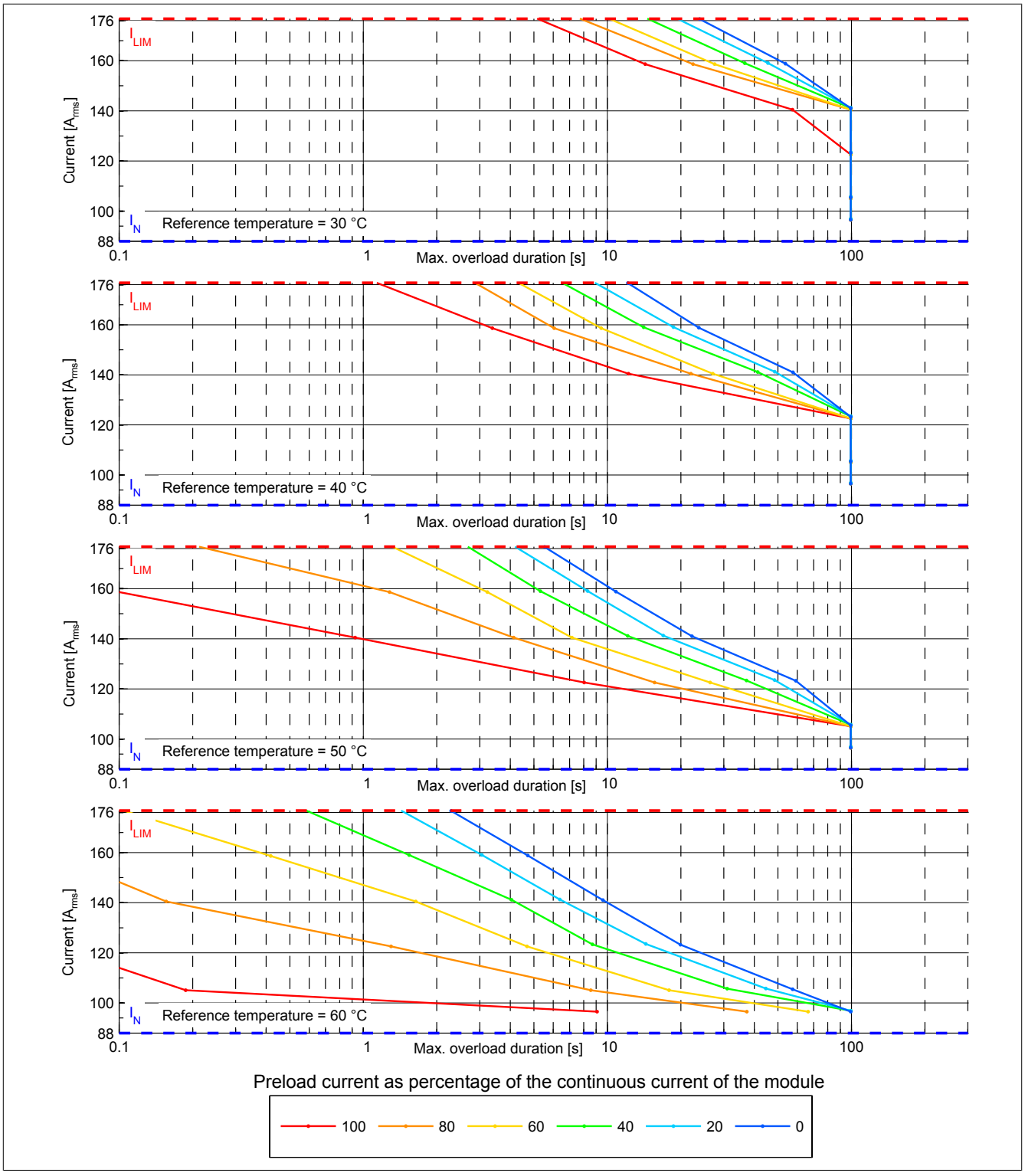


Figure 321: Overload characteristics of 8BVI0880HCSx.004-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

18 Inverter module 8BVI0880HWSx.004-1

The continuous current for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

If the module exceeds the maximum overload duration, it outputs a warning (WARNING).

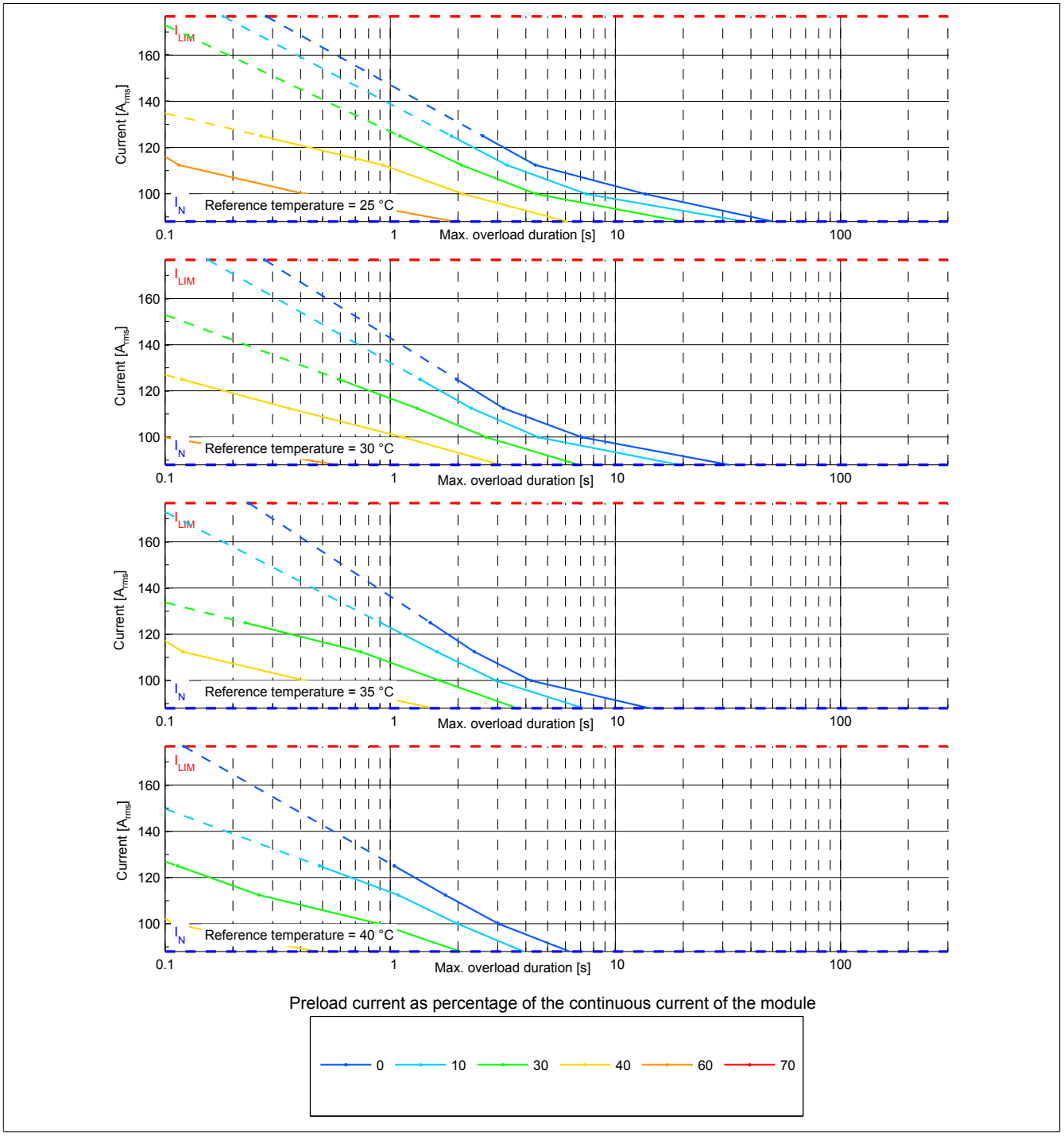


Figure 322: Overload characteristics of 8BVI0880HWSx.004-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Ambient temperature of the module

Overload response ERROR + STOP

If the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

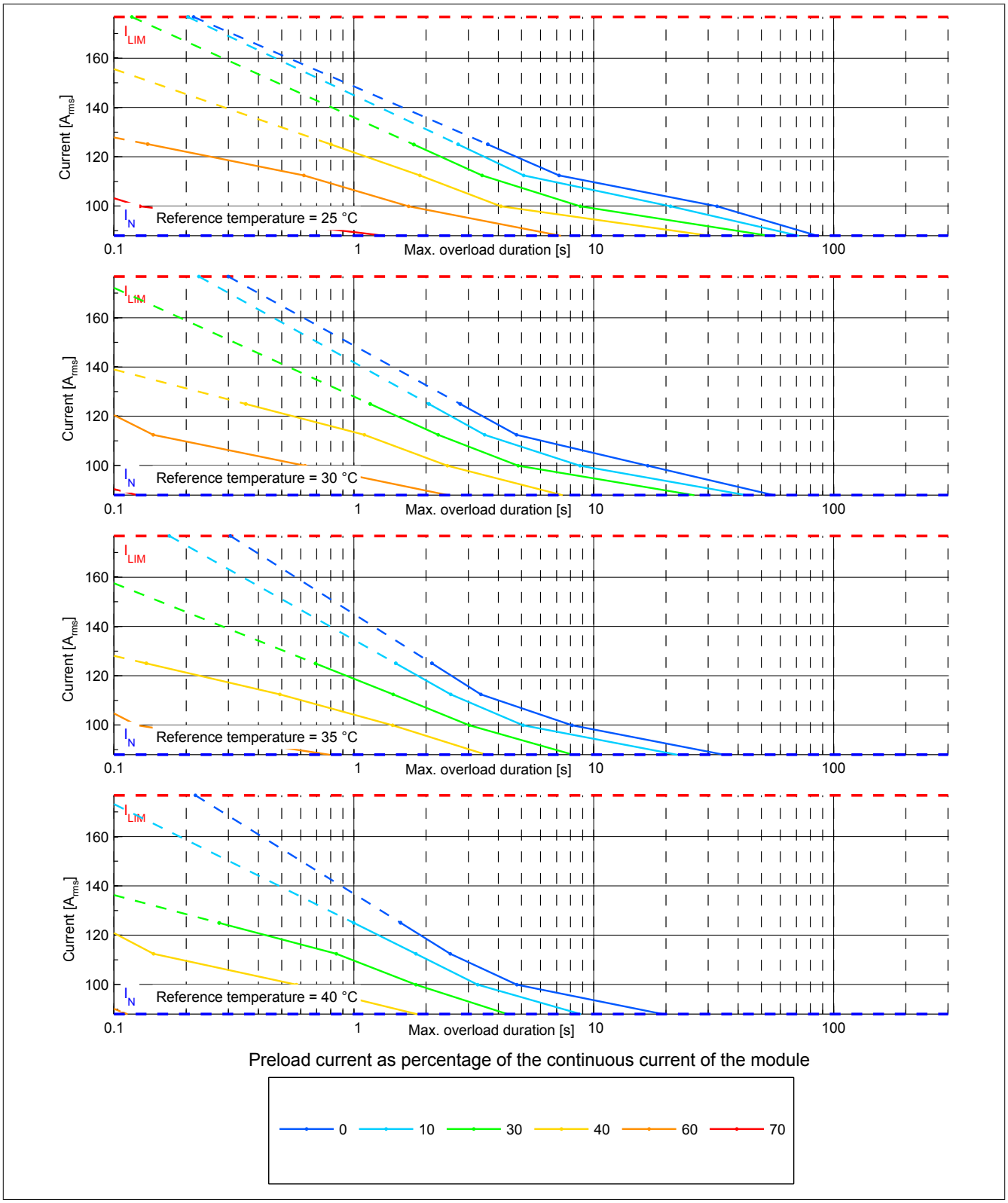


Figure 323: Overload characteristics of 8BVI0880HWSx.004-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Ambient temperature of the module

19 Inverter module 8BVI1650HCSx.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

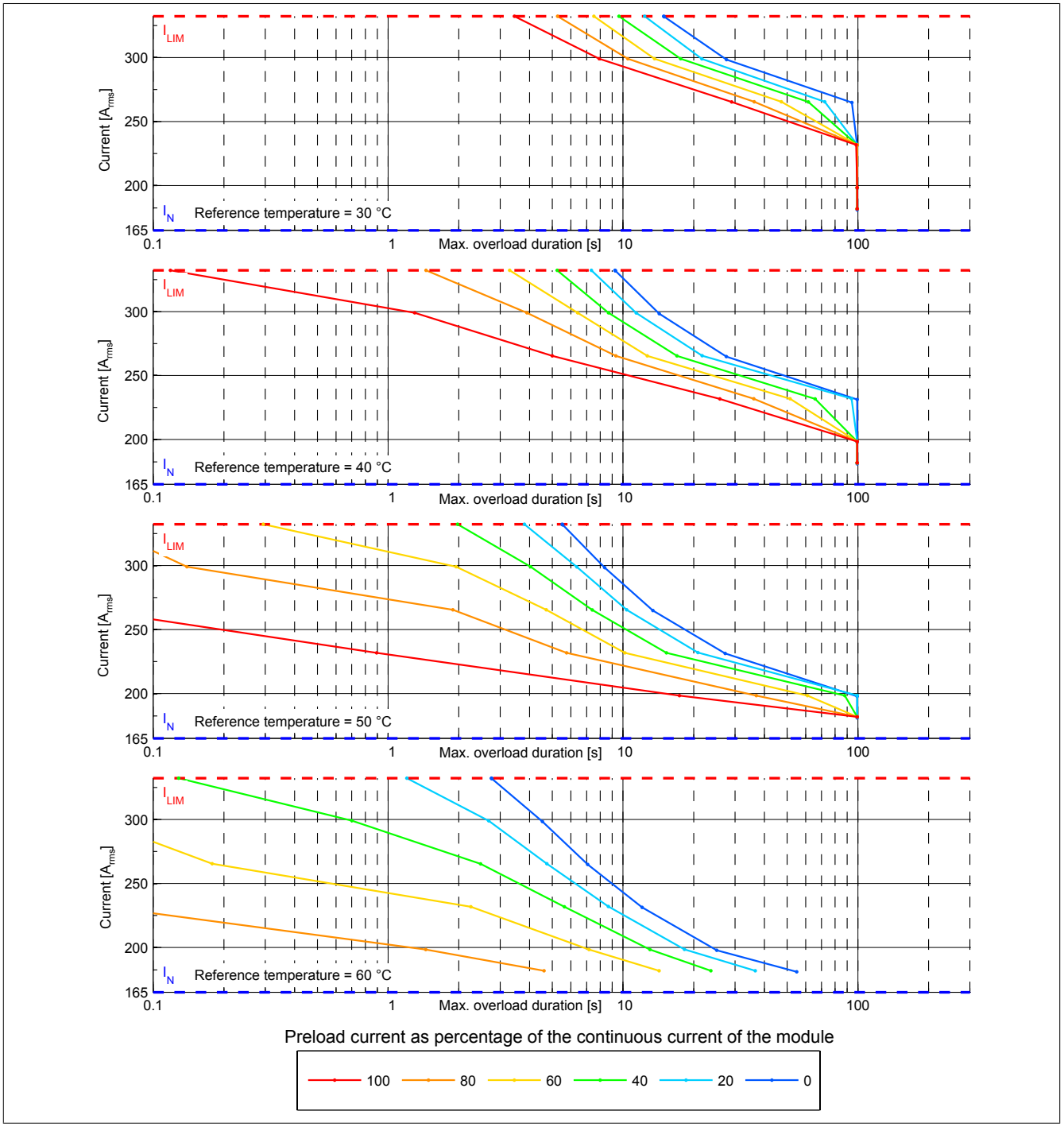


Figure 324: Overload characteristics of 8BVI1650HCSx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

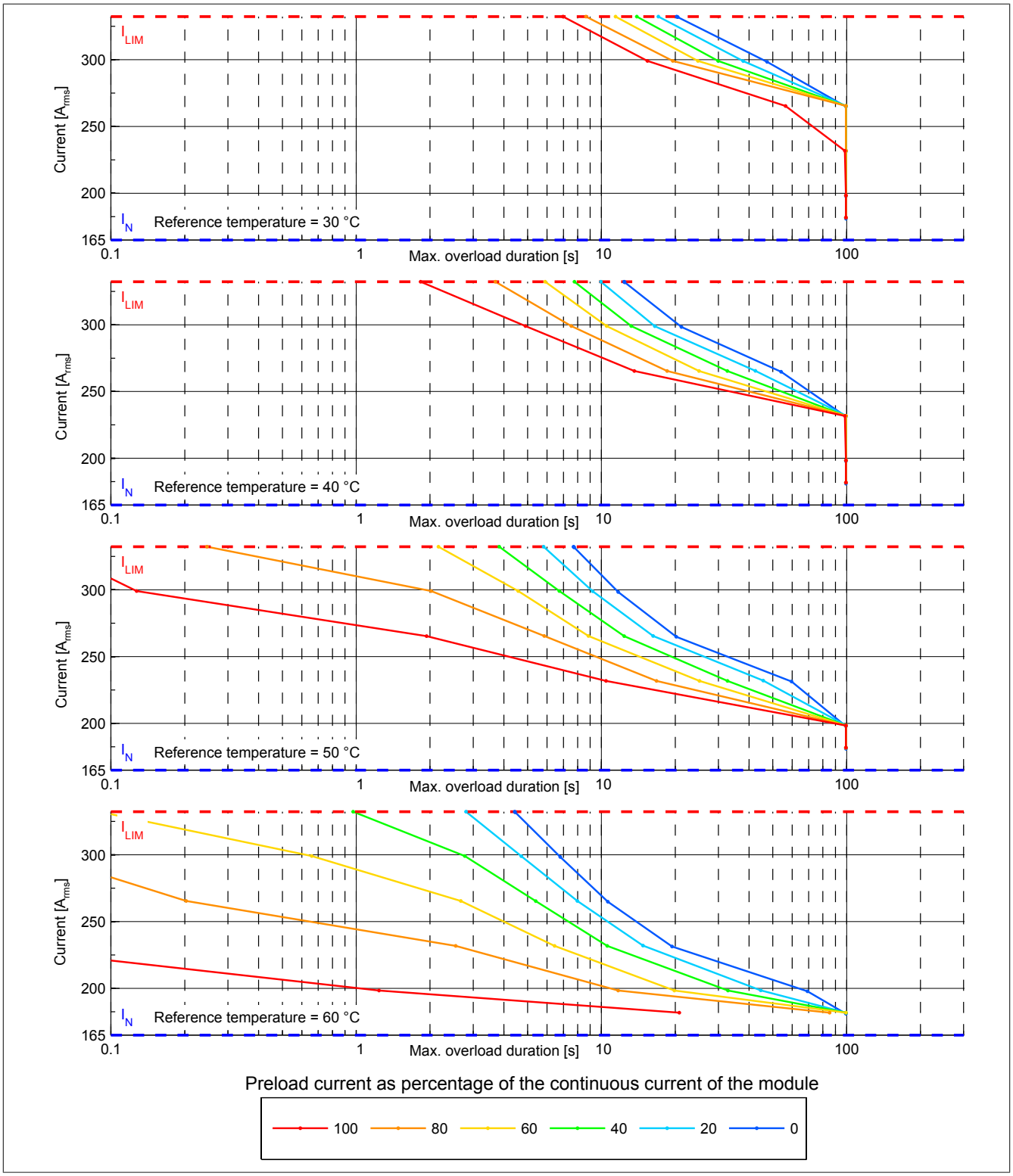


Figure 325: Overload characteristics of 8BVI1650HCSx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Temperature of the coolant at the inlet on the cold plate mounting plate

20 Inverter module 8BVI1650HWSx.000-1

The continuous current for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

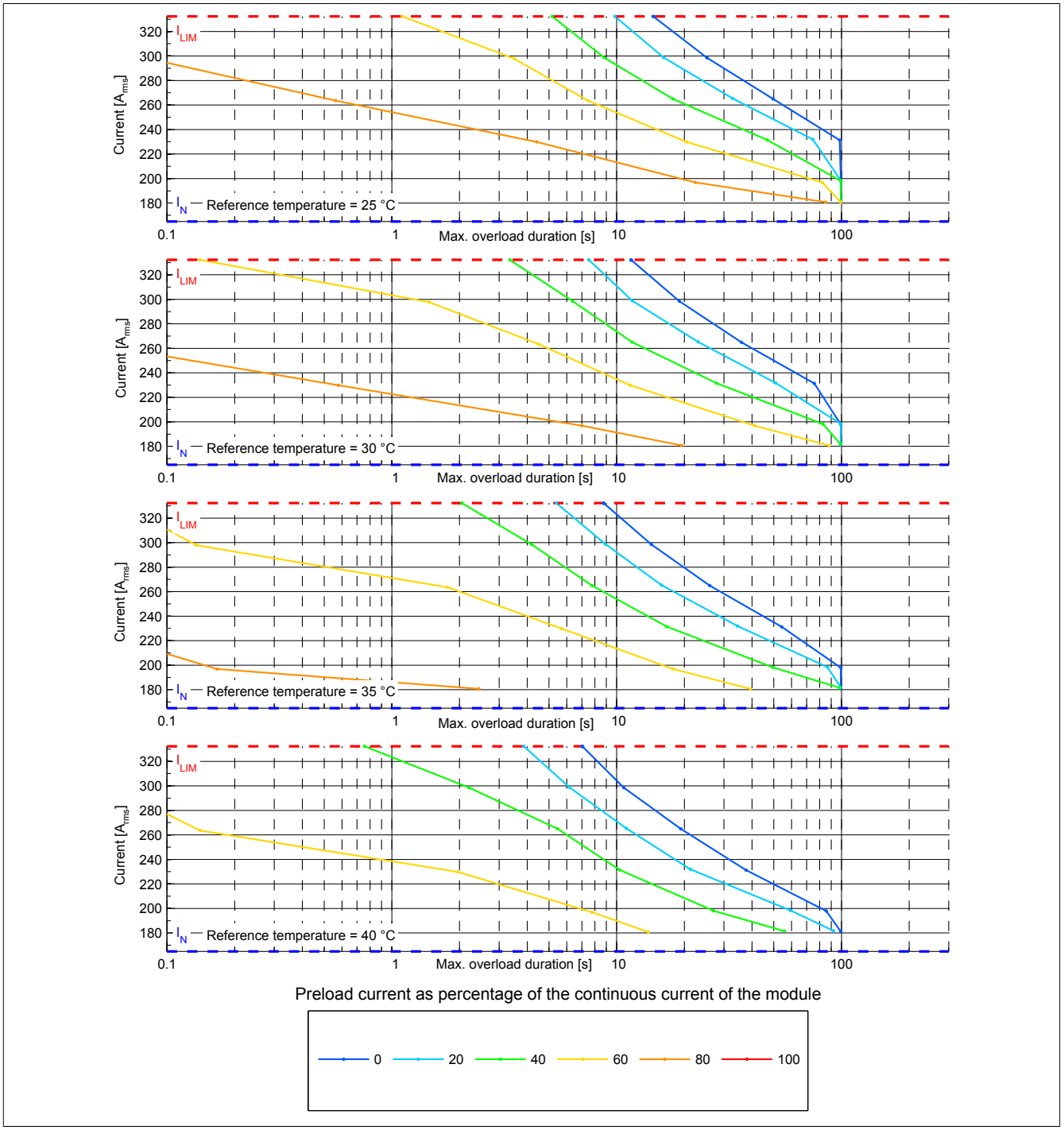


Figure 326: Overload characteristics of 8BVI1650HWSx.000-1, overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Ambient temperature of the module

Overload response ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

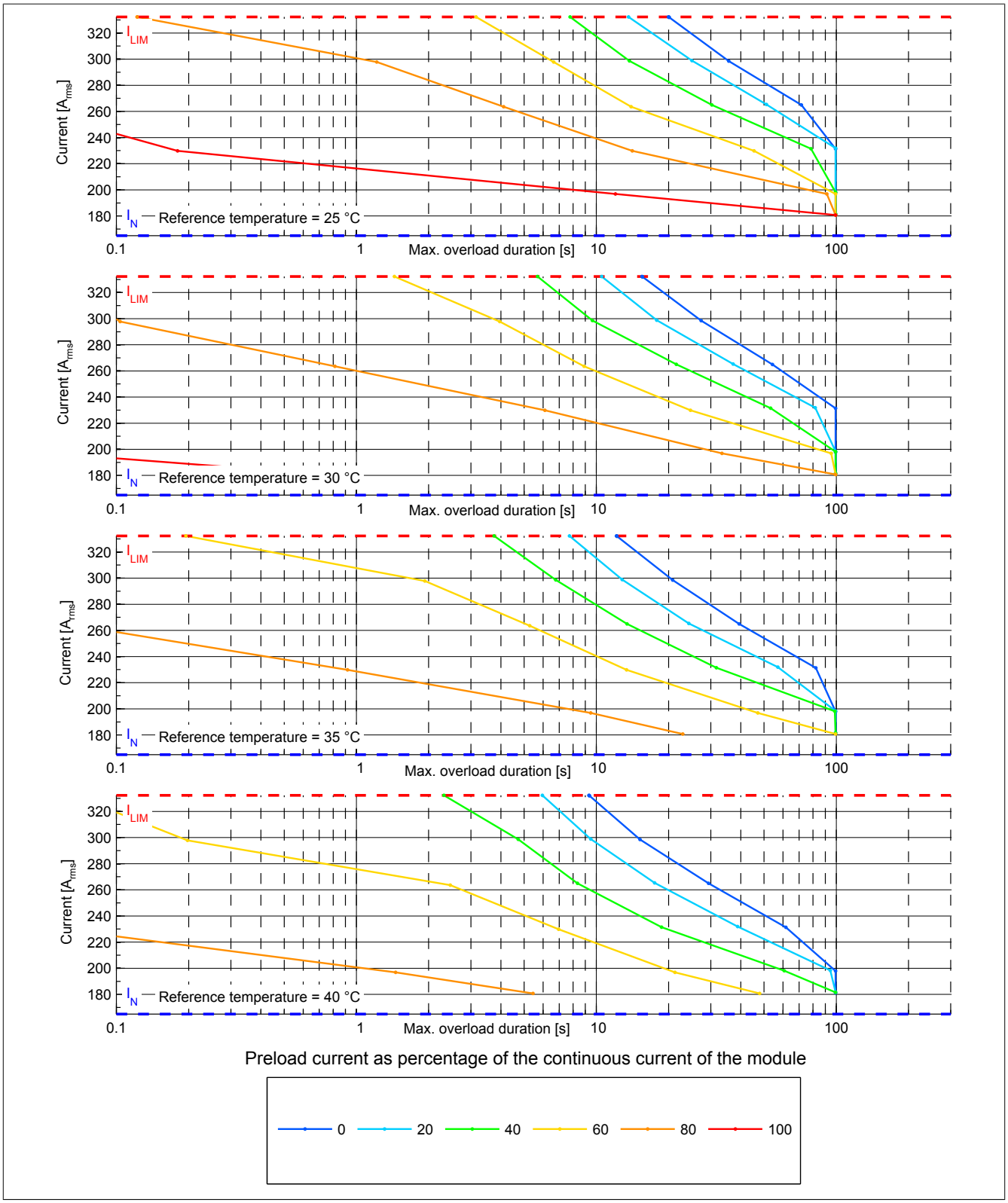


Figure 327: Overload characteristics of 8BVI1650HWSx.000-1, overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Wall mounting
DC bus voltage:	750 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	20 Hz
Reference temperature:	Ambient temperature of the module

21 Power supply module 8BVP0220HC00.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

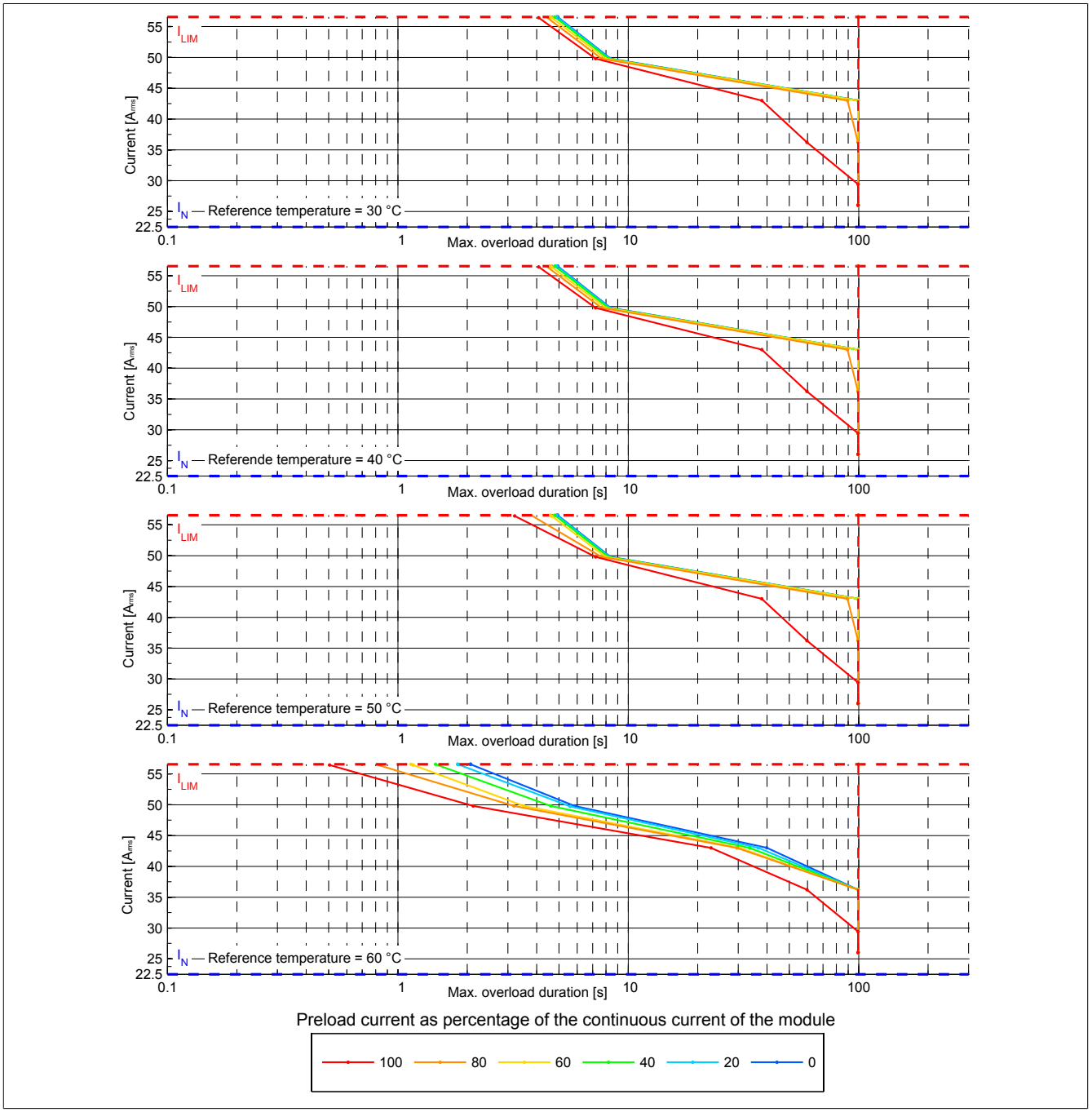


Figure 328: Overload characteristic - 8BVP0220HCS0.000-1, Overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	700 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	50 Hz
Reference temperature:	Temperature of the coolant at the return of the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

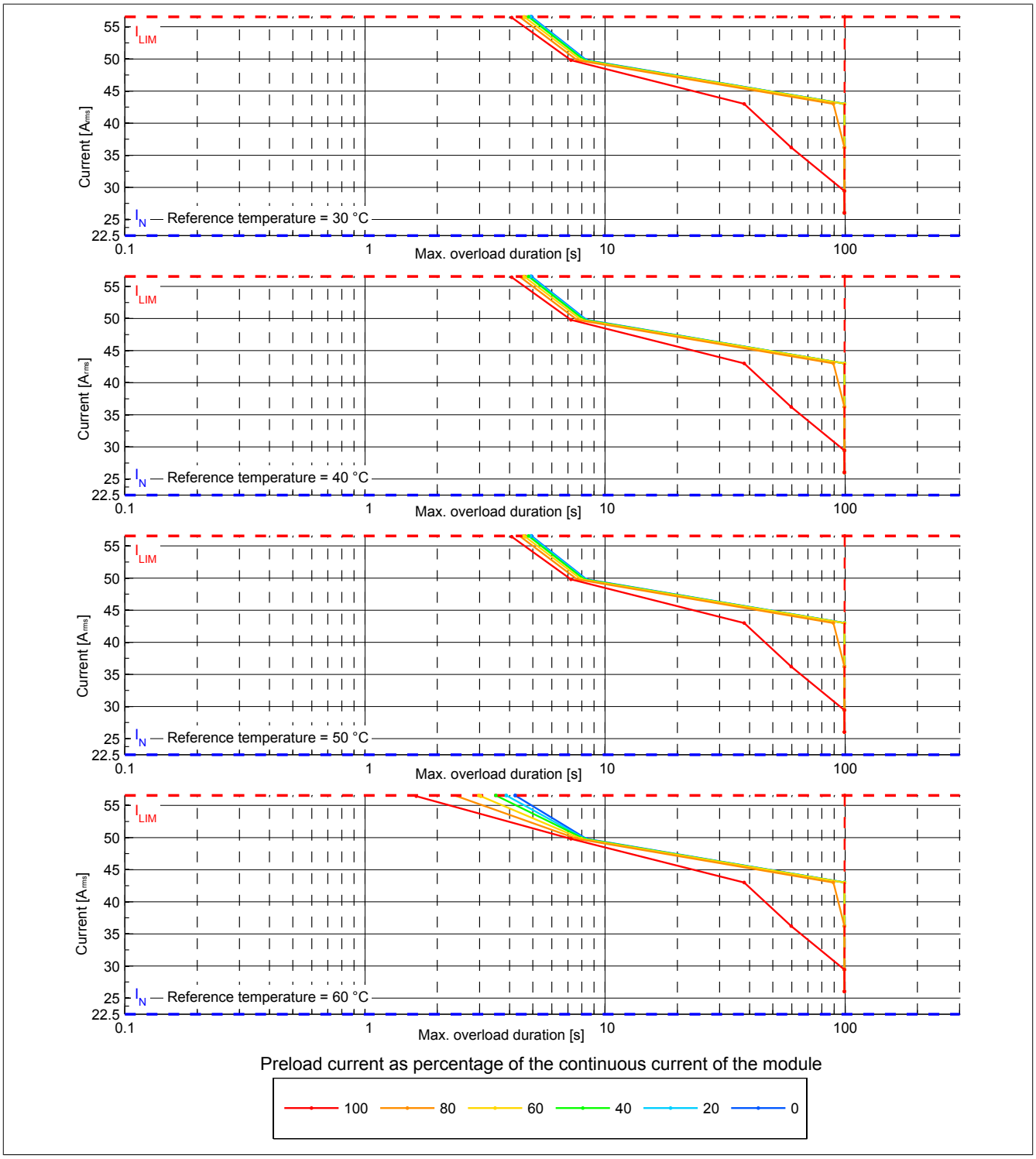


Figure 329: Overload characteristic - 8BVP0220HCS0.000-1, Overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	700 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	50 Hz
Reference temperature:	Temperature of the coolant at the return of the cold plate mounting plate

22 Power supply module 8BVP0880HC00.004-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

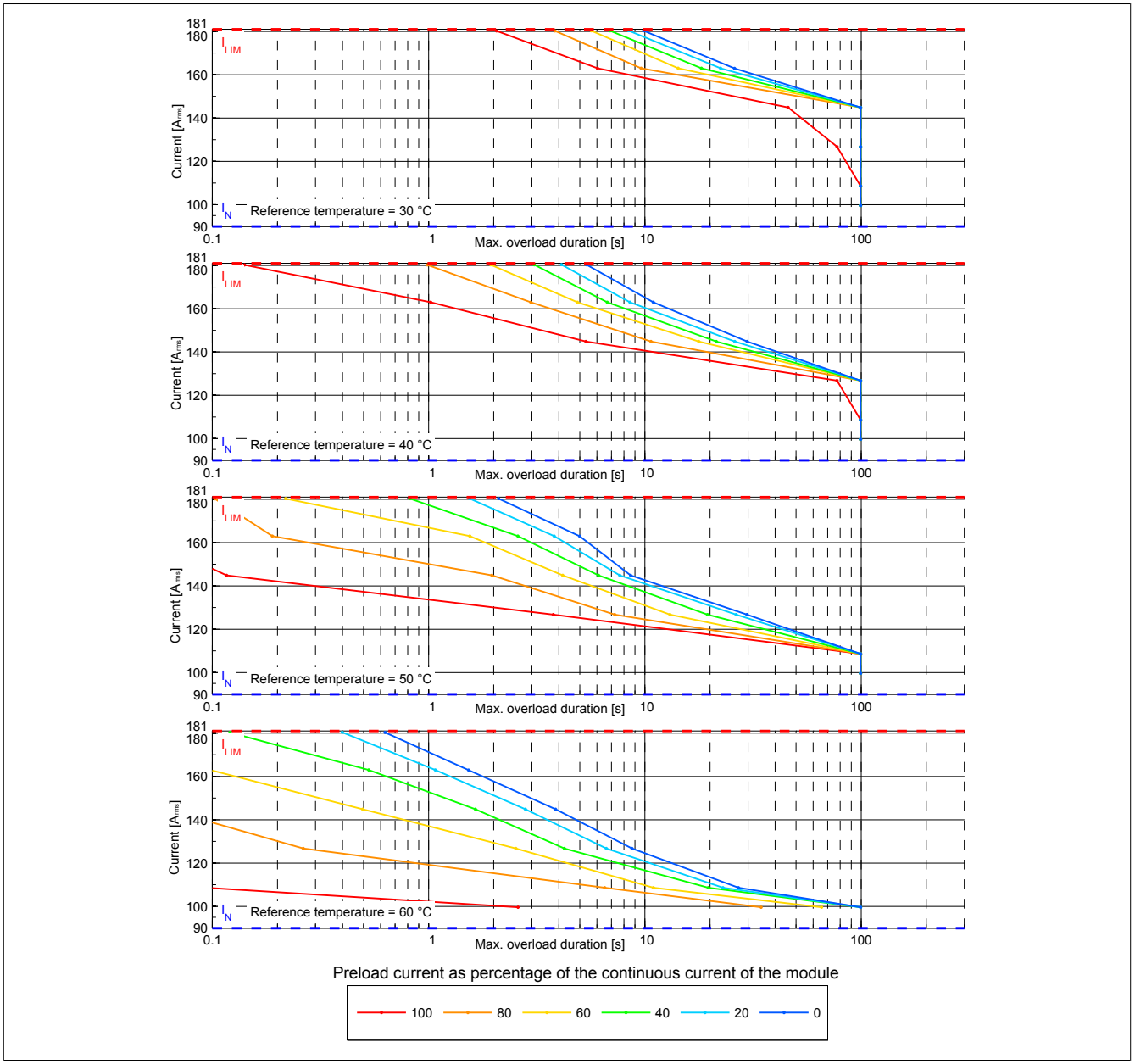


Figure 330: Overload characteristic - 8BVP0880HCS0.004-1, Overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	700 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	50 Hz
Reference temperature:	Temperature of the coolant at the return of the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

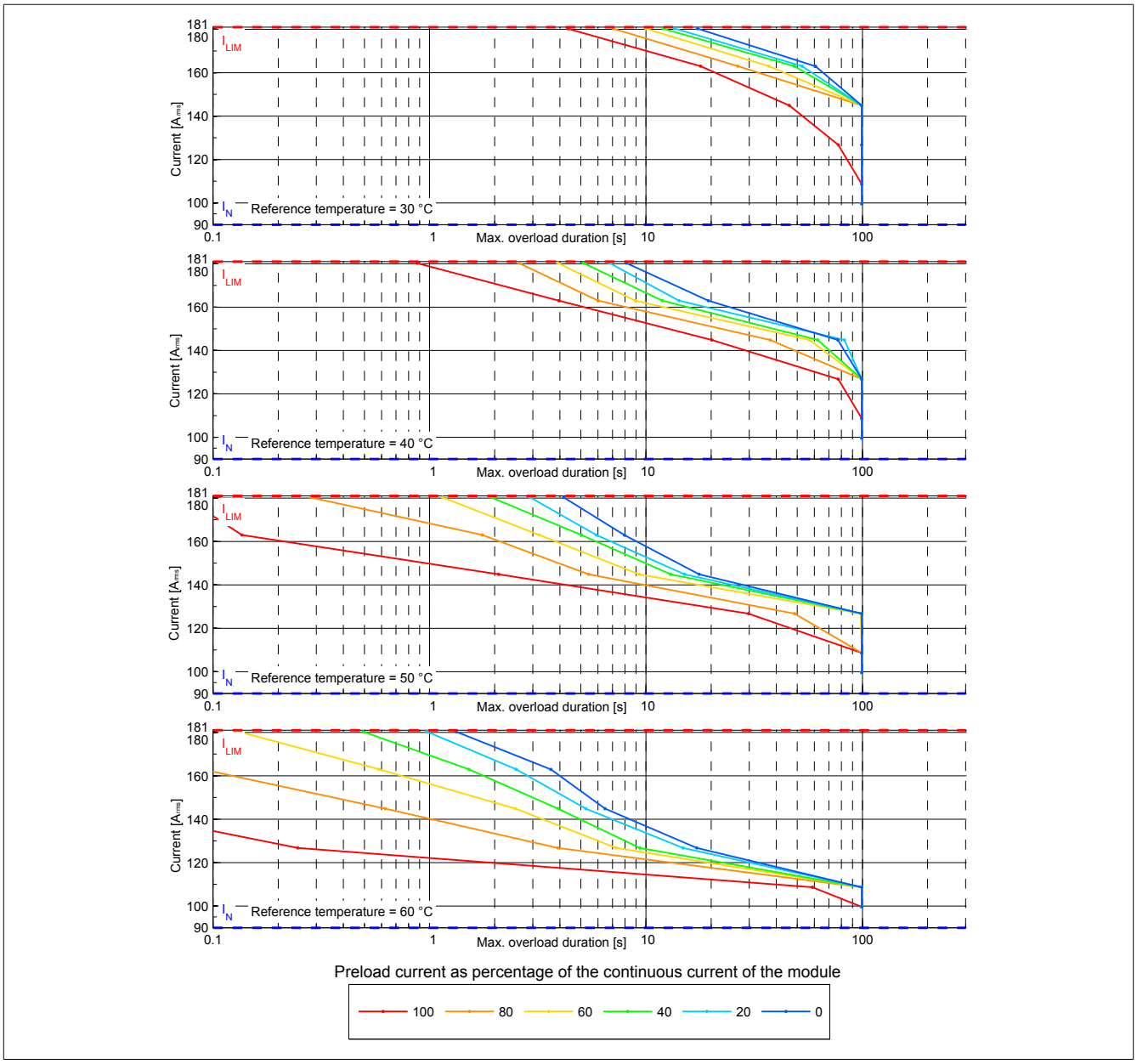


Figure 331: Overload characteristic - 8BVP0880HCS0.004-1, Overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	700 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	50 Hz
Reference temperature:	Temperature of the coolant at the return of the cold plate mounting plate

23 Power supply module 8BVP1650HC00.000-1

The overcurrent for the module is permitted to be exceeded for a short time during operation (dynamic overload).

Overload response: WARNING

When the module exceeds the maximum overload duration, it outputs a warning.

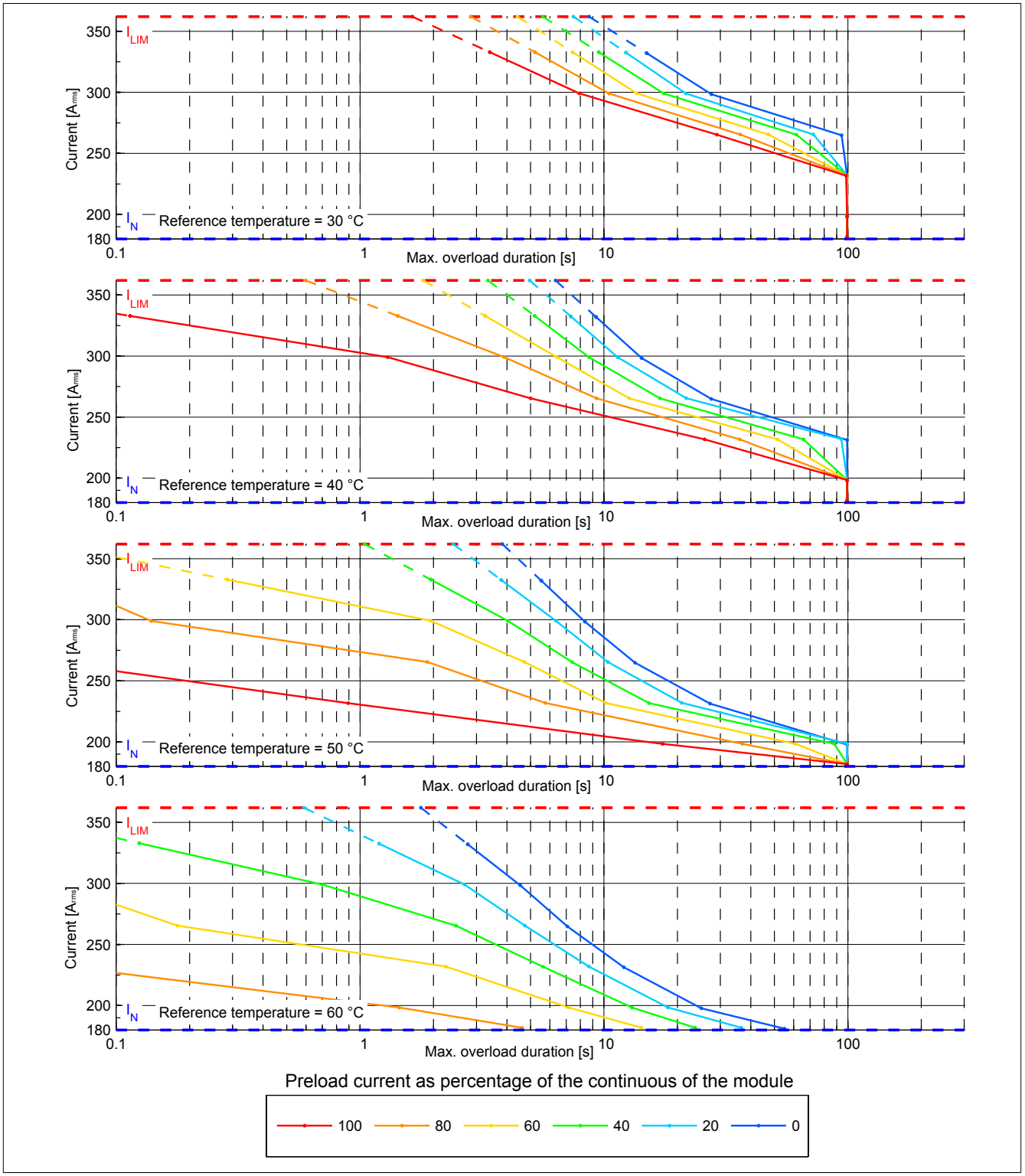


Figure 332: Overload characteristic - 8BVP1650HCS0.000-1, Overload response - WARNING

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	700 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	50 Hz
Reference temperature:	Temperature of the coolant at the return of the cold plate mounting plate

Overload response: ERROR + STOP

When the module exceeds the maximum overload duration, it outputs an error and executes a movement stop with current limiting (ERROR + STOP).

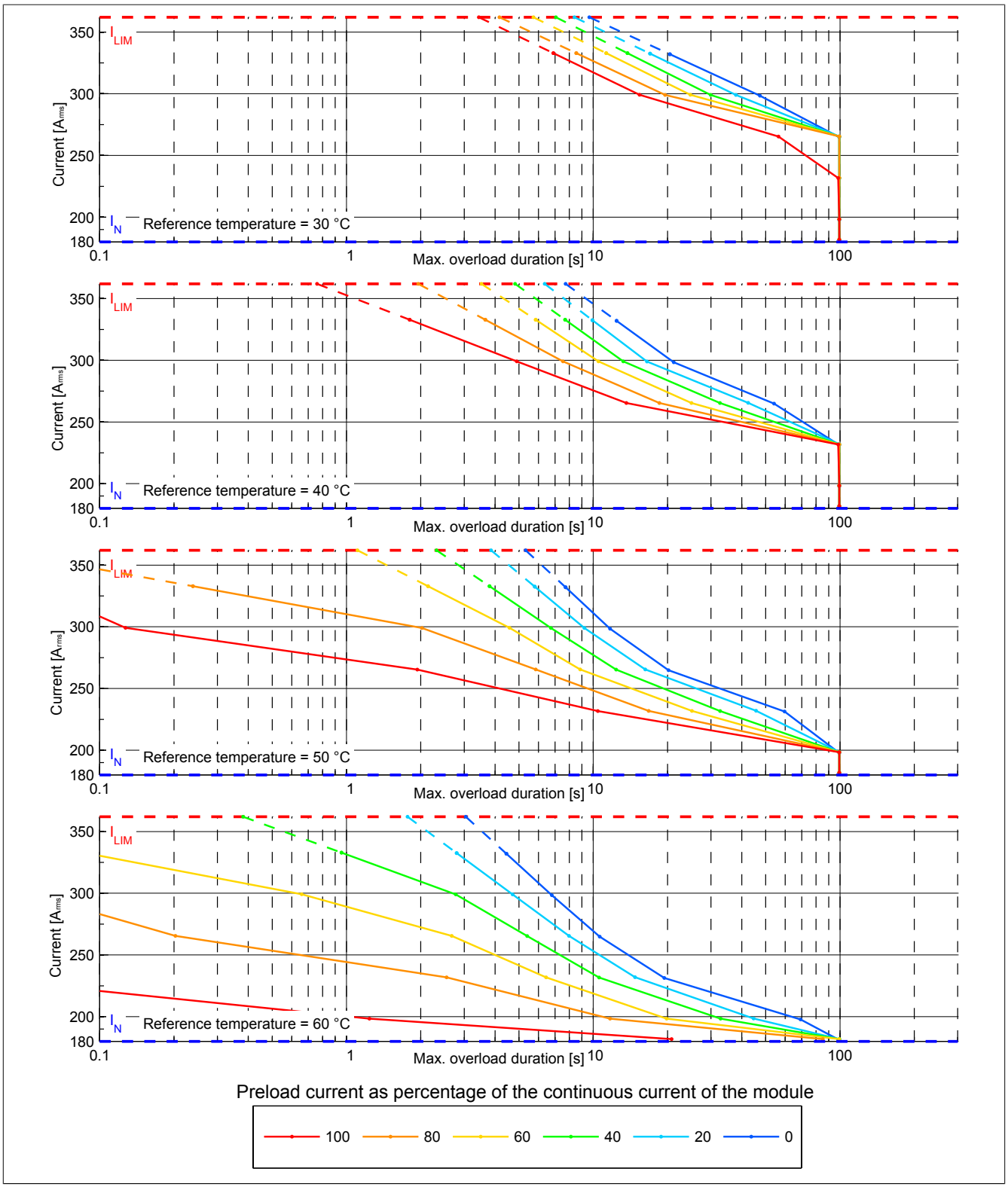


Figure 333: Overload characteristic - 8BVP1650HCS0.000-1, Overload response - ERROR+STOP

I_N	Continuous current of the module [A_{rms}]
I_{LIM}	Peak current of the module [A_{rms}]
Mounting type:	Cold plate mounting
DC bus voltage:	700 V
Switching frequency:	5 kHz
Rotary frequency of current indicator:	50 Hz
Reference temperature:	Temperature of the coolant at the return of the cold plate mounting plate

Appendix B • Accessories included in delivery

1 ACOPOSmulti modules

Figure	Quantity	Name	Model number	Module width			
				1	2	4	8
	1	Safety guidelines	MAACPSH-X	X	X	X	X
	1	ACOPOSmulti multilingual warning stickers	-	X	X	X	X
	1	Accessory set for ACOPOSmulti modules, 1x wide, cold plate / feed-through mounting, consists of: Quantity: 1 — Details: Cylinder head screw with hexagon socket, M6x22 8.8, galvanized	-	a			
	1	Accessory set for ACOPOSmulti modules, 1x wide, wall mounting, consists of: Quantity: 1 — Details: Cylinder head screw with hexagon socket, M6x12 8.8, galvanized	-	b			
	1	Accessory set for ACOPOSmulti modules, 2x wide, cold plate / feed-through mounting, consists of: Quantity: 2 — Details: Cylinder head screw with hexagon socket, M6x22 8.8, galvanized	-		a		
	1	Accessory set for ACOPOSmulti modules, 2x wide, wall mounting, consists of: Quantity: 2 — Details: Cylinder head screw with hexagon socket, M6x12 8.8, galvanized	-		b		
	1	Accessory set for ACOPOSmulti modules, 4x wide, cold plate / feed-through mounting, consists of: Quantity: 4 — Details: Cylinder head screw with hexagon socket, M6x22 8.8, galvanized	-			a	
	1	Accessory set for ACOPOSmulti modules, 4x wide, wall mounting, consists of: Quantity: 4 — Details: Cylinder head screw with hexagon socket, M6x12 8.8, galvanized	-			b	
	1	Accessory set for ACOPOSmulti modules, 8x wide, cold plate / feed-through mounting, consists of: Quantity: 8 — Details: Cylinder head screw with hexagon socket, M6x22 8.8, galvanized	-				a
	1	Accessory set for ACOPOSmulti modules, 8x wide, wall mounting, consists of: Quantity: 8 — Details: Cylinder head screw with hexagon socket, M6x12 8.8, galvanized	-				b

<table>
<tr><th rowspan="2">Figure</th><th rowspan="2">Quan-tity</th><th rowspan="2">Name</th><th rowspan="2">Model number</th><th colspan="4">Module width</th></tr>
<tr><th>1</th><th>2</th><th>4</th><th>8</th></tr>
<tr><td rowspan="5"></td><td rowspan="5">1</td><td colspan="2">Accessory set for ACOPOSmulti connector insulators</td><td rowspan="5">-</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">X</td><td rowspan="5">X</td></tr>
<tr><td>Quan-tity</td><td>Details</td></tr>
<tr><td>3</td><td>ACPmulti connector insulators UT</td></tr>
<tr><td>3</td><td>ACPmulti connector insulators OT</td></tr>
<tr><td>6</td><td>ACPmulti cable insulation</td></tr>
</table>

X For all ACOPOSmulti modules of this width
a For all ACOPOSmulti modules with cold plate or feed-through mounting (8BxxxxxHCxx.x0x-1)
b For all ACOPOSmulti modules with wall mounting (8BxxxxxHWxx.x0x-1)

Appendix C • UL markings

- ACOPOSmulti systems utilizing the regeneration choke must mount the regeneration choke horizontally in the final installation.
- All field wiring must use 75°C, copper conductors only.
- ACOPOSmulti servo drive modules provide motor overload protection at 100% of the FLA rating.
- ACOPOSmulti 8BVI models are suitable for use on a circuit capable of delivery not more than 65,000 A_{rms} symmetrical amperes maximum, 480 VAC 3ph maximum.
- Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electric Code and any additional local codes.
- Models 8B0P0110HC00, 8B0P0110HW00 only:
  For use in Canada: Transient surge suppression shall be installed on the line side of this equipment and shall be rated 277 V (phase to ground), 480 V (phase to phase), suitable for overvoltage category III, and shall provide protection for a rated impulse withstand voltage peak of 4 kV.
- For branch circuit protection of the drives, use fuses or circuit breaker rated as tabulated below:

Drive output rating, A	Type of branch circuit protective device	Maximum current rating, A
1.9 - 165 A	Class J fuse or circuit breaker	300 percent of output current rating

Figure 1: Scalable dynamic features... 30
Figure 2: Compact, modular motion control applications... 33
Figure 3: Extensive, modular motion control applications with up to 253 axes... 33
Figure 4: Modular motion control applications with up to 253 axes and HMI... 34
Figure 5: Warning label on ACOPOSmulti modules... 38
Figure 6: 8B0P power supply modules - Status indicator groups... 42
Figure 7: 8BVP power supply modules - Status indicator groups... 43
Figure 8: Indicator groups for auxiliary supply modules (8B0C0xx0Hx00.000-1)... 44
Figure 9: Indicator groups for auxiliary supply modules with 24 V Out (8B0C0xx0Hx00.00x-1)... 45
Figure 10: 8B0C0160Hx00.A01-1 auxiliary supply modules with 42 V Out - Status indicator groups... 46
Figure 11: 8B0C0320Hx00.00A-1 auxiliary supply modules with 24 V Out and 24 V In - Status indicator groups... 47
Figure 12: 8BVI inverter modules (1-axis modules) - Status indicator groups... 48
Figure 13: Indicator groups for 8BVI inverter modules (2-axis modules)... 49
Figure 14: 8BVE expansion modules - Status indicator groups... 50
Figure 15: Indicator groups for 8B0K capacitor modules without integrated charging circuit... 51
Figure 16: Indicator groups for 8B0K capacitor modules with integrated charging circuit... 51
Figure 17: Fan module 8BXF002.0000-00... 53
Figure 18: 8B0F0160H000.A00-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Pinout overview... 59
Figure 19: 8B0F - Input/Output circuit diagram... 62
Figure 20: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Pinout overview... 65
Figure 21: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Input/Output circuit diagram... 67
Figure 22: 8BVF0880H000.000-1 - Pinout overview... 68
Figure 23: 8BVF0880H000.000-1 - Input/Output circuit diagram... 69
Figure 24: 8BVR0220H000.100-1 - Pinout overview... 72
Figure 25: 8BVR0220H000.100-1 - Input/Output circuit diagram... 73
Figure 26: 8BVR0440H000.100-2 - Pinout overview... 73
Figure 27: 8BVR0440H000.100-x - Input/Output circuit diagram... 74
Figure 28: 8BVR0880H000.100-1 - Pinout overview... 74
Figure 29: 8BVR0880H000.100-1 - Input/Output circuit diagram... 75
Figure 30: 8BVR1650H000.100-1 - Pinout overview... 75
Figure 31: 8BVR1650H000.100-1 - Input/Output circuit diagram... 76
Figure 32: Fan LED 8BXF002.0000-00... 79
Figure 33: Fan module 8BVF002.0000-00... 79
Figure 34: 8B0P0110Hx00.000-1 - 24 VDC power supply diagram... 86
Figure 35: 8B0P0110Hx00.000-1 - Pinout overview... 90
Figure 36: 8B0C - Enable... 92
Figure 37: Power unit and external 24 VDC input... 93
Figure 38: 8B0P0220Hx00.00x-1, 8B0P0440Hx00.00x-1 - Pinout overview... 102
Figure 39: 8B0C - Enable... 105
Figure 40: Temperature sensor... 105
Figure 41: Power unit 8B0P0220Hx00.000-1, 8B0P0440Hx00.000-1... 105
Figure 42: Power unit 8B0P0220Hx00.001-1, 8B0P0440Hx00.001-1... 106
Figure 43: 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1 - Pinout overview... 111
Figure 44: 8B0C - Enable... 113
Figure 45: Trigger inputs... 114
Figure 46: 24 VDC out... 114
Figure 47: 8BVF fan - Control... 114
Figure 48: Temperature sensor... 115
Figure 49: Power unit... 115
Figure 50: 8BVP0880Hx00.004-1 - Pinout overview... 120
Figure 51: Mains connection L1, L2, L3 - Cable installation... 122
Figure 52: 8B0C - Enable... 123
Figure 53: Trigger inputs... 123
Figure 54: 24 VDC out... 123
Figure 55: Internal 24 V generation and control of 8BVF fans... 124
Figure 56: Temperature sensor... 124

Figure 57: Power unit....124
Figure 58: 8BVP1650Hx00.000-1 - Pinout overview....129
Figure 59: Mains connection L1, L2, L3 - Cable installation....131
Figure 60: 8B0C - Enable....132
Figure 61: Trigger inputs....132
Figure 62: 24 VDC out....132
Figure 63: 8BVF fan - Control....133
Figure 64: Temperature sensor....133
Figure 65: Power unit....133
Figure 66: Pinout overview - 8B0C0160Hx00.000-1, 8B0C0320Hx00.000-1....139
Figure 67: Input/output circuit diagram - 8B0C0160Hx00.000-1, 8B0C0320Hx00.000-1....140
Figure 68: Pinout overview - 8B0C0160Hx00.001-1, 8B0C0320Hx00.002-1....147
Figure 69: Input/output circuit diagram - 8B0C0160Hx00.001-1, 8B0C0320Hx00.002-1....148
Figure 70: 8B0C0160Hx00.A01-1 - Pinout overview....152
Figure 71: 8B0C0160Hx00.A01-1 - Input/Output circuit diagram....153
Figure 72: 8B0C0320Hx00.00A-1 - Pinout overview....158
Figure 73: 8B0C0320Hx00.00A-1 - Input/Output circuit diagram....159
Figure 74: 8BVI0014HxS0.000-1, 8BVI0028HxS0.000-1, 8BVI0055HxS0.000-1, 8BVI0110HxS0.000-1 - Pinout overview....179
Figure 75: 8BVI0220HxS0.000-1, 8BVI0330HxS0.000-1, 8BVI0440HxS0.000-1 - Pinout overview....180
Figure 76: Enable....185
Figure 77: Trigger inputs....185
Figure 78: 24 VDC out....186
Figure 79: Holding brake....186
Figure 80: Temperature sensor....186
Figure 81: Motor....186
Figure 82: 8BVI0660HxS0.000-1, 8BVI0880HxS0.004-1 - Pinout overview....196
Figure 83: 8BVI1650HxS0.000-1 - Pinout overview....197
Figure 84: Cable installation for motor connections U, V, W....202
Figure 85: Enable....204
Figure 86: Trigger inputs....204
Figure 87: 24 VDC out....204
Figure 88: Holding brake....204
Figure 89: Temperature sensor....205
Figure 90: Motor....205
Figure 91: 8BVI0014HxD0.000-1, 8BVI0028HxD0.000-1, 8BVI0055HxD0.000-1 - Pinout overview....215
Figure 92: Enable....223
Figure 93: Holding brake....224
Figure 94: Temperature sensor....224
Figure 95: Motor....225
Figure 96: 8BVI0110HxD0.000-1, 8BVI0220HxD0.000-1 - Pinout overview....231
Figure 97: Enable....239
Figure 98: Trigger inputs....239
Figure 99: 24 VDC out....240
Figure 100: Holding brake....240
Figure 101: Temperature sensor....241
Figure 102: Motor....241
Figure 103: Pinout overview - 8BVE0500Hx00.000-1....248
Figure 104: DC connection between 2 8BVE expansion modules....249
Figure 105: DC connection between 8BVE expansion modules....249
Figure 106: 8CVI inverter module to both 8BVE expansion modules....250
Figure 107: 8CVI inverter modules to the last 8BVE expansion module....250
Figure 108: Input/output circuit diagram for 8BVE expansion modules....252
Figure 109: 8B0K3630Hx00.001-1 - Pinout overview....257
Figure 110: 8B0K3630Hx00.001-1 - Input/Output circuit diagram....258
Figure 111: 8BAC0120.000-1 EnDat 2.1 interface - Input/Output circuit diagram....262
Figure 112: 8BAC0120.001-2 EnDat 2.2 interface - Input/Output circuit diagram....266

Figure 113: 8BAC0121.000-1 HIPERFACE interface - Input/Output circuit diagram..... 269
Figure 114: 8BAC0122.000-1 resolver interface - Input/Output circuit diagram..... 273
Figure 115: 8BAC0123.000-1 incremental/SSI encoder interface - Input/Output circuit diagram..... 280
Figure 116: Connection example for cabled tracer pins with 5V supply and TTL output signals..... 281
Figure 117: 8BAC0123.001-1 incremental encoder interface - Input/Output circuit diagram..... 286
Figure 118: 8BAC0123.002-1 incremental encoder interface - Input/Output circuit diagram..... 292
Figure 119: Connection example for cabled tracer pins with 24V supply and HTL output signals..... 293
Figure 120: Connection example for cable-free (IR) tracer pins with 24V supply and HTL output signals. 293
Figure 121: 8BAC0124.000-1 SinCos interface - Input/Output circuit diagram..... 298
Figure 122: Input/Output circuit diagram - SinCos EnDat 2.1/SSI/BiSS interface 8BAC0125.000-1..... 302
Figure 123: 8BAC0130.000-1 digital I/O interface - Input/Output circuit diagram..... 305
Figure 124: 8BAC0130.001-1 digital Out interface - Input/Output circuit diagram..... 308
Figure 125: 8BAC0132.000-1 analog interface - Input/Output circuit diagram..... 311
Figure 126: 8BAC0133.000-1 encoder emulation interface - Input/Output circuit diagram..... 315
Figure 127: 8B0W - Pinout overview..... 317
Figure 128: 8B0M0040HFF0.000-1 - Pinout overview..... 319
Figure 129: 8B0M0040HFF0.000-1 - Wiring example..... 320
Figure 130: 0.75 mm² - 4 mm² motor cables - Cable diagram..... 340
Figure 131: 0.75 mm² motor cables - Cable diagram..... 341
Figure 132: 10 mm² motor cables - Cable diagram..... 342
Figure 133: Hybrid motor cables - Cable diagram..... 348
Figure 134: 8BCE EnDat 2.1 cables - Cable diagram..... 353
Figure 135: 8BCF EnDat 2.2 cables - Cable diagram..... 356
Figure 136: 8BCFxxxx.1231B-0 - Cable diagram..... 359
Figure 137: 8BCR resolver cables - Cable diagram..... 363
Figure 138: Cable schematic - 8BCS SinCos cable..... 366
Figure 139: Cable schematic - 8BCA expansion cable..... 372
Figure 140: Attaching modules..... 420
Figure 141: Tightening the fastening screws..... 420
Figure 142: Changing/Inserting the backup battery..... 421
Figure 143: Expansion module - Installing device fuses..... 425
Figure 144: Expansion module - Closing the cover plate..... 425
Figure 145: Expansion module - Closing the cover plate..... 426
Figure 146: Expansion module - Removing the cover plate..... 426
Figure 147: Removing the fuse removal tool..... 427
Figure 148: Using the fuse removal tool..... 427
Figure 149: Removing the fuse..... 427
Figure 150: Fan module snap-fit connectors..... 429
Figure 151: Stripped cable end..... 435
Figure 152: Cable end with shielding mesh pulled back..... 435
Figure 153: Pulling out the separately shielded signal lines..... 436
Figure 154: Cable end without stranding elements..... 436
Figure 155: Cable ends with shortened shielding mesh..... 437
Figure 156: Attaching the shielding mesh..... 437
Figure 157: Wire ends with wire end sleeves..... 437
Figure 158: Installing shield components..... 438
Figure 159: Overview of shield components sets for single-width modules..... 439
Figure 160: Overview of shield components sets for double-width modules..... 440
Figure 161: Overview of shield components sets for 4x-width modules..... 441
Figure 162: Overview of shield components sets for 8x-width modules..... 442
Figure 163: 8SCS002.0000-00 shield set..... 443
Figure 164: Removing the clip..... 443
Figure 165: Swivel range of the connector cover..... 445
Figure 166: 8B0F0160H000.A00-1 - Dimension diagram and installation dimensions..... 446
Figure 167: 8B0F0300H000.000-1 - Dimension diagram and installation dimensions..... 446
Figure 168: 8B0F0550H000.000-1 - Dimension diagram and installation dimensions..... 447
Figure 169: 8BVF0220H000.000-1 - Dimension diagram and installation dimensions (up to revision D0) 448

Figure 170: 8BVF0220H000.000-1 - Dimension diagram and installation dimensions (revision E0 and later)....448
Figure 171: 8BVF0440H000.001-2 - Dimension diagram and installation dimensions (up to revision E0) 449
Figure 172: 8BVF0440H000.001-2 - Dimension diagram and installation dimensions (revision F0 and later)....449
Figure 173: 8BVF8800H000.000-1 - Dimension diagram and installation dimensions (up to revision E0) 450
Figure 174: 8BVF0880H000.000-1 - Dimension diagram and installation dimensions (revision F0 and later)....451
Figure 175: 8BVR0220H000.100-1 - Dimension diagram and installation dimensions....452
Figure 176: 8BVR0440H000.100-2 - Dimension diagram and installation dimensions....453
Figure 177: 8BVR0880H000.100-1 - Dimension diagram and installation dimensions....454
Figure 178: 8BVR1650H000.100-1 - Dimension diagram and installation dimensions....455
Figure 179: 8B0MnnnnHW00.000-1 - Dimension diagram and installation dimensions.... 456
Figure 180: 8BxP0220HW00.00x-1, 8BxP0440HW00.00x-1 - Dimension diagram and installation dimensions....457
Figure 181: 8BVP0880HW00.000-1 - Dimension diagram and installation dimensions....458
Figure 182: 8B0C0160HW00.000-1, 8B0C0320HW00.000-1 - Dimension diagram and installation dimensions....459
Figure 183: 8B0C0160HW00.001-1, 8B0C0320HW00.002-1, 8B0C0320HW00.00A-1 - Dimension diagram and installation dimensions....460
Figure 184: 8BVI0014HWSx.000-1, 8BVI0028HWSx.000-1, 8BVI0055HWSx.000-1, 8BVI0110HWSx.000-1 - Dimension diagram and installation dimensions....461
Figure 185: 8BVI0014HWDx.000-1, 8BVI0028HWDx0.000-1, 8BVI0055HWDx.000-1 - Dimension diagram and installation dimensions.... 462
Figure 186: 8BVI0220HWSx.000-1, 8BVI0330HWSx.000-1, 8BVI0440HWSx.000-1 - Dimension diagram and installation dimensions.... 463
Figure 187: 8BVI0110HWDx.000-1, 8BVI0220HWDx.000-1 - Dimension diagram and installation dimensions....464
Figure 188: Dimension diagram and installation dimensions for 8BVI0660HWS0.000-1, 8BVI0880HWS0.004-1, 8BVI1650HWS0.000-1.... 465
Figure 189: 8BVE0500HW00.000-1 - Dimension diagram and installation dimensions....466
Figure 190: 8B0K1650HW00.000-1, 8B0K3630HW00.001-1 - Dimension diagram and installation dimensions....467
Figure 191: 8B0MnnnnHC00.000-1 - Dimension diagram and installation dimensions.... 468
Figure 192: 8BxP0220HC00.00x-1, 8BxP0440HC00.00x-1 - Dimension diagram and installation dimensions....469
Figure 193: 8BVP0880HC00.004-1 - Dimension diagram and installation dimensions.... 470
Figure 194: 8BVP1650HC00.000-1 - Dimension diagram and installation dimensions.... 471
Figure 195: 8B0C0160HC00.000-1, 8B0C0320HC00.000-1 - Dimension diagram and installation dimensions....472
Figure 196: 8B0C0160HC00.001-1, 8B0C0320HC00.002-1, 8B0C0320HC00.00A-1 - Dimension diagram and installation dimensions.... 473
Figure 197: 8BVI0014HCSx.000-1, 8BVI0028HCSx.000-1, 8BVI0055HCSx.000-1, 8BVI0110HCSx.000-1 - Dimension diagram and installation dimensions....474
Figure 198: 8BVI0014HCDx.000-1, 8BVI0028HCDx.000-1, 8BVI0055HCDx.000-1 - Dimension diagram and installation dimensions.... 475
Figure 199: 8BVI0220HCSx.000-1, 8BVI0440HCSx.000-1 - Dimension diagram and installation dimensions....476
Figure 200: 8BVI0110HCDx.000-1, 8BVI0220HCDx.000-1 - Dimension diagram and installation dimensions....477
Figure 201: 8BVI0880HCSx.004-1 - Dimension diagram and installation dimensions....478
Figure 202: 8BVI1650HCS0.000-1 - Dimension diagram and installation dimensions.... 479
Figure 203: 8BVE0500HC00.000-1 - Dimension diagram and installation dimensions.... 480
Figure 204: 8B0K1650HC00.000-1, 8B0K3630HC00.001-1 - Dimension diagram and installation dimensions....481
Figure 205: 8B0MnnnnHF00.000-1 - Dimension diagram and installation dimensions....482
Figure 206: 8BxP0220HC00.00x-1, 8BxP0440HC00.00x-1 - Dimension diagram and installation dimensions....483
Figure 207: 8BVP0880HC00.004-1 - Dimension diagram and installation dimensions.... 484

Figure 208: 8BVP1650HC00.000-1 - Dimension diagram and installation dimensions..... 485
Figure 209: 8B0C0160HC00.000-1, 8B0C0320HC00.000-1 - Dimension diagram and installation dimensions.....486
Figure 210: 8B0C0160HC00.001-1, 8B0C0320HC00.002-1, 8B0C0320HC00.00A-1 - Dimension diagram and installation dimensions..... 487
Figure 211: 8BVI0014HCSx.000-1, 8BVI0028HCSx.000-1, 8BVI0055HCSx.000-1, 8BVI0110HCSx.000-1 - Dimension diagram and installation dimensions.....488
Figure 212: 8BVI0014HCDx.000-1, 8BVI0028HCDx.000-1, 8BVI0055HCDx.000-1 - Dimension diagram and installation dimensions..... 489
Figure 213: 8BVI0220HCSx.000-1, 8BVI0440HCSx.000-1 - Dimension diagram and installation dimensions.....490
Figure 214: 8BVI0110HCDx.000-1, 8BVI0220HCDx.000-1 - Dimension diagram and installation dimensions.....491
Figure 215: 8BVI0880HCSx.004-1 - Dimension diagram and installation dimensions.....492
Figure 216: 8BVI1650HCS0.000-1 - Dimension diagram and installation dimensions..... 493
Figure 217: 8BVE0500HC00.000-1 - Dimension diagram and installation dimensions..... 494
Figure 218: 8B0K1650HC00.000-1, 8B0K3630HC00.001-1 - Dimension diagram and installation dimensions.....495
Figure 219: 8B0W0045H000.000-1, 8B0W0079H000.000-1, 8B0W0096H000.000-1 - Dimension diagram and installation dimensions..... 496
Figure 220: 8B0W0045H000.001-1, 8B0W0079H000.001-1, 8B0W0096H000.001-1 - Dimension diagram.....497
Figure 221: 8B0W external braking resistors - Installation dimensions..... 498
Figure 222: 8B0M0040HFF0.000-1 - Dimension diagram and installation dimensions..... 499
Figure 223: Installing ACOPOSmulti plug-in modules.....501
Figure 224: Removing ACOPOSmulti plug-in modules.....501
Figure 225: Filter fans - Function diagram..... 502
Figure 226: Air/Air heat exchangers - Function diagram..... 503
Figure 227: Air/Water heat exchangers - Function diagram 503
Figure 228: Placing a cooling unit on top of the control cabinet.....505
Figure 229: Placing a cooling unit on the front of the control cabinet.....505
Figure 230: Circuit diagram for ACOPOSmulti 8BVF line filter, power mains connection.....510
Figure 231: Circuit diagram for ACOPOSmulti passive 8B0F line filter, power mains connection..... 510
Figure 232: Circuit diagram for ACOPOSmulti passive 8B0P0110 power supply module, power mains connection.....510
Figure 233: Circuit diagram 8B0P0xx0Hx00.00x-1, connection X5B (external braking resistor).....518
Figure 234: Fuse for external braking resistor connection.....519
Figure 235: Removing the locating screw..... 520
Figure 236: Opening up the cover and pulling off to the side.....520
Figure 237: Prying out the fuse..... 520
Figure 238: Removing the fuse..... 521
Figure 239: Inserting the fuse.....521
Figure 240: Composite movement and load profile for a sample application..... 522
Figure 241: Example: Add movement and load profile..... 525
Figure 242: 8B0P0110Hx00.000-1 - Peak load capacity.....526
Figure 243: Peak load capacity - 8B0P0220Hx00.00x-1 527
Figure 244: Peak load capacity - 8B0P0440Hx00.00x-1 528
Figure 245: Determining the peak load factor k.....531
Figure 246: Thermal equivalent circuit diagram of the external braking resistor.....532
Figure 247: Procedure for checking the max. chargeable DC bus capacitance..... 533
Figure 248: Procedure for selecting auxiliary supply modules.....540
Figure 249: Diagram of the cooling water circuit (direct connection)..... 545
Figure 250: Diagram of the cooling water circuit (water-to-water heat exchanger).....546
Figure 251: Diagram of the cooling water circuit (air-to-water heat exchanger)..... 547
Figure 252: Dew point temperature characteristic (installation altitude: 0 ... 500 m).....551
Figure 253: Basic selection of the cooling system.....553
Figure 254: Overview of ground/shield for the ACOPOSmulti drive system (passive power supply 8B0P0110 without 8B0C auxiliary supply module)..... 564

Figure 255: Overview of ground/shield for the ACOPOSmulti drive system (passive power supply 8B0P0110 with 8B0C auxiliary supply module)... 565
Figure 256: Overview of ground/shield for ACOPOSmulti drive system (passive power supply 8B0P0220/0440)... 566
Figure 257: Overview of ground/shield for ACOPOSmulti drive system (active power supply)... 567
Figure 258: 8BVP1650 power mains connection with 2x 8BVR0880 and 2x 8BVF0880... 568
Figure 259: 8BVP1650 power mains connection with 8BVR1650 and 2x 8BVF0880... 570
Figure 260: DC connection between 2 8BVE expansion modules... 571
Figure 261: DC connection between 8BVE expansion modules... 571
Figure 262: 8CVI inverter module to both 8BVE expansion modules... 572
Figure 263: 8CVI inverter modules to the last 8BVE expansion module... 572
Figure 264: Permissible wiring of CR_OK In and CR_OK Out... 573
Figure 265: Impermissible wiring of CR_OK In and CR_OK Out... 573
Figure 266: 8B0F line filters - Ground connections and shield connections... 574
Figure 267: 8B0P0220/0440 power supply modules - Ground connections and shield connections... 575
Figure 268: 8B0P0220/0440 power supply modules - Ground connections and shield connections... 576
Figure 269: 8BVF line filters - Ground connections and shield connections... 577
Figure 270: 8BVP power supply modules - Ground connections and shield connections... 578
Figure 271: 8BVR regeneration chokes - Ground connections and shield connections... 579
Figure 272: 8B0C auxiliary supply modules - Ground connections and shield connections... 580
Figure 273: 8BVI inverter modules - Ground connections and shield connections... 581
Figure 274: 8BVE expansion modules - Ground connections and shield connections... 582
Figure 275: Cable shield in DSUB housing... 583
Figure 276: Male RJ45 connector - Grounding the cable shield... 583
Figure 277: Block diagram of safe pulse disabling... 592
Figure 278: STO, Category 4 / SIL 3 / PL e (Variant A)... 595
Figure 279: STO, Category 4 / SIL 3 / PL e (Variant B)... 596
Figure 280: STO, Category 3 / SIL 2 / PL d... 597
Figure 281: STO, SLS, SOS - Safety Category 4 / SIL 3 / PL e... 598
Figure 282: SS1, SLS, SS2 - Safety Category 4 / SIL 3 / PL e (Variant A)... 600
Figure 283: SS1, SLS, SS2 - Safety Category 4 / SIL 3 / PL e (Variant B)... 602
Figure 284: STO, SLS, SOS - Safety Category 3 / SIL 2 / PL d... 605
Figure 285: SS1, SLS, SS2 - Safety Category 3 / SIL 2 / PL d (Variant A)... 607
Figure 286: SS1, SLS, SS2 - Safety Category 3 / SIL 2 / PL d (Variant B)... 609
Figure 287: Risk diagram for determining the PL_r for each safety function per EN ISO 13849-1, appendix A... 620
Figure 288: Overload characteristics of 8BVI0014HCSx.000-1_8BVI0014HCDx.000-1, overload response - WARNING... 621
Figure 289: Overload characteristics of 8BVI0014HCSx.000-1_8BVI0014HCDx.000-1, overload response - ERROR+STOP... 622
Figure 290: Overload characteristics of 8BVI0014HWSx.000-1_8BVI0014HWDx.000-1, overload response - WARNING... 623
Figure 291: Overload characteristics of 8BVI0014HWSx.000-1_8BVI0014HWDx.000-1, overload response - ERROR+STOP... 624
Figure 292: Overload characteristic 8BVI0028HCSx.000-1_8BVI0028HCDx.000-1, Overload response - WARNING... 626
Figure 293: Overload characteristic 8BVI0028HCSx.000-1_8BVI0028HCDx.000-1, Overload response - ERROR+STOP... 628
Figure 294: Overload characteristics of 8BVI0028HWSx.000-1_8BVI0028HWDx.000-1, overload response - WARNING... 629
Figure 295: Overload characteristics of 8BVI0028HWSx.000-1_8BVI0028HWDx.000-1, overload response ERROR+STOP... 630
Figure 296: Overload characteristic 8BVI0055HCSx.000-1_8BVI0055HCDx.000-1, Overload response - WARNING... 631
Figure 297: Overload characteristic 8BVI0055HCSx.000-1_8BVI0055HCDx.000-1, Overload response - ERROR+STOP... 632
Figure 298: Overload characteristics of 8BVI0055HWSx.000-1_8BVI0055HWDx.000-1, overload response WARNING... 633

Figure 299: Overload characteristics of 8BVI0055HWSx.000-1_8BVI0055HWDx.000-1, overload response - ERROR+STOP....634
Figure 300: Overload characteristics of 8BVI0110HCSx.000-1_8BVI0110HCDx.000-1, overload response - WARNING....635
Figure 301: Overload characteristics of 8BVI0110HCSx.000-1_8BVI0110HCDx.000-1, overload response - ERROR+STOP....636
Figure 302: Overload characteristics of 8BVI0110HWSx.000-1_8BVI0110HWDx.000-1, overload response - WARNING....638
Figure 303: Overload characteristics of 8BVI0110HWSx.000-1_8BVI0110HWDx.000-1, overload response - ERROR+STOP....639
Figure 304: Overload characteristics of 8BVI0220HCSx.000-1_8BVI0220HCDx.000-1, overload response - WARNING....640
Figure 305: Overload characteristics of 8BVI0220HCSx.000-1_8BVI0220HCDx.000-1, overload response - ERROR+STOP....641
Figure 306: Overload characteristics of 8BVI0220HWSx.000-1_8BVI0220HWDx.000-1, overload response - WARNING....642
Figure 307: Overload characteristics of 8BVI0220HWSx.000-1_8BVI0220HWDx.000-1, overload response - ERROR+STOP....643
Figure 308: Overload characteristics of 8BVI0330HCSx.000-1, overload response - WARNING....644
Figure 309: Overload characteristics of 8BVI0330HCSx.000-1, overload response - ERROR+STOP... 645
Figure 310: Overload characteristics of 8BVI0330HWSx.000-1, overload response - WARNING....646
Figure 311: Overload characteristics of 8BVI0330HWSx.000-1, overload response - ERROR+STOP...647
Figure 312: Overload characteristics of 8BVI0440HCSx.000-1, overload response - WARNING....648
Figure 313: Overload characteristics of 8BVI0440HCSx.000-1, overload response - ERROR+STOP... 649
Figure 314: Overload characteristic 8BVI0440HWSx.000-1, Overload response - WARNING....650
Figure 315: Overload characteristic 8BVI0440HWSx.000-1, Overload response - ERROR+STOP..... 651
Figure 316: Overload characteristics of 8BVI0660HCSx.000-1, overload response - WARNING....653
Figure 317: Overload characteristics of 8BVI0660HCSx.000-1, overload response - ERROR+STOP... 654
Figure 318: Overload characteristics of 8BVI0660HWSx.000-1, overload response - WARNING....655
Figure 319: Overload characteristics of 8BVI0660HWSx.000-1, overload response - ERROR+STOP...656
Figure 320: Overload characteristics of 8BVI0880HCSx.004-1, overload response - WARNING....657
Figure 321: Overload characteristics of 8BVI0880HCSx.004-1, overload response - ERROR+STOP... 658
Figure 322: Overload characteristics of 8BVI0880HWSx.004-1, overload response - WARNING....659
Figure 323: Overload characteristics of 8BVI0880HWSx.004-1, overload response - ERROR+STOP...660
Figure 324: Overload characteristics of 8BVI1650HCSx.000-1, overload response - WARNING....661
Figure 325: Overload characteristics of 8BVI1650HCSx.000-1, overload response - ERROR+STOP... 662
Figure 326: Overload characteristics of 8BVI1650HWSx.000-1, overload response - WARNING....663
Figure 327: Overload characteristics of 8BVI1650HWSx.000-1, overload response - ERROR+STOP...664
Figure 328: Overload characteristic - 8BVP0220HCS0.000-1, Overload response - WARNING....665
Figure 329: Overload characteristic - 8BVP0220HCS0.000-1, Overload response - ERROR+STOP.... 666
Figure 330: Overload characteristic - 8BVP0880HCS0.004-1, Overload response - WARNING....667
Figure 331: Overload characteristic - 8BVP0880HCS0.004-1, Overload response - ERROR+STOP.... 668
Figure 332: Overload characteristic - 8BVP1650HCS0.000-1, Overload response - WARNING....669
Figure 333: Overload characteristic - 8BVP1650HCS0.000-1, Overload response - ERROR+STOP.... 670

Table 1: Manual history....22
Table 2: Organization of safety notices....35
Table 3: Organization of general notices....35
Table 4: Environmentally friendly separation of materials....39
Table 5: 8B0P power supply modules - LED status indicators....42
Table 6: 8BVP power supply modules - LED status indicators....43
Table 7: LED status - 8B0C auxiliary supply modules....44
Table 8: LED status - 8B0C auxiliary supply modules with 24 V Out....45
Table 9: 8B0C auxiliary supply modules with 42 V Out - LED status indicators....46
Table 10: 8B0C auxiliary supply modules with 24 V Out and 24 V In - LED status indicators....47
Table 11: 8BVI inverter modules (1-axis modules) - LED status indicators....48
Table 12: LED status indicators - 8BVI inverter modules (2-axis modules)....49
Table 13: Status LEDs - 8BVE expansion modules....50
Table 14: LED status for 8B0K capacitor modules....51
Table 15: 8B0K capacitor modules with integrated charging circuit - LED status indicators....51
Table 16: RDY, RUN, ERR (8BVI, 8BVP, 8B0P) - LED status indicators....52
Table 17: POWERLINK - LED status indicators....52
Table 18: Backup battery - LED status indicators....52
Table 19: Status changes when starting up the operating system loader....53
Table 20: LED status indicator 8BXF002.0000-00....53
Table 21: 8B0F0160H000.A00-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Order data....57
Table 22: Allocation to power supply module....57
Table 23: 8B0F0160H000.A00-1, 8B0F0300H000.000-1, 8B0F0550H000.000-1 - Technical data....57
Table 24: Connector X1 - Pinout....60
Table 25: Connector X2 - Pinout....60
Table 26: Connector X1 - Pinout....60
Table 27: Connector X2 - Pinout....60
Table 28: Connector X1 - Pinout....61
Table 29: Connector X2 - Pinout....61
Table 30: Protective ground connection (PE) 8B0F....61
Table 31: 8BVF0220H000.000-1, 8BVF0440H000.001-2, 8BVF0880H000.000-1 - Order data....63
Table 32: 8BVF0220H000.000-1, 8BVF0440H000.001-2, 8BVF0880H000.000-1 - Technical data....63
Table 33: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Connector X1 - Pinout....65
Table 34: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Connector X2 - Pinout....66
Table 35: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Connector X3 - Pinout....66
Table 36: 8BVF0220H000.000-1, 8BVF0440H000.001-2 - Additional protective ground connection (PE)....67
Table 37: 8BVF0880H000.000-1 - X1 - Pinout....68
Table 38: 8BVF0880H000.000-1 - X2 - Pinout....68
Table 39: 8BVF0880H000.000-1 - X3 connector - Pinout....69
Table 40: 8BVR0220H000.100-1, 8BVR0440H000.100-2, 8BVR0880H000.100-1, 8BVR1650H000.100-1 - Order data....70
Table 41: 8BVR0220H000.100-1, 8BVR0440H000.100-2, 8BVR0880H000.100-1, 8BVR1650H000.100-1 - Technical data....70
Table 42: 8B0M0020HW00.000-1, 8B0M0030HW00.000-1, 8B0M0040HW00.000-1, 8B0M0050HW00.000-1, 8B0M0060HW00.000-1, 8B0M0070HW00.000-1, 8B0M0080HW00.000-1, 8B0M0090HW00.000-1, 8B0M0100HW00.000-1, 8B0M0110HW00.000-1, 8B0M0120HW00.000-1, 8B0M0130HW00.000-1, 8B0M0140HW00.000-1, 8B0M0150HW00.000-1, 8B0M0160HW00.000-1, 8B0M0170HW00.000-1, 8B0M0180HW00.000-1, 8B0M0190HW00.000-1, 8B0M0200HW00.000-1, 8B0M0210HW00.000-1, 8B0M0220HW00.000-1, 8B0M0230HW00.000-1, 8B0M0240HW00.000-1, 8B0M0250HW00.000-1, 8B0M0260HW00.000-1, 8B0M0270HW00.000-1 - Order data....77
Table 43: Number of 8BXF002.0000-00 fan modules depending on mounting plate 8B0M....78
Table 44: 8B0MnnnnHW00.000-1 - Technical data....78
Table 45: LED status indicator 8BXF002.0000-00....79

Table 46: 8B0M0020HC00.000-1, 8B0M0030HC00.000-1, 8B0M0040HC00.000-1, 8B0M0050HC00.000-1, 8B0M0060HC00.000-1, 8B0M0070HC00.000-1, 8B0M0080HC00.000-1, 8B0M0090HC00.000-1, 8B0M0100HC00.000-1, 8B0M0110HC00.000-1, 8B0M0120HC00.000-1, 8B0M0130HC00.000-1, 8B0M0140HC00.000-1, 8B0M0150HC00.000-1, 8B0M0160HC00.000-1, 8B0M0170HC00.000-1, 8B0M0180HC00.000-1, 8B0M0190HC00.000-1, 8B0M0200HC00.000-1, 8B0M0210HC00.000-1, 8B0M0220HC00.000-1, 8B0M0230HC00.000-1, 8B0M0240HC00.000-1, 8B0M0250HC00.000-1, 8B0M0260HC00.000-1, 8B0M0270HC00.000-1 - Order data 80
Table 47: 8B0MnnnnHC00.000-1 - Technical data 81
Table 48: 8B0M0040HF00.000-1, 8B0M0080HF00.000-1, 8B0M0120HF00.000-1, 8B0M0160HF00.000-1, 8B0M0200HF00.000-1 - Order data 83
Table 49: Number of required 8B0M0040HFF0.000-1 fan modules depending on mounting plate 8B0M 83
Table 50: 8B0MnnnnHF00.000-1 - Technical data 84
Table 51: 8B0P0110HW00.000-1, 8B0P0110HC00.000-1 - Order data 86
Table 52: 8B0P0110HW00.000-1, 8B0P0110HC00.000-1 - Technical data 87
Table 53: Connector X1 - Pinout 91
Table 54: X3A, X3B connectors - Pinout 91
Table 55: Connector X5A - Pinout 91
Table 56: X5B - Pinout 91
Table 57: Additional protective ground connection (PE) 92
Table 58: 8B0P0220HW00.000-1, 8B0P0440HW00.000-1, 8B0P0220HC00.000-1, 8B0P0440HC00.000-1 - Order data 94
Table 59: 8B0P0220HW00.000-1, 8B0P0220HC00.000-1, 8B0P0440HW00.000-1, 8B0P0440HC00.000-1 - Technical data 95
Table 60: 8B0P0220HW00.001-1, 8B0P0440HW00.001-1, 8B0P0220HC00.001-1, 8B0P0440HC00.001-1 - Order data 98
Table 61: 8B0P0220HW00.001-1, 8B0P0220HC00.001-1, 8B0P0440HW00.001-1, 8B0P0440HC00.001-1 - Technical data 99
Table 62: Setting the POWERLINK node number 101
Table 63: Connector X1 - Pinout 103
Table 64: X3A, X3B connectors - Pinout 103
Table 65: Connector X5A - Pinout 103
Table 66: X5B - Pinout 103
Table 67: Additional protective ground connection (PE) 104
Table 68: 8BVP0220HW00.000-1, 8BVP0440HW00.000-1, 8BVP0220HC00.000-1, 8BVP0440HC00.000-1 - Order data 107
Table 69: 8BVP0220HW00.000-1, 8BVP0220HC00.000-1, 8BVP0440HW00.000-1, 8BVP0440HC00.000-1 - Technical data 108
Table 70: Connector X1 - Pinout 111
Table 71: Connector X2 - Pinout 112
Table 72: X3A, X3B connectors - Pinout 112
Table 73: Connector X4A - Pinout 112
Table 74: Connector X5A - Pinout 113
Table 75: Additional protective ground connection (PE) 113
Table 76: 8BVP0880HC00.004-1, 8BVP0880HW00.004-1 - Order data 116
Table 77: 8BVP0880HC00.004-1, 8BVP0880HW00.004-1 - Technical data 117
Table 78: Connector X1 - Pinout 120
Table 79: Connector X2 - Pinout 121
Table 80: X3A, X3B connectors - Pinout 121
Table 81: Connector X4A - Pinout 121
Table 82: X5A - Pinout 122
Table 83: PE connection (1-wire) - Cable installation 122
Table 84: PE connection (3-wire) - Cable installation 123
Table 85: 8BVP1650HC00.000-1, 8BVP1650HW00.000-1 - Order data 125
Table 86: 8BVP1650HC00.000-1, 8BVP1650HW00.000-1 - Technical data 126
Table 87: Connector X1 - Pinout 129
Table 88: Connector X2 - Pinout 130
Table 89: X3A, X3B connectors - Pinout 130
Table 90: Connector X4A - Pinout 130

Table 91: X5A - Pinout....131
Table 92: PE connection (1-wire) - Cable installation....131
Table 93: PE connection (3-wire) - Cable installation....132
Table 94: Setting the POWERLINK node number....134
Table 95: 8B0C0160HW00.000-1, 8B0C0160HC00.000-1 - Order data....135
Table 96: 8B0C0160HW00.000-1, 8B0C0160HC00.000-1 - Technical data....135
Table 97: 8B0C0320HW00.000-1, 8B0C0320HC00.000-1 - Order data....137
Table 98: 8B0C0320HW00.000-1, 8B0C0320HC00.000-1 - Technical data....137
Table 99: Connector X1 - Pinout....139
Table 100: 8B0C0160HW00.001-1, 8B0C0160HC00.001-1 - Order data....141
Table 101: 8B0C0160HW00.001-1, 8B0C0160HC00.001-1 - Technical data....141
Table 102: 8B0C0320HW00.002-1, 8B0C0320HC00.002-1 - Order data....144
Table 103: 8B0C0320HW00.002-1, 8B0C0320HC00.002-1 - Technical data....144
Table 104: Connector X1 - Pinout....147
Table 105: X2 connector - Pinout....147
Table 106: X3 connector - Pinout....148
Table 107: 8B0C0160HW00.A01-1, 8B0C0160HC00.A01-1 - Order data....149
Table 108: 8B0C0160HW00.A01-1, 8B0C0160HC00.A01-1 - Technical data....149
Table 109: Connector X1 - Pinout....152
Table 110: Pinout - Connector X2 with 42 Out....153
Table 111: X3 connector - Pinout....153
Table 112: 8B0C0320HW00.00A-1, 8B0C0320HC00.00A-1 - Order data....155
Table 113: 8B0C0320HW00.00A-1, 8B0C0320HC00.00A-1 - Technical data....155
Table 114: Connector X1 - Pinout....158
Table 115: X2 connector - Pinout....158
Table 116: X3 connector - Pinout....159
Table 117: 8BVI0014HWS0.000-1, 8BVI0028HWS0.000-1, 8BVI0014HCS0.000-1, 8BVI0028HCS0.000-1 - Order data....160
Table 118: 8BVI0014HWS0.000-1, 8BVI0014HCS0.000-1, 8BVI0028HWS0.000-1, 8BVI0028HCS0.000-1 - Technical data....161
Table 119: 8BVI0055HWS0.000-1, 8BVI0110HWS0.000-1, 8BVI0055HCS0.000-1, 8BVI0110HCS0.000-1 - Order data....165
Table 120: 8BVI0055HWS0.000-1, 8BVI0055HCS0.000-1, 8BVI0110HWS0.000-1, 8BVI0110HCS0.000-1 - Technical data....166
Table 121: 8BVI0220HWS0.000-1, 8BVI0220HCS0.000-1 - Order data....170
Table 122: 8BVI0220HWS0.000-1, 8BVI0220HCS0.000-1 - Technical data....171
Table 123: 8BVI0330HWS0.000-1, 8BVI0440HWS0.000-1, 8BVI0330HCS0.000-1, 8BVI0440HCS0.000-1 - Order data....174
Table 124: 8BVI0330HWS0.000-1, 8BVI0330HCS0.000-1, 8BVI0440HWS0.000-1, 8BVI0440HCS0.000-1 - Technical data....175
Table 125: X1 connector - Pinout....181
Table 126: Activating the motor holding brake internally....181
Table 127: Activating the motor holding brake internally and/or externally....182
Table 128: X2 connector - Pinout....182
Table 129: X3A, X3B connectors - Pinout....182
Table 130: Connector X4A - Pinout....183
Table 131: Activating the motor holding brake internally....184
Table 132: Activating the motor holding brake internally and/or externally....184
Table 133: Connector X5A - Pinout....185
Table 134: Connector X5A - Pinout....185
Table 135: 8BVI0660HWS0.000-1, 8BVI0880HWS0.004-1, 8BVI0660HCS0.000-1, 8BVI0880HCS0.004-1 - Order data....187
Table 136: 8BVI0660HWS0.000-1, 8BVI0660HCS0.000-1, 8BVI0880HWS0.004-1, 8BVI0880HCS0.004-1 - Technical data....188
Table 137: 8BVI1650HWS0.000-1, 8BVI1650HCS0.000-1 - Order data....192
Table 138: 8BVI1650HWS0.000-1, 8BVI1650HCS0.000-1 - Technical data....193
Table 139: X1 connector - Pinout....197
Table 140: Activating the motor holding brake internally....198

Table 141: Activating the motor holding brake internally and/or externally....199
Table 142: Connector X2 - Pinout....199
Table 143: X3A, X3B connectors - Pinout....199
Table 144: Connector X4A - Pinout....200
Table 145: Activating the motor holding brake internally....201
Table 146: Activating the motor holding brake internally and/or externally....201
Table 147: X5A - Pinout....202
Table 148: X5A - Pinout....202
Table 149: PE connection (1-wire) - Cable installation....203
Table 150: PE connection (3-wire) - Cable installation....203
Table 151: 8BVI0014HWD0.000-1, 8BVI0028HWD0.000-1, 8BVI0014HCD0.000-1, 8BVI0028HCD0.000-1 - Order data....206
Table 152: 8BVI0014HWD0.000-1, 8BVI0014HCD0.000-1, 8BVI0028HWD0.000-1, 8BVI0028HCD0.000-1 - Technical data....207
Table 153: 8BVI0055HWD0.000-1, 8BVI0055HCD0.000-1 - Order data....211
Table 154: 8BVI0055HWD0.000-1, 8BVI0055HCD0.000-1 - Technical data....212
Table 155: Connector X1 - Pinout....216
Table 156: Activating the motor holding brake internally....217
Table 157: Activating the motor holding brake internally and/or externally....218
Table 158: Connector X2 - Pinout....219
Table 159: X3A, X3B connectors - Pinout....219
Table 160: Connector X4A - Pinout....219
Table 161: Connector X4B - Pinout....220
Table 162: Activating the motor holding brake internally....221
Table 163: Activating the motor holding brake internally and/or externally....222
Table 164: Connector X5A - Pinout....223
Table 165: Connector X5B - Pinout....223
Table 166: 8BVI0110HWD0.000-1, 8BVI0220HWD0.000-1, 8BVI0110HCD0.000-1, 8BVI0220HCD0.000-1 - Order data....226
Table 167: 8BVI0110HWD0.000-1, 8BVI0110HCD0.000-1, 8BVI0220HWD0.000-1, 8BVI0220HCD0.000-1 - Technical data....227
Table 168: Connector X1 - Pinout....232
Table 169: Activating the motor holding brake internally....233
Table 170: Activating the motor holding brake internally and/or externally....234
Table 171: Connector X2 - Pinout....235
Table 172: X3A, X3B connectors - Pinout....235
Table 173: Connector X4A - Pinout....235
Table 174: Connector X4B - Pinout....236
Table 175: Activating the motor holding brake internally....237
Table 176: Activating the motor holding brake internally and/or externally....238
Table 177: Connector X5A - Pinout....239
Table 178: Connector X5B - Pinout....239
Table 179: Setting the POWERLINK node number....242
Table 180: 8BVE0500HW00.000-1, 8BVE0500HC00.000-1 - Order data....244
Table 181: 8BVE0500HW00.000-1, 8BVE0500HC00.000-1 - Technical data....245
Table 182: X2 connector - Pinout....251
Table 183: X3A connector - Pinout....251
Table 184: X3B connector - Pinout....251
Table 185: X4A connector - Pinout....251
Table 186: Pinout - X4B plug....251
Table 187: 8B0K1650HW00.000-1, 8B0K1650HC00.000-1 - Order data....253
Table 188: 8B0K1650HW00.000-1, 8B0K1650HC00.000-1 - Technical data....253
Table 189: 8B0K3630HW00.001-1, 8B0K3630HC00.001-1 - Order data....255
Table 190: 8B0K3630HW00.001-1, 8B0K3630HC00.001-1 - Technical data....255
Table 191: X1 connector - Pinout....257
Table 192: 8BAC0120.000-1 - Order data....259
Table 193: 8BAC0120.000-1 - Technical data....259
Table 194: 8BAC0120.000-1 EnDat 2.1 interface - Pinout....261

Table 195: 8BAC0120.001-2 - Order data....264
Table 196: 8BAC0120.001-2 - Technical data....264
Table 197: 8BAC0120.001-2 EnDat 2.2 interface - Pinout....265
Table 198: 8BAC0121.000-1 - Order data....267
Table 199: 8BAC0121.000-1 - Technical data....267
Table 200: 8BAC0121.000-1 HIPERFACE interface - Pinout....268
Table 201: 8BAC0122.000-1 - Order data....271
Table 202: 8BAC0122.000-1 - Technical data....271
Table 203: 8BAC0122.000-1 resolver interface - Pinout....272
Table 204: Monitoring functions during incremental encoder operation....276
Table 205: Monitoring functions during SSI encoder operation....276
Table 206: Monitoring functions during sensing device operation....277
Table 207: 8BAC0123.000-1 - Order data....277
Table 208: 8BAC0123.000-1 - Technical data....277
Table 209: 8BAC0123.000-1 incremental/SSI encoder interface - Pinout....279
Table 210: Monitoring functions during incremental encoder operation....283
Table 211: 8BAC0123.001-1 - Order data....283
Table 212: 8BAC0123.001-1 - Technical data....284
Table 213: 8BAC0123.001-1 incremental encoder interface - Pinout....285
Table 214: Possible configurations of the pull-up and pull-down resistances in the module....287
Table 215: Configuration of open line monitoring for encoders with push or pull outputs....287
Table 216: Monitoring functions during incremental encoder operation....289
Table 217: Monitoring functions during sensing device operation....289
Table 218: 8BAC0123.002-1 - Order data....290
Table 219: 8BAC0123.002-1 - Technical data....290
Table 220: 8BAC0123.002-1 incremental encoder interface - Pinout....291
Table 221: Possible configurations of the pull-up and pull-down resistances in the module....294
Table 222: Configuration of open line monitoring for encoders with push or pull outputs....294
Table 223: 8BAC0124.000-1 - Order data....295
Table 224: 8BAC0124.000-1 - Technical data....295
Table 225: 8BAC0124.000-1 SinCos interface - Pinout....296
Table 226: BiSS functionality with 8BAC0125.000-1 - Minimum revision of the ACOPOSmulti modules....299
Table 227: 8BAC0125.000-1 - Order data....300
Table 228: 8BAC0125.000-1 - Technical data....300
Table 229: Pinout - SinCos EnDat 2.1/SSI/BiSS interface 8BAC0125.000-1....301
Table 230: 8BAC0130.000-1 - Order data....303
Table 231: 8BAC0130.000-1 - Technical data....303
Table 232: 8BAC0130.000-1 digital I/O interface - Pinout....304
Table 233: 8BAC0130.001-1 - Order data....306
Table 234: 8BAC0130.001-1 - Technical data....306
Table 235: 8BAC0130.001-1 digital Out interface - Pinout....307
Table 236: 8BAC0132.000-1 - Order data....309
Table 237: 8BAC0132.000-1 - Technical data....309
Table 238: 8BAC0132.000-1 analog interface - Pinout....310
Table 239: 8BAC0133.000-1 - Order data....313
Table 240: 8BAC0133.000-1 - Technical data....313
Table 241: Encoder emulation interface 8BAC0133.000-1 - Pinout....314
Table 242: 8B0W0045H000.000-1, 8B0W0045H000.001-1, 8B0W0079H000.000-1, 8B0W0079H000.001-1 - Order data....316
Table 243: 8B0W0045H000.000-1, 8B0W0045H000.001-1, 8B0W0079H000.000-1, 8B0W0079H000.001-1 - Technical data....316
Table 244: 8B0M0040HFF0.000-1 - Order data....318
Table 245: Number of required 8B0M0040HFF0.000-1 fan modules depending on mounting plate 8B0M..318
Table 246: 8B0M0040HFF0.000-1 - Technical data....319
Table 247: X1 connector - Pinout....320
Table 248: X2 connector - Pinout....320
Table 249: 8BXF001.0000-00 - Order data....321

Table 250: Number of 8BXF001.0000-00 fan modules depending on the module width of the ACOPOSmulti module....321
Table 251: 8BXF001.0000-00 - Technical data....321
Table 252: 8BXF002.0000-00 - Order data....322
Table 253: Number of 8BXF002.0000-00 fan modules depending on mounting plate 8B0M....322
Table 254: 8BXF002.0000-00 - Technical data....322
Table 255: 8BCM0005.1011A-0, 8BCM0007.1011A-0, 8BCM0010.1011A-0, 8BCM0015.1011A-0, 8BCM0020.1011A-0, 8BCM0025.1011A-0 - Order data....324
Table 256: 8BCM0005.1011A-0, 8BCM0007.1011A-0, 8BCM0010.1011A-0, 8BCM0015.1011A-0, 8BCM0020.1011A-0, 8BCM0025.1011A-0 - Technical data....325
Table 257: 8BCM0005.3011A-0, 8BCM0007.3011A-0, 8BCM0010.3011A-0, 8BCM0015.3011A-0, 8BCM0020.3011A-0, 8BCM0025.3011A-0 - Order data....326
Table 258: 8BCM0005.3011A-0, 8BCM0007.3011A-0, 8BCM0010.3011A-0, 8BCM0015.3011A-0, 8BCM0020.3011A-0, 8BCM0025.3011A-0 - Technical data....326
Table 259: 8BCM0005.1111A-0, 8BCM0007.1111A-0, 8BCM0010.1111A-0, 8BCM0015.1111A-0, 8BCM0020.1111A-0, 8BCM0025.1111A-0 - Order data....328
Table 260: 8BCM0005.1111A-0, 8BCM0007.1111A-0, 8BCM0010.1111A-0, 8BCM0015.1111A-0, 8BCM0020.1111A-0, 8BCM0025.1111A-0 - Technical data....328
Table 261: 8BCM0005.3111A-0, 8BCM0007.3111A-0, 8BCM0010.3111A-0, 8BCM0015.3111A-0, 8BCM0020.3111A-0, 8BCM0025.3111A-0 - Order data....330
Table 262: 8BCM0005.3111A-0, 8BCM0007.3111A-0, 8BCM0010.3111A-0, 8BCM0015.3111A-0, 8BCM0020.3111A-0, 8BCM0025.3111A-0 - Technical data....330
Table 263: 8BCM0005.1312A-0, 8BCM0007.1312A-0, 8BCM0010.1312A-0, 8BCM0015.1312A-0, 8BCM0020.1312A-0, 8BCM0025.1312A-0 - Order data....332
Table 264: 8BCM0005.1312A-0, 8BCM0007.1312A-0, 8BCM0010.1312A-0, 8BCM0015.1312A-0, 8BCM0020.1312A-0, 8BCM0025.1312A-0 - Technical data....332
Table 265: 8BCM0005.3312A-0, 8BCM0007.3312A-0, 8BCM0010.3312A-0, 8BCM0015.3312A-0 - Order data....333
Table 266: 8BCM0005.3312A-0, 8BCM0007.3312A-0, 8BCM0010.3312A-0, 8BCM0015.3312A-0 - Technical data....334
Table 267: 8BCM0005.1322A-0, 8BCM0007.1322A-0, 8BCM0010.1322A-0, 8BCM0015.1322A-0, 8BCM0020.1322A-0, 8BCM0025.1322A-0 - Order data....335
Table 268: 8BCM0005.1322A-0, 8BCM0007.1322A-0, 8BCM0010.1322A-0, 8BCM0015.1322A-0, 8BCM0020.1322A-0, 8BCM0025.1322A-0 - Technical data....335
Table 269: 8BCM0005.1523A-0, 8BCM0007.1523A-0, 8BCM0010.1523A-0, 8BCM0015.1523A-0, 8BCM0020.1523A-0, 8BCM0025.1523A-0 - Order data....337
Table 270: 8BCM0005.1523A-0, 8BCM0007.1523A-0, 8BCM0010.1523A-0, 8BCM0015.1523A-0, 8BCM0020.1523A-0, 8BCM0025.1523A-0 - Technical data....337
Table 271: 0.75 mm² - 4 mm² motor cables - Construction....339
Table 272: 0.75 mm² - 4 mm² motor cables - Pinout....339
Table 273: 0.75 mm² motor cables - Cable construction....340
Table 274: 0.75 mm² motor cables - Pinout....340
Table 275: 10 mm² motor cables - Construction....341
Table 276: 10 mm² motor cables - Pinout....341
Table 277: 8BCH0005.1111A-0, 8BCH0007.1111A-0, 8BCH0010.1111A-0, 8BCH0015.1111A-0, 8BCH0020.1111A-0, 8BCH0025.1111A-0 - Order data....343
Table 278: 8BCH0005.1111A-0, 8BCH0007.1111A-0, 8BCH0010.1111A-0, 8BCH0015.1111A-0, 8BCH0020.1111A-0, 8BCH0025.1111A-0 - Technical data....343
Table 279: 8BCH0005.1312A-0, 8BCH0007.1312A-0, 8BCH0010.1312A-0, 8BCH0015.1312A-0, 8BCH0020.1312A-0, 8BCH0025.1312A-0 - Order data....345
Table 280: 8BCH0005.1312A-0, 8BCH0007.1312A-0, 8BCH0010.1312A-0, 8BCH0015.1312A-0, 8BCH0020.1312A-0, 8BCH0025.1312A-0 - Technical data....345
Table 281: Hybrid motor cables - Cable construction....347
Table 282: Hybrid motor cables - Pinout....347
Table 283: 8BCE0005.1111A-0, 8BCE0007.1111A-0, 8BCE0010.1111A-0, 8BCE0015.1111A-0, 8BCE0020.1111A-0, 8BCE0025.1111A-0 - Order data....349
Table 284: 8BCE0005.1111A-0, 8BCE0007.1111A-0, 8BCE0010.1111A-0, 8BCE0015.1111A-0, 8BCE0020.1111A-0, 8BCE0025.1111A-0 - Technical data....349

Table 285: 8BCE0005.3111A-0, 8BCE0007.3111A-0, 8BCE0010.3111A-0, 8BCE0015.3111A-0, 8BCE0020.3111A-0, 8BCE0025.3111A-0 - Order data ... 351
Table 286: 8BCE0005.3111A-0, 8BCE0007.3111A-0, 8BCE0010.3111A-0, 8BCE0015.3111A-0, 8BCE0020.3111A-0, 8BCE0025.3111A-0 - Technical data ... 351
Table 287: 8BCE EnDat 2.1 cables - Construction ... 352
Table 288: 8BCE EnDat 2.1 cables - Pinout ... 352
Table 289: 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Order data ... 354
Table 290: 8BCF0005.1221B-0, 8BCF0007.1221B-0, 8BCF0010.1221B-0, 8BCF0015.1221B-0, 8BCF0020.1221B-0, 8BCF0025.1221B-0 - Technical data ... 354
Table 291: 8BCF EnDat 2.2 cables - Construction ... 355
Table 292: 8BCF EnDat 2.2 cables - Pinout ... 355
Table 293: 8BCF0005.1231B-0, 8BCF0007.1231B-0, 8BCF0010.1231B-0, 8BCF0015.1231B-0, 8BCF0020.1231B-0, 8BCF0025.1231B-0 - Order data ... 357
Table 294: 8BCF0005.1231B-0, 8BCF0007.1231B-0, 8BCF0010.1231B-0, 8BCF0015.1231B-0, 8BCF0020.1231B-0, 8BCF0025.1231B-0 - Technical data ... 357
Table 295: 8BCFxxxx.1231B-0 - Cable construction ... 358
Table 296: 8BCFxxxx.1231B-0 - Pinout ... 358
Table 297: 8BCR0005.1111A-0, 8BCR0007.1111A-0, 8BCR0010.1111A-0, 8BCR0015.1111A-0, 8BCR0020.1111A-0, 8BCR0025.1111A-0 - Order data ... 360
Table 298: 8BCR0005.1111A-0, 8BCR0007.1111A-0, 8BCR0010.1111A-0, 8BCR0015.1111A-0, 8BCR0020.1111A-0, 8BCR0025.1111A-0 - Technical data ... 360
Table 299: 8BCR0005.3111A-0, 8BCR0007.3111A-0, 8BCR0010.3111A-0, 8BCR0015.3111A-0, 8BCR0020.3111A-0, 8BCR0025.3111A-0 - Order data ... 361
Table 300: 8BCR0005.3111A-0, 8BCR0007.3111A-0, 8BCR0010.3111A-0, 8BCR0015.3111A-0, 8BCR0020.3111A-0, 8BCR0025.3111A-0 - Technical data ... 362
Table 301: 8BCR resolver cables - Construction ... 363
Table 302: 8BCR resolver cables - Pinout ... 363
Table 303: 8BCS0005.1111A-0, 8BCS0007.1111A-0, 8BCS0010.1111A-0, 8BCS0015.1111A-0, 8BCS0020.1111A-0, 8BCS0025.1111A-0 - Order data ... 364
Table 304: 8BCS0005.1111A-0, 8BCS0007.1111A-0, 8BCS0010.1111A-0, 8BCS0015.1111A-0, 8BCS0020.1111A-0, 8BCS0025.1111A-0 - Technical data ... 364
Table 305: Construction - 8BCS SinCos cable ... 365
Table 306: Pinout - 8BCS SinCos cable ... 365
Table 307: 8BCA01X5.1111A-0, 8BCA0003.1111A-0, 8BCA0005.1111A-0 - Order data ... 367
Table 308: 8BCA01X5.1111A-0, 8BCA0003.1111A-0, 8BCA0005.1111A-0 - Technical data ... 367
Table 309: 8BCA01X5.1312A-0, 8BCA0003.1312A-0, 8BCA0005.1312A-0 - Order data ... 369
Table 310: 8BCA01X5.1312A-0, 8BCA0003.1312A-0, 8BCA0005.1312A-0 - Technical data ... 369
Table 311: 8BCA01X5.1513A-0, 8BCA0003.1513A-0, 8BCA0005.1513A-0 - Order data ... 371
Table 312: 8BCA01X5.1513A-0, 8BCA0003.1513A-0, 8BCA0005.1513A-0 - Technical data ... 371
Table 313: Construction - 8BCA expansion cable ... 372
Table 314: 8BCM0005.11140-0, 8BCM0007.11140-0, 8BCM0010.11140-0, 8BCM0015.11140-0, 8BCM0020.11140-0, 8BCM0025.11140-0 - Order data ... 373
Table 315: 8BCM0005.11140-0, 8BCM0007.11140-0, 8BCM0010.11140-0, 8BCM0015.11140-0, 8BCM0020.11140-0, 8BCM0025.11140-0 - Technical data ... 373
Table 316: 8BCM0005.13140-0, 8BCM0007.13140-0, 8BCM0010.13140-0, 8BCM0015.13140-0, 8BCM0020.13140-0, 8BCM0025.13140-0 - Order data ... 375
Table 317: 8BCM0005.13140-0, 8BCM0007.13140-0, 8BCM0010.13140-0, 8BCM0015.13140-0, 8BCM0020.13140-0, 8BCM0025.13140-0 - Technical data ... 375
Table 318: 8BCM0005.15250-0, 8BCM0007.15250-0, 8BCM0010.15250-0, 8BCM0015.15250-0, 8BCM0020.15250-0, 8BCM0025.15250-0 - Order data ... 377
Table 319: 8BCM0005.15250-0, 8BCM0007.15250-0, 8BCM0010.15250-0, 8BCM0015.15250-0, 8BCM0020.15250-0, 8BCM0025.15250-0 - Technical data ... 377
Table 320: 8BCE0005.11120-0, 8BCE0007.11120-0, 8BCE0010.11120-0, 8BCE0015.11120-0, 8BCE0020.11120-0, 8BCE0025.11120-0 - Order data ... 379
Table 321: 8BCE0005.11120-0, 8BCE0007.11120-0, 8BCE0010.11120-0, 8BCE0015.11120-0, 8BCE0020.11120-0, 8BCE0025.11120-0 - Technical data ... 379
Table 322: 8BCF0005.12230-0, 8BCF0007.12230-0, 8BCF0010.12230-0, 8BCF0015.12230-0, 8BCF0020.12230-0, 8BCF0025.12230-0 - Order data ... 381

Table 323: 8BCF0005.12230-0, 8BCF0007.12230-0, 8BCF0010.12230-0, 8BCF0015.12230-0, 8BCF0020.12230-0, 8BCF0025.12230-0 - Technical data..... 381
Table 324: 8BCR0005.11120-0, 8BCR0007.11120-0, 8BCR0010.11120-0, 8BCR0015.11120-0, 8BCR0020.11120-0, 8BCR0025.11120-0 - Order data.....383
Table 325: 8BCR0005.11120-0, 8BCR0007.11120-0, 8BCR0010.11120-0, 8BCR0015.11120-0, 8BCR0020.11120-0, 8BCR0025.11120-0 - Technical data.....383
Table 326: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Order data..... 385
Table 327: 8BCR0005.11230-0, 8BCR0007.11230-0, 8BCR0010.11230-0, 8BCR0015.11230-0, 8BCR0020.11230-0, 8BCR0025.11230-0 - Technical data..... 385
Table 328: 8TB3104.201M-11, 8TB3104.201H-11, 8TB3104.204G-11, 8TB3104.204K-11, 8TB3102.201C-11 - Order data..... 387
Table 329: 8TB3104.201M-11, 8TB3104.201H-11, 8TB3104.204G-11, 8TB3104.204K-11, 8TB3102.201C-11 - Technical data..... 387
Table 330: 8TB4103.202A-00, 8TB4104.202N-00 - Order data.....388
Table 331: 8TB4103.202A-00, 8TB4104.202N-00 - Technical data..... 388
Table 332: 8TB4104.206D-10, 8TB4104.202L-10, 8TB4104.204G-10, 8TB4104.204G-00 - Order data....389
Table 333: 8TB4104.206D-10, 8TB4104.202L-10, 8TB4104.204G-10, 8TB4104.204G-00 - Technical data.....389
Table 334: 8TB2104.2010-00, 8TB2106.2010-00, 8TB2108.2010-00, 8TB2112.2010-00, 8TB2104.204A-00, 8TB2104.203L-00, 8TB2104.203F-00 - Order data..... 390
Table 335: 8TB2104.2010-00, 8TB2106.2010-00, 8TB2108.2010-00, 8TB2112.2010-00, 8TB2104.204A-00, 8TB2104.203L-00, 8TB2104.203F-00 - Technical data..... 390
Table 336: 8BPM0001.0000-00, 8BPM0002.0000-00, 8BPM0003.0000-00 - Order data.....391
Table 337: 8BPM0001.0000-00, 8BPM0002.0000-00, 8BPM0003.0000-00 - Technical data..... 391
Table 338: 8BPE0001.0000-00 - Order data.....392
Table 339: 8BPE0001.0000-00 - Technical data.....392
Table 340: 8BPR0001.0000-00 - Order data.....393
Table 341: 8BPR0001.0000-00 - Technical data..... 393
Table 342: 8BPR0002.0000-00 - Order data.....394
Table 343: 8BPR0002.0000-00 - Technical data..... 394
Table 344: 8BPM0004.0000-00 - Order data..... 395
Table 345: 8BPM0004.0000-00 - Technical data..... 395
Table 346: 8BXC000.0000-00, 8BXC001.0000-00, 8BXC002.0000-00, 8BXC003.0000-00, 8BXC004.0000-00, 8BXC005.0000-00, 8BXC009.0000-00 - Order data.....396
Table 347: 8BXC000.0000-00, 8BXC001.0000-00, 8BXC002.0000-00, 8BXC003.0000-00, 8BXC004.0000-00, 8BXC005.0000-00, 8BXC009.0000-00 - Technical data.....396
Table 348: 8SCS000.0000-00 - Order data.....397
Table 349: 8SCS000.0000-00 - Technical data..... 397
Table 350: 8SCS001.0000-00 - Order data.....397
Table 351: 8SCS001.0000-00 - Technical data..... 397
Table 352: 8SCS002.0000-00 - Order data.....398
Table 353: 8SCS002.0000-00 - Technical data..... 398
Table 354: 8SCS003.0000-00 - Order data.....398
Table 355: 8SCS003.0000-00 - Technical data..... 398
Table 356: 8SCS004.0000-00 - Order data.....399
Table 357: 8SCS004.0000-00 - Technical data..... 399
Table 358: 8SCS005.0000-00 - Order data.....399
Table 359: 8SCS005.0000-00 - Technical data..... 399
Table 360: 8SCS007.0000-00 - Order data.....400
Table 361: 8SCS007.0000-00 - Technical data..... 400
Table 362: 8SCS008.0000-00 - Order data.....400
Table 363: 8SCS008.0000-00 - Technical data..... 400
Table 364: 8SCS009.0000-00 - Order data.....401
Table 365: 8SCS009.0000-00 - Technical data..... 401
Table 366: 8SCS010.0000-00 - Order data.....401
Table 367: 8SCS010.0000-00 - Technical data..... 401

Table 368: 8BZ0C016000.001-1A, 8BZ0C016000.A01-1A, 8BZ0C032000.000-1A, 8BZ0C032000.002-1A, 8BZ0C032000.00A-1A - Order data....402
Table 369: 8BZ0C016000.001-1A, 8BZ0C016000.A01-1A, 8BZ0C032000.000-1A, 8BZ0C032000.002-1A, 8BZ0C032000.00A-1A - Technical data....402
Table 370: 8BZ0P044000.000-1A, 8BZVE050000.000-1A, 8BZVF088000.000-1A, 8BZVF044000.001-2A - Order data....403
Table 371: 8BZ0P044000.000-1A, 8BZVE050000.000-1A, 8BZVF088000.000-1A, 8BZVF044000.001-2A - Technical data....403
Table 372: 8BZVI0055D0.000-1A, 8BZVI0055DS.000-1A, 8BZVI0055S0.000-1A, 8BZVI0055SS.000-1A - Order data....404
Table 373: 8BZVI0055D0.000-1A, 8BZVI0055DS.000-1A, 8BZVI0055S0.000-1A, 8BZVI0055SS.000-1A - Technical data....404
Table 374: 8BZVI0110SS.000-1A, 8BZVI0110S0.000-1A, 8BZVI0110DS.000-1A, 8BZVI0110D0.000-1A - Order data....405
Table 375: 8BZVI0110SS.000-1A, 8BZVI0110S0.000-1A, 8BZVI0110DS.000-1A, 8BZVI0110D0.000-1A - Technical data....405
Table 376: 8BZVI0220SS.000-1A, 8BZVI0220S0.000-1A, 8BZVI0220DS.000-1A, 8BZVI0220D0.000-1A - Order data....406
Table 377: 8BZVI0220SS.000-1A, 8BZVI0220S0.000-1A, 8BZVI0220DS.000-1A, 8BZVI0220D0.000-1A - Technical data....406
Table 378: 8BZVI0440SS.000-1A, 8BZVI0440S0.000-1A, 8BZVP044000.000-1A - Order data....407
Table 379: 8BZVI0440SS.000-1A, 8BZVI0440S0.000-1A, 8BZVP044000.000-1A - Technical data....407
Table 380: 8BZVI1650SS.000-1A, 8BZVI1650S0.000-1A, 8BZVP165000.000-1A - Order data....408
Table 381: 8BZVI1650SS.000-1A, 8BZVI1650S0.000-1A, 8BZVP165000.000-1A - Technical data....408
Table 382: 8BXS000.0000-00 - Order data....409
Table 383: 8BXS000.0000-00 - Technical data....409
Table 384: 8BXS001.0000-00 - Order data....410
Table 385: 8BXS001.0000-00 - Technical data....410
Table 386: 8BXS002.0000-00 - Order data....411
Table 387: 8BXS002.0000-00 - Technical data....411
Table 388: 8BXS003.0000-00 - Order data....412
Table 389: 8BXS003.0000-00 - Technical data....412
Table 390: 8BXS004.0000-00 - Order data....413
Table 391: 8BXS004.0000-00 - Technical data....413
Table 392: 8BXS005.0000-00 - Order data....414
Table 393: 8BXS005.0000-00 - Technical data....414
Table 394: 8BXS006.0000-00 - Order data....414
Table 395: 8BXS006.0000-00 - Technical data....414
Table 396: 8BXB000.0000-00 - Order data....415
Table 397: 8BXB000.0000-00 - Technical data....415
Table 398: 8BXW000.0000-00 - Technical data....416
Table 399: Fitting 8BXW000.0000-00, angled - Dimensions....416
Table 400: 8BXW001.0000-00 - Technical data....417
Table 401: Fitting 8BXW001.0000-00, straight - Dimensions....417
Table 402: Permissible mounting orientations for 8B0W external braking resistors....434
Table 403: Impermissible mounting orientation for 8B0W external braking resistors....434
Table 404: Maximum possible number of plug-in modules by ACOPOSmulti module....500
Table 405: Slot assignments for ACOPOSmulti plug-in modules....500
Table 406: Selecting the cross section of the protective ground conductor....508
Table 407: Protective ground conditions for ACOPOSmulti 8BVF line filters....509
Table 408: Protective ground conditions for ACOPOSmulti 8BxP power supply modules....509
Table 409: Constant k....511
Table 410: Current-carrying capacity of PVC insulated three-phase cables or individual wires....512
Table 411: Discharge capacitances C_D from ACOPOSmulti modules....514
Table 412: Manufacturers of fault current protection devices that can be used....514
Table 413: Checking if fault current protection devices can be used - Example 1....515
Table 414: Checking if fault current protection devices can be used - Example 2....515
Table 415: Wiring diagram for ACOPOSmulti inverter modules, motor connection....516

Table 416: Maximum current load for specially insulated three-phase cables 516
Table 417: Maximum current load for PVC-insulated three-phase cables 517
Table 418: The location where the fuse for the external braking resistor connection is installed..... 519
Table 419: Overview of braking resistor data - 8B0W 523
Table 420: Series and parallel connection of braking resistors..... 524
Table 421: ParIDs for setting external braking resistor parameters..... 532
Table 422: Determining the DC bus capacitance values for all ACOPOSmulti modules in the drive system. 536
Table 423: Determining the sum of the DC bus capacitance values..... 536
Table 424: Determining the DC bus capacitance values for all modules in the drive system..... 537
Table 425: Determining the sum of the DC bus capacitance values..... 537
Table 426: Determine the DC bus capacitance values for all ACOPOSmulti modules in the drive system.. 538
Table 427: Determine the sum of the DC bus capacitance values..... 538
Table 428: Functionalities of 8B0C auxiliary supply modules..... 539
Table 429: Overview of methods for removing impurities in the coolant..... 549
Table 430: Hydrologic data..... 550
Table 431: Electrochemical series, standard potential against hydrogen..... 550
Table 432: Calculation of the effective control cabinet surface A (DIN VDE 57 660 part 500 or IEC 890)... 554
Table 433: Determining the heat dissipation of all devices in the control cabinet..... 555
Table 434: Compensation factor f depending on the control cabinet's installation altitude..... 556
Table 435: Determining the heat dissipation of all devices in the control cabinet..... 557
Table 436: Determining the heat dissipation of all devices in the control cabinet..... 558
Table 437: Determining the heat dissipation of all devices in the control cabinet..... 560
Table 438: 8BVF line filters - Terminal cross sections..... 587
Table 439: 8BVR regeneration chokes - Terminal cross sections..... 587
Table 440: 8B0P power supply units - Terminal cross sections..... 588
Table 441: 8BVP power supply units - Terminal cross sections..... 588
Table 442: 8B0C auxiliary supply modules - Terminal cross sections..... 589
Table 443: 8BVI inverter modules - Terminal cross sections..... 589
Table 444: 8BVE expansion modules - Terminal cross sections..... 590
Table 445: 8B0K3630Hx00.001-1 capacitor modules - Terminal cross sections..... 590
Table 446: Safety classifications, criteria and characteristics for safe pulse disabling 591
Table 447: Overview of safety functions according to standards..... 591
Table 448: List of possible errors..... 595
Table 449: Applicable standards..... 613
Table 450: Mechanical conditions during operation..... 614
Table 451: Mechanical conditions during transport..... 614
Table 452: Climate conditions during operation..... 614
Table 453: Climate conditions during storage (temperature)..... 614
Table 454: Climate conditions during storage (relative humidity)..... 614
Table 455: Climate conditions during transport..... 614
Table 456: Evaluation criteria (performance criteria) for immunity to disturbances..... 615
Table 457: Limit values for power mains harmonics..... 615
Table 458: Limit values for commutation notches / voltage distortions..... 615
Table 459: Limit values for voltage deviations..... 615
Table 460: Limit values for voltage dips and short-term interruptions..... 615
Table 461: Limit values for voltage unbalance..... 615
Table 462: Limit values for frequency changes..... 615
Table 463: Limit values for electrostatic discharge..... 616
Table 464: Limit values for electromagnetic fields..... 616
Table 465: Limit values for burst..... 616
Table 466: Limit values for surge..... 616
Table 467: Limit values for high-frequency conducted disturbances..... 616
Table 468: Limit values for disturbance voltages on power mains connection..... 617
Table 469: Limits for disturbance voltages on the power connections..... 617
Table 470: Limit values for radiated emissions..... 617

Table 471: Additional environmental limit values ... 617
Table 472: International certifications ... 618
Table 473: Overview of stop function categories ... 619
Table 474: Overview of performance levels (PL) ... 619

8

8B0C auxiliary supply modules ... 135
8B0C0160Hx00.000-1 - Wiring, 8B0C0320Hx00.000-1 ... 139
8B0C0160Hx00.001-1 - Wiring, 8B0C0320Hx00.002-1 ... 147
8B0C0160Hx00.A01-1 - Wiring ... 152
8B0C0320Hx00.00A-1 - Wiring ... 158
Parallel connection ... 148, 153, 159
8B0F passive line filters ... 57
Wiring ... 59
8B0K capacitor modules ... 253
Input/Output circuit diagram ... 258
Pinout ... 257
8B0M0040HFF0.000-1 fan module ... 499
8B0M mounting plates
Cold plate ... 419
Cold plate mounting ... 80
Feed-through mounting ... 83, 418
Wall mounting ... 77, 418
8B0P power supply modules ... 85
Wiring ... 102
8BCA expansion cables ... 367
8BCE EnDat cables ... 349
8BCF EnDat 2.2 cable ... 354
8BCM motor cables ... 324
8BCS SinCos cables ... 364
8BPE EnDat connectors ... 392
8BPM motor connectors ... 391
8BPR resolver connectors ... 393
8BVE expansion modules ... 243
PE connection ... 249, 571
8BVF line filters ... 63
Input/Output circuit diagram ... 67
8BVI 2-axis inverter modules (double-width)
Input/Output circuit diagram ... 239
Pinout ... 231
8BVI 2-axis inverter modules (single-width)
Input/Output circuit diagram ... 223
Pinout ... 215
8BVI inverter modules ... 160
8BVI single axis inverter modules (4x- and 8x-width)
Pinout ... 196
8BVI single-axis inverter modules (4x and 8x width)
Input/Output circuit diagram ... 204
8BVI single-axis inverter modules (single- and double width)
Pinout ... 179
8BVP power supply modules ... 107
Input/Output circuit diagram ... 113, 123, 132
Wiring ... 111, 120, 129
8BVR regeneration chokes ... 70
Wiring ... 72, 73, 74
8SCS002.0000-00 shield set ... 443

A

Accident prevention regulations ... 35
Air/air heat exchanger ... 558
Dimensioning ... 558
Air/Air heat exchangers ... 503
Function diagram ... 503
Air/Water heat exchangers ... 503
Function diagram ... 503

Air-to-water heat exchangers ... 560
Dimensioning ... 560
Analog In interface ... 309
Antifreeze ... 549
Apparent power from the transformer ... 508
Applicable standards ... 613

B

B&R Automation Studio ... 532
Backup battery
- Changing ... 421
- Inserting ... 421
Service life ... 415, 421
Brake resistor parameters ... 532
Braking resistor data ... 523
Braking resistors ... 518

C

Cable
8BCF EnDat 2.2 cable ... 354
8BCM motor cables ... 324
8BCS SinCos cables ... 364
Resolver cable - 8BCR ... 360
Cable diagram
8BCA expansion cable ... 372
8BCF EnDat 2.2 cables ... 356
8BCM motor cables ... 340, 342
8BCR resolver cable ... 363
EnDat 2.1 8BCE cables ... 353
Cabled tracer pins ... 281, 293
Cable-free (IR) tracer pins ... 293
Cables
8BCA expansion cables ... 367
8BCE EnDat 2.1 cables ... 349
Assembly ... 435
General information ... 324
Cable schematic
8BCS SinCos cable ... 366
Cables from other manufacturers ... 324
Calculating characteristic values ... 39
Calculating the effective control cabinet surface area A ... 554
Calculation for dimensioning the braking resistor
Average brake power for one cycle ... 523
Average temperature in continuous operation ... 524
Braking energy for one cycle ... 523
Braking energy per braking procedure ... 523
Continuous power ... 529
Maximum brake power within one cycle ... 523
Maximum heat that can be absorbed by the braking resistor ... 524
Maximum temperature in continuous operation ... 524
Power calculation ... 523
Sample calculation ... 525
Thermal resistance ... 529
Thermal time constant of the braking resistor ... 524
Total braking time within one cycle ... 523
Certifications ... 618
Characteristic values ... 39
Choosing a fuse
Suitable fuse ... 510
Circuit breakers ... 510

Climate conditions
During operation... 614
Configuration of open line monitoring... 287, 294
Connecting an external braking resistor... 518
Connecting the feed and outlet
Air-to-water heat exchanger... 547
Direct connection... 545
Water-to-water heat exchanger... 546
Connection diagrams for ground connections and shield connections
8B0C auxiliary supply modules... 580
8B0F line filters... 574
8B0P0110 power supply modules... 575
8B0P0220/0440 power supply modules... 576
8BVE expansion modules... 582
8BVF line filters... 577
8BVI inverter modules... 581
8BVP power supply modules... 578
8BVR regeneration chokes... 579
Connection for inlet and return flow... 419
Connector
8BPE EnDat connectors... 392
8BPM motor connectors... 391
8BPR resolver connectors... 393
Contact chatter... 513, 513
Coolant... 549
Coolant properties... 550
Cooling system... 544
Cooling systems in control cabinets... 502
Cooling units... 504, 560
On the front of the control cabinet... 505
On top of the control cabinet... 505
Cross sections, terminals... 587
Current-carrying capacity of PVC-insulated three-phase cables... 512

D

Determining current load... 511
Determining the braking resistor data... 523
Determining the peak load factor k... 531
Determining the value of the braking resistor... 528
Dew point temperature... 551
Dew point temperature characteristic... 551
Diagram of the cooling water
Air-to-water heat exchanger... 547
Diagram of the cooling water circuit
Direct connection... 545
Water-to-water heat exchanger... 546
Digital I/O interface... 303
Digital Out interface... 306
Dimension diagrams and installation dimensions
8B0F passive line filters... 446
8BVF line filter... 448
8BVR regeneration chokes... 452
Cold plate mounting... 468
External braking resistors... 496
Fan module... 499
Feed-through mounting... 482
Wall mounting... 456
Dimensioning
Air/air heat exchanger... 558
Air-to-water heat exchangers... 560
Filter fans... 556

Fuse ... 510
Line contactor ... 512
Natural convection ... 554
Power mains ... 510
Dimensioning criteria for cooling systems ... 553
Dimensioning the motor cable cross section ... 516
Directives ... 613
Discharge capacitance ... 514
Disposal ... 39

E

Electromagnetic compatibility of the installation ... 563
Emergency stops ... 619
Encoder emulation module ... 313
Encoders with pull outputs ... 287, 294
Encoders with push outputs ... 287, 294
Encoders with push-pull outputs ... 287, 294
Encoder systems
EnDat 2.1 encoder ... 259
EnDat 2.2 encoder ... 263
HIPERFACE encoder interface ... 267
Incremental/SSI encoder interface ... 275
Incremental encoder interface for encoders with a +24 V encoder supply ... 288
Incremental encoder interface for encoders with a +5 V encoder supply ... 282
Resolver interface ... 271
EnDat 2.1 interface ... 259
EnDat 2.2 interface ... 263
Environmental limit values ... 614
Environmentally friendly disposal ... 39
Environmentally friendly separation of materials ... 39
ESD ... 36
ESD protective measures ... 36
E-stop buttons ... 38
European directives ... 613
Evaluation criteria for immunity to disturbances ... 615
Exchanging the backup battery ... 421
Expansion module device fuses ... 426
Expansion modules - 8BVE
Input/output circuit diagram ... 252
Pinout ... 248
External braking resistors
Mounting orientation ... 434
Location where the fuse is installed ... 519

F

Fan module 8B0M0040HFF0.000-1 ... 319
Fault current protection devices ... 514
Fault current protective device ... 513
Filter fans ... 556
Dimensioning ... 556
Function diagram ... 502
FI protection ... 513
Firmware for plug-in modules ... 262, 266, 270, 274, 281, 287, 294, 298, 305, 308, 312, 315
Forward movement ... 593
Functional safety ... 39
Function diagram
Filter fans ... 502
Fuse ... 510, 519
Fuse for the power mains connection ... 510
Fuse holder ... 519

G

Ground connections ... 37
Ground potential (PE rail) ... 37
Guidelines for ESD handling ... 36

H

Handling ... 37
Hanging loads ... 593
Hardwired safety technology ... 591
Hazards ... 35
High voltage test ... 586
High voltage test procedure ... 586
HIPERFACE ... 267
HIPERFACE interface ... 267
Holding brake ... 593
Homing procedure ... 259, 263, 267

I

Improperly sealed control cabinet ... 502
Increased discharge current ... 509
Incremental/SSI encoder interface ... 275
Incremental encoder interface (24 V) ... 288
Incremental encoder interface (5 V) ... 282
Incremental encoder operation ... 276, 283, 289
Inductive switching elements ... 563
Input/output circuit diagram
  Auxiliary supply modules - 8B0C ... 140, 148
  Expansion modules - 8BVE ... 252
Input/Output circuit diagram
  8B0C auxiliary supply modules ... 153, 159
  8B0K capacitor modules ... 258
  8BVF line filters ... 67, 69
  8BVI inverter modules ... 204, 223, 239
  8BVP power supply modules ... 113, 123, 132
  Inverter modules - 8BVI ... 185
  Passive line filter - 8B0F ... 62
  Passive power supply modules - 8B0P ... 105
  Regeneration chokes - 8BVR ... 73, 74, 75
Inserting the backup battery ... 421
Installation ... 37, 418, 563
  Air/Air heat exchangers ... 503
  Air/Air heat exchangers behind mounting plates ... 503
  Air/Water heat exchangers ... 503
  Air/Water heat exchangers behind mounting plates ... 504
  Plug-in module ... 501
Installation dimensions
  8B0F passive line filters ... 446
  8BVF line filters ... 448
  8BVR regeneration chokes ... 452
  Cold plate mounting ... 468
  External braking resistors ... 496
  Fan module ... 499
  Feed-through mounting ... 482
  Wall mounting ... 456
Installing device fuses ... 425
Insulation test ... 586
Insulation test procedure ... 586
Interference suppressor ... 563
Internal monitoring ... 38

Inverter modules - Single-axis (single- and double-width)
Input/Output circuit diagram... 185
IT networks... 507

L

Limit values
Disturbance voltages on the power mains connection... 617
Radiated emissions... 617
Line filter - 8BVF
Wiring... 65
Line shielding... 563
List of possible errors... 595
Location where the fuse is installed... 519

M

Machine guidelines... 35
Machine startup... 620
Main principle of air/air heat exchangers... 558
Main principle of the air/water heat exchanger... 560
Mains configurations
IT networks... 507
TN networks... 507, 507
TT networks... 507
Manual history... 21
Manufacturers of fault current protection devices... 514
Matching transformer... 508
Maximum current load for PVC-insulated three-phase cables... 517
Maximum current load for specially insulated three-phase cables... 516
Mechanical conditions
During operation... 614
During transport... 614
Mission time... 39
Monitoring functions... 276, 283, 289
Motor cable assembly... 435, 435
Motor connection... 516
Mounting orientation of external braking resistors... 434
Mounting the 8SCS002.0000-00 shield set... 443
Multiple errors in the IGBT bridge... 593

N

Natural convection... 502, 554
Dimensioning... 554
Nominal continuous power of a braking resistor... 529

O

Open line monitoring... 287, 294
Operation... 37, 614
Operation with the control cabinet doors open... 504
Optional accessories
8B0C0160Hx00.000-1 auxiliary supply modules... 135
8B0C0160Hx00.001-1 auxiliary supply modules... 141
8B0C0160Hx00.A01-1 auxiliary supply modules... 149
8B0C0320Hx00.000-1 auxiliary supply modules... 137
8B0C0320Hx00.002-1 auxiliary supply modules... 144
8B0C0320Hx00.00A-1 auxiliary supply modules... 155
8B0M mounting plates - Cold plate mounting... 80
8B0M mounting plates - Feed-through mounting... 83
8B0M mounting plates - Wall mounting... 77

8B0P0220Hx00.000-1, 8B0P0440Hx00.000-1 power supply modules ... 94
8B0P0220Hx00.001-1, 8B0P0440Hx00.001-1 power supply modules ... 98
8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1 power supply modules ... 107
8BVP0880Hx00.004-1 power supply modules ... 116
8BVP1650Hx00.000-1 power supply modules ... 125
Dual-axis inverter modules (double-width) ... 226
Dual-axis inverter modules (single-width) ... 206
Expansion modules - 8BVE ... 244
Line filter - 8BVF ... 63
Plug-in module - 8BAC0120.000-1 ... 259
Plug-in module - 8BAC0122.000-1 ... 271
Plug-in module - 8BAC0124.000-1 ... 295
Single-axis inverter modules (4x- and 8x-width) ... 187
Single-axis inverter modules (single- and double-width) ... 160
Overview of braking resistor data ... 523

P

Packaging ... 36
Parallel connection
8B0C auxiliary supply modules ... 148, 153, 159
Braking resistor ... 524
Parameter memory ... 259, 263, 267
Passive line filter - 8B0F
Input/Output circuit diagram ... 62
Peak load capacity - 8B0P ... 527, 528
PE connection on 8BVE expansion modules ... 249, 571
Performance criteria for immunity to disturbances ... 615
Performance levels (PL) ... 619
Permanent magnet synchronous motors ... 593
Pinout overview
8B0P power supply modules ... 102
Pinouts
2-axis inverter modules (double-width) ... 231
2-axis inverter modules (single-width) ... 215
8B0C0160Hx00.000-1 auxiliary supply modules, 8B0C0320Hx00.000-1 ... 139
8B0C0160Hx00.001-1 auxiliary supply modules, 8B0C0320Hx00.002-1 ... 147
8B0C0160Hx00.A01-1 auxiliary supply modules ... 152
8B0C0320Hx00.00A-1 auxiliary supply modules ... 158
8B0F line filters ... 59
8B0K capacitor module ... 257
8B0W external braking resistors ... 317
8BCF EnDat 2.2 cables ... 355
8BCM motor cables ... 339
8BCR resolver cable ... 363
8BCS SinCos cable ... 365
8BVF line filters ... 68
8BVP0880Hx00.004-1 power supply modules ... 120
8BVP1650Hx00.000-1 power supply modules ... 129
8BVR regeneration chokes ... 72
EnDat 2.1 8BCE cables ... 352
Expansion modules - 8BVE ... 248
Fan modules ... 319
Inverter modules - Single-axis (single- and double width) ... 179
Line filter - 8BVF ... 65
Power supply modules 8BVP0220Hx00.000-1, 8BVP0440Hx00.000-1 ... 111
Single-axis inverter modules (4x- and 8x-width) ... 196
Plug-in module
8BAC0120.000-1 ... 259
8BAC0120.001-2 ... 263
Plug-in module input/Output circuit diagrams
8BAC0125.000-1 ... 302

Plug-in module pinouts
8BAC0125.000-1 ... 301
Plug-in modules
8BAC0121.000-1 ... 267
8BAC0122.000-1 ... 271
8BAC0123.000-1 ... 275
8BAC0123.001-1 ... 282
8BAC0123.002-1 ... 288
8BAC0124.000-1 ... 295
8BAC0130.000-1 ... 303
8BAC0130.001-1 ... 306
8BAC0132.000-1 ... 309
8BAC0133.000-1 ... 313
Firmware ... 262, 266, 270, 274, 281, 287, 294, 298, 305, 308, 312, 315
Plug-in modules - Input/Output circuit diagram
8BAC0120.000-1 ... 262
8BAC0120.001-2 ... 266
8BAC0121.000-1 ... 269
8BAC0122.000-1 ... 273
8BAC0123.000-1 ... 280
8BAC0123.001-1 ... 286
8BAC0123.002-1 ... 292
8BAC0124.000-1 ... 298
8BAC0130.000-1 ... 305
8BAC0130.001-1 ... 308
8BAC0132.000-1 ... 311
8BAC0133.000-1 ... 315
Plug-in modules - Pinout
8BAC0120.000-1 ... 261
8BAC0120.001-2 ... 265
8BAC0121.000-1 ... 268
8BAC0122.000-1 ... 272
8BAC0123.000-1 ... 279
8BAC0123.001-1 ... 285
8BAC0123.002-1 ... 291
8BAC0124.000-1 ... 296
8BAC0130.000-1 ... 304
8BAC0130.001-1 ... 307
8BAC0132.000-1 ... 310
8BAC0133.000-1 ... 314
Plug-in modules - Wiring
8BAC0133.000-1 ... 314
Plug-in module wiring
8BAC0120.000-1 ... 261
8BAC0120.001-2 ... 265
8BAC0121.000-1 ... 268
8BAC0122.000-1 ... 272
8BAC0123.000-1 ... 279
8BAC0123.001-1 ... 285
8BAC0123.002-1 ... 291
8BAC0124.000-1 ... 296
8BAC0125.000-1 ... 301
8BAC0130.000-1 ... 304
8BAC0130.001-1 ... 307
8BAC0132.000-1 ... 310
Position measurement ... 259, 263, 267
Possible errors ... 595
Power calculation ... 523
Power mains connection ... 507
Power mains connection type ... 510
Power mains systems ... 507
Power supply modules - 8B0P

Input/Output circuit diagram ... 105
Preventing condensation ... 552
Proof test interval ... 39
Proper ESD handling ... 36
Protecting the external braking resistor connection ... 519
Protective equipment ... 37
Protective ground conductor system ... 584
Protective ground connection (PE) ... 508
Pull-up and pull-down resistances ... 287, 294

Q

Qualified personnel ... 35

R

Rated current for the fuse ... 511
Rated current of the line contactor ... 512
RCD - residual current-operated protective device ... 513
Regeneration chokes - 8BVR
Input/Output circuit diagram ... 73, 74, 75
Removing plug-in modules ... 501, 501
Replacing device fuses ... 426
Requirements for cooling systems
For air/air heat exchangers ... 558
For filter fans ... 556
For natural convection ... 554
Resolver cable - 8BCR ... 360
Resolver interface ... 271
Restart interlock ... 620
Risk assessment ... 620
Risk graph ... 620
Risk parameters ... 620
RMS value of the motor current ... 516

S

Safe pulse disabling ... 591
Safety classifications ... 591
Safety features ... 38
Safety functions
According to the standard ... 591
Secure restart interlock ... 599, 601, 603, 606, 608, 610
SLS ... 599, 601, 603, 606, 608, 610
SOS ... 599, 606
SS1 ... 601, 603, 608, 610
SS2 ... 601, 603, 608, 610
STO ... 595, 596, 597, 599, 606
Safety functions that can be implemented ... 591
Safety guidelines ... 35, 37
Safety integrity level - SIL ... 619
Safety-related parts of a control system ... 619
Second protective ground connection ... 509
Selection
Cooling system ... 553
Protective ground conductor ... 508
Sensing device operation ... 277, 289
Series connection - Braking resistor ... 524
Service life of the backup battery ... 415, 421
Setting brake resistor parameters ... 532
Setting the POWERLINK node number
Inverter modules ... 242

Power supply modules ... 101, 134
Shielded cables ... 563
Short circuit between two wires ... 594
SinCos interface ... 295
SSI encoder operation ... 276
Standards ... 613
Status indicators
8B0C auxiliary supply modules ... 44
8B0K capacitor modules ... 51
8B0P power supply modules ... 42
8BVE expansion modules ... 50
8BVI inverter modules ... 48
8BVP power supply modules ... 43
Stop command (code example) ... 611
Stop function categories ... 619
Stop functions ... 619
Storage ... 36, 614
Synchronous motors, permanent magnet ... 593

T

Terminal cross sections
8B0C auxiliary supply modules ... 589
8B0K3630Hx00.001-1 capacitor modules ... 590
8B0P power supply modules ... 588
8BVE expansion modules ... 590
8BVF line filters ... 587
8BVI inverter modules ... 589
8BVP power supply modules ... 588
8BVR regeneration chokes ... 587
Thermal equivalent circuit diagram ... 532
Thermal equivalent RMS value for the motor current ... 516
Three-phase induction motors ... 593
Three-phase industrial power systems ... 507
Tightening the fastening screws ... 420
TN networks ... 507
TN-S networks ... 507
Total discharge capacitance ... 515
Tracer pin connection ... 281, 293
Tracer pins ... 281, 293
Connection ... 281, 293
Tracer pins, cabled ... 293
Tracer pins, cable-free ... 293
Transport ... 36, 614
Tripping currents ... 513
TT networks ... 507
Type of control cabinet installation ... 554
Type test ... 613

W

Warning label ... 38
Wire cross section - Protective ground conductor ... 508
Wiring
2-axis inverter modules (double-width) ... 231
2-axis inverter modules (single-width) ... 215
8B0C0160Hx00.000-1 auxiliary supply modules, 8B0C0320Hx00.000-1 ... 139
8B0C0160Hx00.001-1 auxiliary supply modules, 8B0C0320Hx00.002-1 ... 147
8B0C0160Hx00.A01-1 auxiliary supply modules ... 152
8B0C0320Hx00.00A-1 auxiliary supply modules ... 158
8B0F passive line filters ... 59
8B0K capacitor modules ... 257

8B0P power supply modules..... 102
8B0W external braking resistors..... 317
8BCA expansion cable..... 372
8BCF EnDat 2.2 cables..... 355
8BCM motor cables..... 339
8BCR resolver cable..... 363
8BCS SinCos cable..... 365
8BVF line filters..... 68
8BVP power supply modules..... 111, 120, 129
8BVR regeneration chokes..... 72, 73, 74
EnDat 2.1 8BCE cables..... 352
Expansion modules - 8BVE..... 248
Inverter modules - Single-axis (single- and double width)..... 179
Line filter - 8BVF..... 65
Single-axis inverter modules (4x- and 8x-width)..... 196
Wiring overview
Active power supply..... 567
Passive power supply..... 564
PE connection on expansion modules..... 249, 571

8B0C0160HC00.000-1 ... 135
8B0C0160HC00.001-1 ... 141
8B0C0160HC00.A01-1 ... 149
8B0C0160HW00.000-1 ... 135
8B0C0160HW00.001-1 ... 141
8B0C0160HW00.A01-1 ... 149
8B0C0320HC00.000-1 ... 137
8B0C0320HC00.002-1 ... 144
8B0C0320HC00.00A-1 ... 155
8B0C0320HW00.000-1 ... 137
8B0C0320HW00.002-1 ... 144
8B0C0320HW00.00A-1 ... 155
8B0F0160H000.A00-1 ... 57
8B0F0300H000.000-1 ... 57
8B0F0550H000.000-1 ... 57
8B0K1650HC00.000-1 ... 253
8B0K1650HW00.000-1 ... 253
8B0K3630HC00.001-1 ... 255
8B0K3630HW00.001-1 ... 255
8B0M0020HC00.000-1 ... 80
8B0M0020HW00.000-1 ... 77
8B0M0030HC00.000-1 ... 80
8B0M0030HW00.000-1 ... 77
8B0M0040HC00.000-1 ... 80
8B0M0040HF00.000-1 ... 83
8B0M0040HFF0.000-1 ... 318
8B0M0040HW00.000-1 ... 77
8B0M0050HC00.000-1 ... 80
8B0M0050HW00.000-1 ... 77
8B0M0060HC00.000-1 ... 80
8B0M0060HW00.000-1 ... 77
8B0M0070HC00.000-1 ... 80
8B0M0070HW00.000-1 ... 77
8B0M0080HC00.000-1 ... 80
8B0M0080HF00.000-1 ... 83
8B0M0080HW00.000-1 ... 77
8B0M0090HC00.000-1 ... 80
8B0M0090HW00.000-1 ... 77
8B0M0100HC00.000-1 ... 80
8B0M0100HW00.000-1 ... 77
8B0M0110HC00.000-1 ... 80
8B0M0110HW00.000-1 ... 77
8B0M0120HC00.000-1 ... 80
8B0M0120HF00.000-1 ... 83
8B0M0120HW00.000-1 ... 77
8B0M0130HC00.000-1 ... 80
8B0M0130HW00.000-1 ... 77
8B0M0140HC00.000-1 ... 80
8B0M0140HW00.000-1 ... 77
8B0M0150HC00.000-1 ... 80
8B0M0150HW00.000-1 ... 77
8B0M0160HC00.000-1 ... 80
8B0M0160HF00.000-1 ... 83
8B0M0160HW00.000-1 ... 77
8B0M0170HC00.000-1 ... 80
8B0M0170HW00.000-1 ... 77
8B0M0180HC00.000-1 ... 80
8B0M0180HW00.000-1 ... 77
8B0M0190HC00.000-1 ... 80
8B0M0190HW00.000-1 ... 77
8B0M0200HC00.000-1 ... 80
8B0M0200HF00.000-1 ... 83

8B0M0200HW00.000-1 ... 77
8B0M0210HC00.000-1 ... 80
8B0M0210HW00.000-1 ... 77
8B0M0220HC00.000-1 ... 80
8B0M0220HW00.000-1 ... 77
8B0M0230HC00.000-1 ... 80
8B0M0230HW00.000-1 ... 77
8B0M0240HC00.000-1 ... 80
8B0M0240HW00.000-1 ... 77
8B0M0250HC00.000-1 ... 80
8B0M0250HW00.000-1 ... 77
8B0M0260HC00.000-1 ... 80
8B0M0260HW00.000-1 ... 77
8B0M0270HC00.000-1 ... 80
8B0M0270HW00.000-1 ... 77
8B0P0110HC00.000-1 ... 86
8B0P0110HW00.000-1 ... 86
8B0P0220HC00.000-1 ... 94
8B0P0220HC00.001-1 ... 98
8B0P0220HW00.000-1 ... 94
8B0P0220HW00.001-1 ... 98
8B0P0440HC00.000-1 ... 94
8B0P0440HC00.001-1 ... 98
8B0P0440HW00.000-1 ... 94
8B0P0440HW00.001-1 ... 98
8B0W0045H000.000-1 ... 316
8B0W0045H000.001-1 ... 316
8B0W0079H000.000-1 ... 316
8B0W0079H000.001-1 ... 316
8BAC0120.000-1 ... 259
8BAC0120.001-2 ... 264
8BAC0121.000-1 ... 267
8BAC0122.000-1 ... 271
8BAC0123.000-1 ... 277
8BAC0123.001-1 ... 283
8BAC0123.002-1 ... 290
8BAC0124.000-1 ... 295
8BAC0125.000-1 ... 300
8BAC0130.000-1 ... 303
8BAC0130.001-1 ... 306
8BAC0132.000-1 ... 309
8BAC0133.000-1 ... 313
8BCA0003.1111A-0 ... 367
8BCA0003.1312A-0 ... 369
8BCA0003.1513A-0 ... 371
8BCA0005.1111A-0 ... 367
8BCA0005.1312A-0 ... 369
8BCA0005.1513A-0 ... 371
8BCA01X5.1111A-0 ... 367
8BCA01X5.1312A-0 ... 369
8BCA01X5.1513A-0 ... 371
8BCE0005.1111A-0 ... 349
8BCE0005.11120-0 ... 379
8BCE0005.3111A-0 ... 351
8BCE0007.1111A-0 ... 349
8BCE0007.11120-0 ... 379
8BCE0007.3111A-0 ... 351
8BCE0010.1111A-0 ... 349
8BCE0010.11120-0 ... 379
8BCE0010.3111A-0 ... 351
8BCE0015.1111A-0 ... 349
8BCE0015.11120-0 ... 379

8BCE0015.3111A-0 ... 351
8BCE0020.1111A-0 ... 349
8BCE0020.11120-0 ... 379
8BCE0020.3111A-0 ... 351
8BCE0025.1111A-0 ... 349
8BCE0025.11120-0 ... 379
8BCE0025.3111A-0 ... 351
8BCF0005.1221B-0 ... 354
8BCF0005.12230-0 ... 381
8BCF0005.1231B-0 ... 357
8BCF0007.1221B-0 ... 354
8BCF0007.12230-0 ... 381
8BCF0007.1231B-0 ... 357
8BCF0010.1221B-0 ... 354
8BCF0010.12230-0 ... 381
8BCF0010.1231B-0 ... 357
8BCF0015.1221B-0 ... 354
8BCF0015.12230-0 ... 381
8BCF0015.1231B-0 ... 357
8BCF0020.1221B-0 ... 354
8BCF0020.12230-0 ... 381
8BCF0020.1231B-0 ... 357
8BCF0025.1221B-0 ... 354
8BCF0025.12230-0 ... 381
8BCF0025.1231B-0 ... 357
8BCH0005.1111A-0 ... 343
8BCH0005.1312A-0 ... 345
8BCH0007.1111A-0 ... 343
8BCH0007.1312A-0 ... 345
8BCH0010.1111A-0 ... 343
8BCH0010.1312A-0 ... 345
8BCH0015.1111A-0 ... 343
8BCH0015.1312A-0 ... 345
8BCH0020.1111A-0 ... 343
8BCH0020.1312A-0 ... 345
8BCH0025.1111A-0 ... 343
8BCH0025.1312A-0 ... 345
8BCM0005.1011A-0 ... 324
8BCM0005.1111A-0 ... 328
8BCM0005.11140-0 ... 373
8BCM0005.1312A-0 ... 332
8BCM0005.13140-0 ... 375
8BCM0005.1322A-0 ... 335
8BCM0005.1523A-0 ... 337
8BCM0005.15250-0 ... 377
8BCM0005.3011A-0 ... 326
8BCM0005.3111A-0 ... 330
8BCM0005.3312A-0 ... 333
8BCM0007.1011A-0 ... 324
8BCM0007.1111A-0 ... 328
8BCM0007.11140-0 ... 373
8BCM0007.1312A-0 ... 332
8BCM0007.13140-0 ... 375
8BCM0007.1322A-0 ... 335
8BCM0007.1523A-0 ... 337
8BCM0007.15250-0 ... 377
8BCM0007.3011A-0 ... 326
8BCM0007.3111A-0 ... 330
8BCM0007.3312A-0 ... 333
8BCM0010.1011A-0 ... 324
8BCM0010.1111A-0 ... 328
8BCM0010.11140-0 ... 373

8BCM0010.1312A-0 332
8BCM0010.13140-0 375
8BCM0010.1322A-0 335
8BCM0010.1523A-0 337
8BCM0010.15250-0 377
8BCM0010.3011A-0 326
8BCM0010.3111A-0 330
8BCM0010.3312A-0 333
8BCM0015.1011A-0 324
8BCM0015.1111A-0 328
8BCM0015.11140-0 373
8BCM0015.1312A-0 332
8BCM0015.13140-0 375
8BCM0015.1322A-0 335
8BCM0015.1523A-0 337
8BCM0015.15250-0 377
8BCM0015.3011A-0 326
8BCM0015.3111A-0 330
8BCM0015.3312A-0 333
8BCM0020.1011A-0 324
8BCM0020.1111A-0 328
8BCM0020.11140-0 373
8BCM0020.1312A-0 332
8BCM0020.13140-0 375
8BCM0020.1322A-0 335
8BCM0020.1523A-0 337
8BCM0020.15250-0 377
8BCM0020.3011A-0 326
8BCM0020.3111A-0 330
8BCM0025.1011A-0 324
8BCM0025.1111A-0 328
8BCM0025.11140-0 373
8BCM0025.1312A-0 332
8BCM0025.13140-0 375
8BCM0025.1322A-0 335
8BCM0025.1523A-0 337
8BCM0025.15250-0 377
8BCM0025.3011A-0 326
8BCM0025.3111A-0 330
8BCR0005.1111A-0 360
8BCR0005.11120-0 383
8BCR0005.11230-0 385
8BCR0005.3111A-0 361
8BCR0007.1111A-0 360
8BCR0007.11120-0 383
8BCR0007.11230-0 385
8BCR0007.3111A-0 361
8BCR0010.1111A-0 360
8BCR0010.11120-0 383
8BCR0010.11230-0 385
8BCR0010.3111A-0 361
8BCR0015.1111A-0 360
8BCR0015.11120-0 383
8BCR0015.11230-0 385
8BCR0015.3111A-0 361
8BCR0020.1111A-0 360
8BCR0020.11120-0 383
8BCR0020.11230-0 385
8BCR0020.3111A-0 361
8BCR0025.1111A-0 360
8BCR0025.11120-0 383
8BCR0025.11230-0 385

8BCR0025.3111A-0 361
8BCS0005.1111A-0 364
8BCS0007.1111A-0 364
8BCS0010.1111A-0 364
8BCS0015.1111A-0 364
8BCS0020.1111A-0 364
8BCS0025.1111A-0 364
8BPE0001.0000-00 392
8BPM0001.0000-00 391
8BPM0002.0000-00 391
8BPM0003.0000-00 391
8BPM0004.0000-00 395
8BPR0001.0000-00 393
8BPR0002.0000-00 394
8BVE0500HC00.000-1 244
8BVE0500HW00.000-1 244
8BVF0220H000.000-1 63
8BVF0440H000.001-2 63
8BVF0880H000.000-1 63
8BVI0014HCD0.000-1 206
8BVI0014HCS0.000-1 160
8BVI0014HWD0.000-1 206
8BVI0014HWS0.000-1 160
8BVI0028HCD0.000-1 206
8BVI0028HCS0.000-1 160
8BVI0028HWD0.000-1 206
8BVI0028HWS0.000-1 160
8BVI0055HCD0.000-1 211
8BVI0055HCS0.000-1 165
8BVI0055HWD0.000-1 211
8BVI0055HWS0.000-1 165
8BVI0110HCD0.000-1 226
8BVI0110HCS0.000-1 165
8BVI0110HWD0.000-1 226
8BVI0110HWS0.000-1 165
8BVI0220HCD0.000-1 226
8BVI0220HCS0.000-1 170
8BVI0220HWD0.000-1 226
8BVI0220HWS0.000-1 170
8BVI0330HCS0.000-1 174
8BVI0330HWS0.000-1 174
8BVI0440HCS0.000-1 174
8BVI0440HWS0.000-1 174
8BVI0660HCS0.000-1 187
8BVI0660HWS0.000-1 187
8BVI0880HCS0.004-1 187
8BVI0880HWS0.004-1 187
8BVI1650HCS0.000-1 192
8BVI1650HWS0.000-1 192
8BVP0220HC00.000-1 107
8BVP0220HW00.000-1 107
8BVP0440HC00.000-1 107
8BVP0440HW00.000-1 107
8BVP0880HC00.004-1 116
8BVP0880HW00.004-1 116
8BVP1650HC00.000-1 125
8BVP1650HW00.000-1 125
8BVR0220H000.100-1 70
8BVR0440H000.100-2 70
8BVR0880H000.100-1 70
8BVR1650H000.100-1 70
8BXB000.0000-00 415

8BXC000.0000-00 ... 396
8BXC001.0000-00 ... 396
8BXC002.0000-00 ... 396
8BXC003.0000-00 ... 396
8BXC004.0000-00 ... 396
8BXC005.0000-00 ... 396
8BXC009.0000-00 ... 396
8BXF001.0000-00 ... 321
8BXF002.0000-00 ... 322
8BXS000.0000-00 ... 409
8BXS001.0000-00 ... 410
8BXS002.0000-00 ... 411
8BXS003.0000-00 ... 412
8BXS004.0000-00 ... 413
8BXS005.0000-00 ... 414
8BXS006.0000-00 ... 414
8BZ0C016000.001-1A ... 402
8BZ0C016000.A01-1A ... 402
8BZ0C032000.000-1A ... 402
8BZ0C032000.002-1A ... 402
8BZ0C032000.00A-1A ... 402
8BZ0P044000.000-1A ... 403
8BZVE050000.000-1A ... 403
8BZVF044000.001-2A ... 403
8BZVF088000.000-1A ... 403
8BZVI0055D0.000-1A ... 404
8BZVI0055DS.000-1A ... 404
8BZVI0055S0.000-1A ... 404
8BZVI0055SS.000-1A ... 404
8BZVI0110D0.000-1A ... 405
8BZVI0110DS.000-1A ... 405
8BZVI0110S0.000-1A ... 405
8BZVI0110SS.000-1A ... 405
8BZVI0220D0.000-1A ... 406
8BZVI0220DS.000-1A ... 406
8BZVI0220S0.000-1A ... 406
8BZVI0220SS.000-1A ... 406
8BZVI0440S0.000-1A ... 407
8BZVI0440SS.000-1A ... 407
8BZVI1650S0.000-1A ... 408
8BZVI1650SS.000-1A ... 408
8BZVP044000.000-1A ... 407
8BZVP165000.000-1A ... 408
8SCS000.0000-00 ... 397
8SCS001.0000-00 ... 397
8SCS002.0000-00 ... 398
8SCS003.0000-00 ... 398
8SCS004.0000-00 ... 399
8SCS005.0000-00 ... 399
8SCS007.0000-00 ... 400
8SCS008.0000-00 ... 400
8SCS009.0000-00 ... 401
8SCS010.0000-00 ... 401
8TB2104.2010-00 ... 390
8TB2104.203F-00 ... 390
8TB2104.203L-00 ... 390
8TB2104.204A-00 ... 390
8TB2106.2010-00 ... 390
8TB2108.2010-00 ... 390
8TB2112.2010-00 ... 390
8TB3102.201C-11 ... 387
8TB3104.201H-11 ... 387

8TB3104.201M-11 387
8TB3104.204G-11 387
8TB3104.204K-11 387
8TB4103.202A-00 388
8TB4104.202L-10 389
8TB4104.202N-00 388
8TB4104.204G-00 389
8TB4104.204G-10 389
8TB4104.206D-10 389