

DRIVES FOR WATER

# ACQ580-01 drives, frames R1 to R5

## Quick installation and start-up guide

R1-  
R4

R5



EN



# List of related manuals in English

## Drive manuals and guides

## Code (English)

|                                                                        |                                 |
|------------------------------------------------------------------------|---------------------------------|
| <i>ACQ580 pump control program firmware manual</i>                     | <a href="#">3AXD50000035867</a> |
| <i>ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual</i>       | <a href="#">3AXD50000044862</a> |
| <i>ACQ580-01 frames R1 to R5 quick installation and start-up guide</i> | <a href="#">3AXD50000044864</a> |
| <i>ACQ580-01 frames R6 to R9 quick installation and start-up guide</i> | <a href="#">3AXD50000037301</a> |
| <i>ACx-AP-x assistant control panels user's manual</i>                 | <a href="#">3AUA0000085685</a>  |

## Option manuals and guides

|                                                                                                                                                   |                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <i>ACS580-01, ACH580-01 and ACQ580-01 installation guide for UK gland plate (option +H358)</i>                                                    | <a href="#">3AXD50000034735</a> |
| <i>CPTC-02 ATEX-certified thermistor protection module, Ex II (2) GD (+L537+Q971) user's manual</i>                                               | <a href="#">3AXD50000030058</a> |
| <i>CDPI-01 communication adapter module user's manual</i>                                                                                         | <a href="#">3AXD50000009929</a> |
| <i>DPMP-01 mounting platform for control panels</i>                                                                                               | <a href="#">3AUA0000100140</a>  |
| <i>DPMP-02/03 mounting platform for control panels</i>                                                                                            | <a href="#">3AUA0000136205</a>  |
| <i>FDNA-01 DeviceNet™ adapter module user's manual</i>                                                                                            | <a href="#">3AFE68573360</a>    |
| <i>FEIP-21 Ethernet/IP adapter module user's manual</i>                                                                                           | <a href="#">3AXD50000158621</a> |
| <i>FENA-01/-11/-21 Ethernet adapter module user's manual</i>                                                                                      | <a href="#">3AUA0000093568</a>  |
| <i>FMBA-01 Modbus adapter module user's manual</i>                                                                                                | <a href="#">3AFE68586704</a>    |
| <i>FMBT-21 Modbus/TCP adapter module user's manual</i>                                                                                            | <a href="#">3AXD50000158607</a> |
| <i>FPBA-01 PROFIBUS DP adapter module user's manual</i>                                                                                           | <a href="#">3AFE68573271</a>    |
| <i>FPNO-21 PROFINET adapter module user's manual</i>                                                                                              | <a href="#">3AXD50000158614</a> |
| <i>FSCA-01 RS-485 adapter module user's manual</i>                                                                                                | <a href="#">3AUA0000109533</a>  |
| <i>ACS580-01..., ACH580-01... and ACQ580-01...+C135 drives with flange mounting kit supplement</i>                                                | <a href="#">3AXD50000019100</a> |
| <i>ACS580-01..., ACH580-01... and ACQ580-01...+C135 frames R1 to R3 flange mounting kit quick installation guide</i>                              | <a href="#">3AXD50000119172</a> |
| <i>ACS580-01..., ACH580-01... and ACQ580-01...+C135 frames R4 to R5 flange mounting kit quick installation guide</i>                              | <a href="#">3AXD50000287093</a> |
| <i>Main switch and EMC C1 filter options (+F278, +F316, +E223) installation supplement for ACS580-01, ACH580-01 and ACH580-01 frames R1 to R5</i> | <a href="#">3AXD50000155132</a> |
| <i>UL Type 12 hood quick installation guide for ACS580-01, ACH580-01 and ACQ580-01 frames R1 to R9</i>                                            | <a href="#">3AXD50000196067</a> |

You can find manuals and other product documents in PDF format on the Internet.

See section Document library on the Internet on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

The QR code below opens an online listing of the manuals applicable to this product.



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DRIVES FOR WATER

# ACQ580-01 drives

## Quick installation guide

Frames R1 to R4

R1-  
R4



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EN



Ratings and fuses

IEC ratings at  $U_N = 230\text{ V}$ ,  $400\text{ V}$  and  $480\text{ V}$

■  $U_N = 230\text{ V}$

| Type<br>ACQ580<br>-01-       | Input<br>rating | Output ratings  |             |       | Heat<br>dissipation | Air flow          | Frame<br>size |
|------------------------------|-----------------|-----------------|-------------|-------|---------------------|-------------------|---------------|
|                              |                 | Max.<br>current | Nominal use |       |                     |                   |               |
|                              | $I_1$           | $I_{\max}$      | $I_N$       | $P_N$ |                     |                   |               |
|                              | A               | A               | A           | kW    | W                   | m <sup>3</sup> /h |               |
| 3-phase $U_N = 230\text{ V}$ |                 |                 |             |       |                     |                   |               |
| 04A7-2                       | 4.7             | 6.3             | 4.7         | 0.75  | 45                  | 43                | R1            |
| 06A7-2                       | 6.7             | 8.9             | 6.7         | 1.1   | 55                  | 43                | R1            |
| 07A6-2                       | 7.6             | 11.9            | 7.6         | 1.5   | 66                  | 43                | R1            |
| 012A-2                       | 12.0            | 19.1            | 12.0        | 3.0   | 106                 | 43                | R1            |
| 018A-2                       | 16.9            | 22.0            | 16.9        | 4.0   | 133                 | 43                | R1            |
| 025A-2                       | 24.5            | 32.7            | 24.5        | 5.5   | 174                 | 101               | R2            |
| 032A-2                       | 31.2            | 43.6            | 31.2        | 7.5   | 228                 | 101               | R2            |
| 047A-2                       | 46.7            | 62.4            | 46.7        | 11    | 322                 | 179               | R3            |
| 060A-2                       | 60              | 83.2            | 60.0        | 15    | 430                 | 179               | R3            |

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| Type<br>ACQ580-01-             | Input ratings  | Output ratings  |                | Frame size |
|--------------------------------|----------------|-----------------|----------------|------------|
|                                | I <sub>1</sub> | I <sub>N</sub>  | P <sub>N</sub> |            |
|                                | A              | A <sup>1)</sup> | kW             |            |
| 1-phase U <sub>N</sub> = 230 V |                |                 |                |            |
| 04A7-2                         | 3.3            | 2.2             | 0.37           | R1         |
| 06A7-2                         | 4.6            | 3.2             | 0.5            | R1         |
| 07A6-2                         | 6.3            | 4.2             | 0.75           | R1         |
| 12A0-2                         | 8.9            | 6.0             | 1.1            | R1         |
| 018A-2                         | 11.8           | 6.8             | 1.5            | R1         |
| 025A-2                         | 17.3           | 9.6             | 2.2            | R2         |
| 032A-2                         | 30.4           | 15.2            | 4.0            | R2         |
| 047A-2                         | 42             | 22              | 5.5            | R3         |
| 060A-2                         | 55             | 28              | 7.5            | R3         |

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<sup>1)</sup> Continuous current, no overloadability

R1-  
R4

■  $U_N = 400 \text{ V}$

R1-  
R4

| Type<br>ACQ580<br>-01-       | Input<br>rating | Output ratings  |             |       | Heat<br>dissipation | Air flow          | Frame<br>size |
|------------------------------|-----------------|-----------------|-------------|-------|---------------------|-------------------|---------------|
|                              |                 | Max.<br>current | Nominal use |       |                     |                   |               |
|                              | $I_1$           | $I_{\max}$      | $I_N$       | $P_N$ |                     |                   |               |
|                              | A               | A               | A           | kW    | W                   | m <sup>3</sup> /h |               |
| 3-phase $U_N = 400\text{ V}$ |                 |                 |             |       |                     |                   |               |
| 02A7-4                       | 2.6             | 3.2             | 2.6         | 0.75  | 69                  | 43                | R1            |
| 03A4-4                       | 3.3             | 4.7             | 3.3         | 1.1   | 78                  | 43                | R1            |
| 04A1-4                       | 4.0             | 5.9             | 4.0         | 1.5   | 87                  | 43                | R1            |
| 05A7-4                       | 5.6             | 7.2             | 5.6         | 2.2   | 113                 | 43                | R1            |
| 07A3-4                       | 7.2             | 10.1            | 7.2         | 3.0   | 127                 | 43                | R1            |
| 09A5-4                       | 9.4             | 13.0            | 9.4         | 4.0   | 165                 | 43                | R1            |
| 12A7-4                       | 12.6            | 15.3            | 12.6        | 5.5   | 237                 | 43                | R1            |
| 018A-4                       | 17.0            | 22.7            | 17.0        | 7.5   | 265                 | 101               | R2            |
| 026A-4                       | 25.0            | 30.6            | 25.0        | 11.0  | 416                 | 101               | R2            |
| 033A-4                       | 32.0            | 44.3            | 32.0        | 15.0  | 514                 | 179               | R3            |
| 039A-4                       | 38.0            | 56.9            | 38.0        | 18.5  | 570                 | 179               | R3            |
| 046A-4                       | 45.0            | 67.9            | 45.0        | 22.0  | 709                 | 179               | R3            |
| 062A-4                       | 62              | 76              | 62          | 30    | 957                 | 134               | R4            |
| 073A-4                       | 73              | 104             | 73          | 37    | 1230                | 134               | R4            |

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■  $U_N = 480 \text{ V}$

| Type<br>ACQ580<br>-01-       | Input<br>rating | Output ratings  |             |           | Heat<br>dissipation | Air flow          | Frame<br>size |
|------------------------------|-----------------|-----------------|-------------|-----------|---------------------|-------------------|---------------|
|                              |                 | Max.<br>current | Nominal use |           |                     |                   |               |
|                              |                 |                 | $I_1$       | $I_{max}$ |                     |                   |               |
|                              | A               | A               | A           | hp        | W                   | m <sup>3</sup> /h |               |
| 3-phase $U_N = 480\text{ V}$ |                 |                 |             |           |                     |                   |               |
| 02A7-4                       | 2.1             | 2.9             | 2.1         | 1.0       | 45                  | 43                | R1            |
| 03A4-4                       | 3.0             | 3.8             | 3.0         | 1.5       | 55                  | 43                | R1            |
| 04A1-4                       | 3.4             | 5.4             | 3.5         | 2.0       | 66                  | 43                | R1            |
| 05A7-4                       | 4.8             | 6.1             | 4.8         | 3.0       | 84                  | 43                | R1            |
| 07A3-4                       | 6.0             | 7.2             | 6.0         | 3.0       | 106                 | 43                | R1            |
| 09A5-4                       | 7.6             | 8.6             | 7.6         | 5.0       | 133                 | 43                | R1            |
| 12A7-4                       | 11.0            | 13.7            | 12.0        | 7.5       | 174                 | 43                | R1            |
| 018A-4                       | 14.0            | 19.8            | 14.0        | 10.0      | 228                 | 101               | R2            |
| 026A-4                       | 21.0            | 25.2            | 23.0        | 15.0      | 322                 | 101               | R2            |
| 033A-4                       | 27.0            | 37.8            | 27.0        | 20.0      | 430                 | 179               | R3            |
| 039A-4                       | 34.0            | 48.6            | 34.0        | 25.0      | 525                 | 179               | R3            |
| 046A-4                       | 40.0            | 61.2            | 44.0        | 30.0      | 619                 | 179               | R3            |
| 062A-4                       | 52              | 76              | 52          | 40        | 835                 | 134               | R4            |
| 073A-4                       | 65              | 104             | 65          | 50        | 1024                | 134               | R4            |

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## gG fuses

| Type<br>ACQ580-01-                         | Min. short-circuit<br>current <sup>1)</sup> | Input<br>current | gG (IEC 60269)     |                  |                   |             |                      |
|--------------------------------------------|---------------------------------------------|------------------|--------------------|------------------|-------------------|-------------|----------------------|
|                                            |                                             |                  | Nominal<br>current | $I^2t$           | Voltage<br>rating | ABB type    | IEC<br>60269<br>size |
|                                            | A                                           | A                | A                  | A <sup>2</sup> s | V                 |             |                      |
| 3-phase $U_N = 230\text{ V}$               |                                             |                  |                    |                  |                   |             |                      |
| 04A7-2                                     | 200                                         | 4.7              | 25.0               | 2500.0           | 500               | OFAF000H25  | 000                  |
| 06A7-2                                     | 200                                         | 6.7              | 25.0               | 2500.0           | 500               | OFAF000H25  | 000                  |
| 07A6-2                                     | 200                                         | 7.6              | 25.0               | 2500.0           | 500               | OFAF000H25  | 000                  |
| 012A-2                                     | 200                                         | 12.0             | 25.0               | 2500.0           | 500               | OFAF000H25  | 000                  |
| 018A-2                                     | 200                                         | 16.9             | 25.0               | 2500.0           | 500               | OFAF000H25  | 000                  |
| 025A-2                                     | 320                                         | 24.5             | 40.0               | 7700.0           | 500               | OFAF000H40  | 000                  |
| 032A-2                                     | 320                                         | 31.2             | 40.0               | 7700.0           | 500               | OFAF000H40  | 000                  |
| 047A-2                                     | 500                                         | 46.7             | 63.0               | 20100.0          | 500               | OFAF000H63  | 000                  |
| 060A-2                                     | 500                                         | 60.0             | 63.0               | 20100.0          | 500               | OFAF000H63  | 000                  |
| 3-phase $U_N = 400\text{ or }480\text{ V}$ |                                             |                  |                    |                  |                   |             |                      |
| 02A7-4                                     | 32                                          | 2.6              | 4                  | 55               | 500               | OFAF000H4   | 000                  |
| 03A4-4                                     | 48                                          | 3.3              | 6                  | 110              | 500               | OFAF000H6   | 000                  |
| 04A1-4                                     | 48                                          | 4.0              | 6                  | 110              | 500               | OFAF000H6   | 000                  |
| 05A7-4                                     | 80                                          | 5.6              | 10                 | 360              | 500               | OFAF000H10  | 000                  |
| 07A3-4                                     | 80                                          | 7.2              | 10                 | 360              | 500               | OFAF000H10  | 000                  |
| 09A5-4                                     | 128                                         | 9.4              | 16                 | 740              | 500               | OFAF000H16  | 000                  |
| 12A7-4                                     | 128                                         | 12.6             | 16                 | 740              | 500               | OFAF000H16  | 000                  |
| 018A-4                                     | 200                                         | 17.0             | 25                 | 2500             | 500               | OFAF000H25  | 000                  |
| 026A-4                                     | 256                                         | 25.0             | 32                 | 4000             | 500               | OFAF000H32  | 000                  |
| 033A-4                                     | 320                                         | 32.0             | 40                 | 7700             | 500               | OFAF000H40  | 000                  |
| 039A-4                                     | 400                                         | 38.0             | 50                 | 16000            | 500               | OFAF000H50  | 000                  |
| 046A-4                                     | 500                                         | 45.0             | 63                 | 20100            | 500               | OFAF000H63  | 000                  |
| 062A-4                                     | 800                                         | 62               | 80                 | 37500            | 500               | OFAF000H80  | 000                  |
| 073A-4                                     | 1000                                        | 73               | 100                | 65000            | 500               | OFAF000H100 | 000                  |

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R4

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<sup>1)</sup> Minimum short-circuit current of the installation

## uR or aR fuses

R1-  
R4

| Type<br>ACQ580<br>-01-                     | Min. short-<br>circuit<br>current <sup>1)</sup> | Input<br>current | uR or aR (DIN 43620 blade style) |                  |                   |                 |                   |
|--------------------------------------------|-------------------------------------------------|------------------|----------------------------------|------------------|-------------------|-----------------|-------------------|
|                                            |                                                 |                  | Nominal<br>current               | $I^2t$           | Voltage<br>rating | Busmann<br>type | IEC 60269<br>size |
|                                            | A                                               | A                | A                                | A <sup>2</sup> s | V                 |                 |                   |
| 3-phase $U_N = 230\text{ V}$               |                                                 |                  |                                  |                  |                   |                 |                   |
| 04A7-2                                     | 120.0                                           | 4.7              | 40.0                             | 460.0            | 690               | 170M1563        | 000               |
| 06A7-2                                     | 120.0                                           | 6.7              | 40.0                             | 460.0            | 690               | 170M1563        | 000               |
| 07A6-2                                     | 120.0                                           | 7.6              | 40.0                             | 460.0            | 690               | 170M1563        | 000               |
| 012A-2                                     | 120.0                                           | 12.0             | 40.0                             | 460.0            | 690               | 170M1563        | 000               |
| 018A-2                                     | 120.0                                           | 16.9             | 40.0                             | 460.0            | 690               | 170M1563        | 000               |
| 025A-2                                     | 170.0                                           | 24.5             | 63.0                             | 1450.0           | 690               | 170M1565        | 000               |
| 032A-2                                     | 170.0                                           | 31.2             | 63.0                             | 1450.0           | 690               | 170M1565        | 000               |
| 047A-2                                     | 280.0                                           | 46.7             | 80.0                             | 2550.0           | 690               | 170M1566        | 000               |
| 060A-2                                     | 280.0                                           | 60.0             | 80.0                             | 2550.0           | 690               | 170M1566        | 000               |
| 089A-2                                     | 700.0                                           | 89.0             | 200.0                            | 15000.0          | 690               | 170M3815        | 1                 |
| 115A-2                                     | 700.0                                           | 115.0            | 200.0                            | 15000.0          | 690               | 170M3815        | 1                 |
| 144A-2                                     | 1000                                            | 144.0            | 315                              | 46500            | 690               | 170M3817        | 1                 |
| 171A-2                                     | 1280                                            | 171.0            | 450                              | 105000           | 690               | 170M5809        | 2                 |
| 213A-2                                     | 1450                                            | 213.0            | 500                              | 155000           | 690               | 170M5810        | 2                 |
| 276A-2                                     | 2050                                            | 276.0            | 630                              | 220000           | 690               | 170M6810        | 3                 |
| 3-phase $U_N = 400\text{ or }480\text{ V}$ |                                                 |                  |                                  |                  |                   |                 |                   |
| 02A7-4                                     | 65                                              | 2.6              | 25                               | 130              | 690               | 170M1561        | 000               |
| 03A4-4                                     | 65                                              | 3.3              | 25                               | 130              | 690               | 170M1561        | 000               |
| 04A1-4                                     | 65                                              | 4.0              | 25                               | 130              | 690               | 170M1561        | 000               |
| 05A7-4                                     | 65                                              | 5.6              | 25                               | 130              | 690               | 170M1561        | 000               |
| 07A3-4                                     | 65                                              | 7.2              | 25                               | 130              | 690               | 170M1561        | 000               |
| 09A5-4                                     | 65                                              | 9.4              | 25                               | 130              | 690               | 170M1561        | 000               |
| 12A7-4                                     | 65                                              | 12.6             | 25                               | 130              | 690               | 170M1561        | 000               |
| 018A-4                                     | 120                                             | 17.0             | 40                               | 460              | 690               | 170M1563        | 000               |
| 026A-4                                     | 120                                             | 25.0             | 40                               | 460              | 690               | 170M1563        | 000               |
| 033A-4                                     | 170                                             | 32.0             | 63                               | 1450             | 690               | 170M1565        | 000               |
| 039A-4                                     | 170                                             | 38.0             | 63                               | 1450             | 690               | 170M1565        | 000               |
| 046A-4                                     | 280                                             | 45.0             | 80                               | 2550             | 690               | 170M1566        | 000               |
| 062A-4                                     | 380                                             | 62               | 100                              | 4650             | 690               | 170M1567        | 000               |
| 073A-4                                     | 480                                             | 73               | 125                              | 8500             | 690               | 170M1568        | 000               |
| 088A-4                                     | 700                                             | 88               | 160                              | 16000            | 690               | 170M1569        | 000               |
| 106A-4                                     | 1280                                            | 106              | 315                              | 46500            | 690               | 170M3817        | 1                 |
| 145A-4                                     | 1280                                            | 145              | 315                              | 46500            | 690               | 170M3817        | 1                 |
| 169A-4                                     | 1800                                            | 169              | 450                              | 105000           | 690               | 170M5809        | 1                 |
| 206A-4                                     | 2210                                            | 206              | 500                              | 145000           | 690               | 170M5810        | 1                 |
| 246A-4                                     | 3010                                            | 246              | 630                              | 275000           | 690               | 170M5812        | 2                 |
| 293A-4                                     | 4000                                            | 293              | 800                              | 490000           | 690               | 170M6812D       | 2                 |
| 363A-4                                     | 5550                                            | 363              | 1000                             | 985000           | 690               | 170M6814D       | 2                 |
| 430A-4                                     | 7800                                            | 430              | 1250                             | 2150000          | 690               | 170M8554D       | 2                 |

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<sup>1)</sup> Minimum short-circuit current of the installation

| Type<br>ACQ580<br>-01-                                      | Min. short-<br>circuit<br>current <sup>1)</sup> | Input<br>current | uR or aR (DIN 43653 bolted tags) |                  |                   |                  |                   |
|-------------------------------------------------------------|-------------------------------------------------|------------------|----------------------------------|------------------|-------------------|------------------|-------------------|
|                                                             |                                                 |                  | Nominal<br>current               | $I^2t$           | Voltage<br>rating | Bussmann<br>type | IEC 60269<br>size |
|                                                             | A                                               | A                | A                                | A <sup>2</sup> s | V                 |                  |                   |
| <b>3-phase <math>U_N = 400</math> or <math>480</math> V</b> |                                                 |                  |                                  |                  |                   |                  |                   |
| 02A7-4                                                      | 65                                              | 2.6              | 25                               | 130              | 690               | 170M1311         | 000               |
| 03A4-4                                                      | 65                                              | 3.3              | 25                               | 130              | 690               | 170M1311         | 000               |
| 04A1-4                                                      | 65                                              | 4.0              | 25                               | 130              | 690               | 170M1311         | 000               |
| 05A7-4                                                      | 65                                              | 5.6              | 25                               | 130              | 690               | 170M1311         | 000               |
| 07A3-4                                                      | 65                                              | 7.2              | 25                               | 130              | 690               | 170M1311         | 000               |
| 09A5-4                                                      | 65                                              | 9.4              | 25                               | 130              | 690               | 170M1311         | 000               |
| 12A7-4                                                      | 65                                              | 12.6             | 25                               | 130              | 690               | 170M1311         | 000               |
| 018A-4                                                      | 120                                             | 17.0             | 40                               | 460              | 690               | 170M1313         | 000               |
| 026A-4                                                      | 120                                             | 25.0             | 40                               | 460              | 690               | 170M1313         | 000               |
| 033A-4                                                      | 170                                             | 32.0             | 63                               | 1450             | 690               | 170M1315         | 000               |
| 039A-4                                                      | 170                                             | 38.0             | 63                               | 1450             | 690               | 170M1315         | 000               |
| 046A-4                                                      | 280                                             | 45.0             | 80                               | 2550             | 690               | 170M1316         | 000               |
| 062A-4                                                      | 380                                             | 62               | 100                              | 4650             | 690               | 170M1417         | 000               |
| 073A-4                                                      | 480                                             | 73               | 125                              | 8500             | 690               | 170M1318         | 000               |
| 088A-4                                                      | 700                                             | 88               | 160                              | 16000            | 690               | 170M1319         | 000               |
| 106A-4                                                      | 700                                             | 106              | 200                              | 15000            | 690               | 170M3015         | 1                 |
| 145A-4                                                      | 1000                                            | 145              | 250                              | 28500            | 690               | 170M3016         | 1                 |
| 169A-4                                                      | 1280                                            | 169              | 315                              | 46500            | 690               | 170M3017         | 1                 |
| 206A-4                                                      | 1520                                            | 206              | 350                              | 68500            | 690               | 170M3018         | 1                 |
| 246A-4                                                      | 2050                                            | 246              | 450                              | 105000           | 690               | 170M5009         | 2                 |
| 293A-4                                                      | 2200                                            | 293              | 500                              | 145000           | 690               | 170M5010         | 2                 |
| 363A-4                                                      | 3100                                            | 363              | 630                              | 275000           | 690               | 170M5012         | 2                 |
| 430A-4                                                      | 3600                                            | 430              | 700                              | 405000           | 690               | 170M5013         | 2                 |

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<sup>1)</sup> Minimum short-circuit current of the installationR1-  
R4

R1-  
R4

# EN – R1...R4 Quick installation guide

This guide briefly describes how to install the drive for IEC use. For complete information on installation, see *ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual* (3AXD50000044862 [English]). For start-up instructions, see chapter [EN – Quick start-up guide](#) on page 43.

R1-  
R4

To read a manual, go to [www.abb.com/drives/documents](http://www.abb.com/drives/documents) and search for the document number.

## Obey the safety instructions



**WARNING!** Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur:

- If you are not a qualified electrical professional, do not do electrical installation work.
- Do not work on the drive, motor cable or motor when main power is applied. If the drive is already connected to the input power, wait for 5 minutes after disconnecting the input power.
- Do not work on the control cables when power is applied to the drive or to the external control circuits.
- Make sure that debris from drilling, cutting and grinding does not enter the drive when installing.
- Make sure that the floor below the drive and the wall where the drive is installed are non-flammable.

EN

## Check if capacitors need to be reformed

The capacitors must be reformed if the drive has not been powered (either in storage or unused) for a year or more.

You can determine the manufacturing time from the serial number, which you find on the type designation label attached to the drive. The serial number is of format MYYWWRXXXX. YY and WW tell the manufacturing year and week as follows:

YY: 17, 18, 19, ... for 2017, 2018, 2019, ...

WW: 01, 02, 03, ... for week 1, week 2, week 3, ...

For information on reforming the capacitors, see *Converter module capacitor reforming instructions* (3BFE64059629 [English]), available on the Internet at [www.abb.com/drives/documents](http://www.abb.com/drives/documents).

## Select the power cables

Size the power cables according to local regulations to carry the nominal current given on the type designation label of your drive.

R1-  
R4

## Ensure the cooling

See table *IEC ratings at UN = 230 V, 400 V and 480 V* on page 9 for the heat dissipation. The allowed operating temperature range of the drive is -15 to +50 °C (+5 to +122 °F). No condensation or frost is allowed. For more information on the ambient temperature and derating, see chapter *Technical data* in ACQ580-01 (0.75 to 250 kW) hardware manual (3AXD50000044862 [English]).

EN

## Protect the drive and input power cable

See tables *gG fuses* (on page 11) and *uR or aR fuses* (on page 12).

If you use gG fuses, make sure that the operating time of the fuse is below 0.5 seconds. Follow the local regulations.

## Install the drive on the wall

See figure *R1...R4 Figures A* on page 51.

## Check the insulation of the power cables and the motor

Check the insulation of the input cable according to local regulations before connecting it to the drive.

See figure *B1* on page 51.

1. Check the insulation of the motor cable and motor when the cable is disconnected from the drive. Measure the insulation resistance between each phase conductor and then between each phase conductor and the Protective Earth conductor using a measuring voltage of 1000 V DC. The insulation resistance of a typical motor must exceed 100 Mohm (reference value at 25 °C or 77 °F). For the insulation resistance of motors, see the manufacturer's instructions.

**Note:** Moisture inside the motor casing will reduce the insulation resistance. If moisture is suspected, dry the motor and repeat the measurement.

## Switch off the power and open the cover

See figure [B1](#) on page [51](#).

2. Switch off the power from the drive.
3. Remove the front cover: Loosen the retaining screw, if any, with a screwdriver (3a) and lift the cover from the bottom outwards (3b) and then up (3c).

**R1-  
R4**

## Install the cable box

Only for frames IP21, R1....R2.

See figures [B1](#) on page [51](#).

4. IP21, R1....R2: Remove the screw (4a) and lift the cover off (4b) from the separate cable box.
5. IP21, R1....R2: Attach the cable box cover to the front cover.
6. IP21, R1....R2: Install the cable box to the frame. Position the cable box (6a) and tighten the screws (6b).

**EN**

## Attach the warning sticker

See figure [B2](#) on page [51](#).

7. Attach the residual voltage warning sticker in the local language.

## Check the compatibility with IT (ungrounded), corner-grounded delta, midpoint-grounded delta, and TT systems

See figure [B3](#) on page [51](#).

### EMC filter

A drive with the internal EMC filter connected can be installed to a symmetrically grounded TN-S system. If you install the drive to another system, you may need to disconnect the EMC filter. See section *Checking the compatibility with IT (ungrounded), corner-grounded delta, midpoint-grounded delta, and TT systems* (for IEC) in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000044862 [English]).



**WARNING!** Do not install a drive with the EMC filter connected to a system that the filter is not suitable for. This can cause danger, or damage the drive.

**Note:** When the internal EMC filter is disconnected, the EMC compatibility of the drive is considerably reduced. See section *EMC compatibility and motor cable length*

in chapter *Technical data* in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000044862 [English]).

### ■ Ground-to-phase varistor

R1-  
R4

A drive with the ground-to-phase varistor connected can be installed to a symmetrically grounded TN-S system. If you install the drive to another system, you may need to disconnect the varistor. See section *Checking the compatibility with IT (ungrounded), corner-grounded delta, midpoint-grounded delta, and TT systems* (for IEC) in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000044862 [English]).



**WARNING!** Do not install a drive with the ground-to-phase varistor connected to a system that the varistor is not suitable for. If you do, the varistor circuit can be damaged.

EN

## Connect the power cables

See figures [C1](#) (page 51), [C2](#), [D](#), [E1](#), [E2](#), [F](#), [G1](#), [G2](#) and [R1...R4 Figures H](#) (page 53).

1. Remove the rubber grommets from the cable entry.

Use symmetrical shielded cable for motor cabling. If the cable shield is the sole PE conductor for drive or motor, make sure that it has sufficient conductivity for the PE.

2. Cut an adequate hole into the rubber grommet. Slide the grommet onto the cable.

3. Prepare the ends of the motor cable as illustrated in figures 3a and 3b (two different motor cable types are shown). In frames R1 and R2 there are markings on the drive frame near the power cable terminals helping you to strip the wires to the correct length of 8 mm. **Note:** The bare shield will be grounded 360 degrees. Mark the pigtail made from the shield as a PE conductor with yellow-and-green color.

4. Slide the cable through the hole in the cable entry, and attach the grommet to the hole.

5. Connect the motor cable:
  - Ground the shield 360 degrees by tightening the clamp of the power cable grounding shelf onto the stripped part of the cable (5a).
  - Connect the twisted shield of the cable to the grounding terminal (5b).
  - Connect the phase conductors of the cable to the T1/U, T2/V and T3/W terminals (5c). Tighten the screws to the torque given in the figure.

6. Repeat steps [2...4](#) for the input power cable.

7. Connect the input power cable. Connect the additional PE conductor of the cable (7c). Tighten the screws to the torque given in the figure.

8. [R1...R2, R4](#): Install the grounding shelf.

9. Repeat steps [2...4](#) for the brake resistor cable (if used). Cut off extra phase conductors (if any).

10. Connect the resistor cable (if used). Tighten the screws to the torque given in the figure.

11. Put the unused rubber grommets to the holes in the cable entry.

12. Secure the cables outside the unit mechanically.

13. Ground the motor cable shield at the motor end. For minimum radio frequency interference, ground the motor cable shield 360 degrees at the cable entry of the motor terminal box.

R1-R4

EN

## Connect the control cables

See figures [1](#) and [12](#) on page [53](#). It shows an example with one analog signal cable and one digital signal cable. Make the connections according to the default configuration in use. The default connections of the Water default configuration are shown in section [Default I/O connections](#) on page [21](#).

**R1-  
R4**

1. Remove the front cover, if not already removed. See section [Switch off the power and open the cover](#) on page [17](#).

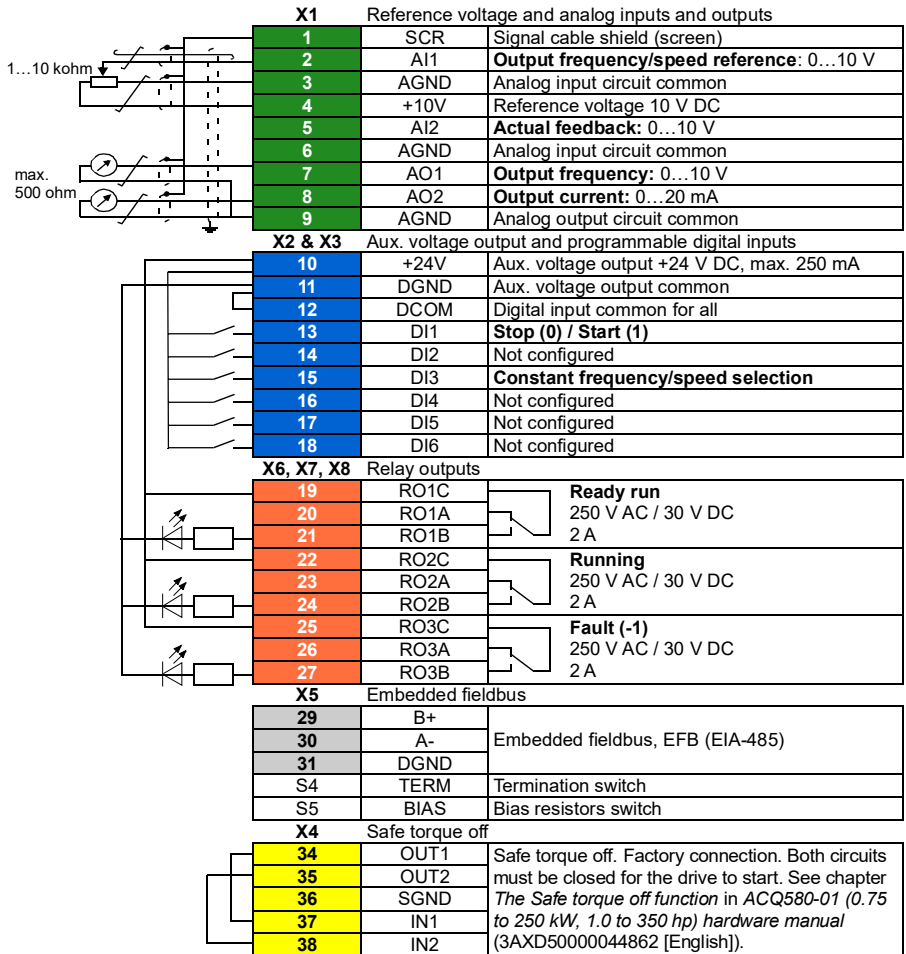
Example of connecting an analog signal cable:

2. Cut an adequate hole into the rubber grommet and slide the grommet onto the cable. Slide the cable through a hole in the cable entry and attach the grommet to the hole.
3. Ground the outer shield of the cable 360 degrees under the grounding clamp. Keep the cable unstripped as close to the terminals of the control board as possible. Ground also the pair-cable shields and grounding wire at the SCR1 terminal.
4. Route the cable as shown in the figure.
5. Connect the conductors to the appropriate terminals of the control board and tighten to 0.5...0.6 N·m (0.4 lbf·ft).
6. Tie all control cables to the provided cable tie mounts.

**EN**

## Default I/O connections

Default I/O connections of the Water default configuration are shown below.

R1-  
R4

EN

Total load capacity of the Auxiliary voltage output +24V (X2:10) is 6.0 W (250 mA / 24 V DC).

Wire sizes:

0.2...2.5 mm<sup>2</sup> (24...14 AWG): Terminals +24V, DGND, DCOM, B+, A-, DGND, Ext. 24V

0.14...1.5 mm<sup>2</sup> (26...16 AWG): Terminals DI, AI, AO, AGND, RO, STO

Tightening torques: 0.5...0.6 N·m (0.4 lbf·ft)

## Install optional modules, if any

See chapter *Electrical installation* in *ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual* (3AXD50000044862 [English]).

R1-  
R4

### Reinstall cover

See figure [J](#) on page [54](#).

1. Put the tabs on the inside of the cover top in their counterparts on the housing (1a) and then press the cover at the bottom (1b).
2. Tighten the retaining screw with a screwdriver.

EN

For start-up instructions, see chapter [EN – Quick start-up guide](#) on page [43](#).

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# Compliance with the European Machinery Directive 2006/42/EC

## Declaration of conformity



R1-  
R4

### EU Declaration of Conformity

Machinery Directive 2006/42/EC

We

|               |                                       |
|---------------|---------------------------------------|
| Manufacturer: | ABB Oy                                |
| Address:      | Hiomotie 13, 00380 Helsinki, Finland. |
| Phone:        | +358 10 22 11                         |

declare under our sole responsibility that the following product:

**Frequency converter(s)**

**ACQ580-01/-31**

with regard to the safety function(s)

**Safe Torque Off**

is/are in conformity with all the relevant safety component requirements of EU Machinery Directive 2006/42/EC, when the listed safety function is used for safety component functionality.

The following harmonized standards have been applied:

|                                             |                                                                                                                              |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| EN 61800-5-2:2007                           | Adjustable speed electrical power drive systems – Part 5-2: Safety requirements - Functional                                 |
| EN 62061:2005 + AC:2010 + A1:2013 + A2:2015 | Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems |
| EN ISO 13849-1:2015                         | Safety of machinery – Safety-related parts of control systems. Part 1: General requirements                                  |
| EN ISO 13849-2:2012                         | Safety of machinery – Safety-related parts of the control systems. Part 2: Validation                                        |
| EN 60204-1: 2006 + A1:2009 + AC:2010        | Safety of machinery – Electrical equipment of machines – Part 1: General requirements                                        |

The following other standards have been applied:

|                           |                                                                                               |
|---------------------------|-----------------------------------------------------------------------------------------------|
| IEC 61508:2010, parts 1-2 | Functional safety of electrical / electronic / programmable electronic safety-related systems |
| IEC 61800-5-2:2016        | Adjustable speed electrical power drive systems – Part 5-2: Safety requirements - Functional  |

The product(s) referred in this Declaration of conformity fulfil(s) the relevant provisions of other European Union Directives which are notified in Single EU Declaration of conformity 3AXD10000497692.

Person authorized to compile the technical file

Name and address: Risto Mynttinen, Hiomotie 13, 00380 Helsinki, Finland.

Helsinki 07.06.2019

|                              |                                        |
|------------------------------|----------------------------------------|
| Manufacturer representative: | Tuomo Tarula<br>Vice President, ABB Oy |
|------------------------------|----------------------------------------|

R1-  
R4

DRIVES FOR WATER

# ACQ580-01 drives

## Quick installation guide Frames R5

R5

English . . . . .31

EN





# Ratings and fuses

IEC ratings at  $U_N = 230\text{ V}$ ,  $400\text{ V}$  and  $480\text{ V}$

$U_N = 230\text{ V}$

| Type<br>ACQ580<br>-01-       | Input<br>rating | Output ratings  |             |       | Heat<br>dissipation | Air flow | Frame<br>size |
|------------------------------|-----------------|-----------------|-------------|-------|---------------------|----------|---------------|
|                              |                 | Max.<br>current | Nominal use |       |                     |          |               |
|                              | $I_1$           | $I_{\max}$      | $I_N$       | $P_N$ |                     |          |               |
|                              | A               | A               | A           | kW    | W                   | m³/h     |               |
| 3-phase $U_N = 230\text{ V}$ |                 |                 |             |       |                     |          |               |
| 089A-2                       | 89              | 135             | 89          | 22    | 619                 | 139      | R5            |
| 115A-2                       | 115             | 158             | 115         | 30    | 835                 | 139      | R5            |

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| Type<br>ACQ580-01-           | Input ratings | Output ratings  |       | Frame size |
|------------------------------|---------------|-----------------|-------|------------|
|                              | $I_1$         | $I_N$           | $P_N$ |            |
|                              | A             | A <sup>1)</sup> | kW    |            |
| 1-phase $U_N = 230\text{ V}$ |               |                 |       |            |
| 089A-2                       | 81            | 42              | 11    | R5         |
| 115A-2                       | 111           | 54              | 15    | R5         |

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<sup>1)</sup> Continuous current, no overloadability

$U_N = 400\text{ V}$

| Type<br>ACQ580<br>-01-       | Input<br>rating | Output ratings  |             |       | Heat<br>dissipation | Air flow | Frame<br>size |
|------------------------------|-----------------|-----------------|-------------|-------|---------------------|----------|---------------|
|                              |                 | Max.<br>current | Nominal use |       |                     |          |               |
|                              | $I_1$           | $I_{\max}$      | $I_N$       | $P_N$ |                     |          |               |
|                              | A               | A               | A           | kW    | W                   | m³/h     |               |
| 3-phase $U_N = 400\text{ V}$ |                 |                 |             |       |                     |          |               |
| 088A-4                       | 88              | 122             | 88          | 45    | 1316                | 139      | R5            |
| 106A-4                       | 106             | 148             | 106         | 55    | 1589                | 139      | R5            |

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■  $U_N = 480\text{ V}$

| Type<br>ACQ580<br>-01-       | Input<br>rating | Output ratings  |             |          | Heat<br>dissipation | Air flow | Frame<br>size |
|------------------------------|-----------------|-----------------|-------------|----------|---------------------|----------|---------------|
|                              |                 | Max.<br>current | Nominal use |          |                     |          |               |
|                              |                 |                 | $I_l$       | $P_{Ld}$ |                     |          |               |
|                              |                 |                 | A           | hp       |                     |          |               |
| 3-phase $U_N = 480\text{ V}$ |                 |                 |             |          |                     |          |               |
| 088A-4                       | 77              | 122             | 77          | 60       | 1240                | 139      | R5            |
| 106A-4                       | 96              | 148             | 96          | 75       | 1510                | 139      | R5            |

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## gG fuses

| Type<br>ACQ580-01-           | Min. short-circuit<br>current <sup>1)</sup> | Input<br>current | gG (IEC 60269)     |                  |                   |             |                      |
|------------------------------|---------------------------------------------|------------------|--------------------|------------------|-------------------|-------------|----------------------|
|                              |                                             |                  | Nominal<br>current | $I^2t$           | Voltage<br>rating | ABB type    | IEC<br>60269<br>size |
|                              | A                                           | A                | A                  | A <sup>2</sup> s | V                 |             |                      |
| 3-phase $U_N = 230$ V        |                                             |                  |                    |                  |                   |             |                      |
| 089A-2                       | 1300                                        | 89.0             | 125.0              | 103000           | 500               | OFAF00H125  | 00                   |
| 115A-2                       | 1300                                        | 115.0            | 125.0              | 103000           | 500               | OFAF00H125  | 00                   |
| 3-phase $U_N = 400$ or 480 V |                                             |                  |                    |                  |                   |             |                      |
| 088A-4                       | 1000                                        | 88               | 100                | 65000            | 500               | OFAF000H100 | 000                  |
| 106A-4                       | 1300                                        | 106              | 125                | 103000           | 500               | OFAF00H125  | 00                   |

R5

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<sup>1)</sup> Minimum short-circuit current of the installation

## uR or aR fuses

| Type<br>ACQ580<br>-01-                     | Min. short-circuit<br>current <sup>1)</sup> | Input<br>current | uR or aR (DIN 43620 blade style) |                  |                   |                  |                   |
|--------------------------------------------|---------------------------------------------|------------------|----------------------------------|------------------|-------------------|------------------|-------------------|
|                                            |                                             |                  | Nominal<br>current               | $I^2t$           | Voltage<br>rating | Bussmann<br>type | IEC 60269<br>size |
|                                            | A                                           | A                | A                                | A <sup>2</sup> s | V                 |                  |                   |
| 3-phase $U_N = 230\text{ V}$               |                                             |                  |                                  |                  |                   |                  |                   |
| 089A-2                                     | 700.0                                       | 89.0             | 200.0                            | 15000.0          | 690               | 170M3815         | 1                 |
| 115A-2                                     | 700.0                                       | 115.0            | 200.0                            | 15000.0          | 690               | 170M3815         | 1                 |
| 3-phase $U_N = 400\text{ or }480\text{ V}$ |                                             |                  |                                  |                  |                   |                  |                   |
| 088A-4                                     | 700                                         | 88               | 160                              | 16000            | 690               | 170M1569         | 000               |
| 106A-4                                     | 1280                                        | 106              | 315                              | 46500            | 690               | 170M3817         | 1                 |

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<sup>1)</sup> Minimum short-circuit current of the installation

| Type<br>ACQ580<br>-01-         | Min. short-circuit<br>current <sup>1)</sup> | Input<br>current | uR or aR (DIN 43653 bolted tags) |                  |                   |                  |                   |
|--------------------------------|---------------------------------------------|------------------|----------------------------------|------------------|-------------------|------------------|-------------------|
|                                |                                             |                  | Nominal<br>current               | $I^2t$           | Voltage<br>rating | Bussmann<br>type | IEC 60269<br>size |
|                                | A                                           | A                | A                                | A <sup>2</sup> s | V                 |                  |                   |
| 3-phase $U_N = 400$ or $480$ V |                                             |                  |                                  |                  |                   |                  |                   |
| 088A-4                         | 700                                         | 88               | 160                              | 16000            | 690               | 170M1319         | 000               |
| 106A-4                         | 700                                         | 106              | 200                              | 15000            | 690               | 170M3015         | 1                 |

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<sup>1)</sup> Minimum short-circuit current of the installation



# EN – R5 Quick installation guide

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This guide briefly describes how to install the drive for IEC use. For complete information on installation, see *ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual* (3AXD50000044862 [English]). For start-up instructions, see chapter [EN – Quick start-up guide](#) on page 43.

To read a manual, go to [www.abb.com/drives/documents](http://www.abb.com/drives/documents) and search for the document number.

R5

## Obey the safety instructions

---



**WARNING!** Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur:

- If you are not a qualified electrical professional, do not do electrical installation work.
  - Do not work on the drive, motor cable or motor when main power is applied. If the drive is already connected to the input power, wait for 5 minutes after disconnecting the input power.
  - Do not work on the control cables when power is applied to the drive or to the external control circuits.
  - Make sure that debris from drilling, cutting and grinding does not enter the drive when installing.
  - Make sure that the floor below the drive and the wall where the drive is installed are non-flammable.
- 

EN

## Check if capacitors need to be reformed

The capacitors must be reformed if the drive has not been powered (either in storage or unused) for a year or more.

You can determine the manufacturing time from the serial number, which you find on the type designation label attached to the drive. The serial number is of format MYYWWRXXXX. YY and WW tell the manufacturing year and week as follows:

YY: 16, 17, 18, ... for 2016, 2017, 2018, ...

WW: 01, 02, 03, ... for week 1, week 2, week 3, ...

For information on reforming the capacitors, see *Converter module capacitor reforming instructions* (3BFE64059629 [English]), available on the Internet at [www.abb.com/drives/documents](http://www.abb.com/drives/documents).

---

## Select the power cables

Size the power cables according to local regulations to carry the nominal current given on the type designation label of your drive.

## Ensure the cooling

R5

See table *IEC ratings at UN = 230 V, 400 V and 480 V* on page 27 for the heat dissipation. The allowed operating temperature range of the drive is -15 to +50 °C (+5 to +122 °F). No condensation or frost is allowed. For more information on the ambient temperature and derating, see chapter *Technical data* in *ACQ580-01 (0.75 to 250 kW) hardware manual* (3AXD50000044862 [English]).

## Protect the drive and input power cable

EN

See tables *gG fuses* (on page 29) and *uR or aR fuses* (on page 29).

If you use gG fuses, make sure that the operating time of the fuse is below 0.5 seconds. Follow the local regulations.

## Install the drive on the wall

See figure *R5 Figures A* on page 55.

## Check the insulation of the power cables and the motor

Check the insulation of the input cable according to local regulations before connecting it to the drive.

See figure *B* on page 55.

1. Check the insulation of the motor cable and motor when the cable is disconnected from the drive. Measure the insulation resistance between each phase conductor and then between each phase conductor and the Protective Earth conductor using a measuring voltage of 1000 V DC. The insulation resistance of a typical motor must exceed 100 Mohm (reference value at 25 °C or 77 °F). For the insulation resistance of motors, see the manufacturer's instructions.

**Note:** Moisture inside the motor casing will reduce the insulation resistance. If moisture is suspected, dry the motor and repeat the measurement.

## Switch off the power and open the cover

See figure [B](#) on page [55](#).

2. Switch off the power from the drive.
3. IP21, Remove the module cover: Loosen the retaining screws with a screwdriver (3a) and lift the cover from the bottom outwards (3b) and then up (3c).
4. IP21, Remove the box cover: Loosen the retaining screws with a screwdriver (4a) and slide the cover downwards (4b).
5. IP55, Remove the front cover: Loosen the retaining screws with a screwdriver (4a) and lift the cover from the bottom outwards (4b) and then up (4c).

R5

## Check the compatibility with IT (ungrounded), corner-grounded delta, midpoint-grounded delta, and TT systems

EN

See figure [C](#) on page [56](#).

### ■ EMC filter

A drive with the internal EMC filter connected can be installed to a symmetrically grounded TN-S system. If you install the drive to another system, you may need to disconnect the EMC filter. See section *Checking the compatibility with IT (ungrounded), corner-grounded delta, midpoint-grounded delta, and TT systems* (for IEC) in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000044862 [English]).



**WARNING!** Do not install a drive with the EMC filter connected to a system that the filter is not suitable for. This can cause danger, or damage the drive.

**Note:** When the internal EMC filter is disconnected, the EMC compatibility of the drive is considerably reduced. See section *EMC compatibility and motor cable length* in chapter *Technical data* in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000044862 [English]).

### ■ Ground-to-phase varistor

A drive with the ground-to-phase varistor connected can be installed to a symmetrically grounded TN-S system. If you install the drive to another system, you may need to disconnect the varistor. See section *Checking the compatibility with IT (ungrounded), corner-grounded delta, midpoint-grounded delta, and TT systems* (for IEC) in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000044862 [English]).



**WARNING!** Do not install a drive with the ground-to-phase varistor connected to a system that the varistor is not suitable for. If you do, the varistor circuit can be damaged.

---

R5

EN

---

## Connect the power cables

See figures [D](#) (page [56](#)), [E](#) and [R5 Figures F](#) (page [57](#)).

1. Attach the residual voltage warning sticker in the local language next to the control board.
2. Remove the shroud on the power cable terminals by releasing the clips with a screwdriver and pulling the shroud out.

Use symmetrical shielded cable for motor cabling. If the cable shield is the sole PE conductor for drive or motor, make sure that it has sufficient conductivity for the PE.

3. Cut an adequate hole into the rubber grommet. Slide the grommet onto the cable.
4. Prepare the ends of the motor cable as illustrated in figures 4a and 4b (two different motor cable types are shown). **Note:** The bare shield will be grounded 360 degrees. Mark the pigtail made from the shield as a PE conductor with yellow-and-green color.
5. Slide the cable through the hole in the cable entry and attach the grommet to the hole.
6. Connect the motor cable:
  - Ground the shield 360 degrees by tightening the clamp of the power cable grounding shelf onto the stripped part of the cable (6a).
  - Connect the twisted shield of the cable to the grounding terminal (6b).
  - Connect the phase conductors of the cable to the T1/U, T2/V and T3/W terminals (6c). Tighten the screws to the torque given in the figure.
7. Repeat steps [3...5](#) for the input power cable.
8. Connect the input power cable. Tighten the screws to the torque given in the figure.
9. Install the cable box plate. Position the plate and tighten the screw.
10. Reinstall the shroud on the power terminals by putting the tabs at the top of the shroud in their counterparts on the drive frame and then pressing the shroud in place.
11. Secure the cables outside the unit mechanically.
12. See figure [G](#) (page [57](#)). Ground the motor cable shield at the motor end. For minimum radio frequency interference, ground the motor cable shield 360 degrees at the cable entry of the motor terminal box.

R5

EN

## Connect the control cables

See figure [H](#) on page [57](#). It shows an example with one analog signal cable and one digital signal cable. Make the connections according to the default configuration in use. The default connections of the Water default configuration are shown in section [Default I/O connections](#) on page [37](#).

**R5**

1. Remove the front cover, if not already removed. See section [Switch off the power and open the cover](#) on page [33](#).

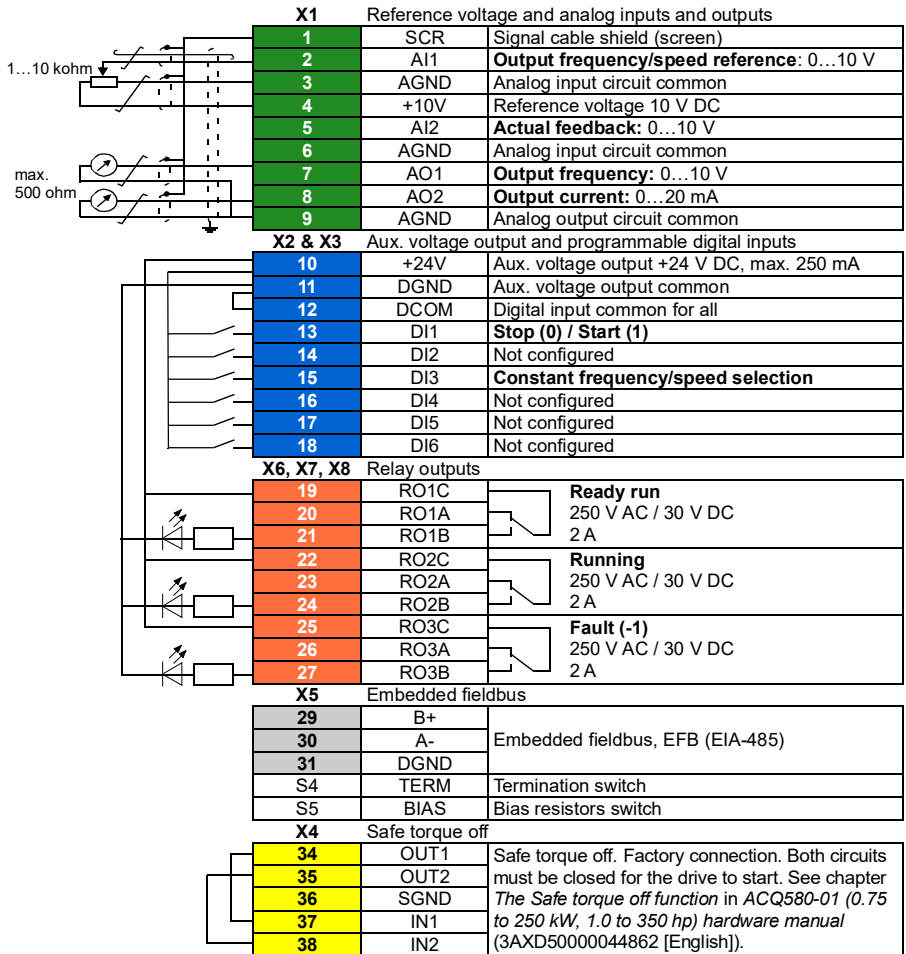
Example of connecting an analog signal cable:

**EN**

2. Cut an adequate hole into the rubber grommet and slide the grommet onto the cable. Slide the cable through a hole in the cable entry and attach the grommet to the hole.
  3. Ground the outer shield of the cable 360 degrees under the grounding clamp. Keep the cable unstripped as close to the terminals of the control board as possible. Ground also the pair-cable shields and grounding wire at the SCR1 terminal.
  4. Route the cable as shown in the figure.
  5. Connect the conductors to the appropriate terminals of the control board and tighten to 0.5...0.6 N·m (0.4 lbf·ft).
  6. Tie all control cables to the provided cable tie mounts.
-

## Default I/O connections

Default I/O connections of the Water default configuration are shown below.



R5

EN

Total load capacity of the Auxiliary voltage output +24V (X2:10) is 6.0 W (250 mA / 24 V DC).

Wire sizes:

0.2...2.5 mm<sup>2</sup> (24...14 AWG): Terminals +24V, DGND, DCOM, B+, A-, DGND, Ext. 24V

0.14...1.5 mm<sup>2</sup> (26...16 AWG): Terminals DI, AI, AO, AGND, RO, STO

Tightening torques: 0.5...0.6 N·m (0.4 lbf·ft)

## Install optional modules, if any

See chapter *Electrical installation* in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) *hardware manual* (3AXD50000044862 [English]).

## Reinstall cover

R5

See figure / on page 58.

1. IP21, Reinstall the box cover: Slide the cover upwards (1a) and tighten the retaining screws (1b).
2. IP21, Reinstall the module cover: Put the tabs on the inside of the cover top in their counterparts on the housing (2a), press the cover at the bottom (2b) and tighten the retaining screws (2c).
3. IP55, Reinstall the front cover: Put the tabs on the inside of the cover top in their counterparts on the housing (3a), press the cover at the bottom (3a) and tighten the retaining screws (3b).

EN

For start-up instructions, see chapter [EN – Quick start-up guide](#) on page 43.

**Compliance with the European Machinery Directive 2006/42/EC**

R5

## EU Declaration of Conformity

Machinery Directive 2006/42/EC

We

Manufacturer: ABB Oy  
Address: Hiomotie 13, 00380 Helsinki, Finland.  
Phone: +358 10 22 11

declare under our sole responsibility that the following product:

**Frequency converter**

**ACQ580-01**

with regard to the safety function

**Safe torque off**

is in conformity with all the relevant safety component requirements of EU Machinery Directive 2006/42/EC, when the listed safety function is used for safety component functionality.

The following harmonized standards have been applied:

|                                             |                                                                                                                                     |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| EN 61800-5-2:2007                           | <i>Adjustable speed electrical power drive systems – Part 5-2: Safety requirements - Functional</i>                                 |
| EN 62061:2005 + AC:2010 + A1:2013 + A2:2015 | <i>Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems</i> |
| EN ISO 13849-1:2015                         | <i>Safety of machinery – Safety-related parts of control systems. Part 1: General requirements</i>                                  |
| EN ISO 13849-2:2012                         | <i>Safety of machinery – Safety-related parts of the control systems. Part 2: Validation</i>                                        |
| EN 60204-1: 2006 + A1:2009 + AC:2010        | <i>Safety of machinery – Electrical equipment of machines – Part 1: General requirements</i>                                        |

The following other standards have been applied:

|                    |                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------|
| IEC 61508:2010     | <i>Functional safety of electrical / electronic / programmable electronic safety-related systems</i> |
| IEC 61800-5-2:2015 | <i>Adjustable speed electrical power drive systems – Part 5-2: Safety requirements - Functional</i>  |

The product referred in this Declaration of conformity fulfils the relevant provisions of other European Union Directives which are notified in Single EU Declaration of conformity 3AXD10000497692.

Person authorized to compile the technical file:

Name and address: Risto Mynttinen, Hiomotie 13, 00380 Helsinki, Finland.

Helsinki, 30 Jun 2016

Manufacturer representative:



Tuomo Hoysniemi  
Vice President, ABB Oy

DRIVES FOR WATER

# ACQ580-01 drives

## Quick start-up guide Frames R1 to R9

R1-  
R9



English . . . . . 43

EN



# EN – Quick start-up guide

This guide describes how to start-up the drive using the Set-up assistant on the HVAC control panel. For complete information on start-up, see *ACQ580 pump control program firmware manual* (3AXD50000035867 [English]).

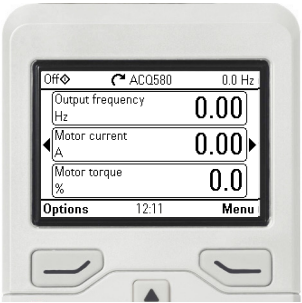
## Before you start

Ensure that the drive has been installed as described in chapter [EN – R1...R4 Quick installation guide](#) on page 15 (frames R1...R4) or in chapter [EN – R5 Quick installation guide](#) page 31 (frame R5).

R1-  
R9

## Start-up with the Set-up assistant on an HVAC control panel

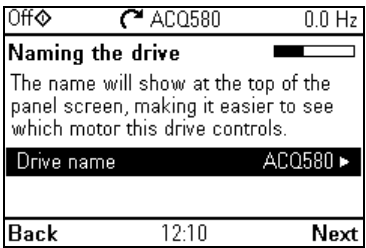
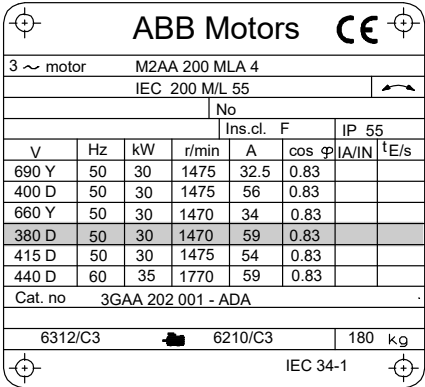
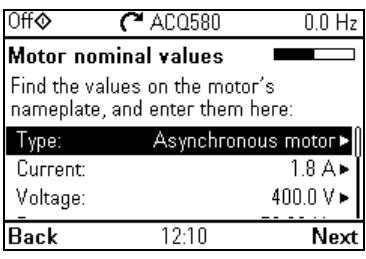
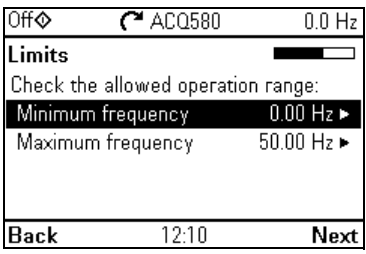
EN

| Safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Make sure that the installation work is complete. Make sure that cover of the drive and the cable box, if included, are on place.                                                                                                                                 |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  Check that the starting of the motor does not cause any danger. <b>De-couple the driven machine</b> if there is a risk of damage in case of an incorrect direction of rotation. |
| Hints on using the assistant control panel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                   |
| <p>The two commands at the bottom of the display (<b>Options</b> and <b>Menu</b> in the figure on the right), show the functions of the two softkeys  and  located below the display. The commands assigned to the softkeys vary depending on the context.</p> <p>Use keys , ,  and  to move the cursor and/or change values depending on the active view.</p> <p>Key  shows a context-sensitive help page.</p> |                                                                                                                                                                                |
| 1 – First start assistant guided settings:<br>Language, date and time, and motor nominal values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                   |
| <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Have the motor name plate data at hand.<br>Power up the drive.                                                                                                                                                                                                    |

R1-  
R9

EN

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                |  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <input type="checkbox"/> | <p>The First start assistant guides you through the first start-up.</p> <p>The assistant begins automatically. Wait until the control panel enters the view shown on the right. Select the language you want to use by highlighting it (if not already highlighted) and pressing  (OK).</p> <p><b>Note:</b> After you have selected the language, it takes a few minutes for the control panel to wake up.</p> |  |
| <input type="checkbox"/> | <p>Select <b>Start set-up</b> and press  (Next).</p>                                                                                                                                                                                                                                                                                                                                                           |  |
| <input type="checkbox"/> | <p>Set the date and time as well as date and time display formats.</p> <ul style="list-style-type: none"> <li>Go to the edit view of a selected row by pressing .</li> <li>Scroll the view with  and .</li> </ul> <p>Go to the next view by pressing  (Next).</p>                                                                                                                                              |  |
| <input type="checkbox"/> | <p>To change a value in an edit view:</p> <ul style="list-style-type: none"> <li>Use  and  to move the cursor left and right.</li> <li>Use  and  to change the value.</li> <li>Press  (Save) to accept the new setting, or press  (Cancel) to go back to the previous view without making changes.</li> </ul>                                                                                                  |  |
| <input type="checkbox"/> | <p>Change the units shown on the control panel if needed.</p> <ul style="list-style-type: none"> <li>Go to the edit view of a selected row by pressing .</li> <li>Scroll the view with  and .</li> </ul> <p>Go to the next view by pressing  (Next).</p>                                                                                                                                                       |  |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                      |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <p>To give the drive a name that will be shown at the top, press .</p> <p>If you do not want to change the default name (ACQ580), continue by pressing  (<b>Next</b>).</p> <p>For information on editing text, see <i>ACQ580 pump control program firmware manual</i> (3AXD50000035867 [English]).</p> <p>Hint: Name the drive, for example, Pump 1.</p>                                                                                                                                                                                                                                                                 |    |
|                          | <p>Refer to the motor or pump nameplate for the following nominal value settings of the motor. Enter the values <u>exactly</u> as shown on the motor or pump nameplate.</p> <p>Example of a nameplate of an induction (asynchronous) motor:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                      |
| <input type="checkbox"/> | <p>Check that the motor data is correct. Values are predefined on the basis of the drive size but you should verify that they correspond to the motor. Start with the motor type. Go to the edit view of a selected row by pressing .</p> <ul style="list-style-type: none"> <li>• Scroll the view with  and .</li> </ul> <p>Motor nominal <math>\cos\Phi</math> and nominal torque are optional.</p> <p>Press  (<b>Next</b>) to continue.</p> |   |
| <input type="checkbox"/> | <p>Adjust the limits according to your needs.</p> <ul style="list-style-type: none"> <li>• Go to the edit view of a selected row by pressing .</li> <li>• Scroll the view with  and .</li> </ul> <p>Go to the next view by pressing  (<b>Next</b>).</p>                                                                                                                                                                                        |  |

R1-R9



EN

|                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <div>R1-R9</div> <div></div>                                  | <p><input type="checkbox"/> If you want to make a backup of the settings made so far, select <b>Backup</b> and press  (<b>Next</b>).<br/>If you do not want to make a backup, select <b>Not now</b> and press  (<b>Next</b>).</p>                                                                                                                                                                                                                                         |  |
| <div></div> <div>EN</div>                                     | <p><input type="checkbox"/> The set-up is now complete and the drive is ready for use.<br/>Press  (<b>Done</b>) to enter the Home view.</p>                                                                                                                                                                                                                                                                                                                               |  |
| <div></div>                                                   | <p><input type="checkbox"/> The Home view 1 monitoring the values of the selected signals is shown on the panel.<br/>There are four preconfigured Home view displays. Home view 1 is the default Home view. You can browse them with keys  and .</p> <p>For changing the signals and their display style shown in the Home view, see <i>ACx -AP-x assistant control panels user's manual</i> (3AUA0000085685 [English]).</p>                                              |  |
| <h2>2 – Additional settings in the Primary settings menu</h2> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| <div></div>                                                   | <p><input type="checkbox"/> Make any additional adjustments, for example, pump protections, starting from the <b>Main</b> menu – press  (<b>Menu</b>) to enter the <b>Main</b> menu.<br/>Select <b>Primary settings</b> and press  (<b>Select</b>) (or ).<br/>In the <b>Primary settings</b> menu, select <b>Pump features</b> and press  (<b>Select</b>) (or ).<br/>To get more information on the <b>Primary settings</b> menu items, press  to open the help page.</p> |  |

3 – Hand/Off/Auto operation

The drive can be in remote control or local control, and in local control there are additionally two different modes.

Remote control: Drive is controlled from the I/O or the fieldbus.

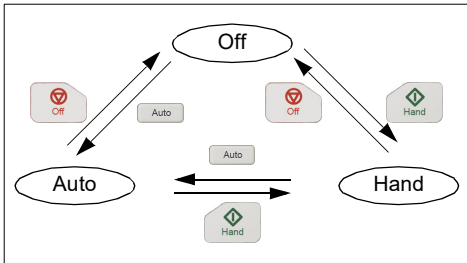
- Top row of the view shows Auto.

Local control: Drive is controlled from the control panel.

- Top row of the view shows Off, that is, the drive is in the Off mode. Drive is stopped.
- Top row of the view shows Hand, that is, the drive is in the Hand mode. Drive is running. The initial reference in the Hand mode is copied from the drive reference.

Symbol  on the top row indicates that you can change the reference with  and .

The following diagram shows the state transitions when you press the Hand, Off or Auto button:



**Note:** When you restart the drive while fault 7081 Control panel loss is active, the mode changes from Hand or Off to Auto.

Auto

 ACQ580

30.0 Hz

Output frequency

Hz

30.00

 Motor current

A

0.46



Motor torque

%

8.9

12:30

Menu

Off

 ACQ580

0.0 Hz

Output frequency

Hz

0.00

 Motor current

A

0.00



Motor torque

%

0.0

12:37

Menu

Hand

 ACQ580

 30.0 Hz

Output frequency

Hz

30.00

 Motor current

A

0.46



Motor torque

%

8.8

Reference

12:38

Menu

Off

 ACQ580

0.0 Hz

 Fault 7081

Aux code: 0000 0000

Control panel loss

12:41:43

Control panel loss fault

Hide

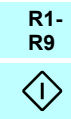
12:42

Reset

R1-  
R9



EN



DRIVES FOR WATER

## **ACQ580-01 drives**

### Quick installation guide

### Frames R1 to R4 and R5 installation figures

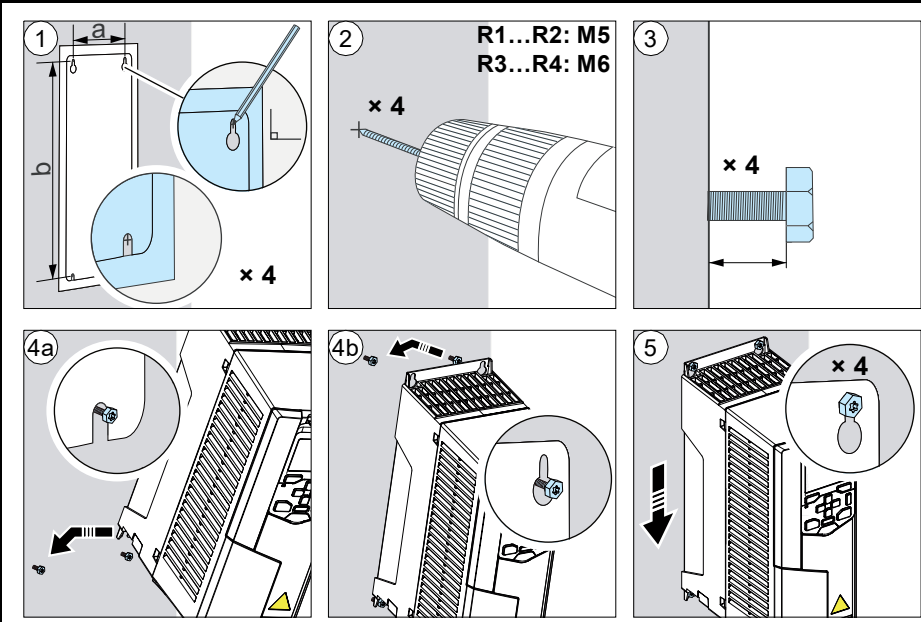
**R1-  
R4**

**R5**

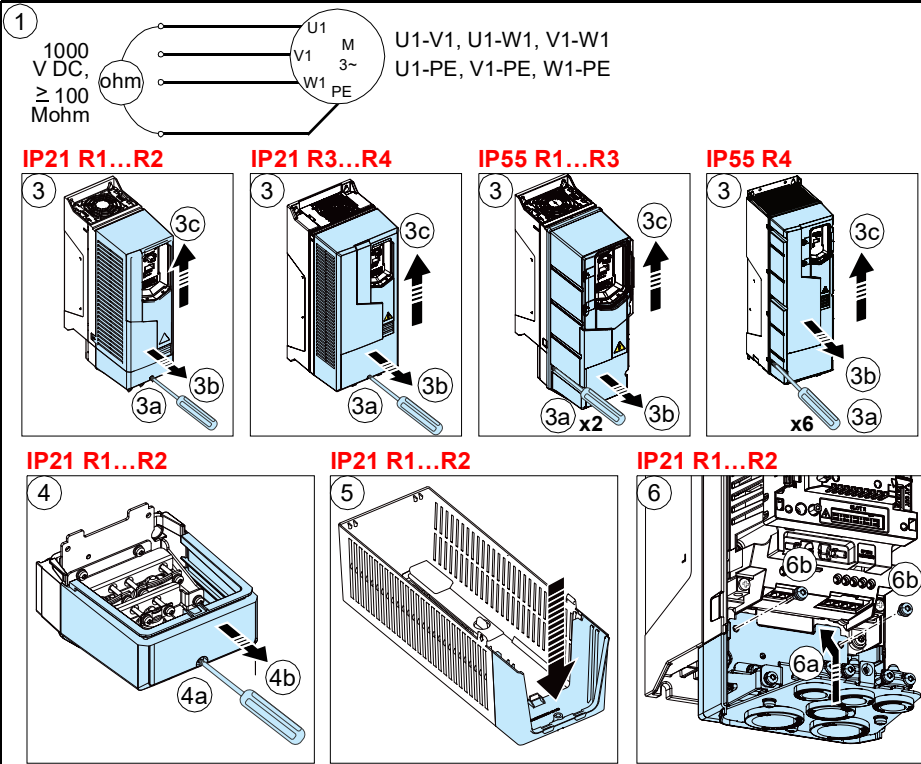




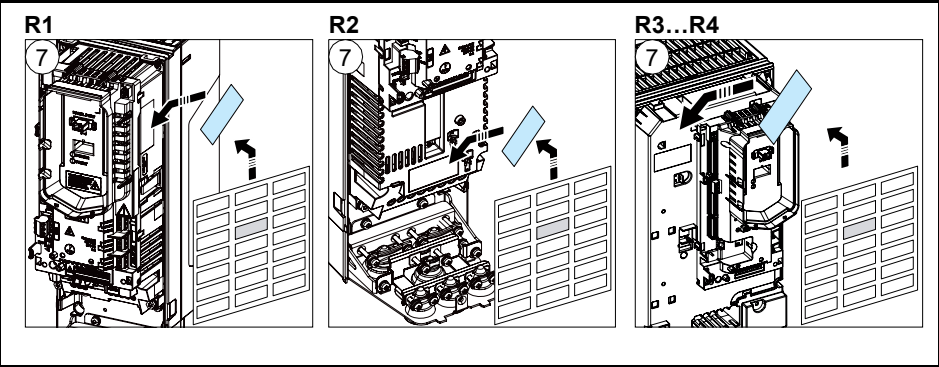
R1...R4 Figures A



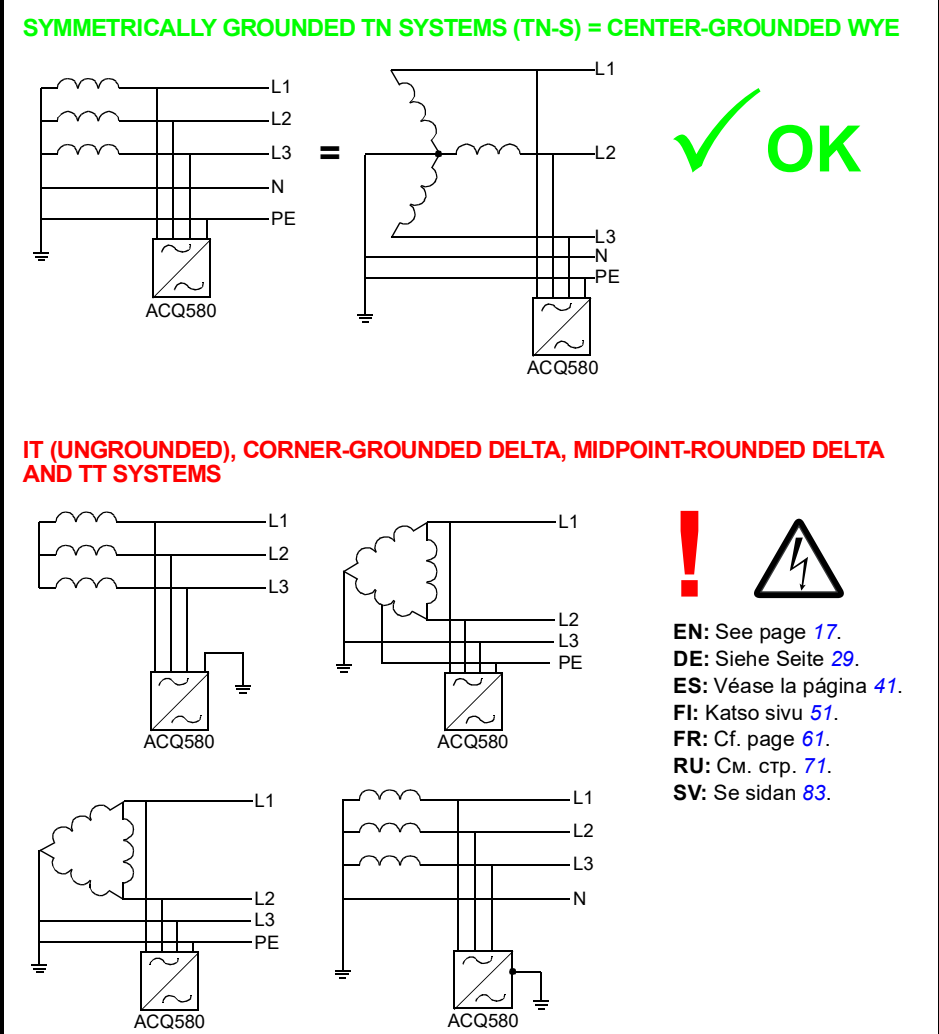
B1



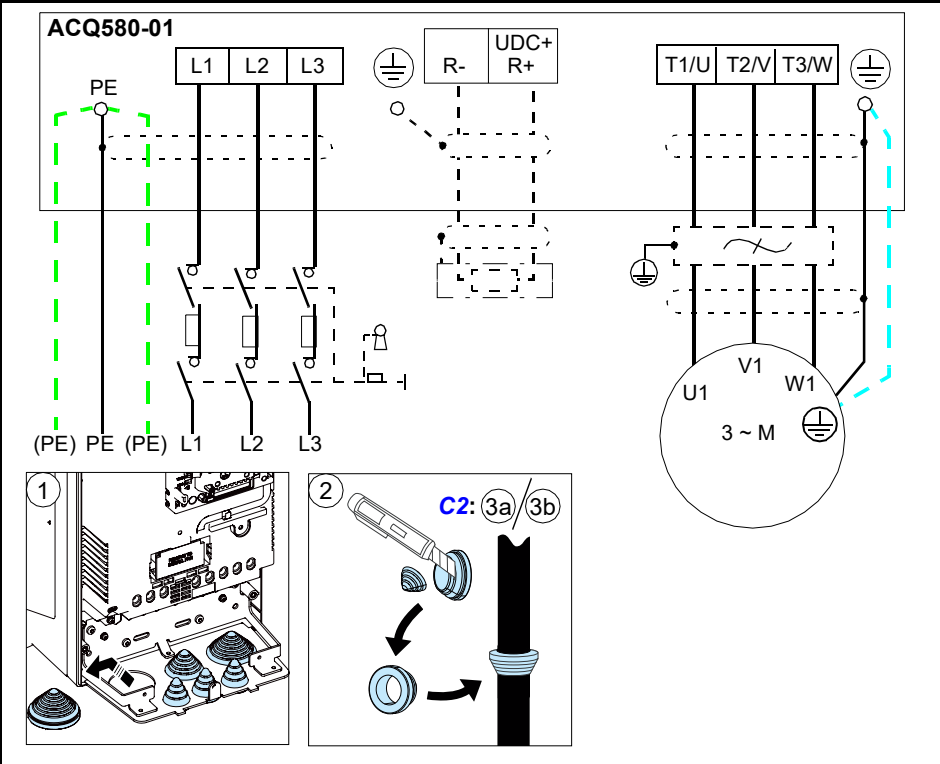
B2



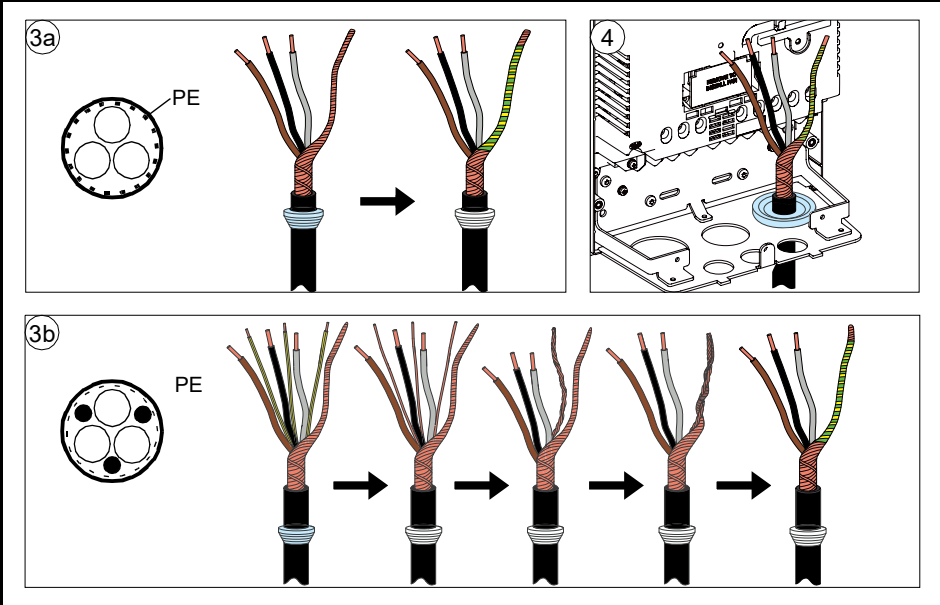
B3



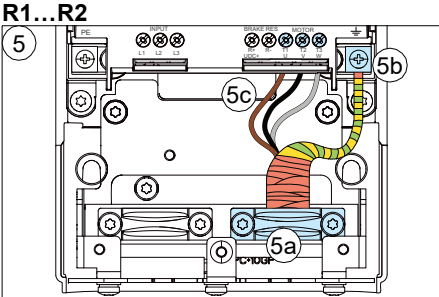
C1



C2

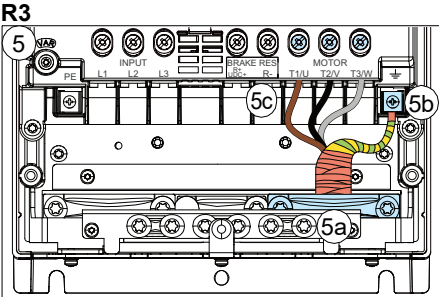


R1...R2



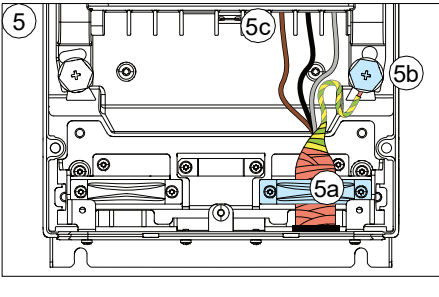
5

R3



5

R4

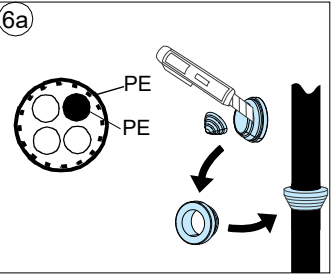


5

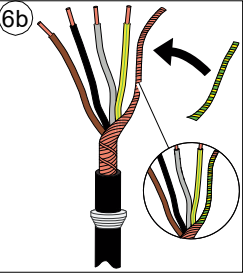
| Frame size       | R1  |        | R2  |        |
|------------------|-----|--------|-----|--------|
|                  | N·m | lbf·ft | N·m | lbf·ft |
| T1/U, T2/V, T3/W | 1.0 | 0.7    | 1.5 | 1.1    |
| PE, $\perp$      | 1.5 | 1.1    | 1.5 | 1.1    |
|                  | 1.2 | 0.9    | 1.2 | 0.9    |

| Frame size       | R3  |        | R4  |        |
|------------------|-----|--------|-----|--------|
|                  | N·m | lbf·ft | N·m | lbf·ft |
| T1/U, T2/V, T3/W | 3.5 | 2.6    | 4.0 | 3.0    |
| PE, $\perp$      | 1.5 | 1.1    | 2.9 | 2.1    |
|                  | 1.2 | 0.9    | 1.2 | 0.9    |

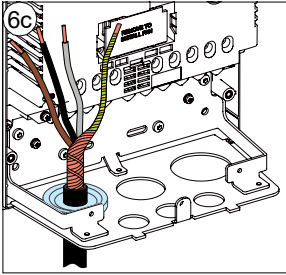
E1



6a

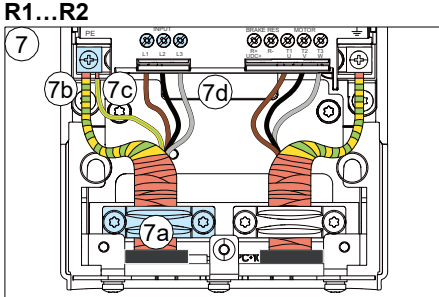


6b



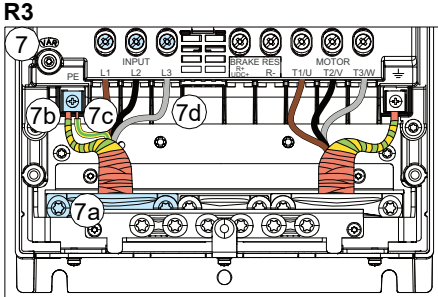
6c

R1...R2



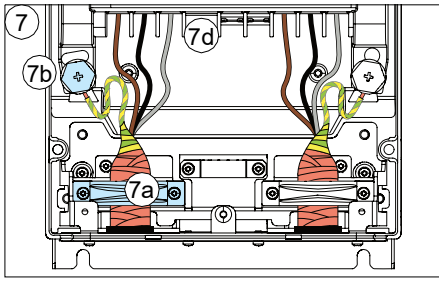
7

R3



7

R4

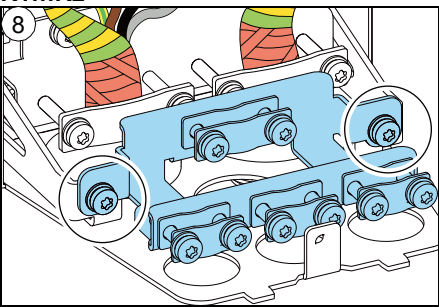


7

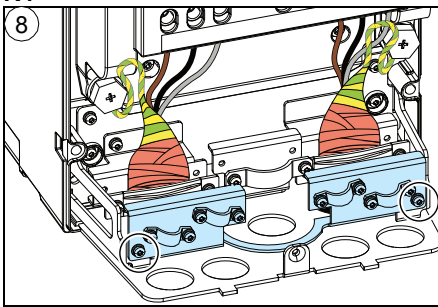
| Frame size  | R1  |        | R2  |        |
|-------------|-----|--------|-----|--------|
|             | N·m | lbf·ft | N·m | lbf·ft |
| L1, L2, L3  | 1.0 | 0.7    | 1.5 | 1.1    |
| PE, $\perp$ | 1.5 | 1.1    | 1.5 | 1.1    |
|             | 1.2 | 0.9    | 1.2 | 0.9    |

| Frame size  | R3  |        | R4  |        |
|-------------|-----|--------|-----|--------|
|             | N·m | lbf·ft | N·m | lbf·ft |
| L1, L2, L3  | 3.5 | 2.6    | 4.0 | 3.0    |
| PE, $\perp$ | 1.5 | 1.1    | 2.9 | 2.1    |
|             | 1.2 | 0.9    | 1.2 | 0.9    |

F

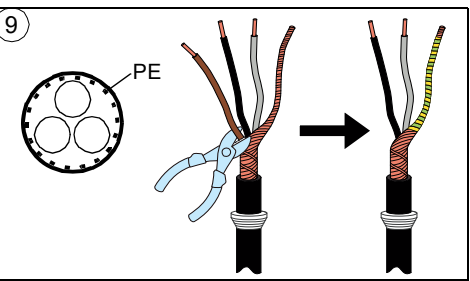


8



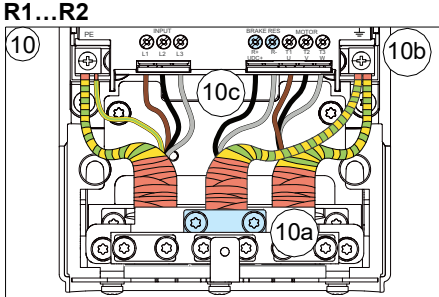
8

G1



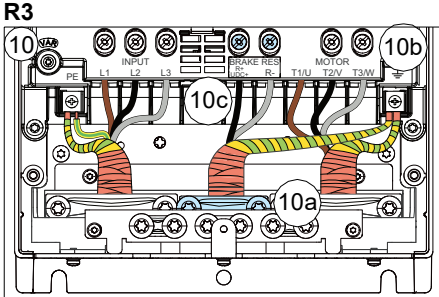
9

R1...R2



10

R3



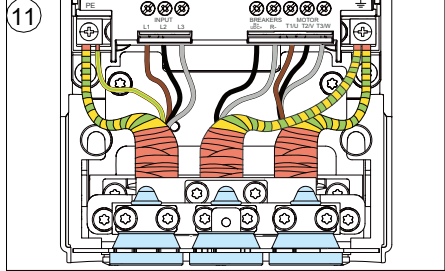
10

| Frame size  | R1  |        | R2  |        | R3  |        |
|-------------|-----|--------|-----|--------|-----|--------|
|             | N·m | lbf·ft | N·m | lbf·ft | N·m | lbf·ft |
| R-, R+      | 1.0 | 0.7    | 1.5 | 1.1    | 3.5 | 2.6    |
| PE, $\perp$ | 1.5 | 1.1    | 1.5 | 1.1    | 1.5 | 1.1    |
|             | 1.2 | 0.9    | 1.2 | 0.9    | 1.2 | 0.9    |

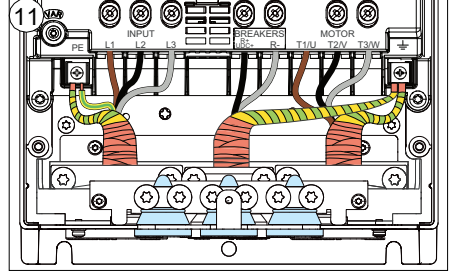
R1...R4 Figures H



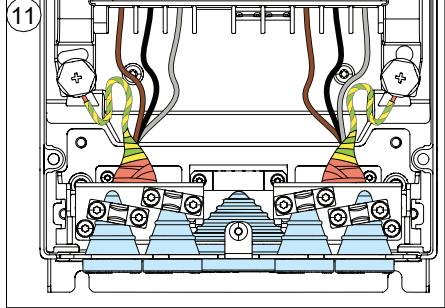
R1...R2



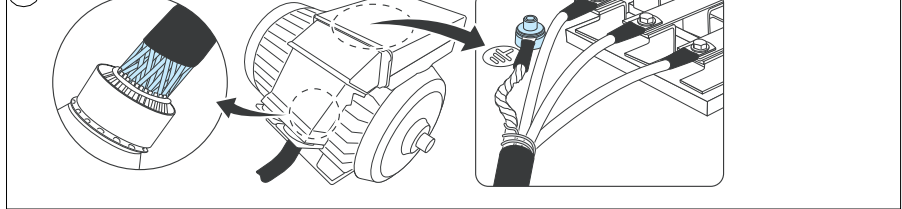
R3



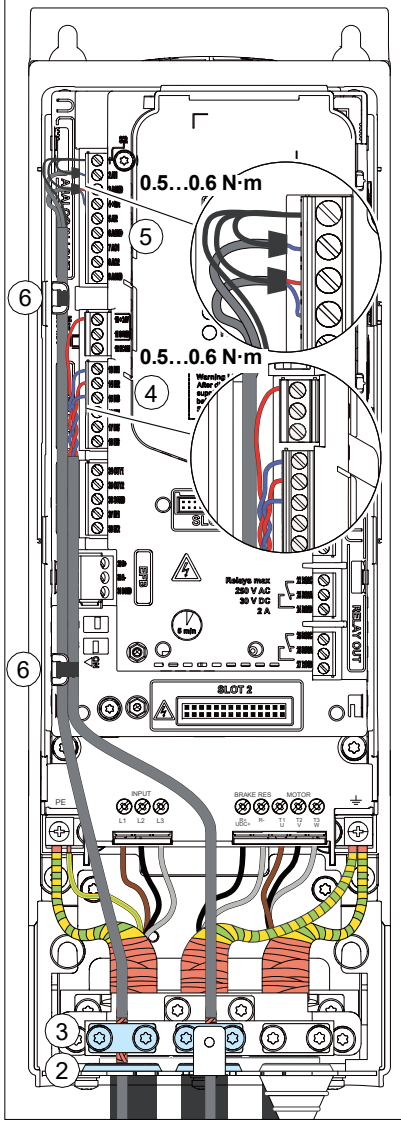
R4



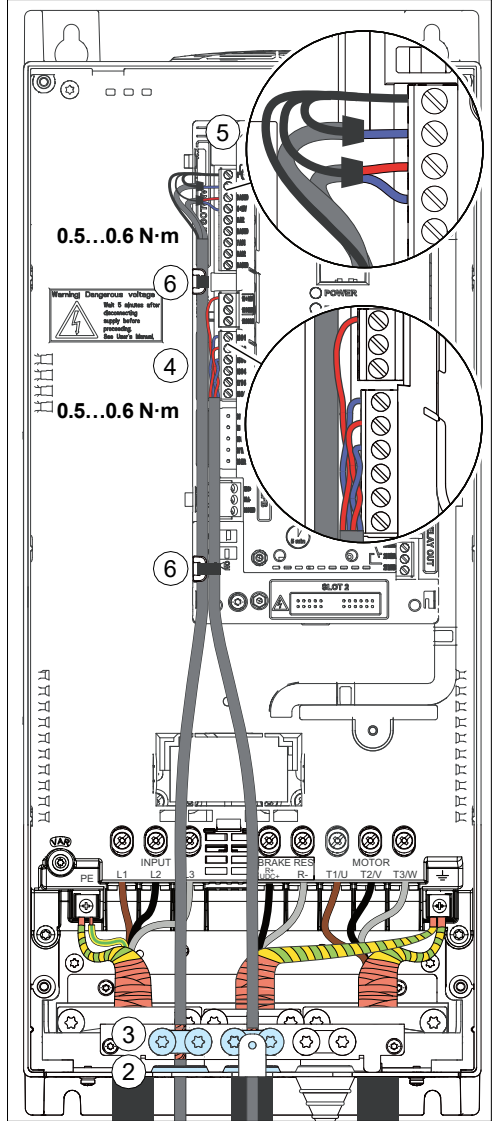
13



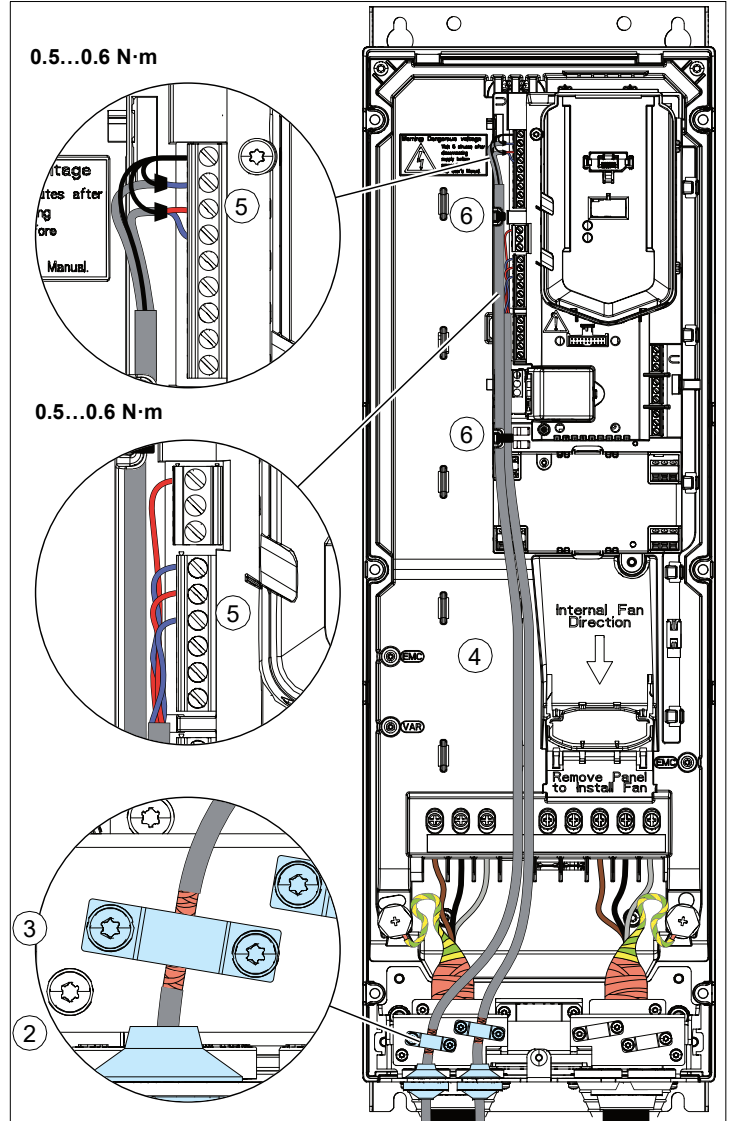
R1...R2

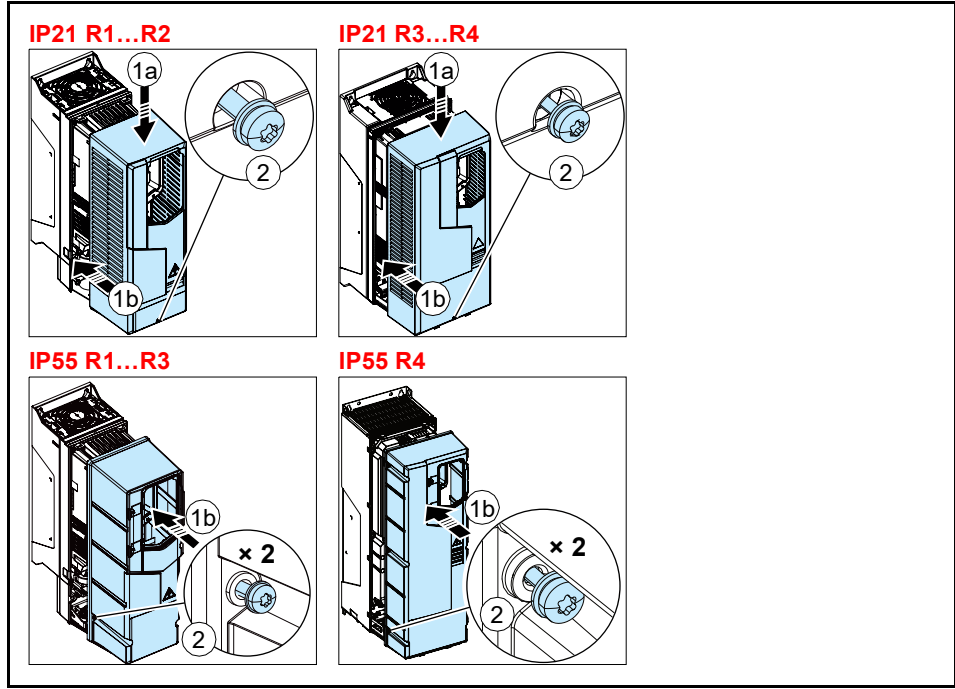


R3



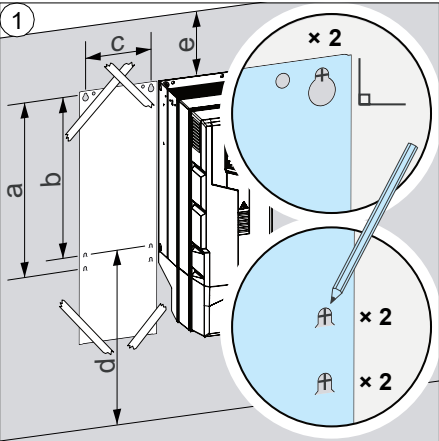
R4





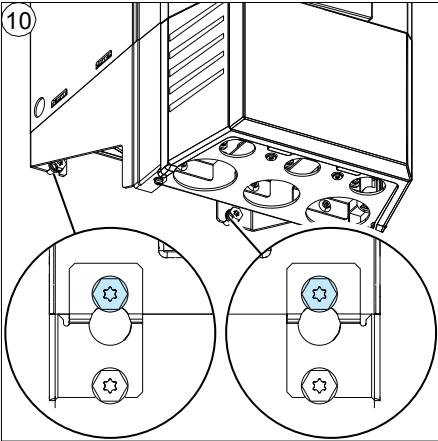
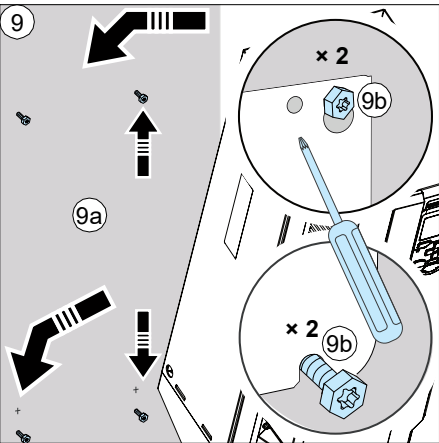
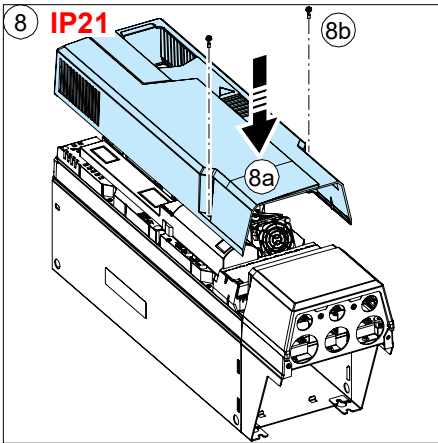
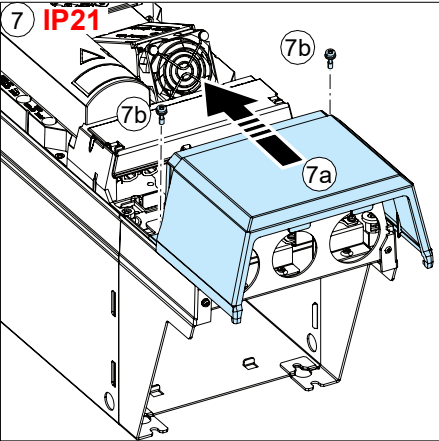
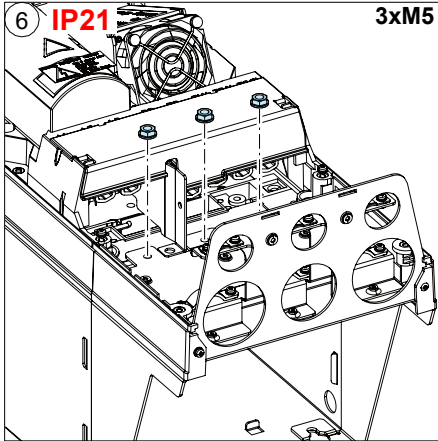
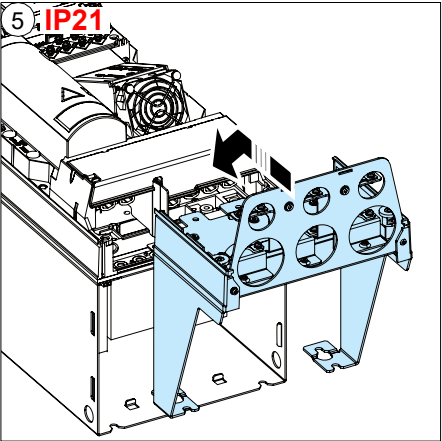
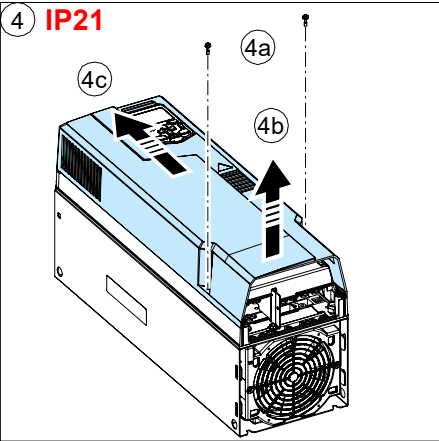
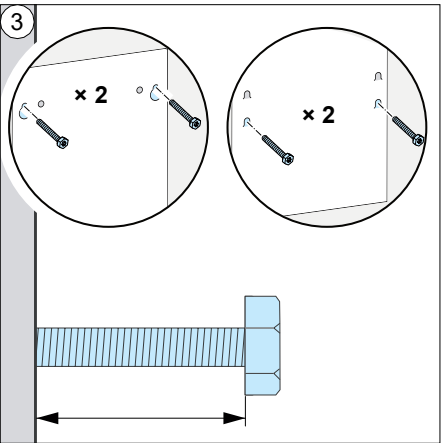
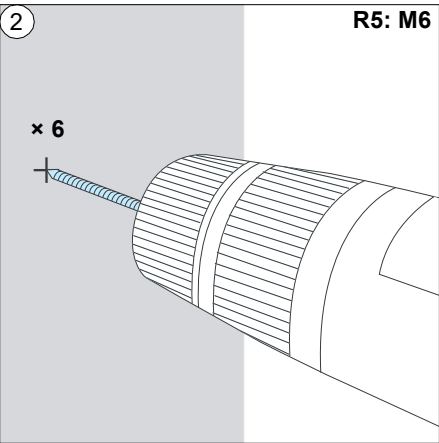


R5 Figures A

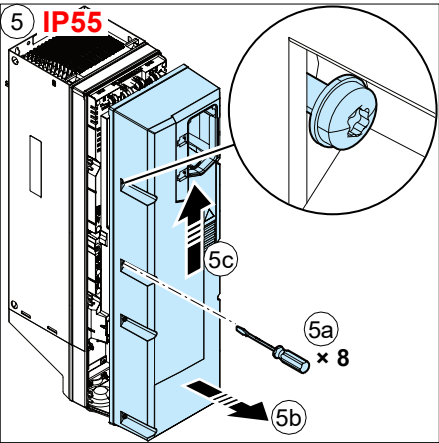
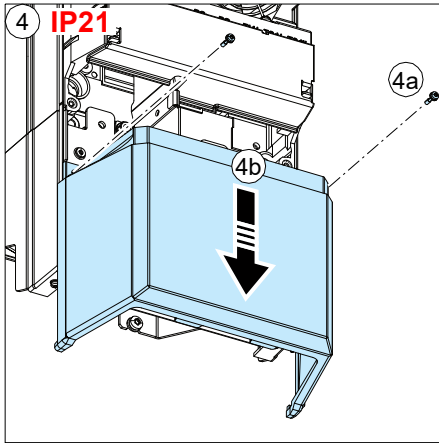
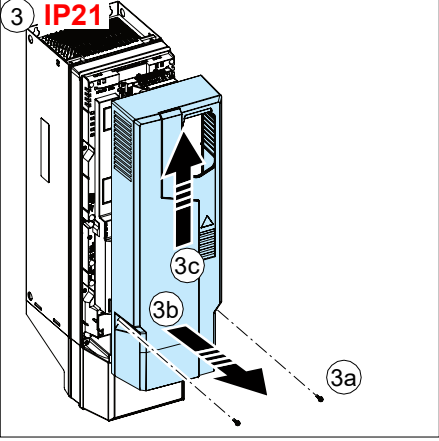
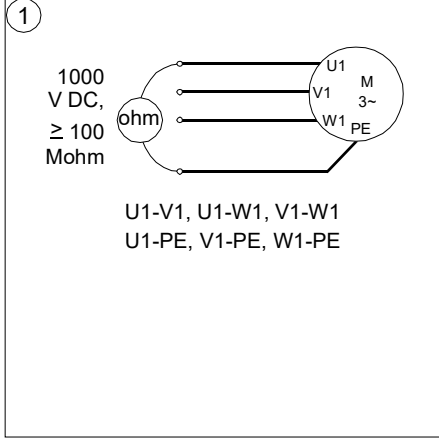


|     | R5 IP21 |       | R5 IP55 |       |
|-----|---------|-------|---------|-------|
|     | mm      | in    | mm      | in    |
| a   | 612     | 24.09 | 612     | 24.09 |
| b   | 581     | 22.87 | 581     | 22.87 |
| c   | 160     | 6.30  | 160     | 6.30  |
| d > | 200     | 7.87  | 200     | 7.87  |
| e > | 100     | 3.94  | 100     | 3.94  |

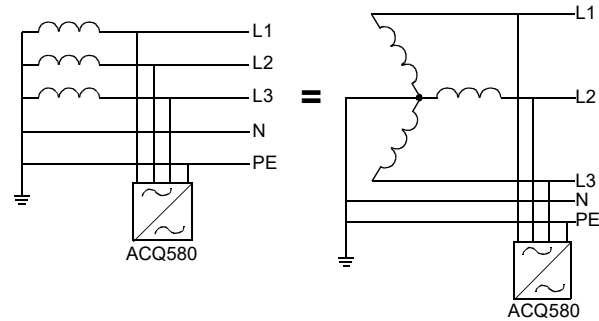
|   | R5 IP21 |      | R5 IP55 |      |
|---|---------|------|---------|------|
|   | kg      | lb   | kg      | lb   |
| ! | 28.3    | 62.4 | 29.0    | 64.0 |



B

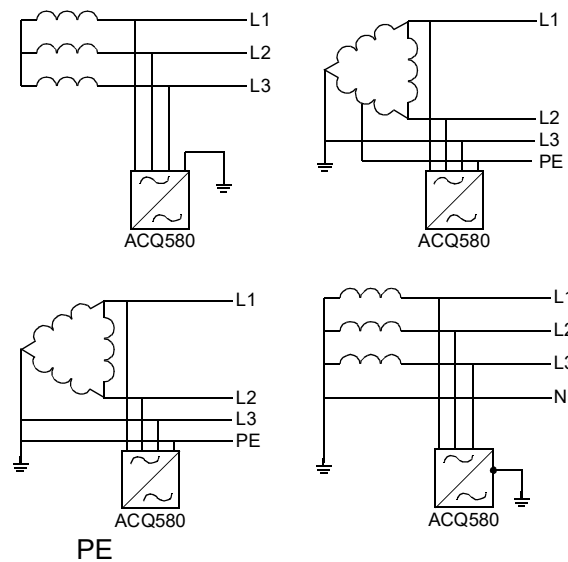


SYMMETRICALLY GROUNDED TN SYSTEMS (TN-S) = CENTER-GROUNDED WYE

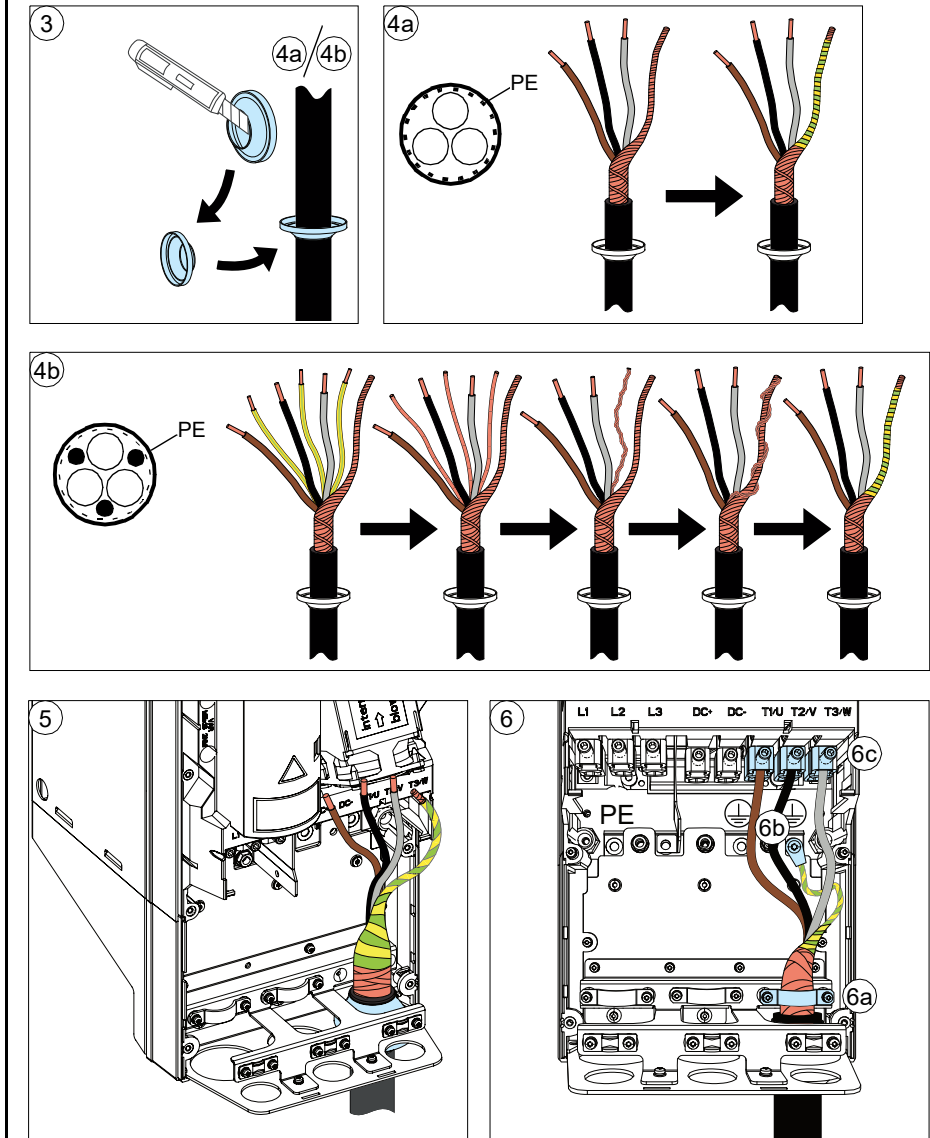
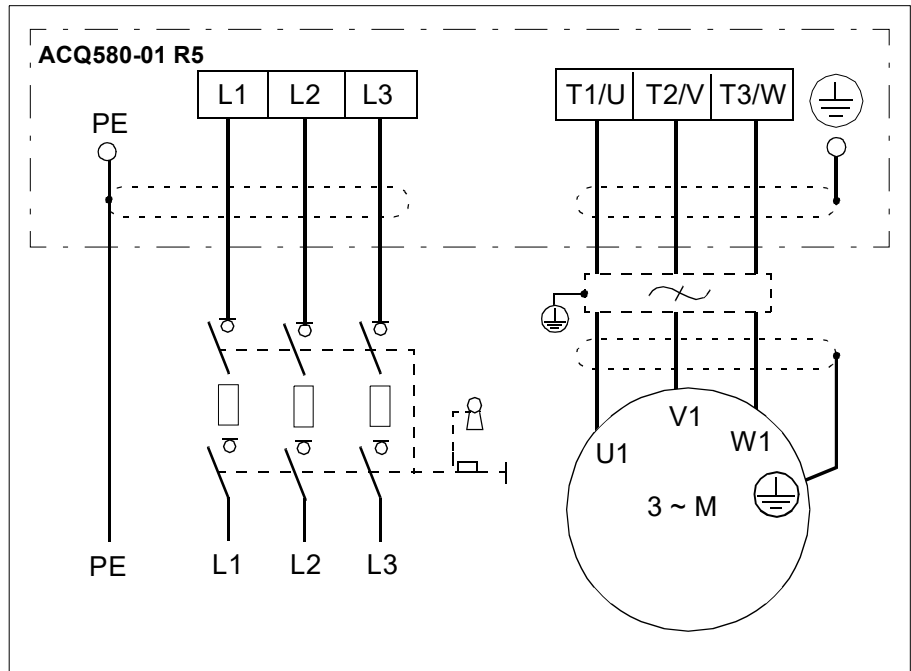
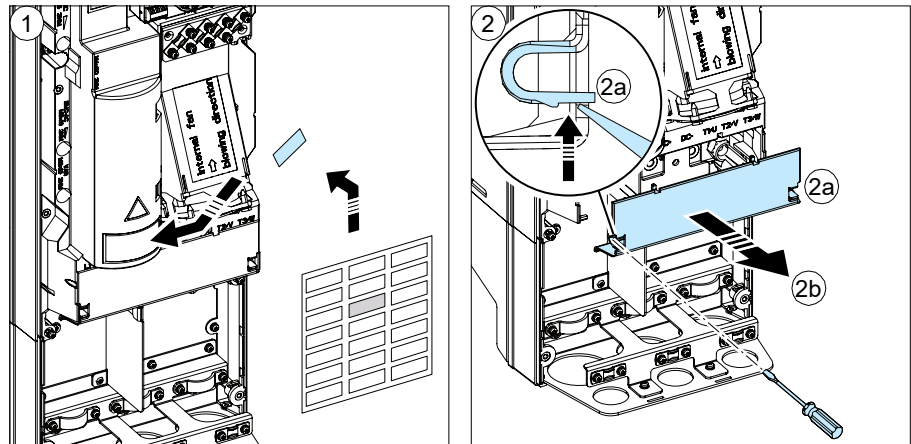


✓ OK

IT (UNGROUNDED), CORNER-GROUNDED DELTA, MIDPOINT-ROUNDED DELTA AND TT SYSTEMS



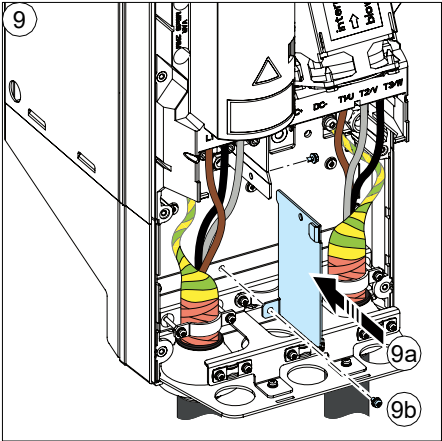
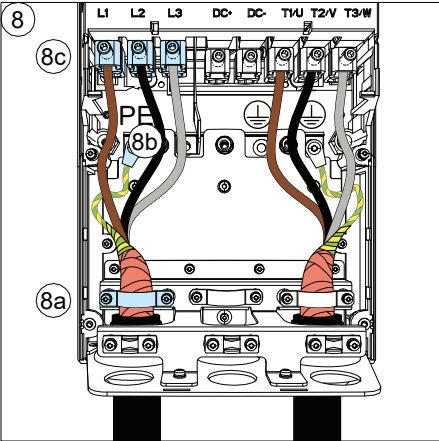
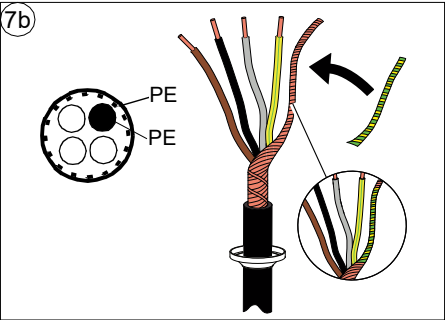
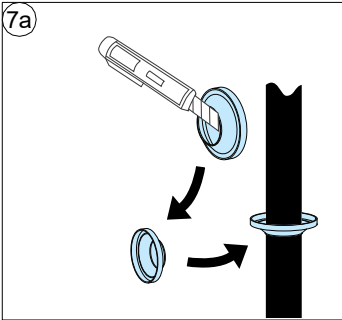
EN: See page [33](#).  
DE: Siehe Seite [109](#).  
ES: Véase la página [119](#).  
FI: Katso sivu [129](#).  
FR: Cf. page [139](#).  
RU: См. стр. [149](#).  
SV: Se sidan [159](#).



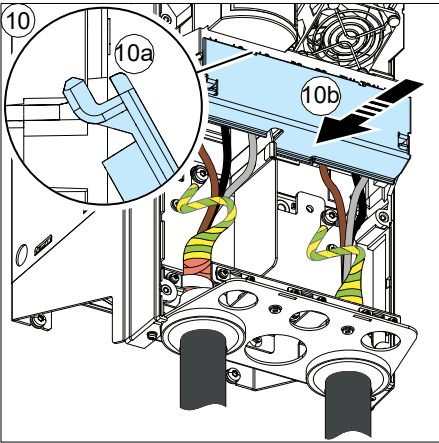
| Frame size | T1/U, T2/V, T3/W |        | PE,  |     |        |  |        |
|------------|------------------|--------|-------------------------------------------------------------------------------------------|-----|--------|---------------------------------------------------------------------------------------|--------|
|            | N·m              | lbf·ft | M                                                                                         | N·m | lbf·ft | N·m                                                                                   | lbf·ft |
| R5         | 5.6              | 4.1    | M5                                                                                        | 2.2 | 1,6    | 1.2                                                                                   | 0.9    |



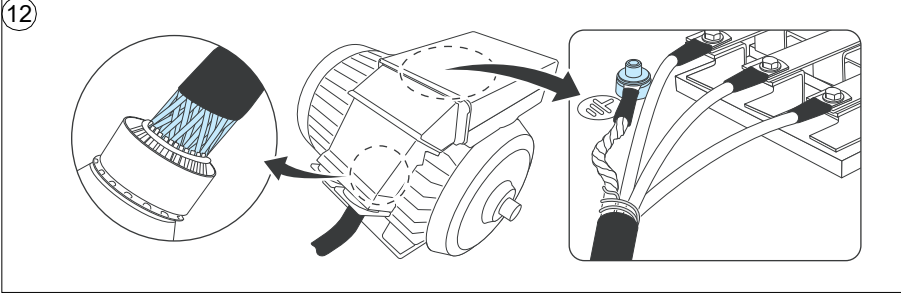
R5 Figures F



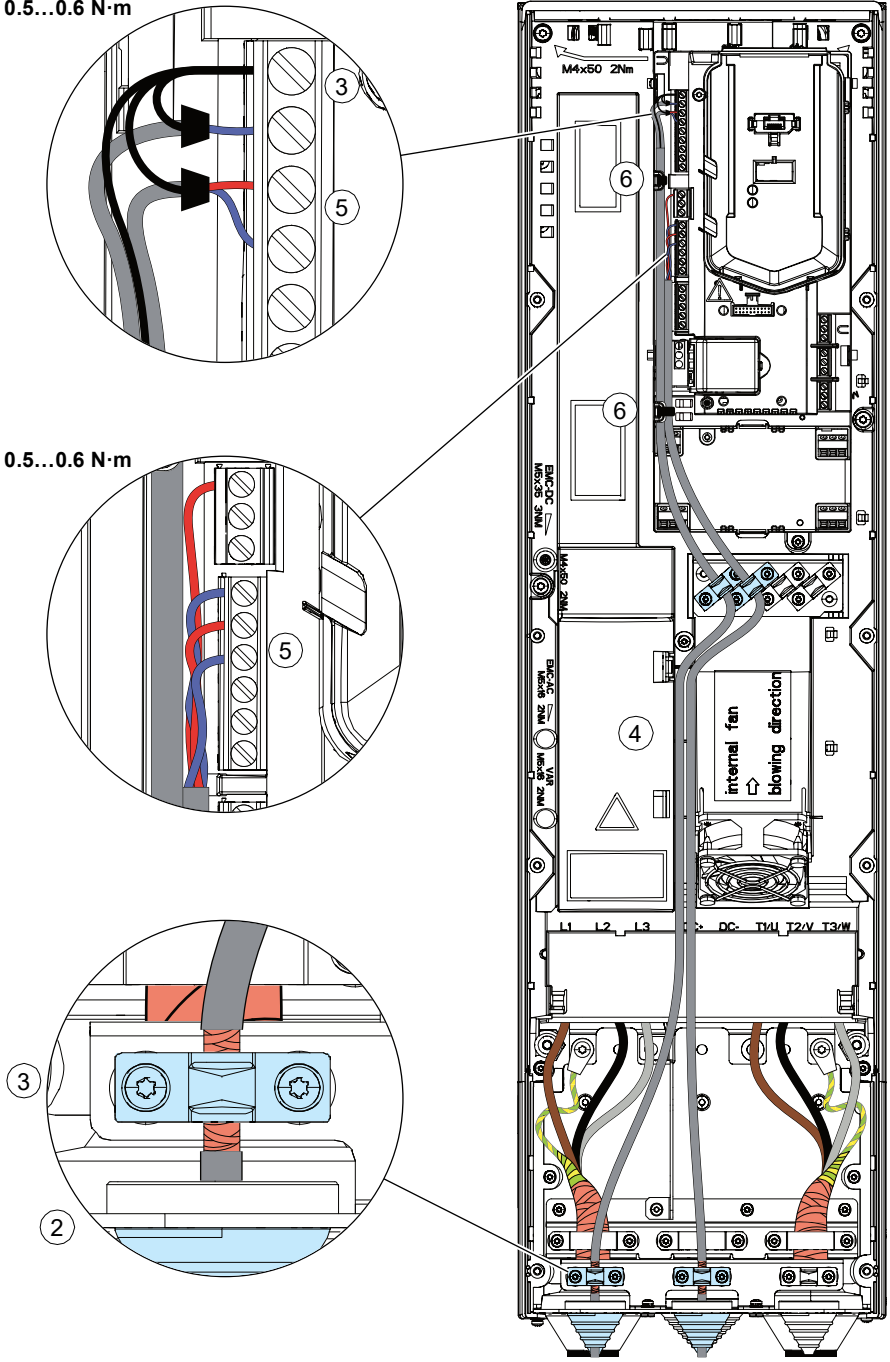
| Frame size | L1, L2, L3, |        |    | PE, $\oplus$ |        |     |        |  |
|------------|-------------|--------|----|--------------|--------|-----|--------|--|
|            | N·m         | lbf·ft | M  | N·m          | lbf·ft | N·m | lbf·ft |  |
| R5         | 5.6         | 4.1    | M5 | 2.2          | 1,6    | 1.2 | 0.9    |  |

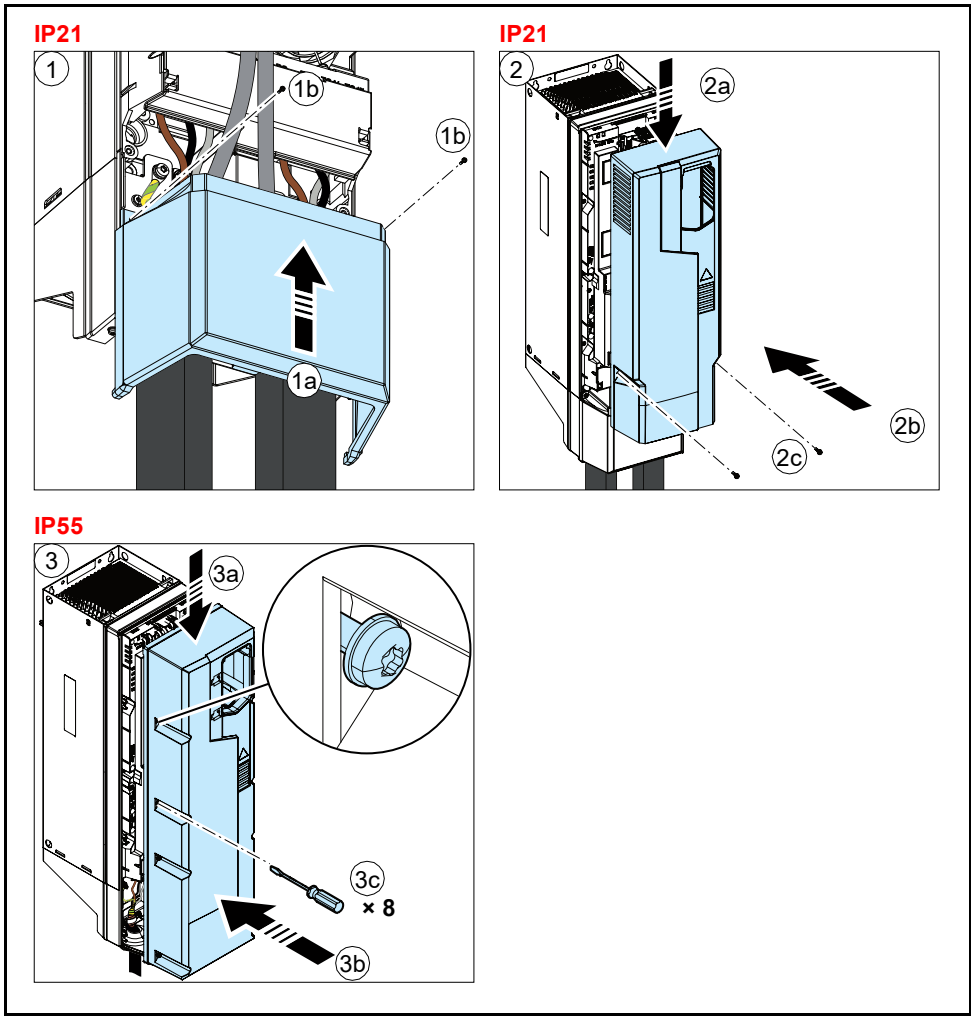


G



H





## Further information

### Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to [www.abb.com/searchchannels](http://www.abb.com/searchchannels).

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