

ABB INDUSTRIAL DRIVES

# ACS880-31 drives

## Quick installation guide

EN

US



# List of related manuals in English

<b>Drive manuals and guides</b>	<b>Code (English)</b>
<i>ACS880 primary control program firmware manual</i>	<a href="#">3AUA0000085967</a>
<i>Quick start-up guide for ACS880 drives with primary control program</i>	<a href="#">3AUA0000098062</a>
<i>ACS880-31 hardware manual</i>	<a href="#">3AXD50000045933</a>
<i>ACS880-31 quick installation guide</i>	<a href="#">3AXD50000048171</a>
<i>ACX-AP-x assistant control panels user's manual</i>	<a href="#">3AUA0000085685</a>
<b>Option manuals and guides</b>	
<i>ACS880 drive module frames R1 to R9 for cabinet installation (options +P940 and +P944) supplement</i>	<a href="#">3AUA0000145446</a>
<i>ACS880-11, ACS880-31, ACH580-31 and ACQ580-31 UK gland plate (+H358) installation guide</i>	<a href="#">3AXD50000110711</a>
<i>FCAN-01 CANopen adapter module user's manual</i>	<a href="#">3AFE68615500</a>
<i>FCNA-01 ControlNet adapter module user's manual</i>	<a href="#">3AUA0000141650</a>
<i>FDNA-01 DeviceNet™ adapter module user's manual</i>	<a href="#">3AFE68573360</a>
<i>FECA-01 EtherCAT adapter module user's manual</i>	<a href="#">3AUA0000068940</a>
<i>FENA-01/-11/-21 Ethernet adapter module user's manual</i>	<a href="#">3AUA0000093568</a>
<i>FEPL-02 Ethernet POWERLINK adapter module user's manual</i>	<a href="#">3AUA0000123527</a>
<i>FPBA-01 PROFIBUS DP adapter module user's manual</i>	<a href="#">3AFE68573271</a>
<i>FSCA-01 RS-485 adapter module user's manual</i>	<a href="#">3AUA0000109533</a>
<b>Tool and maintenance manuals and guides</b>	
<i>Drive composer PC tool user's manual</i>	<a href="#">3AUA0000094606</a>
<i>Converter module capacitor reforming instructions</i>	<a href="#">3BFE64059629</a>
<i>NETA-21 remote monitoring tool user's manual</i>	<a href="#">3AUA0000096939</a>
<i>NETA-21 remote monitoring tool installation and start-up guide</i>	<a href="#">3AUA0000096881</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 code below opens an online listing of the manuals applicable to this product.



[ACS880-31 manuals](#)

# EN – Quick installation guide

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This guide briefly describes how to install the drive. For complete information on installation, see *ACS880-31 drives hardware manual* (3AXD50000045933 [English]). For cabinet installation, see also ACS880 drive module frames R1 to R9 for cabinet installation (options +P940 and +P944) supplement (3AUA0000145446). For start-up instructions, see *ACS880 drives with primary control program quick start-up guide* (3AUA0000098062 [English]).

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

EN

## Obey the safety instructions

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

- Only qualified electrical professionals are allowed to install and maintain the drive.
  - Never 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.
  - Never work on the control cables when power is applied to the drive or to the external control circuits.
  - Do not connect the drive to a voltage higher than what is marked on the type designation label.
  - Always ground the drive, the motor and adjoining equipment to the protective earth (PE) bus of the power supply.
  - Frames R6 and R8: The drive module is heavy and its center of gravity is high. Use a lifting device for lifting. Do not tilt the drive. Manual lifting, or overturning due to the tilting, can cause physical injury. Make sure that the wall and the fixing devices can carry the weight.
  - Make sure that debris from drilling, cutting and grinding does not enter the drive.
  - Make sure that the floor below the drive and the wall where the drive is installed are non-flammable.
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## Check if capacitors need to be reformed

Reform the capacitors if the drive has not been powered up (either in storage or unused) for a year or more.

You can determine the manufacturing date from the serial number, which you find on the type designation label attached to the drive. The serial number is of format XYYWWRXXXX. 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, ...

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

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## Data

### IEC ratings

ACS880-31-	Cable (mm <sup>2</sup> )	aR fuse	Losses (W)
3-phase $U_N = 400$ V			
09A4-3	3×1.5	170M1561	226
12A6-3	3×1.5	170M1561	329
017A-3	3×6	170M1563	395
025A-3	3×6	170M1563	579
032A-3	3×10	170M1565	625
038A-3	3×10	170M1565	751
045A-3	3×16	170M1566	912
061A-3	3×25	170M1567	1088
072A-3	3×35	170M1568	1502
087A-3	3×50	170M1569	1904
105A-3	3×50	170M3817	1877
145A-3	3×95	170M3817	2963
169A-3	3×120	170M5809	3168
206A-3	3×150	170M5810	3990
3-phase $U_N = 500$ V			
07A6-5	3×1.5	170M1561	219
11A0-5	3×1.5	170M1561	278
014A-5	3×6	170M1563	321
021A-5	3×6	170M1563	473
027A-5	3×10	170M1565	625
034A-5	3×10	170M1565	711
040A-5	3×16	170M1566	807
052A-5	3×25	170M1567	960
065A-5	3×35	170M1568	1223
077A-5	3×35	170M1569	1560
101A-5	3×50	170M3816	1995
124A-5	3×95	170M3817	2800
156A-5	3×120	170M5808	3168
180A-5	3×150	170M5810	3872

3AXD00000588487

## Select the power cables

See [Data](#) on page 5.

## Ensure cooling

See [Data](#) on page 5. No condensation or frost is allowed. The allowed operating temperature range of the drive without derating is -15 to +40 °C.

## Protect the drive and input power cable with correct fusing

See [Data](#) on page 5.

### A – Install the drive on the wall

See figure [A](#) on page 19.

### B – Remove the cover

Remove the cover/s. See figures [B \(R3\)](#)... and [...B \(R6, R8\)](#)... on page 19.

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

The standard drive with ground-to-phase varistors connected can be installed to a symmetrically grounded TN-S system. For other systems, see the drive hardware manual and figure [C](#) on page 19.



**WARNING!** Do not install the drive with EMC filter options +E200 or +E202 connected to a system that the filter is not suitable for. This can cause danger, or damage the drive. See the drive hardware manual.

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**WARNING!** Do not install the 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. See the drive hardware manual.

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

Connect the motor cable 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. See figure [D](#) on page 19.

Check the insulation of motor and motor cable. See figure [D](#) on page 19. **Note:** Moisture inside the motor casing will reduce the insulation resistance. If moisture is suspected, dry the motor and repeat the measurement.

Check the insulation of the input cable before you connect it to the drive. Obey the local regulations.

### E – Attach the warning stickers in local languages

See figure [E](#) on page 20.

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## F – Connect the power cables

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

Note for frame R3: Make sure that you have an additional PE conductor in the input power cabling. See the hardware manual for more information.

Procedure:

1. Frames R6 and R8: Remove the shroud on the power cable terminals. See figure [F \(R6, R8\)](#)... on page 20. Frame R8: For easier installation, remove the side plates.

2. Remove the rubber grommets from the bottom plate for the cables to be connected. See figure [...F...](#) on page 20.

3. Cut an adequate hole into the rubber grommets. Slide the grommets onto the cables. Attach the unused grommets to holes cone pointing downwards.

4. Prepare the ends of the cables. See figure [...F...](#) on page 20.

The bare shield will be grounded 360 degrees. Mark the pigtail made from the shield as a PE conductor with yellow-and-green color.

Two alternative symmetrical three-conductor cable types are shown, and one four-conductor cable type. The four-conductor cable is only allowed for the input power cabling.

If you use aluminum cables, put grease to the peeled aluminum cable before connecting it to the drive.

5. Put the cables through the holes of the cable entry plate and attach the grommets to the holes.

6. Connect the cables (use the torques defined in the figure). See figures [...F...](#) on page 20 and [21](#):

- Ground the shield 360 degrees by tightening the clamp of the power cable grounding shelf onto the stripped part of the cable.
- Connect the twisted shield of the cable to the grounding terminal.
- Use a separate grounding PE cable (6a) or a cable with a separate PE conductor (6b) if the conductivity of the shield does not meet the requirements for the PE conductor. If the protective PE conductor is smaller than 10 mm<sup>2</sup>, you must use a second earthing conductor. See the hardware manual for more information.
- Frame R3: Connect the additional PE conductor of the input power cabling.
- Connect the phase conductors of the motor cable to the T1/U, T2/V and T3/W terminals and the phase conductors of the input cable to the L1, L2 and L3 terminals.

- For frame R8: Install the common mode filter. For instructions, see *Common mode filter kit for frames R7 and R8 (option +E208) installation guide* (3AXD50000015179 [English]).
7. Frame R6 types -045A-3 and greater, -040A-5 and greater: Cut tabs in the shroud for the installed cables. Frame R8: Install the side plates if removed. Knock out holes in the shroud for the input cables. See figure [...F \(R6, R8\)](#) on page 21.
  8. Frames R6 and R8: Install the shroud on the power cable terminals. See figure [...F \(R6, R8\)](#) on page 21.
  9. Secure the cables outside the drive mechanically.

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## G – Connect the control cables

Procedure:

1. Remove the front cover(s) if not already removed.
2. Frame R3: Lift the control panel holder up. See figure [G \(R3\)](#)... on page 21.
3. Cut an adequate hole into the rubber grommet and slide the grommet onto the cable. Slide the cable through a hole in the bottom plate and attach the grommet to the hole. Attach the unused grommets to holes cone pointing downwards.
4. Route the cables. Frame R3: See figure [...G \(R3\)](#)... on page 21. Frame R6: See figure [...G \(R6\)](#)... on page 21. Frame R8: See figure [...G \(R8\)](#)... on page 22.
5. 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.
6. Secure the cables inside the drive mechanically.
7. Frame R3: Leave the pair cable shields and grounding wires unconnected at the drive end, and ground them at the other cable end. Cut any unconnected wires at the drive end. Frames R6 and R8: Ground the pair-cable shields and grounding wire under the clamp below the control unit.
8. Connect the conductors to the appropriate terminals of the control unit. See [Default IO connection diagram](#) on page 10.
9. Wire the optional modules if included in the delivery. See the option module user's manual or installation guide.
10. Secure the cables outside the drive mechanically.

**Note:**

- Leave the other ends of the control cable shields unconnected.
  - Keep any signal wire pairs twisted as close to the terminals as possible.
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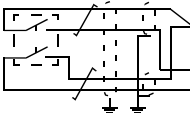
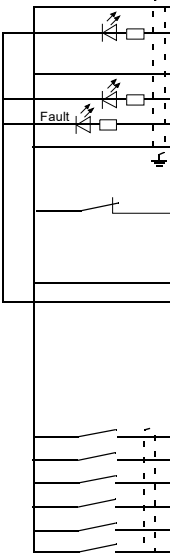
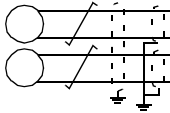
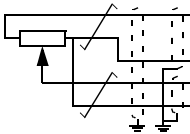
## H – Reinstall cover(s)

See figures [H \(R3, R6, R8\)](#) on page [22](#).

**Default IO connection diagram**

Wire sizes:  
0.5 ... 2.5 mm<sup>2</sup>  
(24... 14 AWG)

Tightening  
torques: 0.5 N·m  
(0.4 lbf·ft) for  
both stranded  
and solid wiring.



XPOW External power input		
1	+24VI	24 V DC, 2 A
2	GND	

XAI Reference voltage and analog inputs		
1	+VREF	10 V DC, $R_i$ 1...10 kohm
2	-VREF	-10 V DC, $R_i$ 1...10 kohm
3	AGND	Ground
4	AI1+	<b>Speed reference</b> 0(2)...10 V, $R_{in} > 200$ kohm
5	AI1-	
6	AI2+	By default not in use. 0(4)...20 mA, $R_{in} = 100$ ohm
7	AI2-	
J1	J1	AI1 current/voltage selection jumper
J2	J2	AI2 current/voltage selection jumper

XAO Analog outputs		
1	AO1	<b>Motor speed rpm</b> 0...20 mA, $R_L < 500$ ohm
2	AGND	
3	AO2	<b>Motor current</b> 0...20 mA, $R_L < 500$ ohm
4	AGND	

XD2D Drive-to-drive link		
1	B	Drive-to-drive link
2	A	
3	BGND	
J3	J3	Drive-to-drive link termination switch

XRO1, XRO2, XRO3 Relay outputs		
11	NC	<b>Ready</b> 250 V AC / 30 V DC 2 A
12	COM	
13	NO	
21	NC	<b>Running</b> 250 V AC / 30 V DC 2 A
22	COM	
23	NO	
31	NC	<b>Faulted(-1)</b> 250 V AC / 30 V DC 2 A
32	COM	
33	NO	

XD24 Digital interlock		
1	DIIL	Run enable
2	+24VD	+24 V DC 200 mA
3	DICOM	Digital input ground
4	+24VD	+24 V DC 200 mA
5	DIOGND	Digital input/output ground
J6	Ground selection switch	

XDIO Digital input/outputs		
1	DIO1	Output: Ready
2	DIO2	Output: Running

XDI Digital inputs		
1	DI1	Stop (0) / Start (1)
2	DI2	Forward (0) / Reverse (1)
3	DI3	Reset
4	DI4	Acceleration & deceleration select
5	DI5	Constant speed 1 (1 = On)
6	DI6	By default not in use.

XSTO Safe torque off		
1	OUT1	Safe torque off. Both circuits must be closed for the drive to start.
2	SGND	
3	IN1	
4	IN2	

X12	Safety functions module connection	
X13	Control panel connection	
X205	Memory unit connection	

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# EN – US quick installation guide

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This guide briefly describes how to install the drive. For complete information on installation, see *ACS880-31 drives hardware manual* (3AXD50000045933 [English]). For cabinet installation, see also ACS880 drive module frames R1 to R9 for cabinet installation (options +P940 and +P944) supplement (3AUA0000145446). For start-up instructions, see *ACS880 drives with primary control program quick start-up guide* (3AUA0000098062 [English]).

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

## Obey the safety instructions

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**US**


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

- Only qualified electrical professionals are allowed to install and maintain the drive.
  - Never 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.
  - Never work on the control cables when power is applied to the drive or to the external control circuits.
  - Do not connect the drive to a voltage higher than what is marked on the type designation label.
  - Always ground the drive, the motor and adjoining equipment to the protective earth (PE) bus of the power supply.
  - Frames R6 and R8: The drive module is heavy and its center of gravity is high. Use a lifting device for lifting. Do not tilt the drive. Manual lifting, or overturning due to the tilting, can cause physical injury. Make sure that the wall and the fixing devices can carry the weight.
  - Make sure that debris from drilling, cutting and grinding does not enter the drive.
  - Make sure that the floor below the drive and the wall where the drive is installed are non-flammable.
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## Check if capacitors need to be reformed

If the drive has not been powered up (either in storage or unused) for over three years, you must reform the capacitors.

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

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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 [abb.com/drives/documents](http://abb.com/drives/documents).

## Data

### UL (NEC) ratings

ACS880-31-	Cu cable (AWG/kcmil)	UL fuse	Losses (W)
3-phase $U_N = 480$ V			
07A6-5	14	JJS-15	219
11A0-5	14	JJS-20	278
014A-5	10	JJS-25	321
021A-5	10	JJS-35	473
027A-5	8	JJS-40	625
034A-5	8	JJS-50	711
040A-5	6	JJS-60	807
052A-5	4	JJS-80	960
065A-5	2	JJS-90	1223
077A-5	2	JJS-110	1560
101A-5	1	JJS-150	1995
124A-5	2/0	JJS-200	2800
156A-5	3/0	JJS-225	3168
180A-5	250MCM	JJS-300	3872

3AXD00000588487

## Select the power cables

See the [Data](#) table on page 12.

## Ensure cooling

See the [Data](#) table on page 12. No condensation or frost is allowed. The allowed operating temperature range of the drive without derating is -15 to +40 °C.

## Protect the drive and input power cable with correct fusing

Check on the fuse time-current curve to ensure that the operating time of the fuse is below 0.5 seconds for frames R3 and R6 and below 0.1 seconds for frame R8. Obey the local regulations.

## A – Install the drive on the wall

See figure [A...](#) on page 25.

Frames R6 and R8 of UL Type 12 (option +B056): Install an additional hood on top of the drive before you tighten the upper fastening screws. Place the vertical edge of the hood in between the wall and the drive back plate. Then tighten the screws to fasten the hood and drive on its place. See figure ...A (R6, R8) on page 25.

## B – Remove the cover

Remove the cover(s). See figures B (R3)... and ...B (R6, R8)... on page 25.

## C – Check the compatibility with IT (ungrounded) and corner-grounded delta systems

See figure C on page 25.



**WARNING!** Do not install the drive with EMC filter options +E200 or +E202 connected to a system that the filter is not suitable for. This can cause danger, or damage the drive. See the drive hardware manual.



**WARNING!** Do not install the 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. See the drive hardware manual.

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

Check the insulation of motor and motor cable. See figure D on page 26. **Note:** Moisture inside the motor casing will reduce the insulation resistance. If moisture is suspected, dry the motor and repeat the measurement.

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

## E – Attach the warning stickers in local languages

See figure E on page 26.

## F – Connect the power cables

Procedure:

1. Frames R6 and R8: Remove the shroud on the power cable terminals. See figure F (R6)... on page 26. Frame R8: For easier installation, remove the side plates.
2. Remove the rubber grommets from the bottom plate for the cable conduits to be installed. See figure ...F... on page 26.
3. Attach the cable conduits to the bottom plate holes. See figure ...F... on page 26.

4. Remove the cable shelves (4a). Reinstall the four screws to avoid moisture exchange through the empty holes! (4b). See figure ...F (R6, R8)... on page 26.
5. Strip the cable ends. (Note the extra length of the grounding conductors.) Slide the cables through the connectors. See figure ...F... on page 26.
6. Connect the grounding conductors to the grounding terminals. Connect the conductors of the input and motor cables. Tighten the screws. See figures ...F (R3)..., ...F (R6)... and ...F (R8)... on page 26.

Connect the phase conductors of the motor cable to the T1/U, T2/V and T3/W terminals and the phase conductors of the input cable to the L1, L2 and L3 terminals.

For frame R8: Install the common mode filter. For instructions, see *Common mode filter kit for frames R7 and R8 (option +E208) installation guide* (3AXD50000015179 [English]).

If the protective PE conductor is smaller than 10 mm<sup>2</sup>, you must use a second earthing conductor (6a). See the hardware manual for more information.

7. Frame R6 types -040A-5 and greater: Cut tabs in the shroud for the installed cables. Frame R8: Install the side plates if removed. Knock out holes in the shroud for the input cables. See figure ...F (R6, R8)... on page 27.
8. Frames R6 and R8: Install the shroud on the power cable terminals.

## G – Connect the control cables

Procedure:

1. Remove the front cover(s) if not already removed.
2. Frame R3: Lift the control panel holder up. See figure [G \(R3\)](#)... on page 27.
3. Remove the rubber grommets from the bottom plate for the cable conduits to be installed.
4. Attach the cable conduits to the bottom plate holes.
5. Strip the cable ends and cut to suitable length (note the extra length of the grounding conductors).
6. Route the cables. Frame R3: See figure [...G \(R3\)](#)... on page 27. Frame R6: See figure [...G \(R6\)](#)... on page 28. Frame R8: See figure [...G \(R8\)](#)... on page 28.
7. Secure the cables inside the drive with cable ties.
8. Frame R3: Leave the pair cable shields and grounding wires unconnected at the drive end, and ground them at the other cable end. Cut any unconnected wires at the drive end. Frames R6 and R8: Ground the pair-cable shields and grounding wire under the clamp below the control unit.
9. Connect the conductors to the appropriate terminals of the control unit. See [Default IO connection diagram](#) on page 16.
10. Wire the optional modules if included in the delivery. See the option module user's manual or installation guide.

### Note:

- Leave the other ends of the control cable shields unconnected.
- Keep any signal wire pairs twisted as close to the terminals as possible.

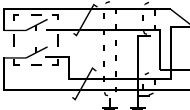
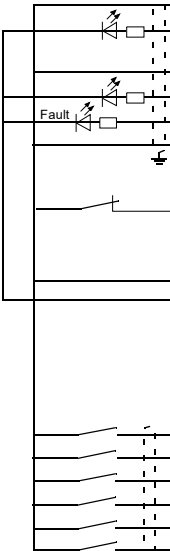
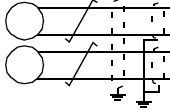
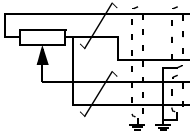
## H – Reinstall cover(s)

See figures [H \(R3, R6, R8\)](#)... on page 29.

**Default IO connection diagram**

Wire sizes:  
0.5 ... 2.5 mm<sup>2</sup>  
(24... 14 AWG)

Tightening  
torques: 0.5 N·m  
(0.4 lbf·ft) for  
both stranded  
and solid wiring.



XPOW External power input		
1	+24VI	24 V DC, 2 A
2	GND	

XAI Reference voltage and analog inputs		
1	+VREF	10 V DC, $R_i$ 1...10 kohm
2	-VREF	-10 V DC, $R_i$ 1...10 kohm
3	AGND	Ground
4	AI1+	<b>Speed reference</b> 0(2)...10 V, $R_{in} >$ 200 kohm
5	AI1-	
6	AI2+	By default not in use. 0(4)...20 mA, $R_{in} =$ 100 ohm
7	AI2-	
J1	J1	AI1 current/voltage selection jumper
J2	J2	AI2 current/voltage selection jumper

XAO Analog outputs		
1	AO1	<b>Motor speed rpm</b> 0...20 mA, $R_L <$ 500 ohm
2	AGND	
3	AO2	<b>Motor current</b> 0...20 mA, $R_L <$ 500 ohm
4	AGND	

XD2D Drive-to-drive link		
1	B	Drive-to-drive link
2	A	
3	BGND	
J3	J3	Drive-to-drive link termination switch

XRO1, XRO2, XRO3 Relay outputs		
11	NC	<b>Ready</b> 250 V AC / 30 V DC 2 A
12	COM	
13	NO	
21	NC	<b>Running</b> 250 V AC / 30 V DC 2 A
22	COM	
23	NO	
31	NC	<b>Faulted(-1)</b> 250 V AC / 30 V DC 2 A
32	COM	
33	NO	

XD24 Digital interlock		
1	DIIL	Run enable
2	+24VD	+24 V DC 200 mA
3	DICOM	Digital input ground
4	+24VD	+24 V DC 200 mA
5	DIOGND	Digital input/output ground
J6	Ground selection switch	

XDIO Digital input/outputs		
1	DIO1	Output: Ready
2	DIO2	Output: Running

XDI Digital inputs		
1	DI1	Stop (0) / Start (1)
2	DI2	Forward (0) / Reverse (1)
3	DI3	Reset
4	DI4	Acceleration & deceleration select
5	DI5	Constant speed 1 (1 = On)
6	DI6	By default not in use.

XSTO Safe torque off		
1	OUT1	Safe torque off. Both circuits must be closed for the drive to start.
2	SGND	
3	IN1	
4	IN2	

X12	Safety functions module connection	
X13	Control panel connection	
X205	Memory unit connection	

US



## UL checklist



**WARNING!** Operation of this drive requires detailed installation and operation instructions provided in the hardware and software manuals. The manuals are provided in electric format in the drive package or on the Internet. Retain the manuals with the drive at all times. Hard copies of the manuals can be ordered through the manufacturer.

- Make sure that the drive type designation label includes the cULus Listed marking.
- **CAUTION - Risk of electric shock.** After disconnecting the input power, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you start working on the drive, motor or motor cable.
- The drive is to be used in a heated, indoor controlled environment. The drive must be installed in clean air according to enclosure classification. Cooling air must be clean, free from corrosive materials and electrically conductive dust. UL Type 12 (IP55) enclosure provides protection from airborne dust and light sprays or splashing water from all directions. See the hardware manual.
- The maximum surrounding air temperature is +55 °C (131 °F) at rated current. The current is derated for 40 to 55 °C (104 to 131 °F).
- The drive is suitable for use in a circuit capable of delivering not more than 100,000 rms symmetrical amperes, 480 V maximum when protected by the UL fuses on page 12. The ampere rating is based on tests done according to the appropriate UL standard.
- The cables located within the motor circuit must be rated for at least 75 °C (167 °F) in UL-compliant installations. For UL Type 12 drives of frame R6, the power cables must be rated for 90 °C (194 °F) minimum. For ambient temperatures above +40 °C (+104 °F), the power cables must be rated for 90 °C (194 °F) minimum.
- Integral solid state short circuit protection does not provide branch circuit protection. The input cable must be protected with fuses. Suitable UL (class T) fuses are listed on page 12. These fuses provide branch circuit protection in accordance with the National Electrical Code (NEC) and Canadian Electrical Code. For installation in the United States, obey any other applicable local codes. For installation in Canada, obey any applicable provincial codes.
- **Note:** Circuit breakers must not be used without fuses in the USA. Consult ABB for suitable circuit breakers.

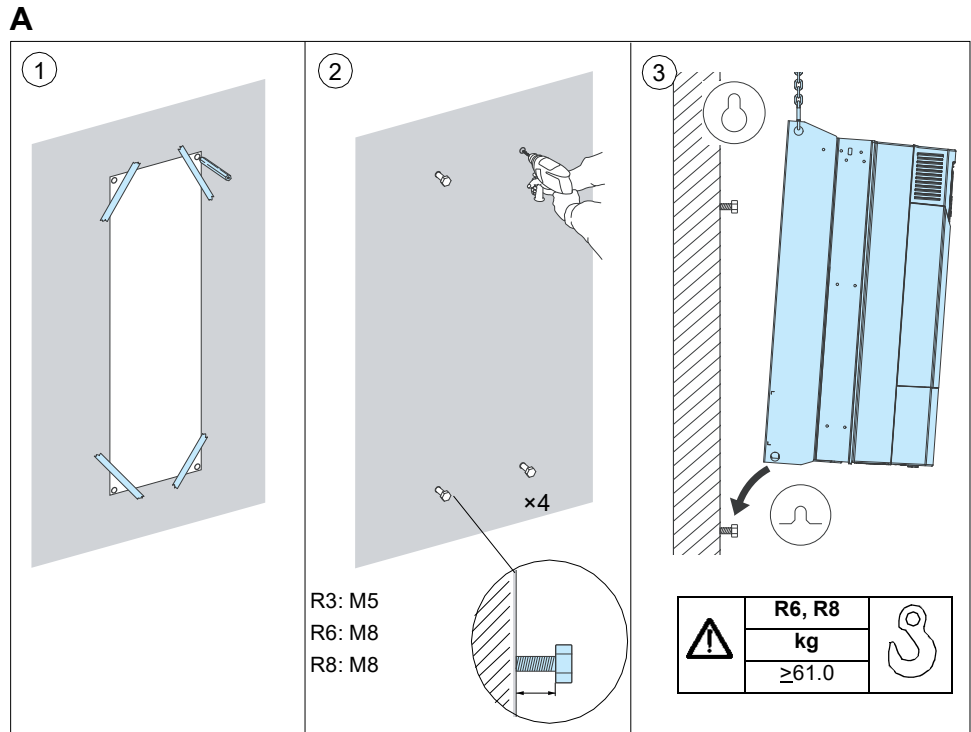


**WARNING!** The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire

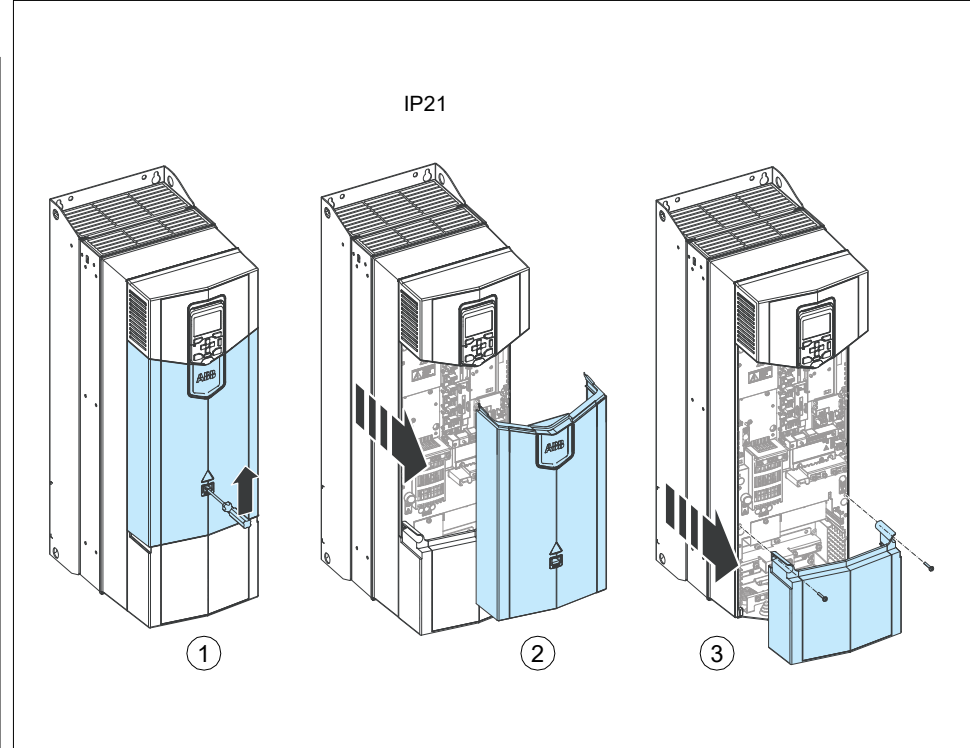
or electric shock, current-carrying parts and other components of the device should be examined and replaced if damaged.

- The drive provides motor overload protection. For the adjustments, see the firmware manual.
- For the drive overvoltage category and pollution degree, see the hardware manual.

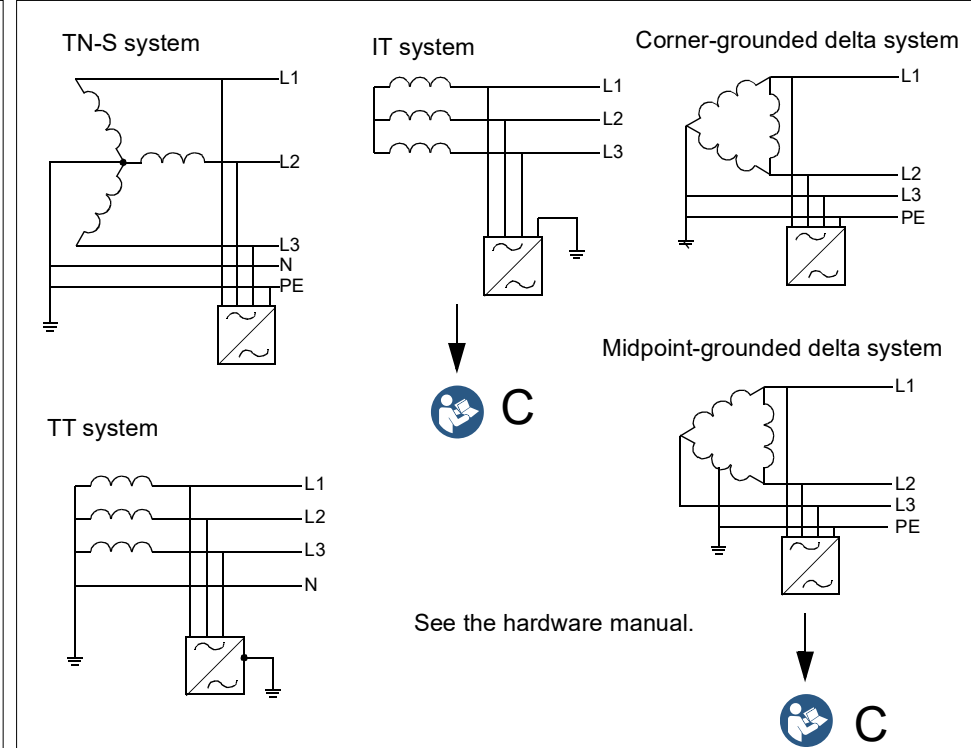
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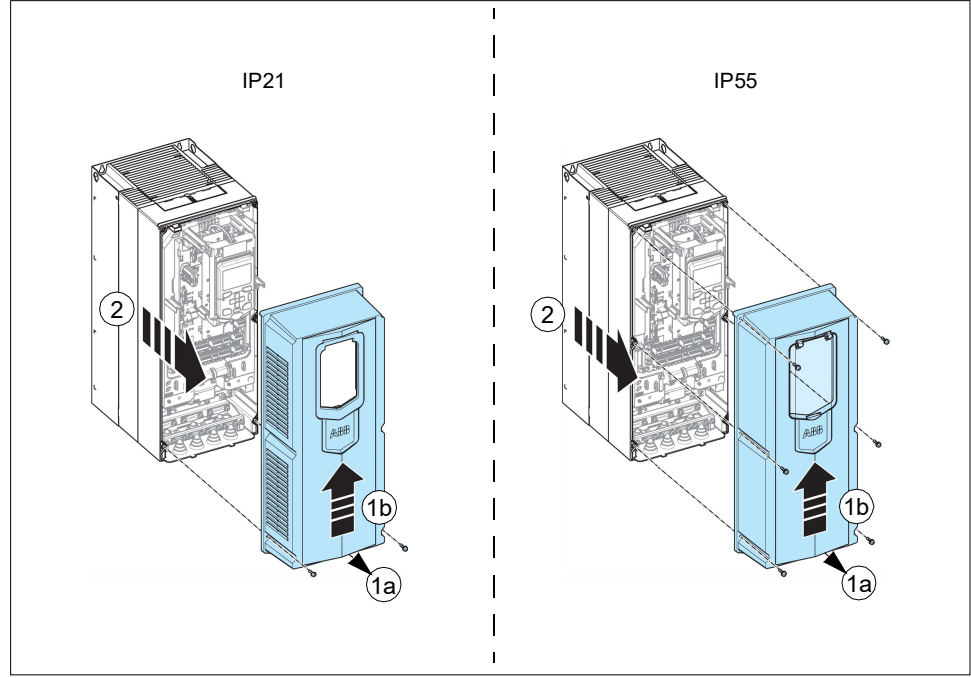
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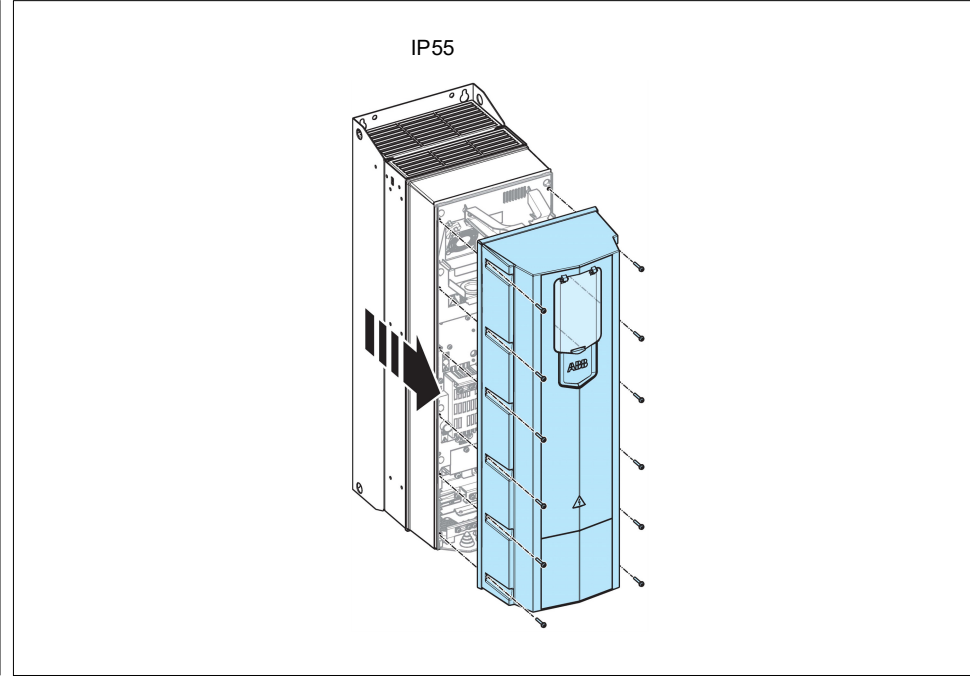
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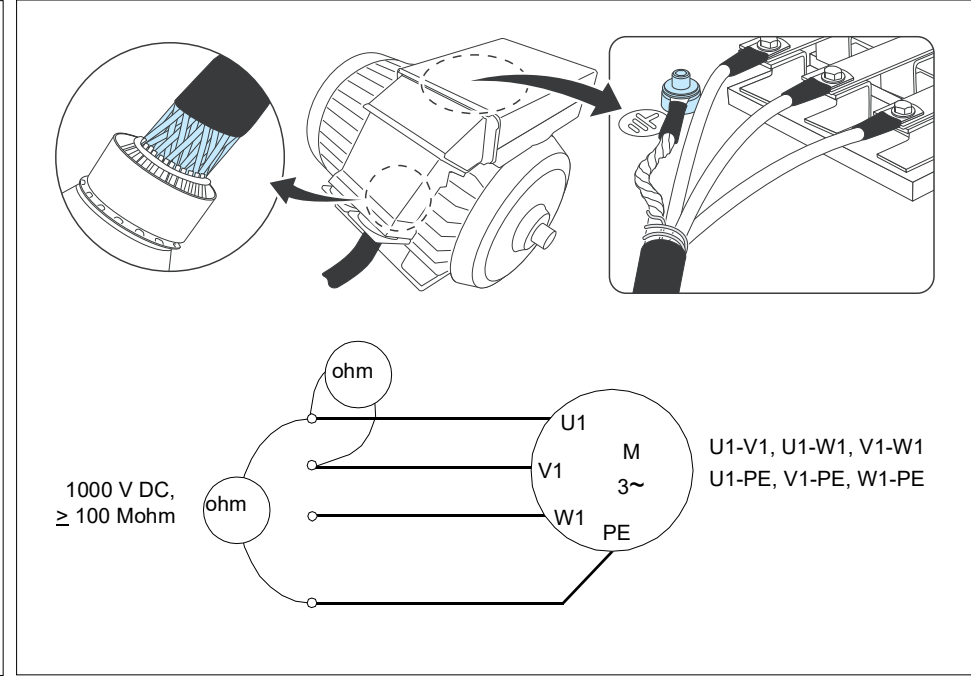
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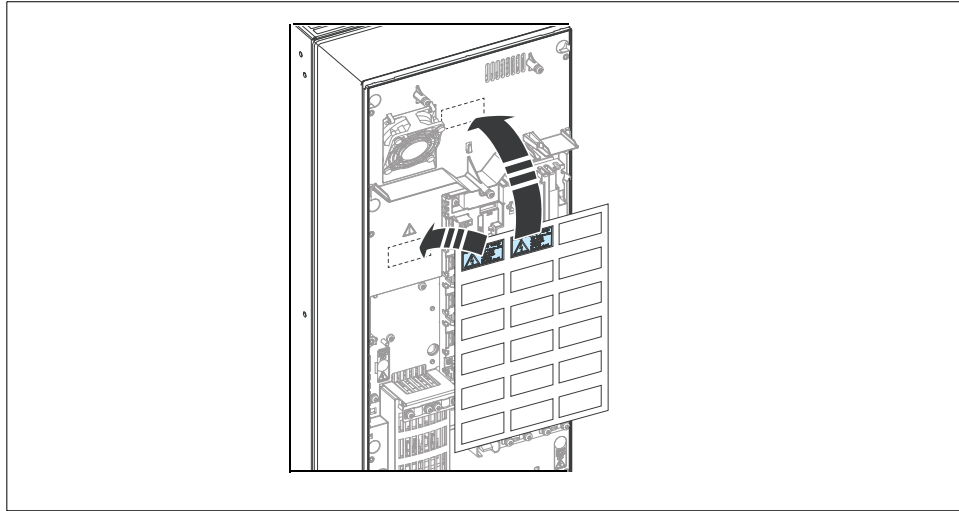


...B (R6, R8)

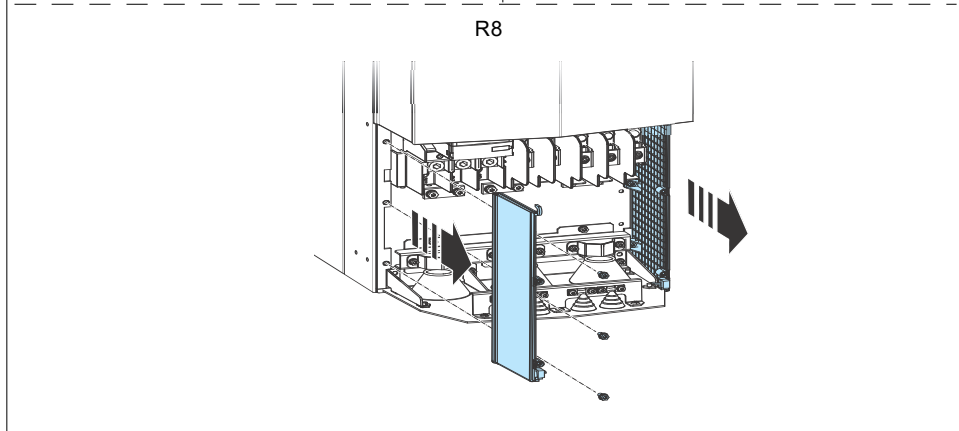
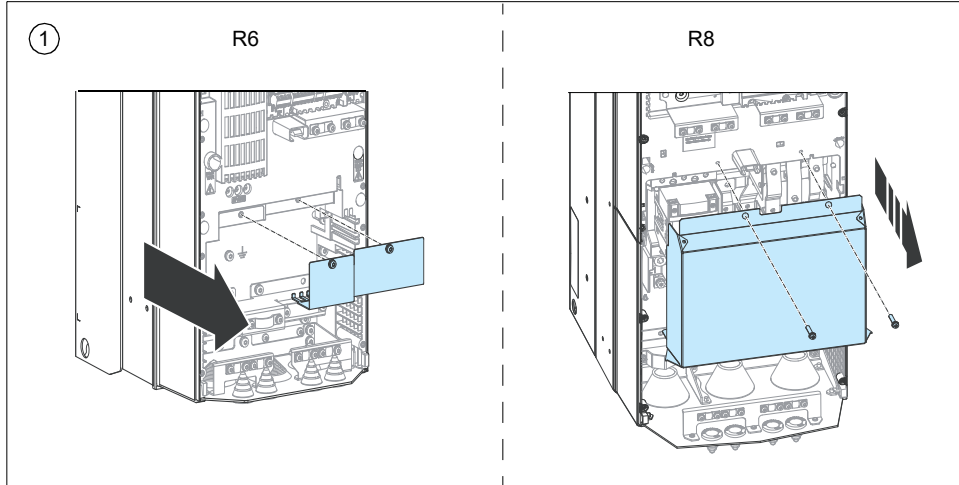


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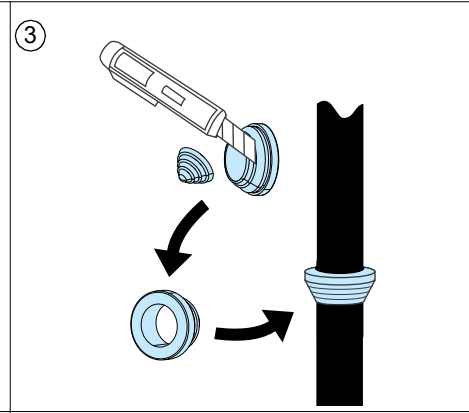
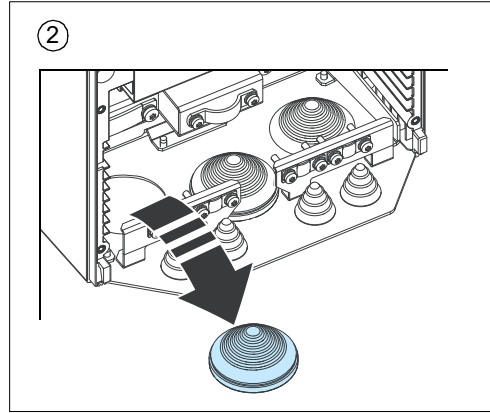




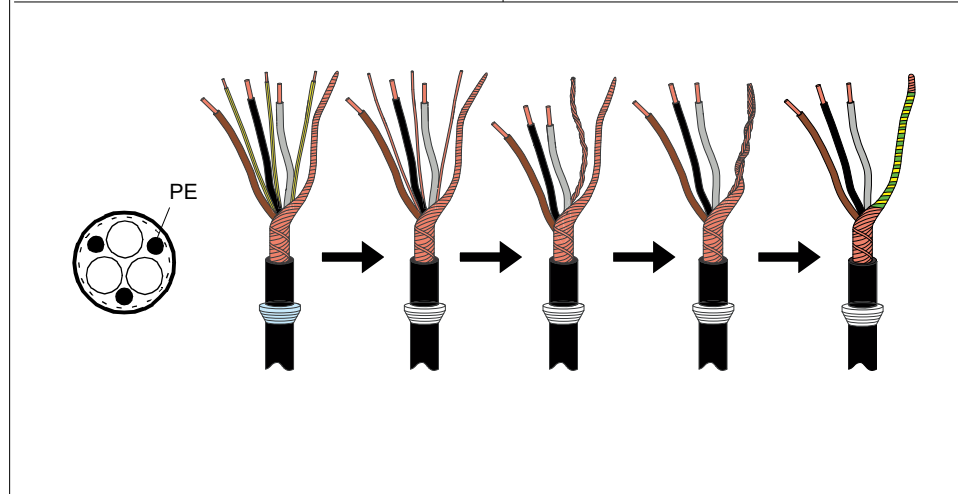
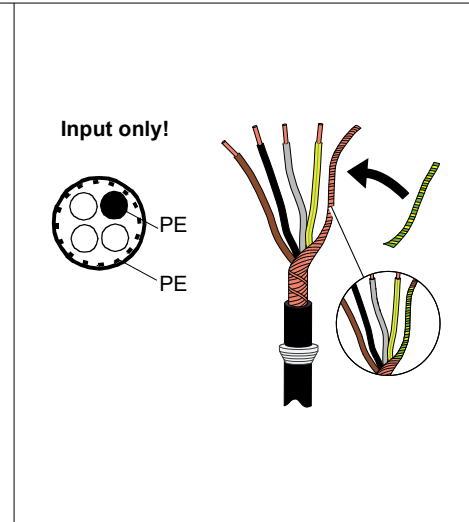
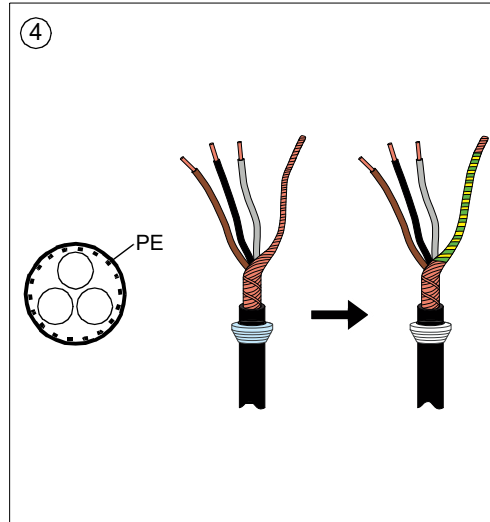
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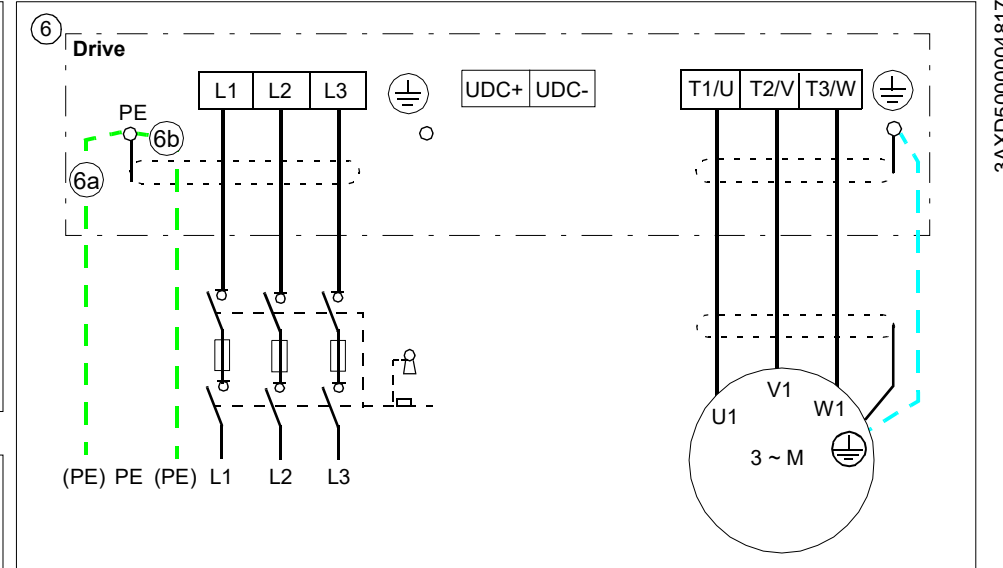
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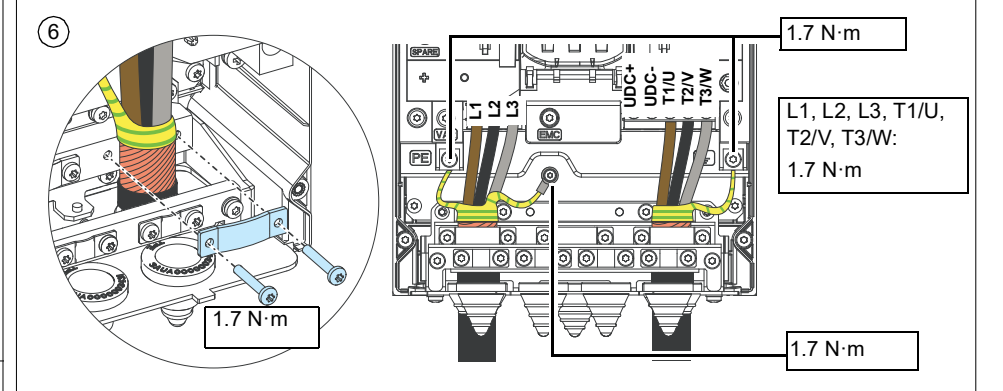
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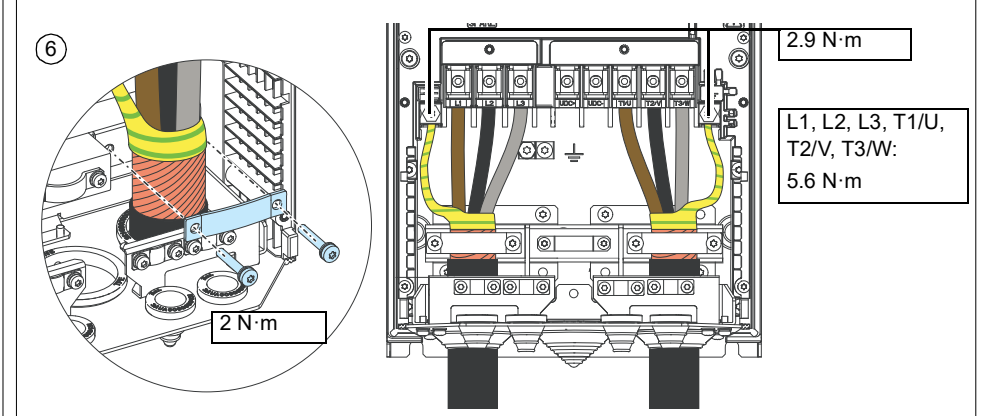
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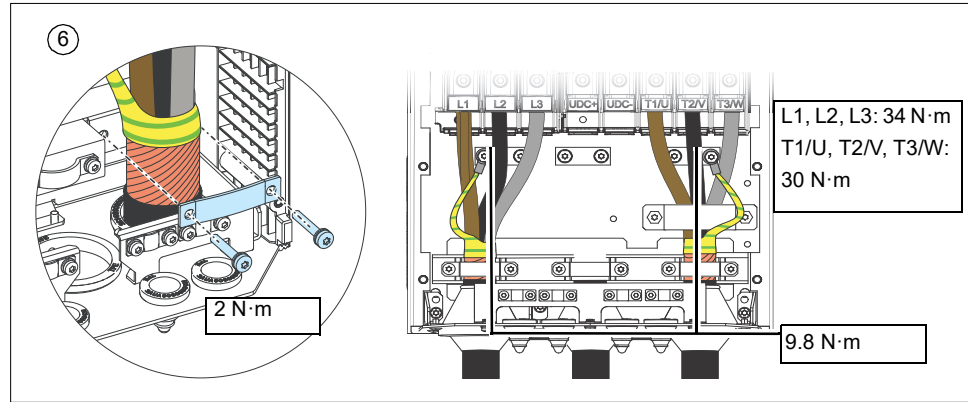
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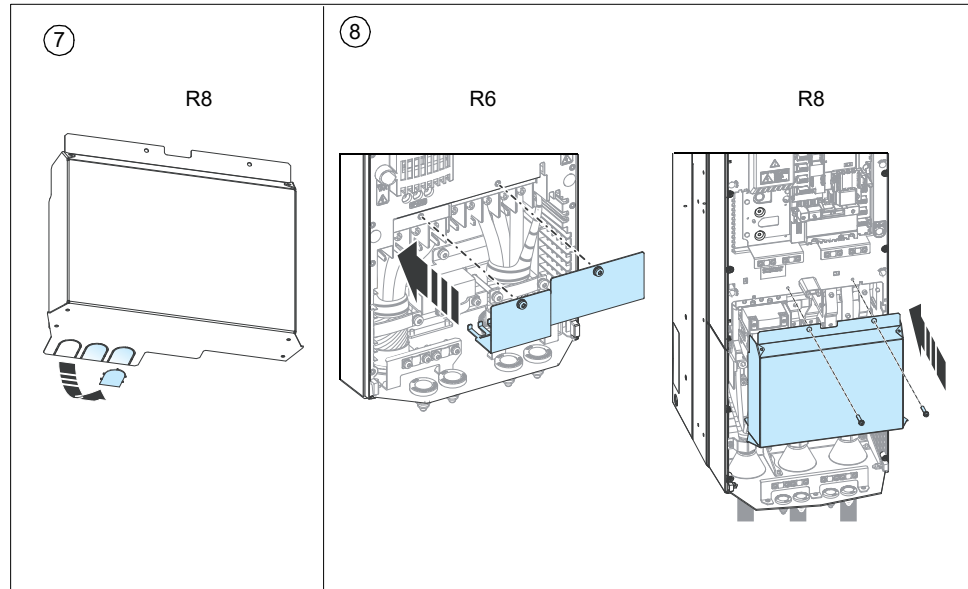
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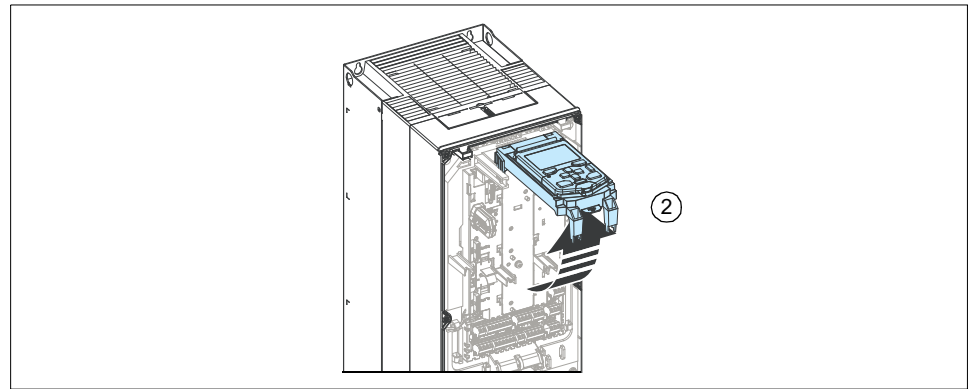
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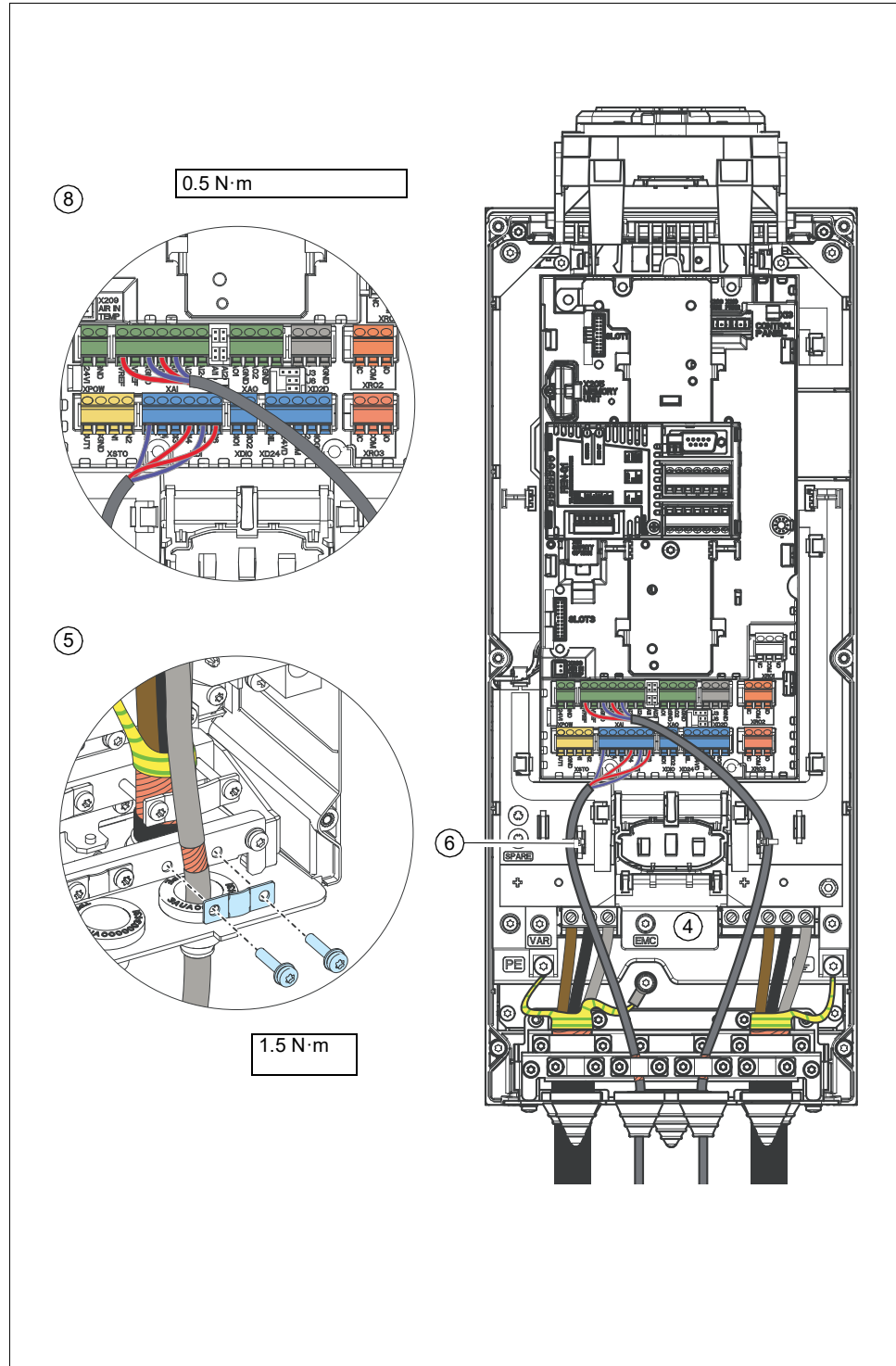
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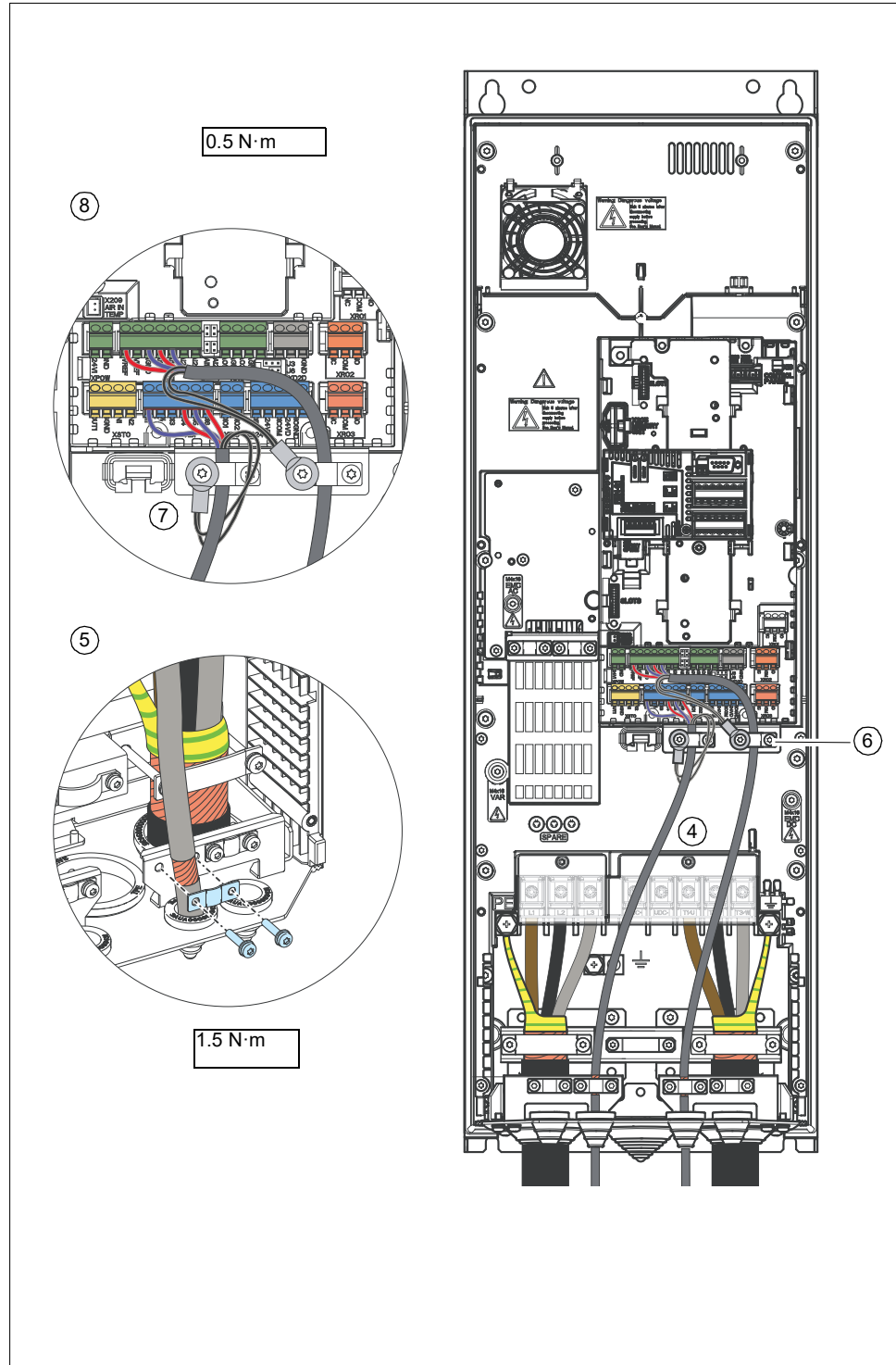
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...G (R3)...

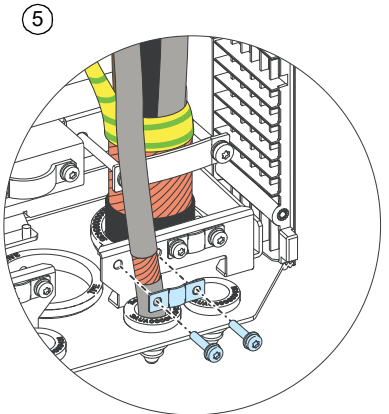
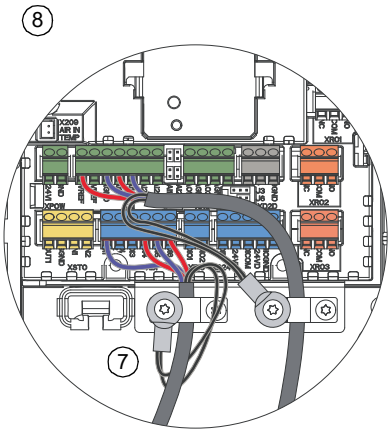


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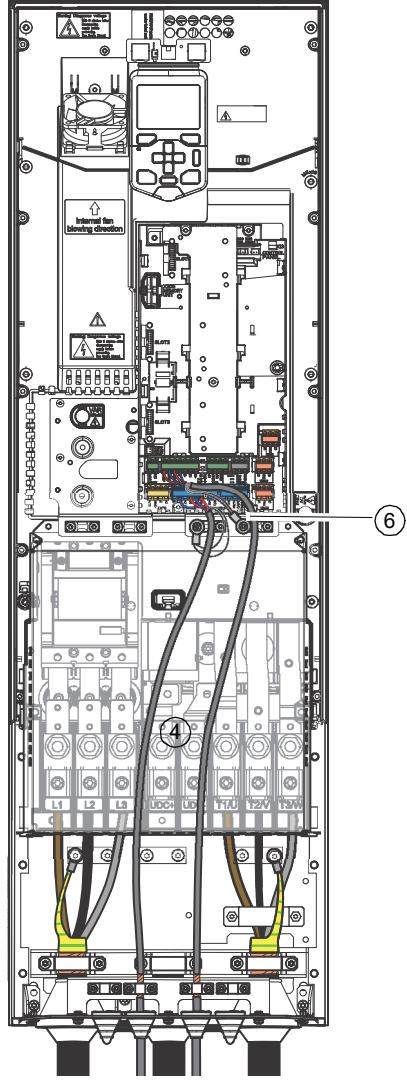


...G (R8)...

0.5...0.6 N·m

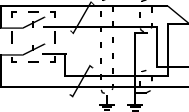
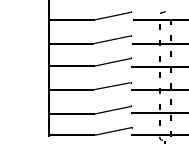
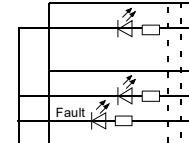
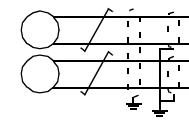
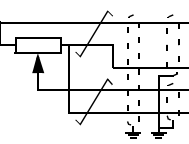


1.5 N·m



...G

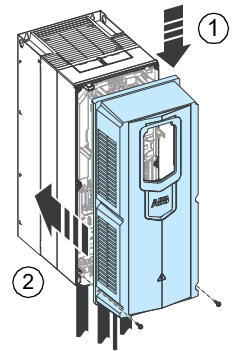
Wire sizes:  
0.5 ... 2.5 mm<sup>2</sup>  
Tightening  
torques: 0.5 N·m  
for both  
stranded and  
solid wiring.



<b>XPOW</b> External power input		
1	+24VI	24 V DC, 2 A
2	GND	
<b>XAI</b> Reference voltage and analog inputs		
1	+VREF	10 V DC, $R_L$ 1...10 kohm
2	-VREF	-10 V DC, $R_L$ 1...10 kohm
3	AGND	Ground
4	AI1+	Speed reference 0(2)...10 V, $R_{in} >$
5	AI1-	200 kohm
6	AI2+	By default not in use. 0(4)...20 mA, $R_{in} =$
7	AI2-	100 ohm
J1	J1	AI1 current/voltage selection jumper
J2	J2	AI2 current/voltage selection jumper
<b>XAO</b> Analog outputs		
1	AO1	Motor speed rpm 0...20 mA, $R_L <$
2	AGND	500 ohm
3	AO2	Motor current 0...20 mA, $R_L <$
4	AGND	500 ohm
<b>XD2D</b> Drive-to-drive link		
1	B	
2	A	Drive-to-drive link
3	BGND	
J3	J3	Drive-to-drive link termination switch
<b>XRO1, XRO2, XRO3</b> Relay outputs		
11	NC	Ready
12	COM	250 V AC / 30 V DC
13	NO	2 A
21	NC	Running
22	COM	250 V AC / 30 V DC
23	NO	2 A
31	NC	Faulted(-1)
32	COM	250 V AC / 30 V DC
33	NO	2 A
<b>XD24</b> Digital interlock		
1	DIIL	Run enable
2	+24VD	+24 V DC 200 mA
3	DICOM	Digital input ground
4	+24VD	+24 V DC 200 mA
5	DIOGND	Digital input/output ground
J6	J6	Ground selection switch
<b>XDIO</b> Digital input/outputs		
1	DIO1	Output: Ready
2	DIO2	Output: Running
<b>XDI</b> Digital inputs		
1	DI1	Stop (0) / Start (1)
2	DI2	Forward (0) / Reverse (1)
3	DI3	Reset
4	DI4	Acceleration & deceleration select
5	DI5	Constant speed 1 (1 = On)
6	DI6	By default not in use.
<b>XSTO</b> Safe torque off		
1	OUT1	
2	SGND	Safe torque off. Both circuits must be
3	IN1	closed for the drive to start.
4	IN2	
<b>X12</b> Safety functions module connection		
<b>X13</b> Control panel connection		
<b>X205</b> Memory unit connection		

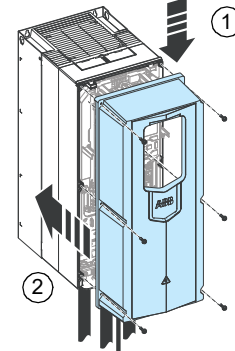
H (R3, R6, R8)

R3 IP21

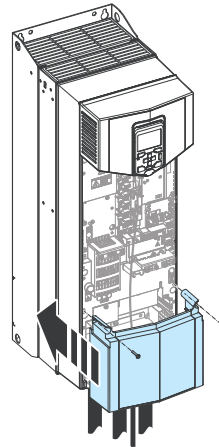


2 N·m

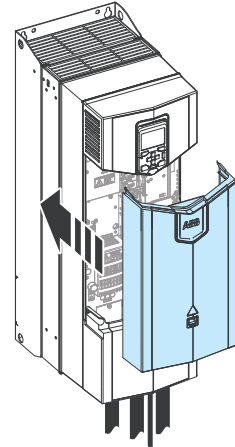
R3 IP55



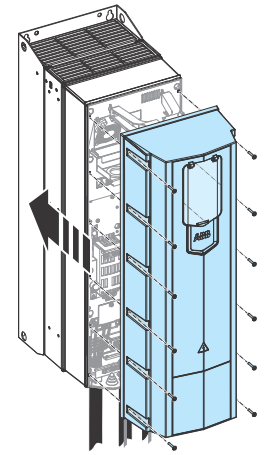
R6, R8 IP21



2 N·m



R6, R8 IP55



2 N·m

# Declaration of Conformity (EU)



## 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)

ACS880-01/-11/-31  
 ACS880-04/-04F/-M04/-14/-34

with regard to the safety function(s)

- (a) Safe Torque Off;
- (b) Safe stop 1, Safe stop emergency, Safely-limited speed, Safe maximum speed, Safe brake control, Prevention of unexpected start-up; [With FSO-12 option module (+Q973, encoderless)]
- (c) Safe stop 1, Safe stop emergency, Safely-limited speed, Safe maximum speed, Safe brake control, Safe speed monitor, Safe direction, Prevention of unexpected start-up; [With FSO-12 option module (+Q972 and +L521, encoder supported)]
- (d) Safe motor temperature; [with FPTC-01 thermistor protection module (option code +L536)]

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 fulfill(s) the relevant provisions of other European Union Directives which are notified in Single EU Declaration of conformity 3AXD10000497831.

Person authorized to compile the technical file

Name and address: Ari Korpela, Hiomotie 13, 00380 Helsinki, Finland.

Helsinki 27.08.2019

Manufacturer representative:

Tuomo Tarula  
 Vice President, ABB Oy

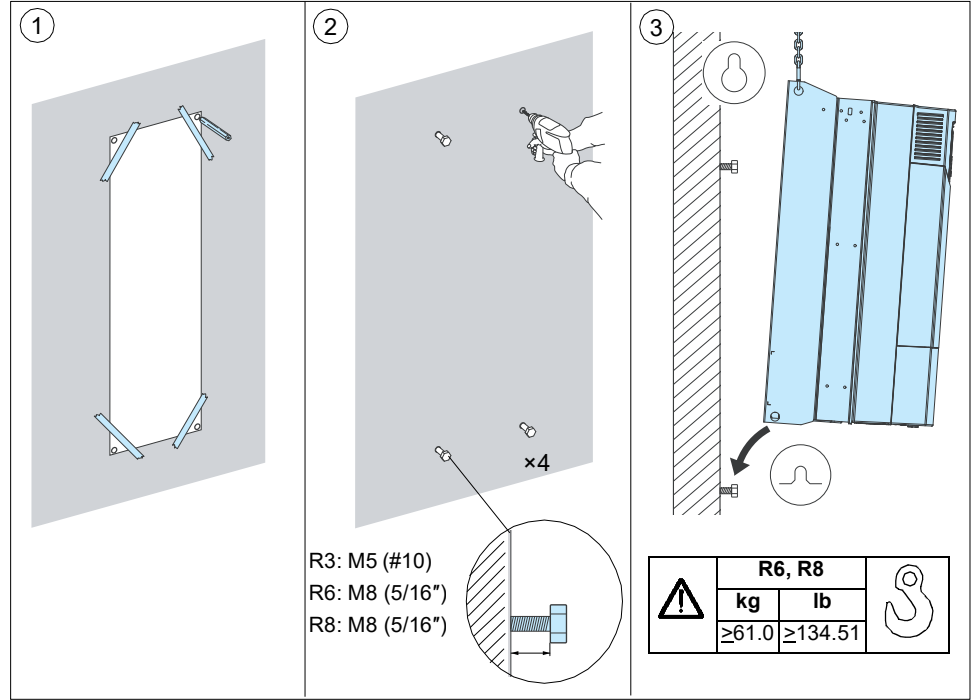
Document number 3AXD10000099646



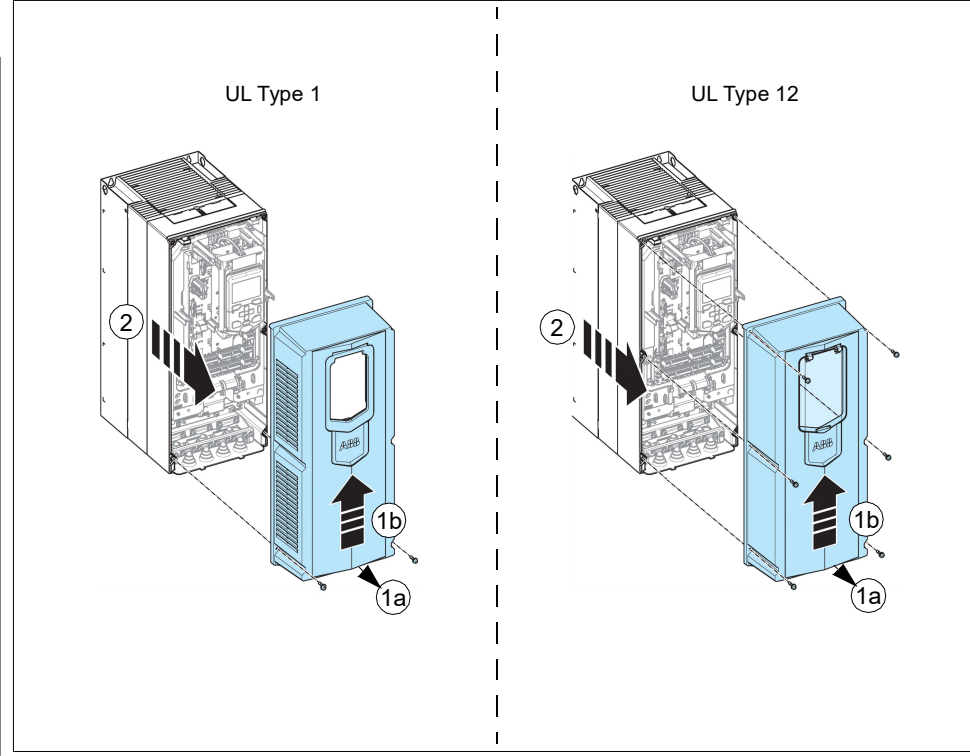


Figures USA

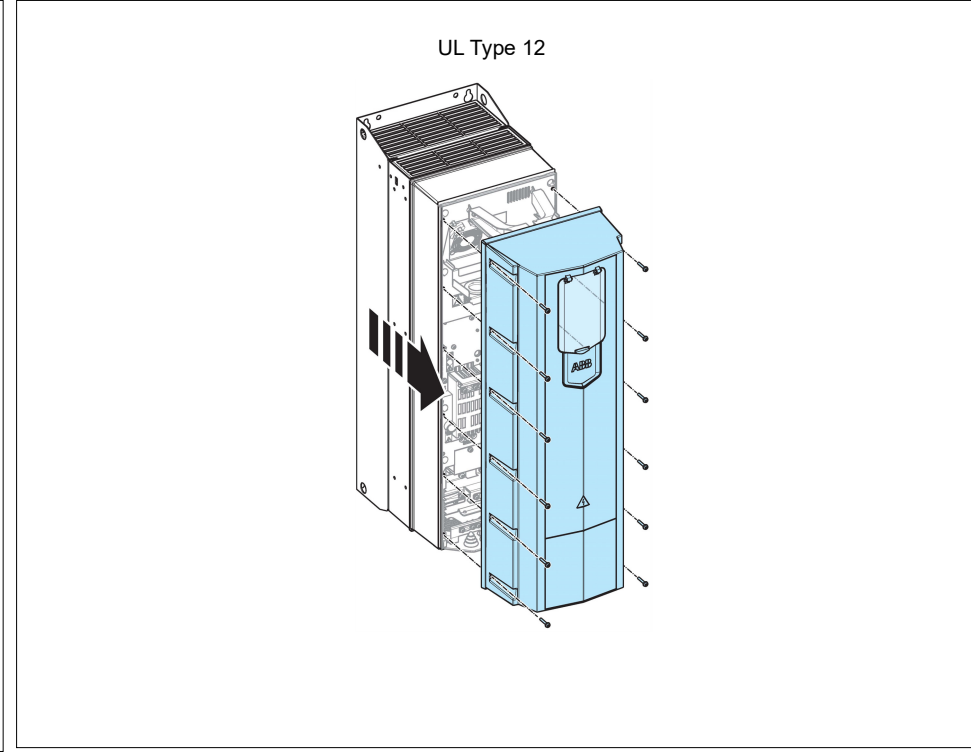
A...



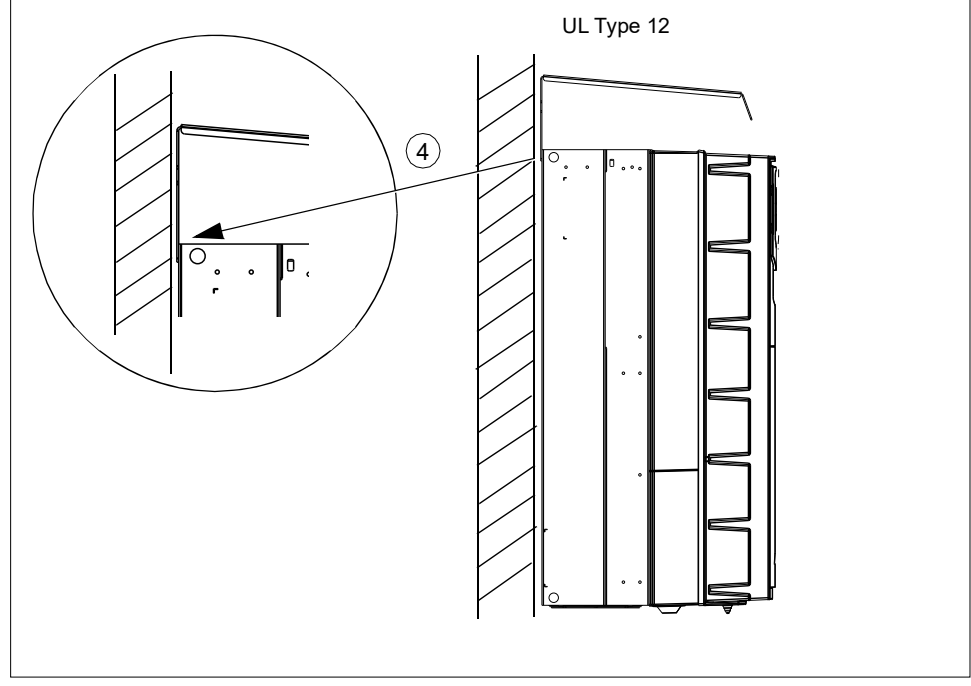
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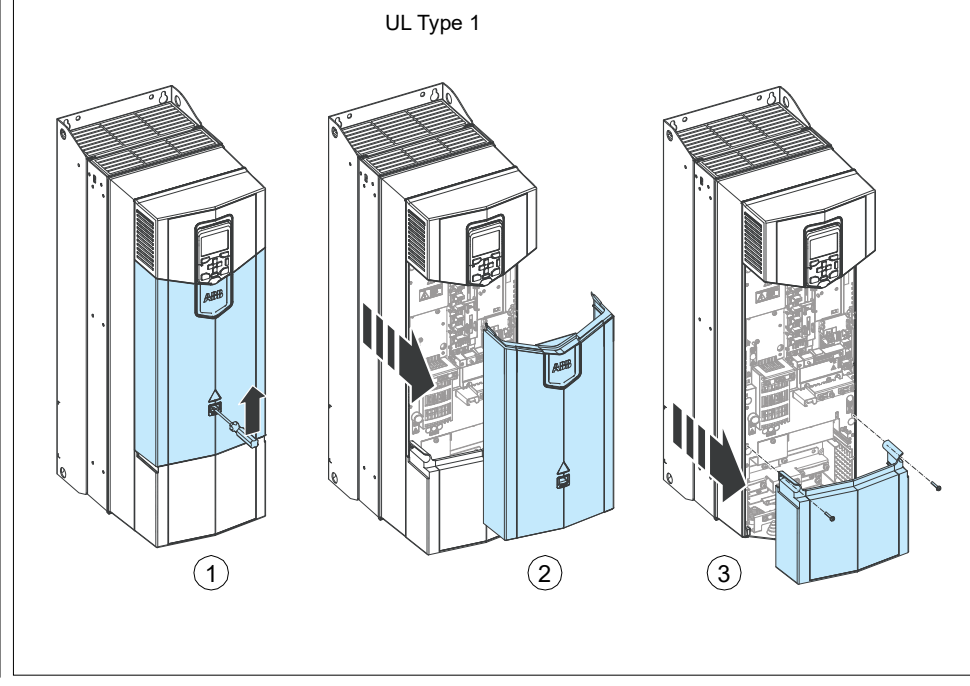
...B (R6, R8)



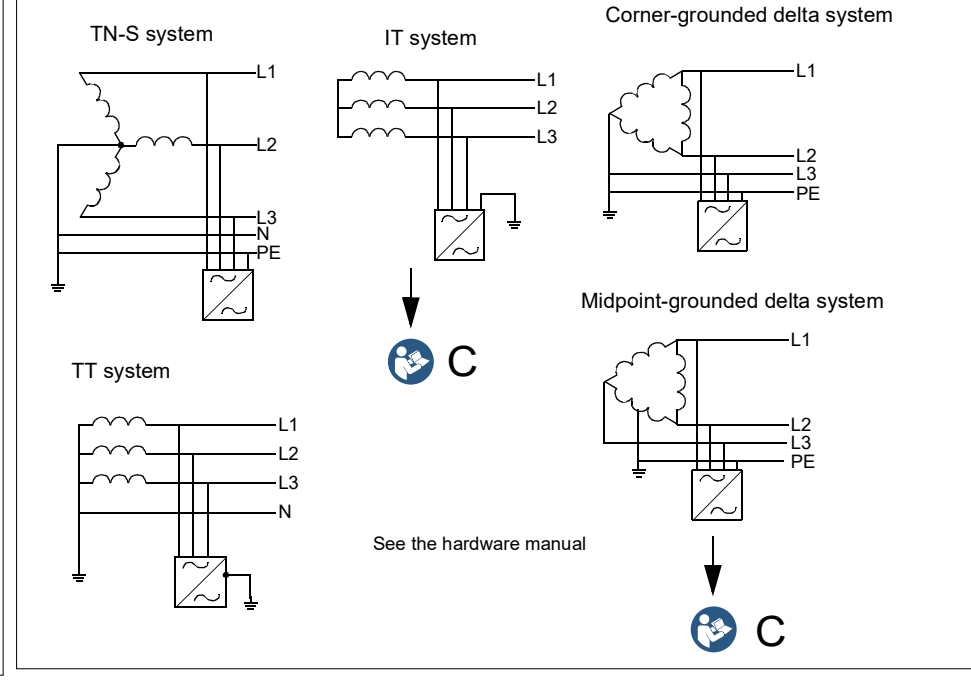
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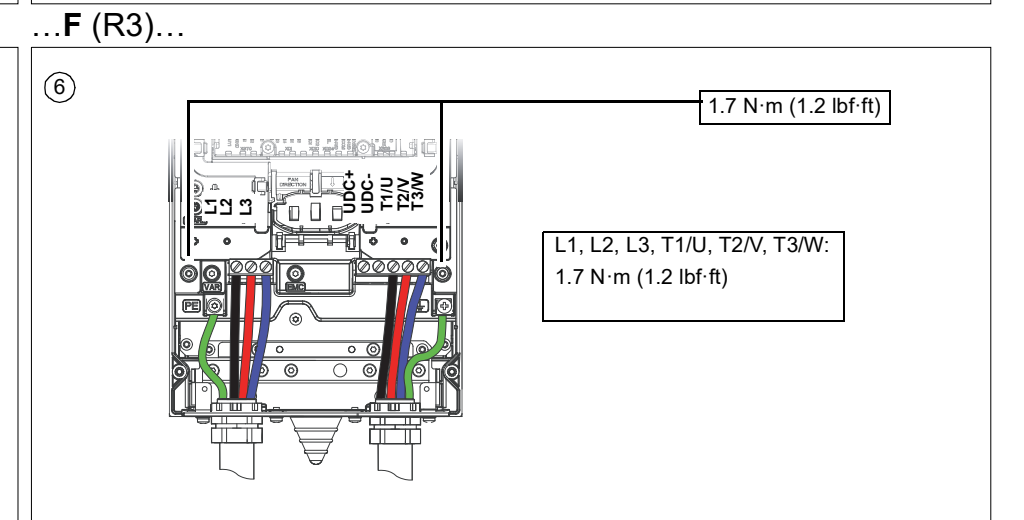
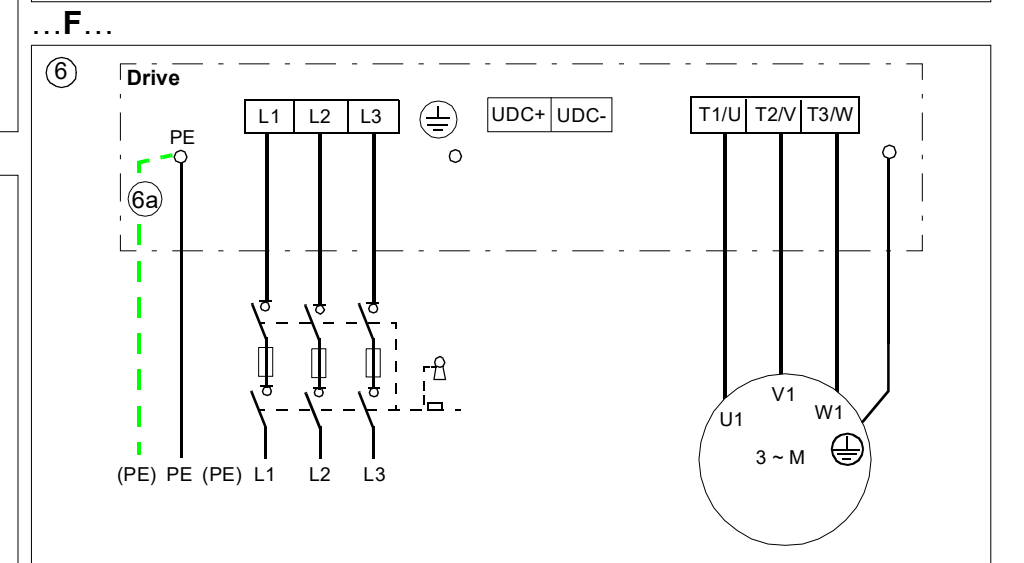
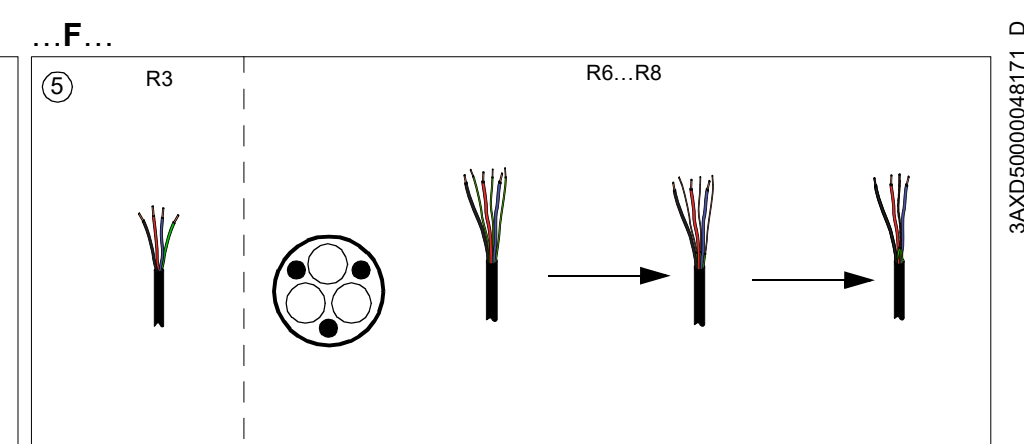
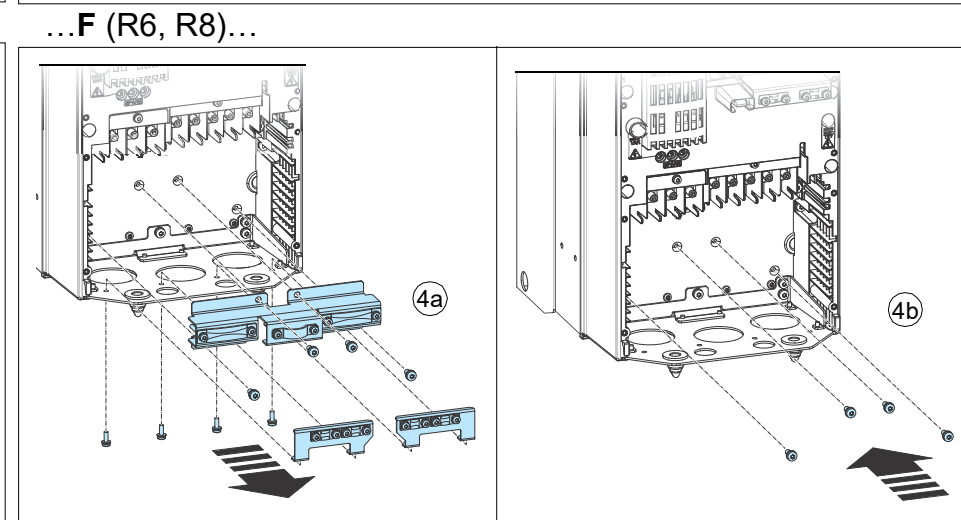
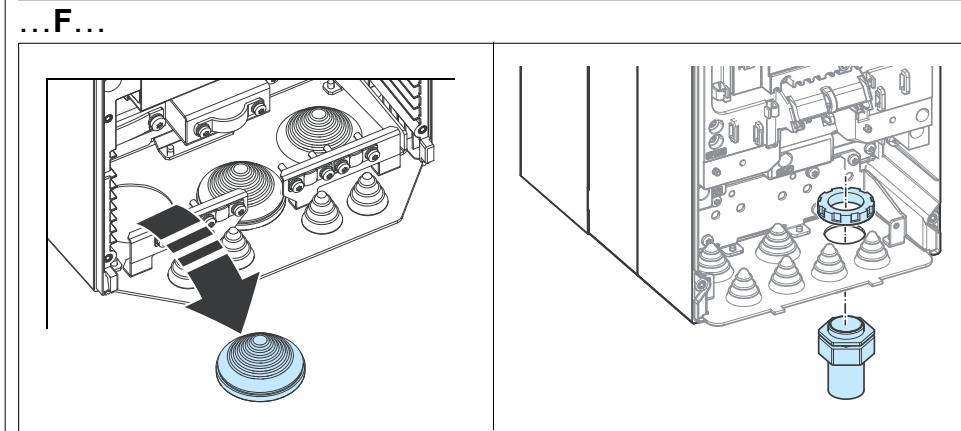
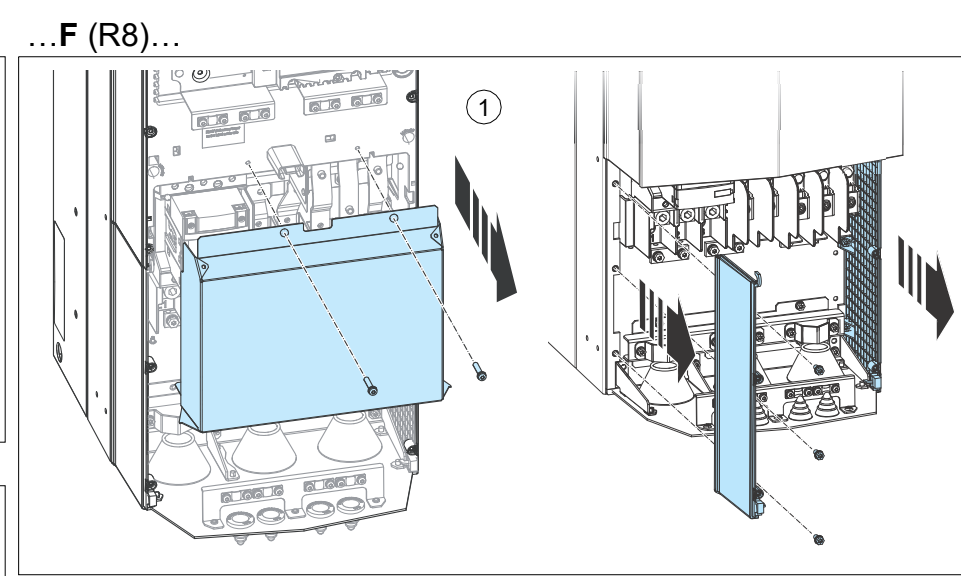
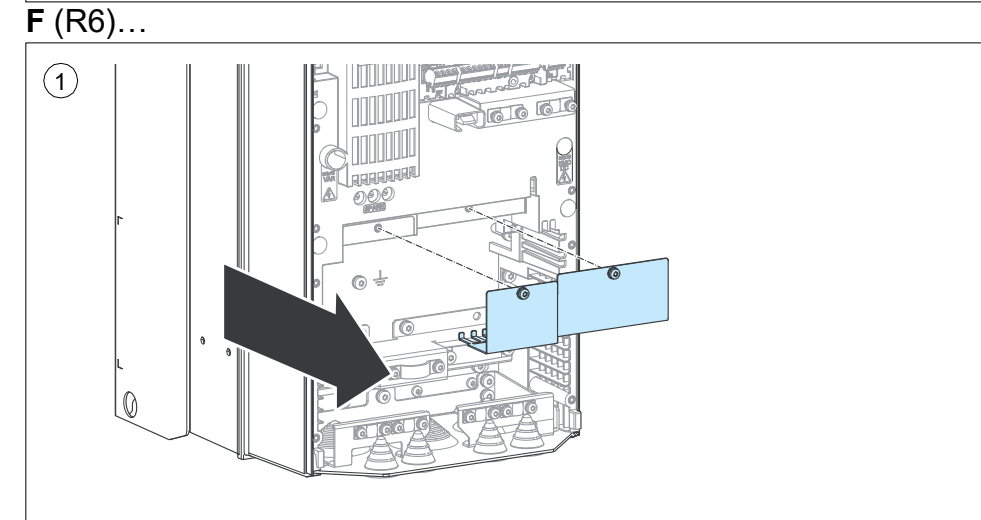
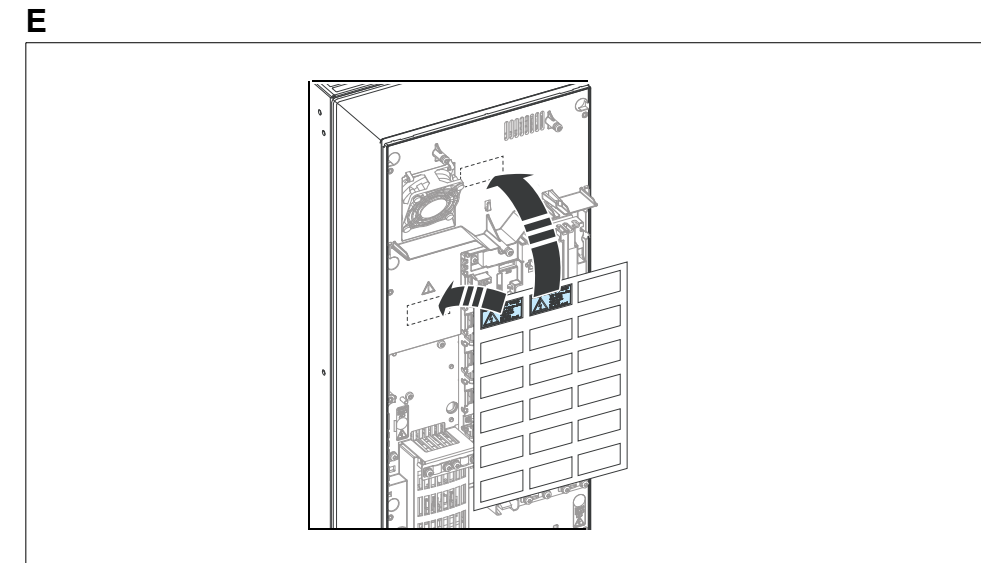
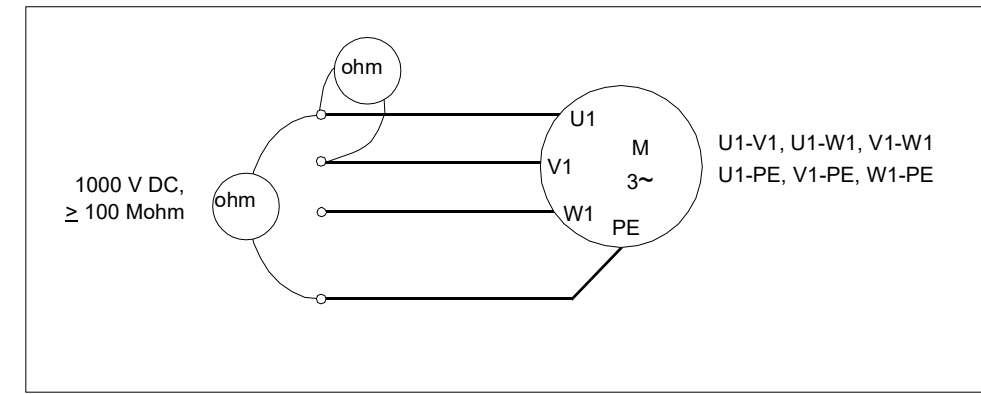


...B (R6, R8)...

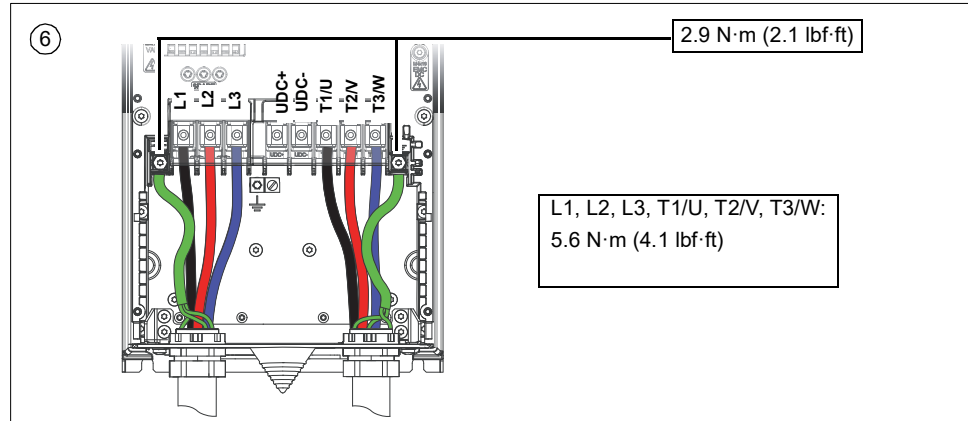


C

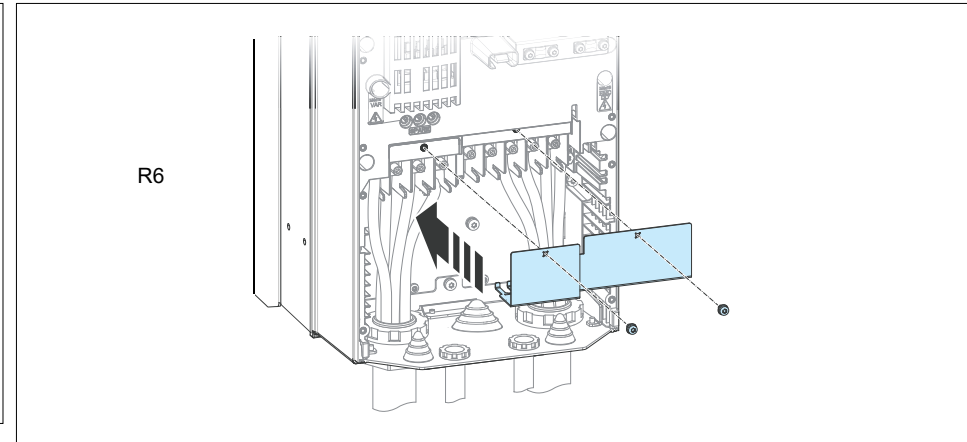




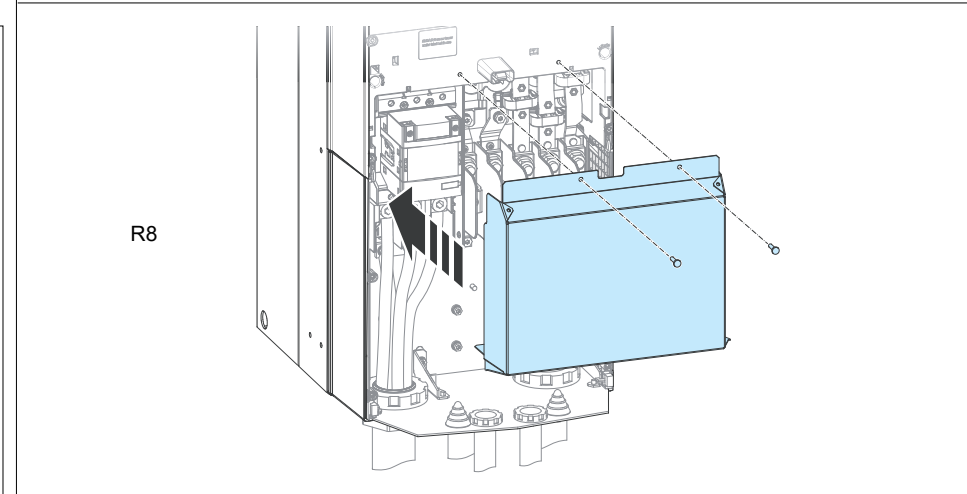
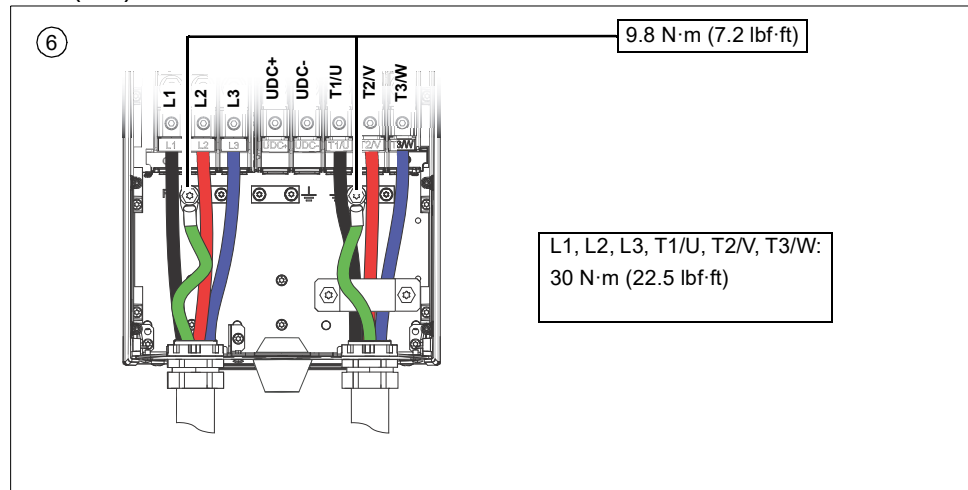
...F (R6)...



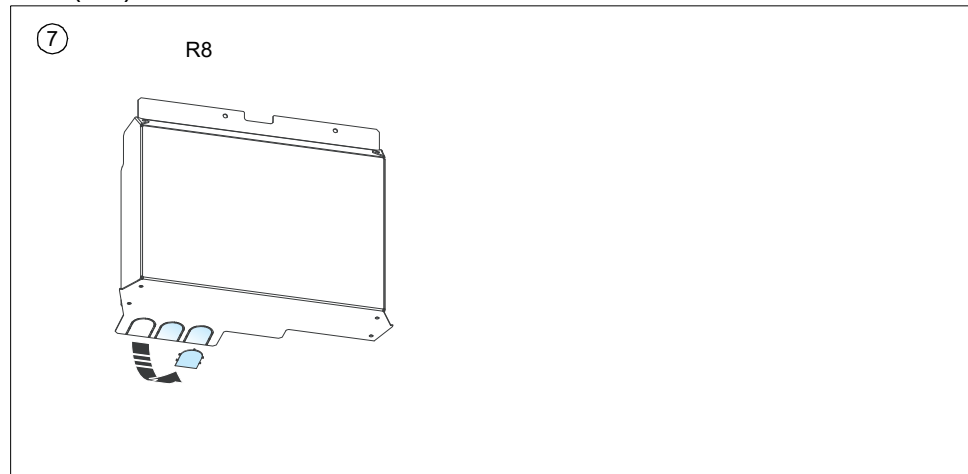
...F (R6, R8)...



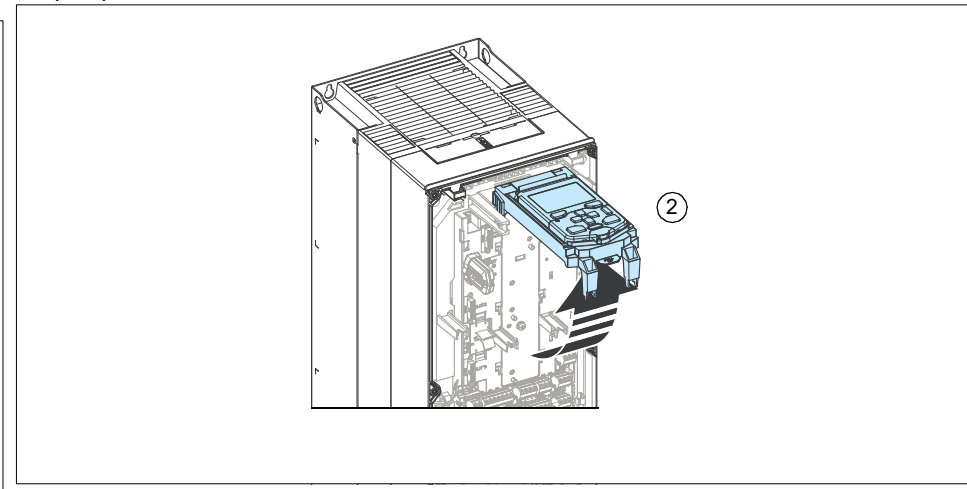
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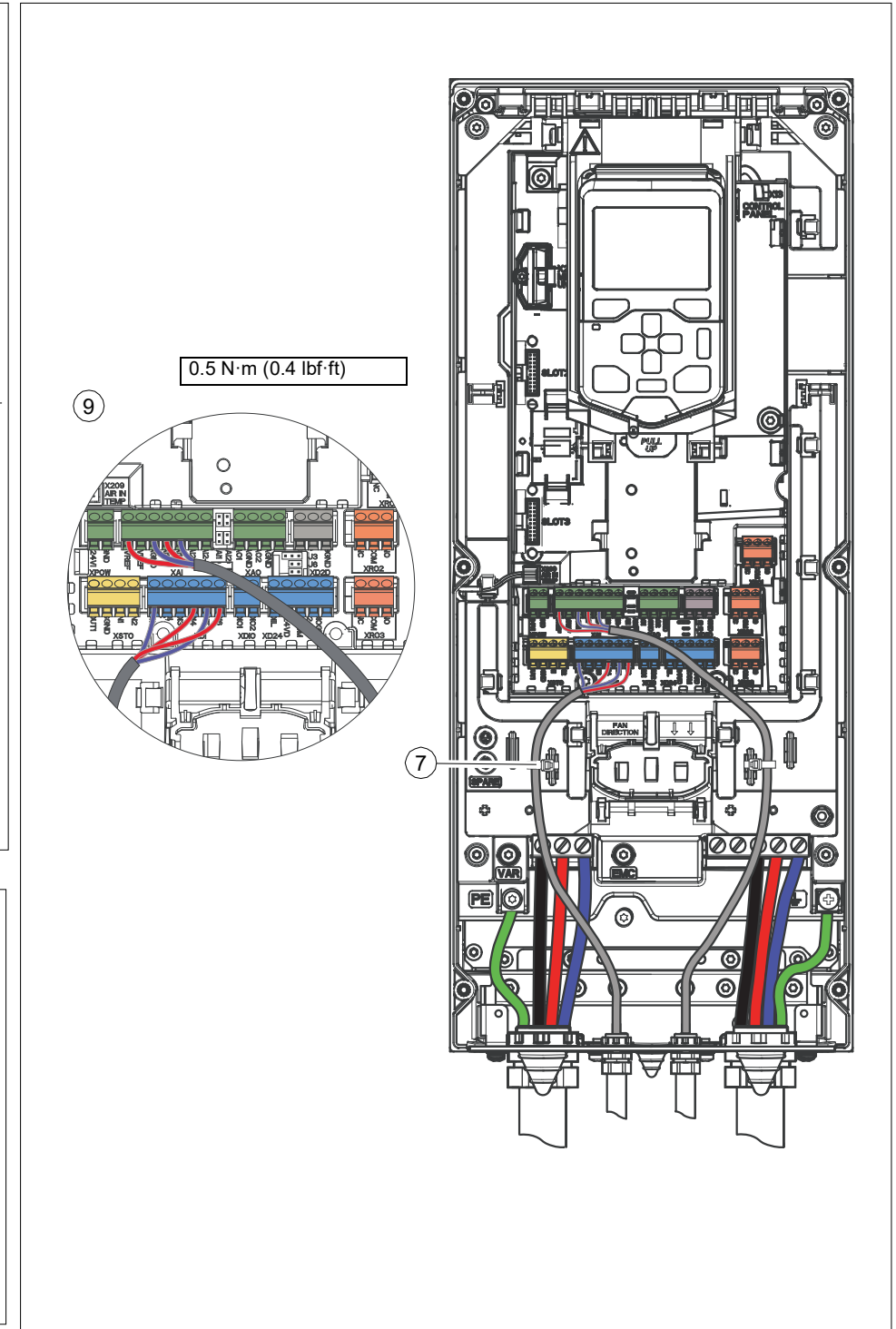
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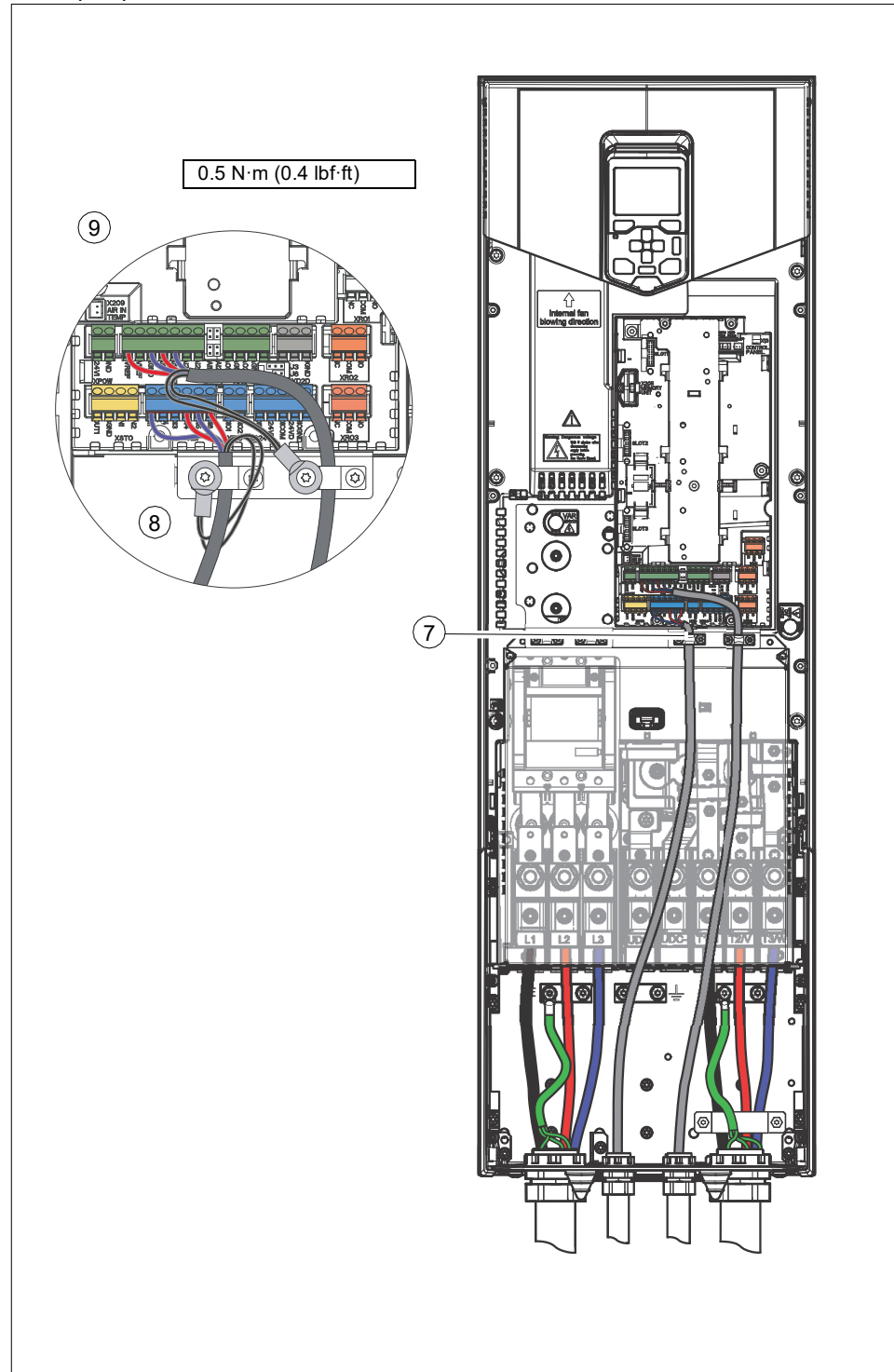
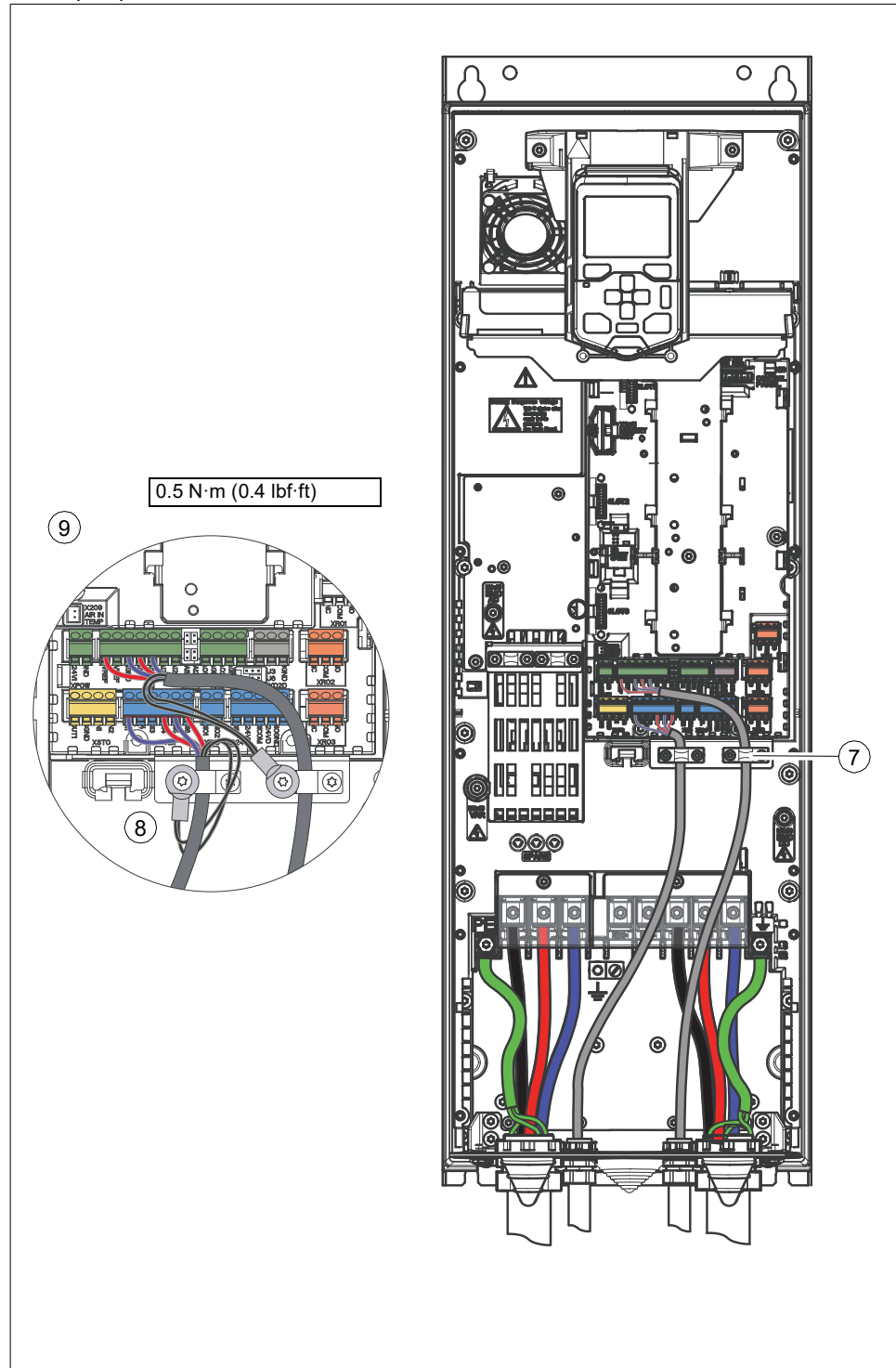


G (R3)...

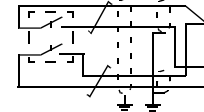
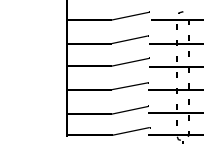
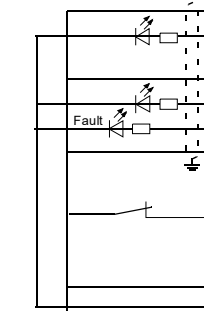
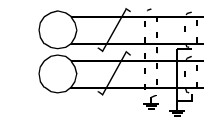
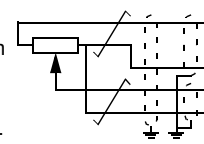


...G (R3)...





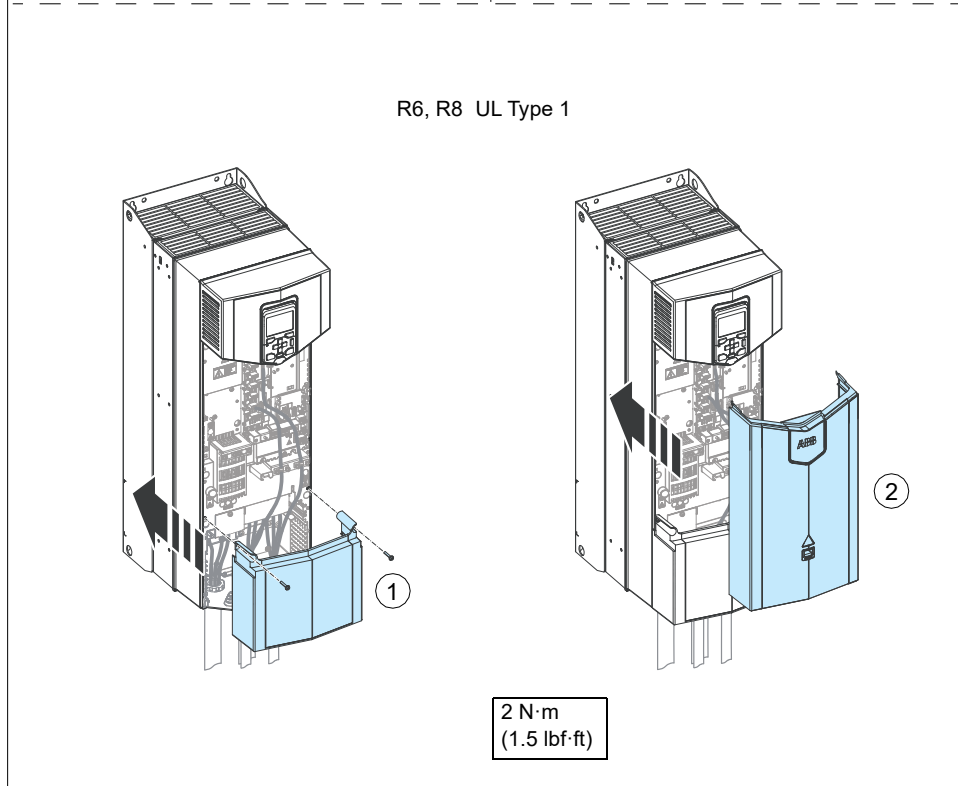
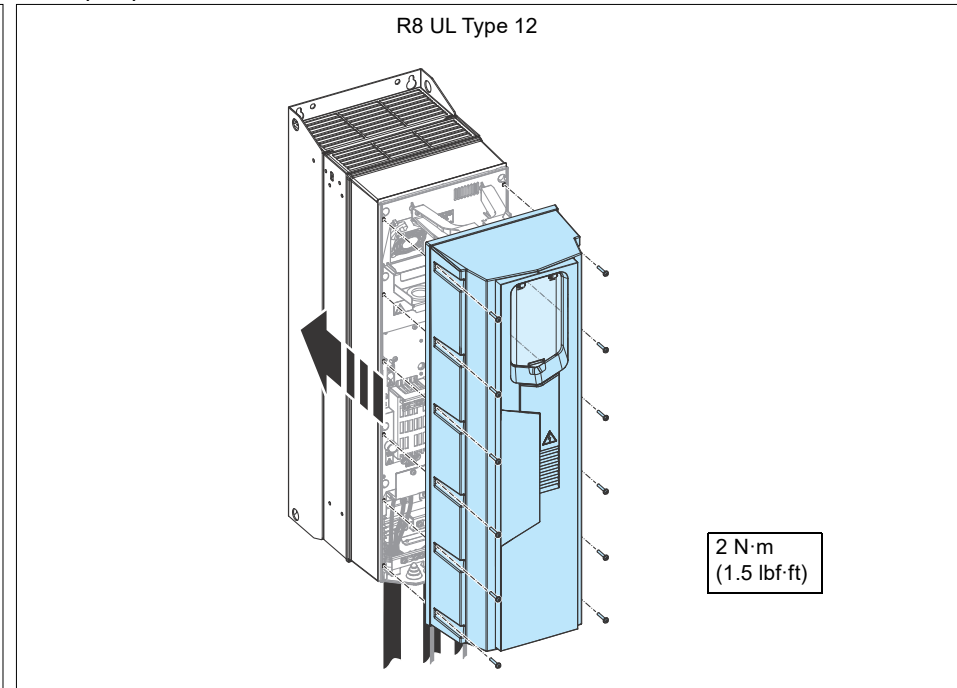
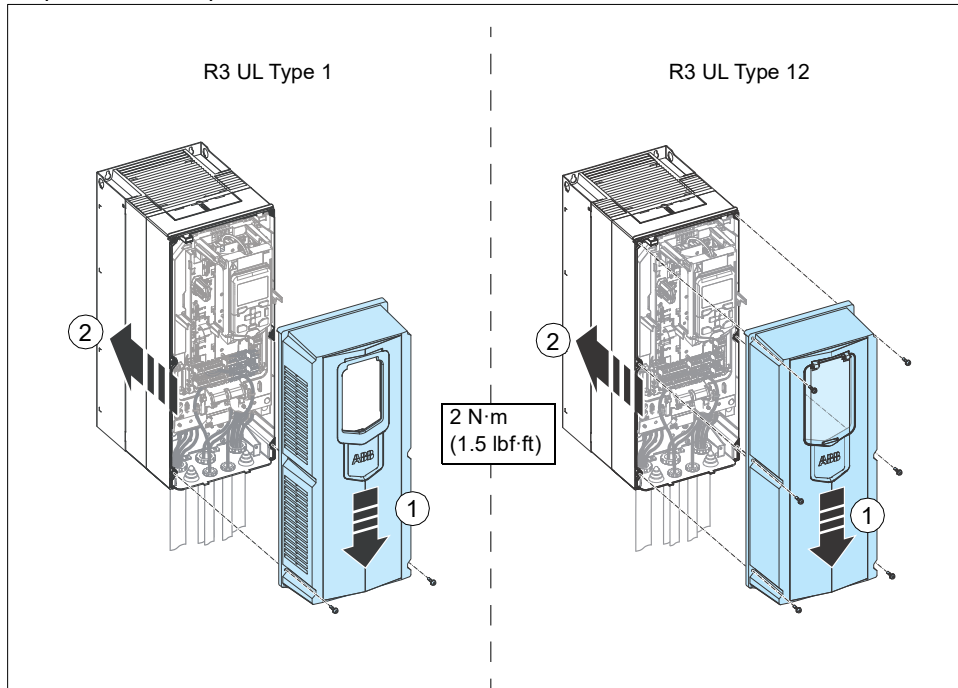
Wire sizes:  
0.5 ... 2.5 mm<sup>2</sup>  
(24... 14 AWG)  
Tightening  
torques: 0.5 N·m  
(0.4 lbf-ft) for  
both stranded  
and solid wiring.



XPOW External power input		
1	+24VI	24 V DC, 2 A
2	GND	
XAI Reference voltage and analog inputs		
1	+VREF	10 V DC, R <sub>i</sub> 1...10 kohm
2	-VREF	-10 V DC, R <sub>i</sub> 1...10 kohm
3	AGND	Ground
4	AI1+	Speed reference 0(2)...10 V, R <sub>in</sub> > 200 kohm
5	AI1-	
6	AI2+	By default not in use. 0(4)...20 mA, R <sub>in</sub> = 100 ohm
7	AI2-	
J1	J1	AI1 current/voltage selection jumper
J2	J2	AI2 current/voltage selection jumper
XAO Analog outputs		
1	AO1	Motor speed rpm 0...20 mA, R <sub>L</sub> < 500 ohm
2	AGND	
3	AO2	Motor current 0...20 mA, R <sub>L</sub> < 500 ohm
4	AGND	
XD2D Drive-to-drive link		
1	B	
2	A	Drive-to-drive link
3	BGND	
J3	J3	Drive-to-drive link termination switch
XRO1, XRO2, XRO3 Relay outputs		
11	NC	Ready 250 V AC / 30 V DC 2 A
12	COM	
13	NO	
21	NC	Running 250 V AC / 30 V DC 2 A
22	COM	
23	NO	
31	NC	Faulted(-1) 250 V AC / 30 V DC 2 A
32	COM	
33	NO	
XD24 Digital interlock		
1	DIIL	Run enable
2	+24VD	+24 V DC 200 mA
3	DICOM	Digital input ground
4	+24VD	+24 V DC 200 mA
5	DIOGND	Digital input/output ground
J6	J6	Ground selection switch
XDIO Digital input/outputs		
1	DIO1	Output: Ready
2	DIO2	Output: Running
XDI Digital inputs		
1	DI1	Stop (0) / Start (1)
2	DI2	Forward (0) / Reverse (1)
3	DI3	Reset
4	DI4	Acceleration & deceleration select
5	DI5	Constant speed 1 (1 = On)
6	DI6	By default not in use.
XSTO Safe torque off		
1	OUT1	
2	SGND	Safe torque off. Both circuits must be closed for the drive to start.
3	IN1	
4	IN2	
X12	Safety functions module connection	
X13	Control panel connection	
X205	Memory unit connection	

H (R3, R6, R8)...

...H (R8)





## 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).

### Product training

For information on ABB product training, navigate to [new.abb.com/service/training](http://new.abb.com/service/training).

### Providing feedback on ABB Drives manuals

Your comments on our manuals are welcome. Navigate to [new.abb.com/drives/manuals-feedback-form](http://new.abb.com/drives/manuals-feedback-form).

### Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet at [www.abb.com/drives/documents](http://www.abb.com/drives/documents).



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