

ABB drives for water

Quick installation and start-up guide

ACQ580-01 drives

Frames R1 to R9

R1-
R4

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R9



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List of related manuals in English

Drive manuals and guides

Code (English)

<i>ACQ580 pump control program firmware manual</i>	3AXD50000035867
<i>ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual</i>	3AXD50000035866
<i>ACS-AP-X assistant control panels user's manual</i>	3AUA0000085685

Option manuals and guides

<i>CDPI-01 communication adapter module user's manual</i>	3AXD50000009929
<i>DPMP-01 mounting platform for control panels</i>	3AUA0000100140
<i>DPMP-02/03 mounting platform for control panels</i>	3AUA0000136205
<i>FCAN-01 CANopen adapter module user's manual</i>	3AFE68615500
<i>FCNA-01 ControlNet adapter module user's manual</i>	3AUA0000141650
<i>FDNA-01 DeviceNet™ adapter module user's manual</i>	3AFE68573360
<i>FECA-01 EtherCAT adapter module user's manual</i>	3AUA0000068940
<i>FENA-01/-11/-21 Ethernet adapter module user's manual</i>	3AUA0000093568
<i>FEPL-02 Ethernet POWERLINK adapter module user's manual</i>	3AUA0000123527
<i>FPBA-01 PROFIBUS DP adapter module user's manual</i>	3AFE68573271
<i>FSCA-01 RS-485 adapter module user's manual</i>	3AUA0000109533
<i>Flange mounting kit quick installation guide for ACX580-01 frames R0 to R5</i>	3AXD50000036610
<i>Flange mounting kit quick installation guide for ACX580-01 frames R6-R9</i>	3AXD50000019099
<i>Flange mounting kit installation supplement</i>	3AXD50000019100

Tool and maintenance manuals and guides

<i>Drive composer PC tool user's manual</i>	3AUA0000094606
<i>Converter module capacitor reforming instructions</i>	3BFE64059629
<i>NETA-21 remote monitoring tool user's manual</i>	3AUA00000969391
<i>NETA-21 remote monitoring tool installation and start-up guide</i>	3AUA0000096881

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.

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Safety instructions

These are the safety instructions which you must obey when you install and operate the drive and do maintenance on the drive. If you ignore the safety instructions, injury, death or damage can occur.

Use of warnings and notes in this manual

Warnings tell you about conditions which can cause injury or death, or damage to the equipment. They also tell you how to prevent the danger. Notes draw attention to a particular condition or fact, or give information on a subject.

The manual uses these warning symbols:



Electricity warning tells about hazards from electricity which can cause injury or death, or damage to the equipment.



General warning tells about conditions, other than those caused by electricity, which can cause injury or death, or damage to the equipment.



Electrostatic sensitive devices warning tells you about the risk of electrostatic discharge which can cause damage to the equipment.

General safety in installation, start-up and maintenance

These instructions are for all personnel that install the drive and do maintenance work on it.



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

- Use safety shoes with a metal toe cap to avoid foot injury. Wear protective gloves and long sleeves. Some parts have sharp edges.
- Handle the drive carefully.
- Frames R5...R9: Lift the drive with a lifting device. Use the lifting eyes of the drive.
- Frames R5...R9: Do not tip the drive over. The drive is heavy and its center of gravity is high. An overturning drive can cause physical injury.

R1-
R4

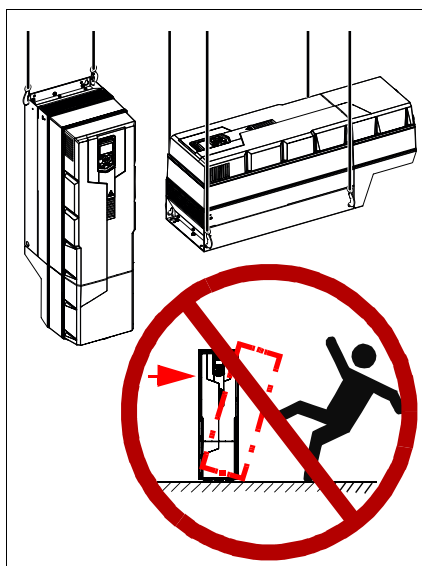
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- Beware of hot surfaces. Some parts, such as heatsinks of power semiconductors, remain hot for a while after disconnection of the electrical supply.
- Keep the drive in its package prior to installation. Protect the installed drive against dust and burrs. Electrically conductive debris inside the drive may cause damage or malfunction.
- Clean the area below the drive before start-up to prevent the drive cooling fan from drawing dust inside the drive.
- Do not cover the air inlet and outlet.
- Make sure that there is sufficient cooling. See section [Ensure the cooling](#) on page 26, 42 or 54 for more information.

- Before you connect voltage to the drive, make sure that the drive covers are on. Keep the covers on during the operation.
- Before you adjust the drive operation limits, make sure that the motor and all driven equipment can operate throughout the set operation limits.
- Before you activate the automatic fault reset or automatic restart functions of the drive control program, make sure that no dangerous situations can occur. These functions reset the drive automatically and continue operation after a fault or supply break.
- The maximum number of drive power-ups is five in ten minutes. Too frequent power-ups can damage the charging circuit of the DC capacitors.
- If you have connected safety circuits to the drive (for example, emergency stop and Safe torque off), validate them at start-up. For the validation of the Safe torque off, see *ACQ580 pump control firmware manual (3AXD500000358677 [English])*. For the validation of other safety circuits, see the instructions provided with them.

Note:


- If you select an external source for start command and it is on, and the start command is level-triggered, the drive will start immediately after fault reset. See parameters 20.02 Ext1 start trigger type and 20.07 Ext2 start trigger type in *ACQ580 pump control firmware manual (3AXD500000358677 [English])*.

- When the control location is not set to Auto, the stop key on the control panel will not stop the drive.
- Only authorized persons are allowed to repair a malfunctioning drive.

Electrical safety in installation, start-up and maintenance

■ Precautions before electrical work

These warnings are for all personnel who do work on the drive, motor cable or motor.


 **WARNING!** Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrician, do not do electrical installation or maintenance work. Go through these steps before you begin any installation or maintenance work.

1. Clearly identify the work location.
2. Disconnect all possible voltage sources.
 - Open the main disconnect at the power supply of the drive.
 - Make sure that reconnection is not possible. Lock the disconnect to open position and attach a warning notice to the disconnect.
 - Disconnect any external power sources from the control circuits before you do work on the control cables.
 - After you disconnect the drive, always wait for 5 minutes to let

the intermediate circuit capacitors discharge before you continue.

3. Protect any other energized parts in the work location against contact.
4. Take special precautions when close to bare conductors.
5. Measure that the installation is de-energized.
 - Use a multimeter with an impedance of at least 1 Mohm.
 - Make sure that the voltage between the drive input power terminals (L1, L2, L3) and the grounding terminal (PE) is close to 0 V.
 - Make sure that the voltage between the drive DC terminals (UDC+ and UDC-) and the grounding terminal (PE) is close to 0 V.
6. Install temporary grounding as required by the local regulations.
7. Ask for a permit to work from the person in control of the electrical installation work.

■ Additional instructions and notes

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

- If the drive will be connected on an IT system (ungrounded or high-resistance-grounded [over 30 ohms]), make sure neither the EMC filter nor the ground-to-phase varistor are connected (metal screws should not be installed). Connections

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with metal screws in these systems can cause danger or damage. See section [Check the compatibility with IT \(ungrounded\) and corner-grounded TN systems](#) on pages 27, 43 or 55.

Note: For other systems, connecting the internal EMC filter will reduce the conducted emission.

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- If the drive will be connected on a corner-grounded TN system, make sure the EMC filter is not connected (metal screws should not be installed). Connections with metal screws in these systems can cause danger or damage. See section [Check the compatibility with IT \(ungrounded\) and corner-grounded TN systems](#) on pages 27, 43 or 55.

Note: For other systems, connecting the internal EMC filter (using metal screws) will reduce the conducted emission.

- Use all ELV (extra low voltage) circuits connected to the drive only within a zone of equipotential bonding, that is, within a zone where all simultaneously accessible conductive parts are electrically connected to prevent hazardous voltages appearing between them. You can accomplish this by a proper factory grounding, that is, make sure that all simultaneously accessible conductive parts are grounded to the protective earth (PE) bus of the building.
- Do not do insulation or voltage withstand tests on the drive or drive modules.

Note:

- The motor cable terminals of the drive are at a dangerous voltage when the input power is on,

regardless of whether the motor is running or not.

- The DC and brake resistor terminals (UDC+, UDC-, R+ and R-) are at a dangerous voltage.
- External wiring can supply dangerous voltages to the terminals of relay outputs (RO1, RO2 and RO3).
- The Safe torque off function does not remove the voltage from the main and auxiliary circuits. The function is not effective against deliberate sabotage or misuse.



WARNING! Use a grounding wrist band when you handle the printed circuit boards. Do not touch the boards unnecessarily. The boards contain components sensitive to electrostatic discharge.

Grounding

These instructions are for all personnel who are responsible for the electrical installation, including the grounding of the drive.



WARNING! Obey these instructions. If you ignore them, injury or death, or equipment malfunction can occur, and electromagnetic interference can increase.

- If you are not a qualified electrician, do not do grounding work.
- Always ground the drive, the motor and adjoining equipment to the protective earth (PE) bus of the power supply. This is necessary for the personnel safety. Proper grounding also reduces

electromagnetic emission and interference.

- In a multiple-drive installation, connect each drive separately to the protective earth (PE) bus of the power supply.
 - Make sure that the conductivity of the protective earth (PE) conductors is sufficient. See chapter Technical data in *ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000035866 [English])*. Obey the local regulations.
 - Connect the power cable shields to the protective earth (PE) terminals of the drive.
 - Standard IEC/EN 61800-5-1 (section 4.3.5.5.2.) requires that as the normal touch current of the drive is higher than 3.5 mA AC or 10 mA DC, you must use a fixed protective earth (PE) connection. In addition,
 - install a second protective earth conductor of the same cross-sectional area as the original protective earthing conductor,
- or
- install a protective earth conductor with a cross-section of at least 7 AWG (10 mm²) Cu,
- or
- install a device which automatically disconnects the supply if the protective earth conductor breaks.

Additional instructions for permanent magnet motor drives

■ Safety in installation, start-up and maintenance

These are additional warnings concerning permanent magnet motor drives. The other safety instructions in this chapter are also valid.



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

- Do not work on a drive when a rotating permanent magnet motor is connected to it. A rotating permanent magnet motor energizes the drive including its power terminals.

Before installation, start-up and maintenance work on the drive:

- Stop the motor.
- Disconnect the motor from the drive with a safety switch or by other means.
- If you cannot disconnect the motor, make sure that the motor cannot rotate during work. Make sure that no other system, like hydraulic crawling drives, can rotate the motor directly or through any mechanical connection like felt, nip, rope, etc.
- Measure that the installation is de-energized.
 - Use a multimeter with an impedance of at least 1 Mohm.

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- Make sure that the voltage between the drive output terminals (T1/U, T2/V, T3/W) and the grounding (PE) busbar is close to 0 V.
- Make sure that the voltage between the drive input power terminals (L1, L2, L3) and the grounding (PE) busbar is close to 0 V.
- Make sure that the voltage between the drive DC terminals (UDC+, UDC-) and the grounding (PE) terminal is close to 0 V.
- Install temporary grounding to the drive output terminals (T1/U, T2/V, T3/W). Connect the output terminals together as well as to the PE.

Start-up and operation:

- Make sure the motor is not run over the rated speed with dynamic/positive displacement loads.

General safety in operation

These instructions are for all personnel that operate the drive.



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

- Do not control the motor with the line side disconnect at the drive power supply; instead, use the control panel start and stop keys or commands through the I/O terminals of the drive.
- Give a stop command to the drive before you reset a fault. If you have an external source for the start command and the start is on, the drive will start immediately after the

fault reset, unless you configure the drive for pulse start. See the firmware manual.

- Before you activate automatic fault reset functions of the drive control program, make sure that no dangerous situations can occur. These functions reset the drive automatically and continue operation after a fault.

Note: When the drive is not in the Hand mode, the Off key on the control panel will not stop the drive.

Cybersecurity disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

R1...R4 Ratings and fuses

I

Type ACQ580-01	Input rating	Output ratings				Maximum heat dissipation	Frame size
		Nominal use		Heavy duty use			
	I_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}		
	A	A	hp	A	hp	W	
3-phase $U_N = 208\text{ V}$ (208...240V)							
04A6-2	4.6	4.6	1	3.5	1	45	R1
06A6-2	6.6	6.6	1.5	4.6	1	55	R1
07A5-2	7.5	7.5	2	6.6	2	66	R1
011A-2	10.6	10.6	3	7.5	2	84	R1
017A-2	16.7	16.7	5	10.6	3	133	R1
024A-2	24	24.2	7.5	16.7	5	174	R2
031A-2	31	30.8	10.0	24.2	7.5	228	R2
046A-2	46	46.2	15.0	30.8	10	322	R3
059A-2	59	59.4	20.0	46.2	15	430	R3
075A-2	75	74.8	25.0	59.4	20	525	R4

R1-
R4

Type ACQ580- 01	Input rating	Output ratings				Maximum heat dissipation	Frame size
		Nominal use		Heavy duty use			
	I_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}		
	A	A	hp	A	hp	W	
3-phase $U_N = 480\text{ V}$ (440...480 V)							
02A1-4	2.1	2.1	1	1.6	0.75	45	R1
03A0-4	3.0	3.0	1.5	2.1	1	55	R1
03A5-4	3.5	3.5	2	3.0	1.5	66	R1
04A8-4	4.8	4.8	3	3.4	2	84	R1
06A0-4	6.0	6.0	3	4.0	3	106	R1
07A6-4	7.6	7.6	5	4.8	3	133	R1
012A-4	12	12	7.5	7.6	5	174	R1
014A-4	14	14	10	11	7.5	228	R2
023A-4	23	23	15	14	10	322	R2
027A-4	27	27	20	21	15	430	R3
034A-4	34	34	25	27	20	525	R3
044A-4	44	44	30	34	25	619	R3
052A-4	52	52	40	40	30	835	R4
065A-4	65	65	50	52	40	1024	R4
077A-4	77	77	60	65	50	1024	R4

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R4

Type ACQ580- 01	Input rating	Output ratings				Maximum heat dissipation	Frame size
		Nominal use		Heavy duty use			
	I_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}		
	A	A	hp	A	hp	W	
3-phase $U_N = 575,600 \text{ V}$ (575...600 V)							
02A7-6	2.7	2.7	2	2.4	1.5	66	R2
03A9-6	3.9	3.9	3	2.7	2	84	R2
06A1-6	6.1	6.1	5	3.9	3	133	R2
09A0-6	9	9	7.5	6.1	5	174	R2
011A-6	11	11	10	9.0	7.5	228	R2
017A-6	17	17	15	11	10	322	R2
022A-6	22	22	20	17	15	430	R3
027A-6	27	27	25	22	20	525	R3
032A-6	32	32	30	27	25	619	R3

II

Note: The UL listed fuses in the table are the required branch circuit protection. Fuses are to be provided as part of the installation.

- Fuses are not included in the purchased drive and must be provided by others.
- Fuses with higher current rating than specified must not be used.
- Fuses with lower current rating than specified may be used if they are of the same class and voltage rating. It is the user's responsibility to verify that lower current rated fuses are compliant with local regulations and appropriate for the application.
- Drive fuses must be used to maintain the drive UL listing. Additional protection can be used. Refer to local codes and regulations.

R1-R4

Type ACQ580- 01	UL			
	I_N	Voltage rating	Bussmann type ¹⁾	UL class
	A	V		
3-phase $U_N = 208 \text{ V (208...240V)}$				
04A6-2	4.6	600	KTK-R-15 or JJS-15	CC or T
06A6-2	6.6	600	KTK-R-15 or JJS-15	CC or T
07A5-2	7.5	600	KTK-R-15 or JJS-15	CC or T
011A-2	10.6	600	KTK-R-15 or JJS-15	CC or T
017A-2	16.7	600	KTK-R-30 or JJS-30	CC or T
024A-2	24.2	600	JJS-40	T
031A-2	30.8	600	JJS-40	T
046A-2	46.2	600	JJS-80	T
059A-2	59.4	600	JJS-80	T
075A-2	74.8	600	JJS-100	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

R1- R4	Type ACQ580- 01	UL			
		I_N	Voltage rating	Bussmann type ¹⁾	UL class
		A	V		
	3-phase $U_N = 480\text{ V}$ (440...480 V)				
	02A1-4	2.1	600	JJS-15	T
	03A0-4	3.0	600	JJS-15	T
	03A5-4	3.5	600	JJS-15	T
	04A8-4	4.8	600	JJS-15	T
	06A0-4	6.0	600	JJS-15	T
	07A6-4	7.6	600	JJS-15	T
	012A-4	12.0	600	JJS-15	T
	014A-4	14.0	600	JJS-30	T
	023A-4	23.0	600	JJS-30	T
	027A-4	27.0	600	JJS-40	T
	034A-4	34.0	600	JJS-50	T
	044A-4	44.0	600	JJS-60	T
	052A-4	52.0	600	JJS-80	T
	065A-4	62.0	600	JJS-90	T
	077A-4	77.0	600	JJS-100	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

Type ACQ580- 01	UL			
	I_N	Voltage rating	Bussmann type ¹⁾	UL class
	A	V		
3-phase $U_N = 575, 600 \text{ V}$ (575...600 V)				
02A7-6	2.7	600	KTK-R-15 or JJS-15	CC or T
03A9-6	3.9	600	KTK-R-15 or JJS-15	CC or T
06A1-6	6.1	600	KTK-R-15 or JJS-15	CC or T
09A0-6	9.0	600	KTK-R-15 or JJS-15	CC or T
011A-6	11	600	KTK-R-15 or JJS-15	CC or T
017A-6	17	600	KTK-R-30 or JJS-30	CC or T
022A-6	22	600	JJS-40	T
027A-6	27	600	JJS-40	T
032A-6	32	600	JJS-40	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

R5 Ratings and fuses

|

R5

Type ACQ580-01	Input rating	Output ratings				Maximum heat dissipation	Frame size
		Nominal use		Heavy duty use			
	I_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}		
	A	A	hp	A	hp	W	
3-phase $U_N = 208\text{ V}$ (208...240V)							
088A-2	88	88	30	74.8	25	619	R5
114A-2	114	114	40	88	30	835	R5

Type ACQ580-01	Input rating	Output ratings				Maximum heat dissipation	Frame size
		Nominal use		Heavy duty use			
		I_{N}	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}	
		A	A	hp	A	hp	
3-phase U_{N} = 480 V (440...480 V)							
078A-4	78	78	60	65	50	1240	R5
096A-4	96	96	75	77	60	1510	R5

Type ACQ580-01	Input rating	Output ratings				Maximum heat dissipation	Frame size
		Nominal use		Heavy duty use			
	I_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}		
	A	A	hp	A	hp	W	
3-phase $U_N = 575,600\text{ V}$ (575...600 V)							
041A-6	41	41	40	32	30	835	R5
052A-6	52	52	50	41	40	1024	R5
062A-6	62	62	60	52	50	1240	R5
077A-6	77	77	75	62	60	1510	R5

II

Note: The UL listed fuses in the table are the required branch circuit protection. Fuses are to be provided as part of the installation.

- Fuses are not included in the purchased drive and must be provided by others.
- Fuses with higher current rating than specified must not be used.
- Fuses with lower current rating than specified may be used if they are of the same class and voltage rating. It is the user's responsibility to verify that lower current rated fuses are compliant with local regulations and appropriate for the application.
- Drive fuses must be used to maintain the drive UL listing. Additional protection can be used. Refer to local codes and regulations.

R5

Type ACQ580-01	UL			
	I_N	Voltage rating	Bussmann type ¹⁾	UL class
	A	V		
3-phase $U_N = 208 \text{ V}$ (208...240V)				
088A-2	88	600	JJS-150	T
114A-2	114	600	JJS-150	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

Type ACQ580-01	UL			
	I_N	Voltage rating	Bussmann type ¹⁾	UL class
	A	V		
3-phase $U_N = 480 \text{ V}$ (440...480 V)				
078A-4	78	600	JJS-100	T
096A-4	96	600	JJS-150	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

Type ACQ580-01	UL			
	I_N	Voltage rating	Bussmann type ¹⁾	UL class
	A	V		
3-phase $U_N = 575, 600 \text{ V}$ (575...600 V)				
041A-6	41	600	JJS-100	T
052A-6	52	600	JJS-100	T
062A-6	62	600	JJS-100	T
077A-6	77	600	JJS-100	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

R6...R9 Ratings and fuses

I

Type ACQ580-01	Input rating	Output ratings				Maximum heat dissipation	Frame size
		Nominal use		Heavy duty use			
	I_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}		
	A	A	hp	A	hp	W	
3-phase $U_N = 208\text{ V}$ (208...240V)							
143A-2	143	143	50	114	40	1035	R6
169A-2	169	169	60	143	50	1251	R7
211A-2	211	211	75	169	60	1521	R7
273A-2	273	273	100	211	75	2061	R8
343A-2	343	343	125	273	100	2547	R9
396A-2	396	396	150	343***	125	3060	R9

R6-
R9

Type ACQ580-01	Input rating	Output ratings				Maximum losses	Frame size
		Nominal use		Heavy duty use			
		I_{1N}	I_{2Ld}	P_{Ld}	I_{2Hd}		
	A	A	hp	A	hp	W	
3-phase $U_N = 480\text{ V}$ (440...480 V)							
124A-4	124	124	100	96	75	1476	R6
156A-4	156	156	125	124	100	1976	R7
180A-4	180	180	150	156	125	2346	R7
240A-4	240	240	200	180	150	3336	R8
260A-4	260	260	200	240*	150	3936	R8
302A-4	302	302	250	261	200	4836	R9
361A-4	361	361	300	302	250	4836	R9
414A-4	414	414	350	361**	300	6036	R9

R6-
R9

Type ACQ580- 01	Input rating	Output ratings				Maximum heat dissipation	Frame size
		Nominal use		Heavy duty use			
	I_N	I_{Ld}	P_{Ld}	I_{Hd}	P_{Hd}		
	A	A	hp	A	hp	W	
3-phase $U_N = 575,600 \text{ V}$ (575...600 V)							
099A-6	99	99	100	77	75	2061	R7
125A-6	125	125	125	99	100	2466	R7
144A-6	144	144	150	125	125	3006	R8
192A-6	192	192	200	144	150	4086	R9
242A-6	242	242	250	192	200	4896	R9
271A-6	271	271	250	242	250	4896	R9

- * 130% overload only
- ** 125% overload only
- *** Maximum current with 40% overload, allowed for one minute every ten minutes

II

Note: The UL listed fuses in the table are the required branch circuit protection. Fuses are to be provided as part of the installation.

- Fuses are not included in the purchased drive and must be provided by others.
- Fuses with higher current rating than specified must not be used.
- Fuses with lower current rating than specified may be used if they are of the same class and voltage rating. It is the user's responsibility to verify that lower current rated fuses are compliant with local regulations and appropriate for the application.
- Drive fuses must be used to maintain the drive UL listing. Additional protection can be used. Refer to local codes and regulations.

Type ACQ580-01	UL			
	I_N	Voltage rating	Bussmann type ¹⁾	UL class
	A	V		
3-phase $U_N = 208 \text{ V}$ (208...240V)				
143A-2	143	600	JJS-200	T
169A-2	169	600	JJS-250	T
211A-2	211	600	JJS-300	T
273A-2	273	600	JJS-400	T
343A-2	343	600	JJS-500	T
396A-2	396	600	JJS-600	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

Type ACQ580- 01	UL			
	I_N	Voltage rating	Bussmann type ¹⁾	UL class
	A	V		
3-phase $U_N = 480\text{ V}$ (440...480 V)				
124A-4	124	600	JJS-200	T
156A-4	156	600	JJS-225	T
180A-4	180	600	JJS-300	T
240A-4	240	600	JJS-350	T
260A-4	260	600	JJS-400	T
302A-4	302	600	JJS-500	T
361A-4	361	600	JJS-500	T
414A-4	414	600	JJS-600	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

Type ACQ580-01	UL			
	I_N	Voltage rating	Bussmann type ¹⁾	UL class
	A	V		
3-phase $U_N = 575, 600 \text{ V}$ (575...600 V)				
099A-6	99	600	JJS-150	T
125A-6	125	600	JJS-200	T
144A-6	144	600	JJS-250	T
192A-6	192	600	JJS-300	T
242A-6	242	600	JJS-400	T
271A-6	271	600	JJS-400	T

1) ABB does not require Bussmann brand fuses. Fuses which meet the appropriate UL class type, current rating, and are rated at 600V, 200 kA may be used.

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R6-
R9

Quick installation guide

ACQ580-01 drives

Frames R1 to R4

R1-
R4



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R1...R4 Quick installation guide

This guide briefly describes how to install the drive. For complete information on installation, see *ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual* (3AXD50000035866 [English]). For start-up instructions, see chapter *Quick start-up guide* on page 65.

R1-
R4

To read a manual, go to 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 electrician, 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 borings and grindings 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.
-

Check if capacitors need to be reformed

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

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.

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 / on page 13 for the losses. 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, 1.0 to 350 hp) hardware manual (3AXD50000035866 [English])*.

Protect the drive and input power cable

See table II on page 15 for the fuses.

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 75.

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 75.

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 an ABB motor must exceed 100 Mohm (reference value at 25 °C or 77 °F). For the insulation resistance of other 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 [75](#).

2. Switch off the power from the drive.
3. Remove the front cover: Loosen the retaining screw, if any, with a T20 Torx 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 and IP55, R1....R2.

See figures [B1](#) and [B2](#) on page [75](#).

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).

Attach the warning sticker

See figure [B2](#) on page [75](#).

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

Check the compatibility with IT (ungrounded) and corner-grounded TN systems

EMC filter

The internal EMC filter is not suitable for use on an IT (ungrounded) system or on a corner-grounded TN system. Disconnect the EMC filter before connecting the drive to the supply network. Check the table on page [28](#).



WARNING! Do not install the drive with the internal EMC filter connected on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohms] power system), otherwise the system will be connected to ground potential through the EMC filter capacitors of the drive. This can cause danger, or damage the drive.

Do not install the drive with the internal EMC filter connected on a corner-grounded TN system, otherwise the drive will be damaged.

Note: When the internal EMC filter is disconnected, the drive EMC compatibility is considerably reduced.

Ground-to-phase varistor

The ground-to-phase varistor is not suitable for use on an IT (ungrounded) system. Disconnect the ground-to-phase varistor before connecting the drive to the supply network. Check the table on page 28.

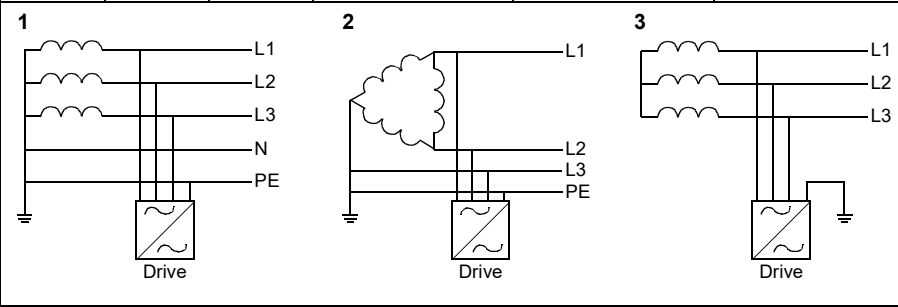
R1-
R4



WARNING! Do not install the drive with the ground-to-phase varistor connected on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohms] power system), otherwise the varistor circuit can be damaged.

Check from the table below if you have to disconnect the EMC filter (EMC) or ground-to-phase varistor (VAR). For instructions on how to do this, see page 29.

Frame sizes	EMC filter (EMC)	Ground-to-phase varistor (VAR)	Symmetrically grounded TN systems (TN-S systems) ¹	Corner grounded TN systems ²	IT systems (ungrounded or high-resistance grounded [>30 ohms]) ³
R1...R3	EMC (1 screw)	-	Do not disconnect	Disconnect	Disconnect
	-	VAR (1 screw)	Do not disconnect	Disconnect	Disconnect
R4	EMC (2 screws)	-	Do not disconnect	Disconnect	Disconnect
	-	VAR (1 screw)	Do not disconnect	Do not disconnect	Disconnect



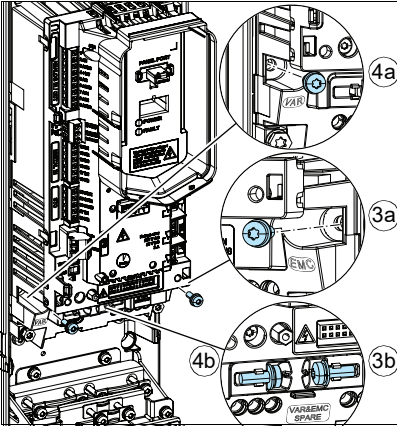
■ Disconnect EMC filter or ground-to-phase varistor, if needed

To disconnect the internal EMC filter or ground-to-phase varistor, if needed, do as follows:

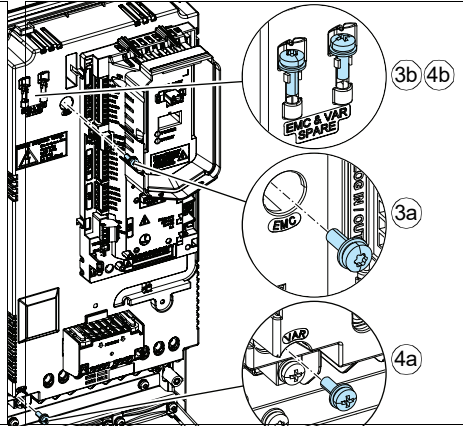
1. Switch off the power from the drive.
2. Open the front cover, if not already opened, see figure **B1** on page **75**.
3. **R1...R3:** To disconnect the internal EMC filter, remove the EMC screw (3a) and place it in the storage place (3b).
R4: To disconnect the internal EMC filter, remove the two EMC screws.
4. **R1...R3:** To disconnect the ground-to-phase varistor, remove the varistor screw (4a) and place it in the storage place (4b).
R4: To disconnect the ground-to-phase varistor, remove the varistor screw.

**R1-
R4**

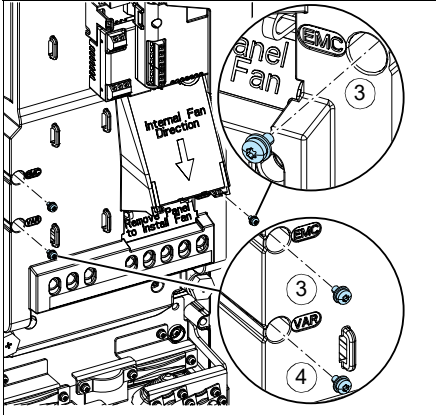
R1...R2



R3



R4



Wiring R1...R2

Note: These are instructions for conduit wiring. For cable wiring, see the ACQ580 *Hardware manual*, publication number 3AXD50000035866.

Note: In US deliveries, options are already installed at the factory. If installing on site, option slot 1 modules (fieldbus adapter) may be installed by mounting the module on the control board and tightening the mounting screw, which is also the grounding screw. Option slot 2 modules (I/O extension) should not be installed until after the power cables. Refer to Warning and step 8 below.



WARNING! If installing modules, obey the instructions in [Safety instructions](#) on page 7. If you ignore them, injury or death, or damage to the equipment can occur. Option slot 2 in frames R1...R5 is at U_{DC} potential. You must disconnect power supplies before installing or removing an I/O extension module.

See figure on page 32.

1. Install thin-wall conduit clamps for IP21/UL Type 1 or liquid-tight conduit connectors for IP55/UL Type 12 (not supplied). Type 12 has a Pressfit gasket.
2. Connect conduit runs for input power, motor and control cables to the conduit box. Ensure grommets (pointing down) are inserted into all unused holes.
3. Route the input power and motor wiring through separate conduits.
4. Strip wires.
5. Connect the motor and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
6. Connect the input power and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
7. *If brake resistor is used* — Connect the resistor and ground wires. Tighten the screws to torques shown in the Power wiring torque table.
8. Install option slot 2 modules (I/O extension), if necessary, at this point.
 - A *Frame R1 only:* Install the option mounting.
 - B Put the module carefully into its position on the control board and tighten the mounting screw.
 - C Tighten the grounding screw, which is necessary for proper operation and for fulfilling EMC requirements.

Note: Frame R1 — The module in option slot 2 covers the power terminals. Do not install a module in option slot 2 before you have installed the power cables.

9. Route the control cables through the conduit (not the same conduit as either input power or motor wiring).

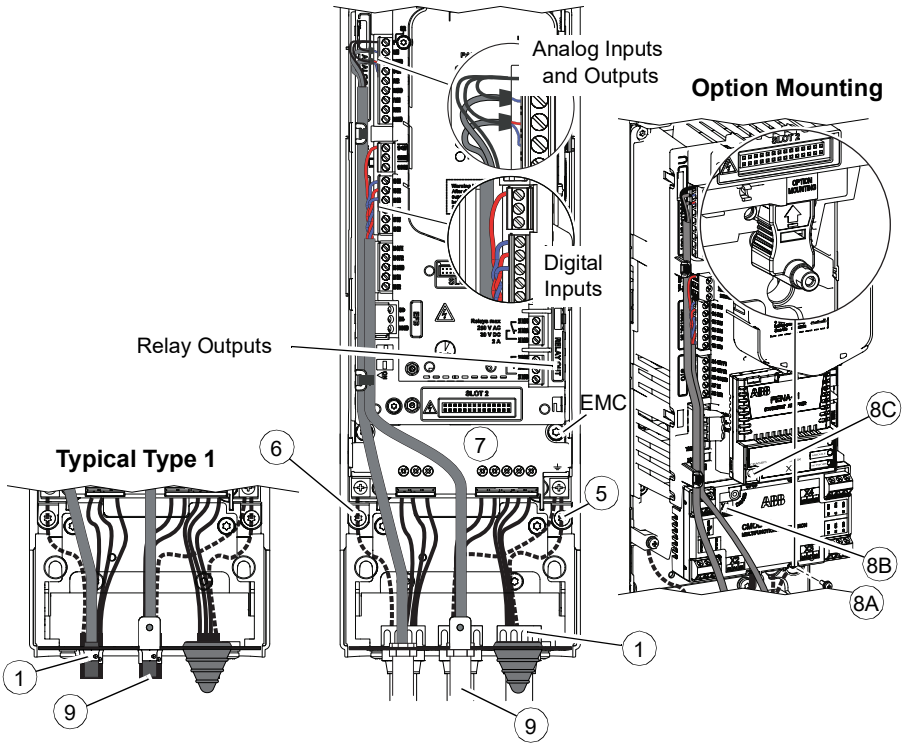
10. Strip the control cable sheathing and twist the copper screen into a pig-tail.
11. Refer to page 37. Connect the ground screen pig-tail for digital and analog I/O cables. (Ground only at drive end.)
12. Connect the ground screen pig-tail for Embedded fieldbus, EFB (EIA-485) cables at X5. (Ground only at drive end.)
13. Strip and connect the individual control wires to the drive terminals. Tighten the screws to 0.4 lb-ft (0.5...0.6 N-m).

R1-
R4

WARNING! To avoid danger or damage to the drive on IT systems and corner grounded TN systems, see section [Check the compatibility with IT \(ungrounded\) and corner-grounded TN systems](#) on page 27.

R1-
R4

R1...R2 Type 12



Power wiring torque table

Frame size	R1		R2	
	lb-ft	N-m	lb-ft	N-m
T1/U, T2/V, T3/W	0.4	1.2...1.5	1.1	1.2...1.5
L1, L2, L3	0.4	1.2...1.5	1.1	1.2...1.5
R+, R-	0.4	1.2...1.5	1.1	1.2...1.5
PE Ground	1.1	1.5	1.1	1.5

Wiring R3

Note: These are instructions for conduit wiring. For cable wiring, see the ACQ580 *Hardware manual*, publication number 3AXD50000035866.

Note: In US deliveries, options are already installed at the factory. If installing on site, option slot 1 modules (fieldbus adapter) may be installed by mounting the module on the control board and tightening the mounting screw, which is also the grounding screw. Option slot 2 modules (I/O extension) may be installed by mounting the module on the control board and tightening both the mounting screw and the grounding screw. Refer to Warning.

R1-
R4



WARNING! If installing modules, obey the instructions in [Safety instructions](#) on page 7. If you ignore them, injury or death, or damage to the equipment can occur. Option slot 2 in frames R1...R5 is at U_{DC} potential. You must disconnect power supplies before installing or removing an I/O extension module.

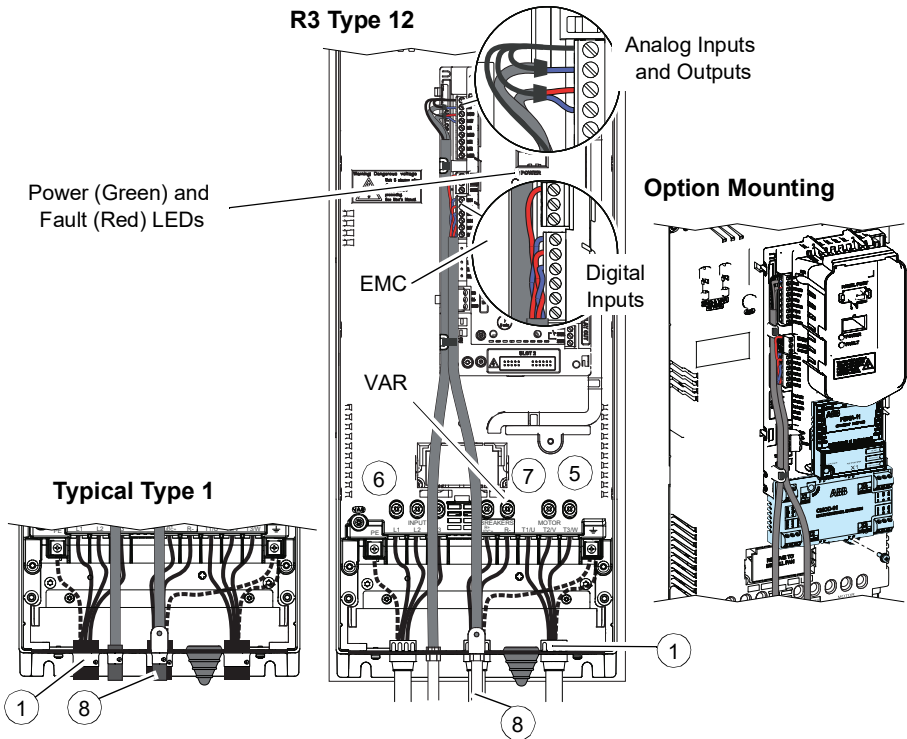
See figure on page 34.

1. Install thin-wall conduit clamps for IP21/UL Type 1 or liquid-tight conduit connectors for IP55/UL Type 12 (not supplied). Type 12 has a Pressfit gasket.
2. Connect conduit runs for input power, motor and control cables to the conduit box. Ensure grommets (pointing down) are inserted into all unused holes.
3. Route the input power and motor wiring through separate conduits.
4. Strip wires.
5. Connect the motor and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
6. Connect the input power and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
7. *If brake resistor is used* — Connect the resistor and ground wires. Tighten the screws to torques shown in the Power wiring torque table.
8. Route the control cables through the conduit (not the same conduit as either input power or motor wiring).
9. Strip the control cable sheathing and twist the copper screen into a pig-tail.
10. Refer to page 37. Connect the ground screen pig-tail for digital and analog I/O cables. (Ground only at drive end.)
11. Connect the ground screen pig-tail for Embedded fieldbus, EFB (EIA-485) cables at X5. (Ground only at drive end.)

12. Strip and connect the individual control wires to the drive terminals. Tighten the screws to 0.4 lb-ft (0.5...0.6 N-m).

R1-
R4

⚠ WARNING! To avoid danger or damage to the drive on IT systems and corner grounded TN systems, see section [Check the compatibility with IT \(ungrounded\) and corner-grounded TN systems](#) on page 27.



Power wiring torque table

Frame size	R3	
	lb-ft	N-m
T1/U, T2/V, T3/W	3.3	2.5...4.5
L1, L2, L3	3.3	2.5...4.5
R+, R-	3.3	2.5...4.5
PE Ground	1.1	1.5

Wiring R4

Note: These are instructions for conduit wiring. For cable wiring, see the ACQ580 *Hardware manual*, publication number 3AXD50000035866.

Note: In US deliveries, options are already installed at the factory. If installing on site, option slot 1 modules (fieldbus adapter) may be installed by mounting the module on the control board and tightening the mounting screw, which is also the grounding screw. Option slot 2 modules (I/O extension) may be installed by mounting the module on the control board and tightening both the mounting screw and the grounding screw. Refer to Warning.

R1-
R4



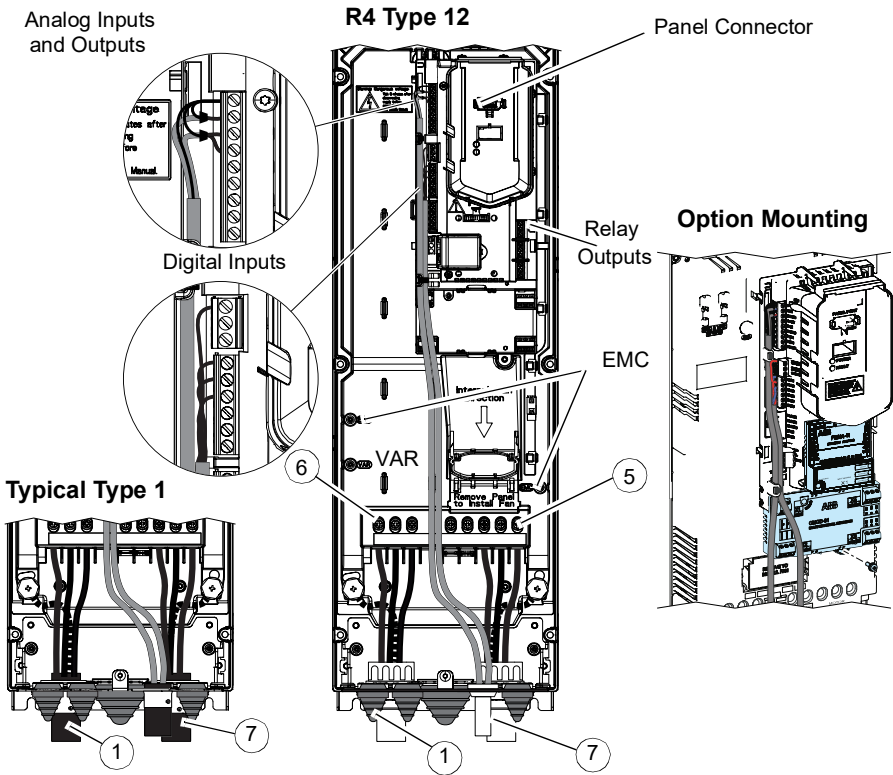
WARNING! If installing modules, obey the instructions in [Safety instructions](#) on page 7. If you ignore them, injury or death, or damage to the equipment can occur. Option slot 2 in frames R1...R5 is at U_{DC} potential. You must disconnect power supplies before installing or removing an I/O extension module.

See figure on page 36.

1. Install thin-wall conduit clamps for IP21/UL Type 1 or liquid-tight conduit connectors for IP55/UL Type 12 (not supplied). Type 12 has a Pressfit gasket.
2. Connect conduit runs for input power, motor and control cables to the conduit box. Ensure grommets (pointed down) are inserted into all unused holes.
3. Route the input power and motor wiring through separate conduits.
4. Strip wires.
5. Connect the motor and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
6. Connect the input power and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
7. Route the control cables through the conduit (not the same conduit as either input power or motor wiring).
8. Strip the control cable sheathing and twist the copper screen into a pig-tail.
9. Refer to page 37. Connect the ground screen pig-tail for digital and analog I/O cables. (Ground only at drive end.)
10. Connect the ground screen pig-tail for Embedded fieldbus, EFB (EIA-485) cables at X5. (Ground only at drive end.)
11. Strip and connect the individual control wires to the drive terminals. Tighten the screws to 0.4 lb-ft (0.5...0.6 N-m).

⚠ WARNING! To avoid danger or damage to the drive on IT systems and corner grounded TN systems, see section [Check the compatibility with IT \(ungrounded\) and corner-grounded TN systems](#) on page 27.

R1-
R4



Note: UDC+ and UDC- terminals are used for external brake chopper units.

Power wiring torque table

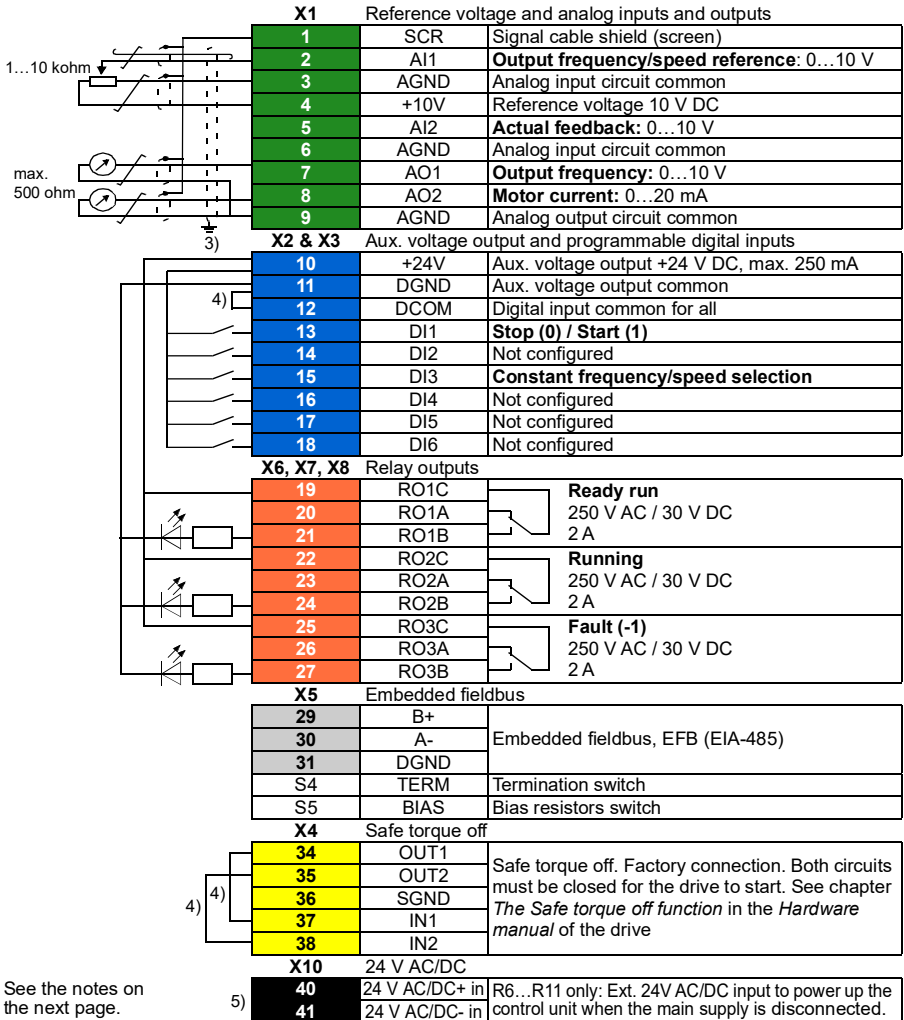
Frame size	R4	
	lb-ft	N-m
T1/U, T2/V, T3/W	3.0	4.0
L1, L2, L3	3.0	4.0
UDC+ and UDC-	3.0	4.0
PE Ground	1.1	1.5

Default I/O connections

This is the default configuration of control connections for water and waste water applications.

Default control connections for the Water default

**R1-
R4**



Terminal sizes:

R1...R5: 0.2...2.5 mm² (24...14 AWG): Terminals +24V, DGND, DCOM, B+, A-, DGND, Ext. 24V
0.14...1.5 mm² (26...16 AWG): Terminals DI, AI, AO, AGND, RO, STO

**R1-
R4** R6...R9: 0.14...2.5 mm² (all terminals)

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

Notes:

- 3) Ground the outer shield of the cable 360 degrees under the grounding clamp on the grounding shelf for the control cables.
- 4) Connected with jumpers at the factory.
- 5) Only frames R6...R11 have terminals 40 and 41 for external 24 V AC/DC input.

Input signals

- Analog frequency reference (AI1)
- Start/stop selection (DI1)
- Constant speed/frequency selection (DI3)

Output signals

- Analog output AO1: Output frequency
- Analog output AO2: Motor current
- Relay output 1: Ready run
- Relay output 2: Running
- Relay output 3: Fault (-1)

Install optional modules, if any

See chapter *Electrical installation* in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000035866 [English]).

Reinstall cover

See figure [J](#) on page [78](#).

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 T20 Torx screwdriver.

For start-up instructions, see chapter [Quick start-up guide](#) on page [65](#).

Quick installation guide

ACQ580-01 drives

Frame R5

R5



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R5 Quick installation guide

This guide briefly describes how to install the drive. For complete information on installation, see *ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual* (3AXD50000035866 [English]). For start-up instructions, see chapter *Quick start-up guide* on page 65.

R5

To read a manual, go to 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 electrician, 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 borings and grindings 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.
-

Check if capacitors need to be reformed

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

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.

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 [I](#) on page [17](#) for the losses. 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, 1.0 to 350 hp) hardware manual (3AXD50000035866 [English])*.

Protect the drive and input power cable

See table [II](#) on page [18](#) for the fuses.

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 [79](#).

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 [79](#).

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 an ABB motor must exceed 100 Mohm (reference value at 25 °C or 77 °F). For the insulation resistance of other 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 [79](#).

2. Switch off the power from the drive.
3. IP21, Remove the module cover: Loosen the retaining screws with a T20 Torx 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 T20 Torx screwdriver (4a) and slide the cover downwards (4b).
5. IP55, Remove the front cover: Loosen the retaining screws with a T20 Torx screwdriver (4a) and lift the cover from the bottom outwards (4b) and then up (4c).

R5

Check the compatibility with IT (ungrounded) and corner-grounded TN systems

■ EMC filter

The internal EMC filter is not suitable for use on an IT (ungrounded) system or on a corner-grounded TN system. Disconnect the EMC filter before connecting the drive to the supply network. Check the table on page [44](#).



WARNING! Do not install the drive with the internal EMC filter connected on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohms] power system), otherwise the system will be connected to ground potential through the EMC filter capacitors of the drive. This can cause danger, or damage the drive.

Do not install the drive with the internal EMC filter connected on a corner-grounded TN system, otherwise the drive will be damaged.

Note: When the internal EMC filter is disconnected, the drive EMC compatibility is considerably reduced.

■ Ground-to-phase varistor

The ground-to-phase varistor is not suitable for use on an IT (ungrounded) system. Disconnect the ground-to-phase varistor before connecting the drive to the supply network. Check the table on page [44](#).

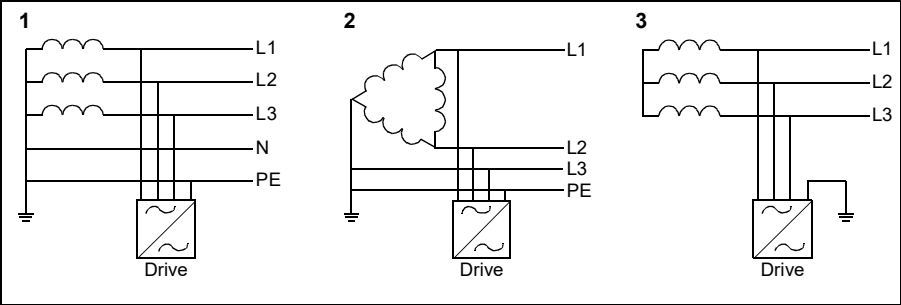


WARNING! Do not install the drive with the ground-to-phase varistor connected on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohms] power system), otherwise the varistor circuit can be damaged.

Check from the table below if you have to disconnect the EMC filter (EMC) or ground-to-phase varistor (VAR). For instructions on how to do this, see page 45.

R5

Frame sizes	EMC filter (EMC)	Ground-to-phase varistor (VAR)	Symmetrically grounded TN systems (TN-S systems) ¹	Corner grounded TN systems ²	IT systems (ungrounded or high-resistance grounded [$>30\text{ ohms}$]) ³
R5	EMC (2 screws)	-	Do not disconnect	Disconnect	Disconnect
	-	VAR (1 screw)	Do not disconnect	Do not disconnect	Disconnect

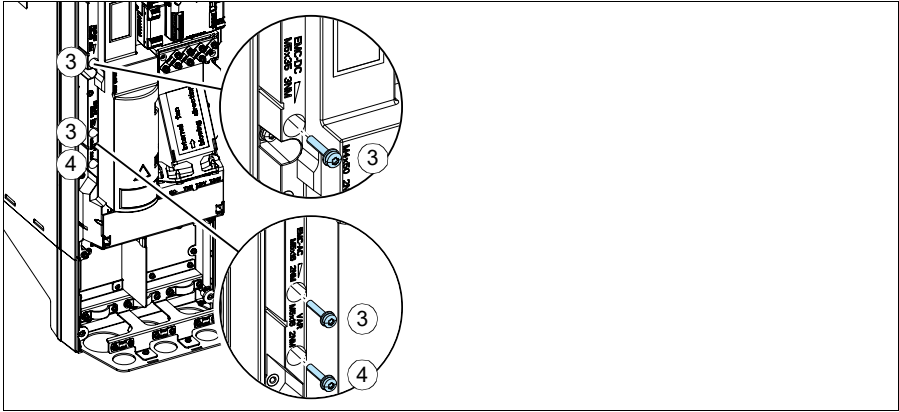


■ Disconnect EMC filter or ground-to-phase varistor, if needed

To disconnect the internal EMC filter or ground-to-phase varistor, if needed, do as follows:

1. Switch off the power from the drive.
2. Open the front cover, if not already opened, see figure [B](#) on page [79](#).
3. To disconnect the internal EMC filter, remove the two EMC screws.
4. To disconnect the ground-to-phase varistor, remove the varistor screw.

R5



Wiring R5

Note: These are instructions for conduit wiring. For cable wiring, see the *ACQ580 Hardware manual*, publication number 3AXD50000035866.

Note: In US deliveries, options are already installed at the factory. If installing on site, option slot 1 modules (fieldbus adapter) may be installed by mounting the module on the control board and tightening the mounting screw, which is also the grounding screw. Option slot 2 modules (I/O extension) may be installed by mounting the module on the control board and tightening both the mounting screw and the grounding screw. Refer to Warning.

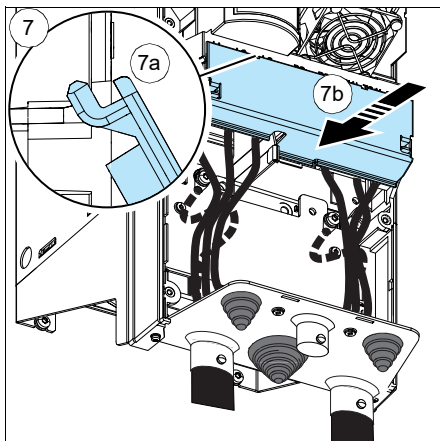


WARNING! If installing modules, obey the instructions in [Safety instructions](#) on page [7](#). If you ignore them, injury or death, or damage to the equipment can occur. Option slot 2 in frames R1...R5 is at U_{DC} potential. You must disconnect power supplies before installing or removing an I/O extension module.

See figure on page 47.

R5

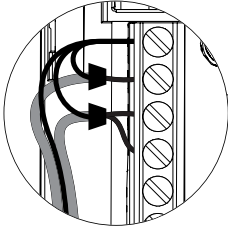
1. Install thin-wall conduit clamps for IP21/UL Type 1 or liquid-tight conduit connectors for IP55/UL Type 12 (not supplied). Type 12 has a Pressfit gasket.
2. Connect conduit runs for input power, motor and control cables to the conduit box. Ensure grommets (pointing down) are inserted into all unused holes.
3. Route the input power and motor wiring through separate conduits.
4. Strip wires.
5. Connect the motor and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
6. Connect the input power and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
7. 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.
8. Route the control cables through the conduit (not the same conduit as either input power or motor wiring).
9. Strip the control cable sheathing and twist the copper screen into a pig-tail.
10. Refer to page 48. Connect the ground screen pig-tail for digital and analog I/O cables. (Ground only at drive end.)
11. Connect the ground screen pig-tail for Embedded fieldbus, EFB (EIA-485) cables at X5. (Ground only at drive end.)
12. Strip and connect the individual control wires to the drive terminals. Tighten the screws to 0.4 lb-ft (0.5...0.6 N-m).



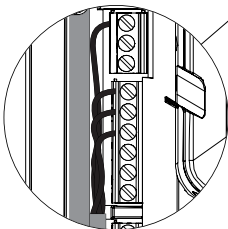


WARNING! To avoid danger or damage to the drive on IT systems and corner grounded TN systems, see section [Check the compatibility with IT \(ungrounded\) and corner-grounded TN systems](#) on page 43.

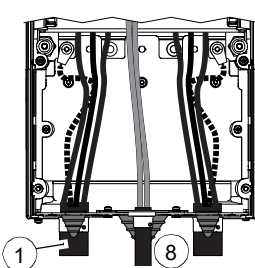
Analog Inputs and Outputs



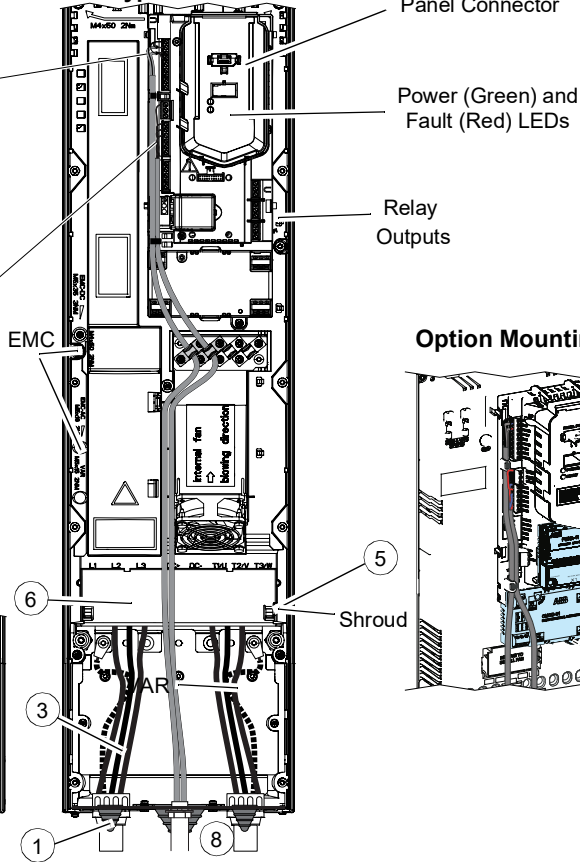
Digital Inputs



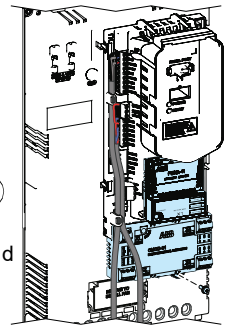
Typical Type 1



R5 Type 12



Option Mounting



Note: UDC+ and UDC- terminals are used for external brake chopper units.

Power wiring torque table

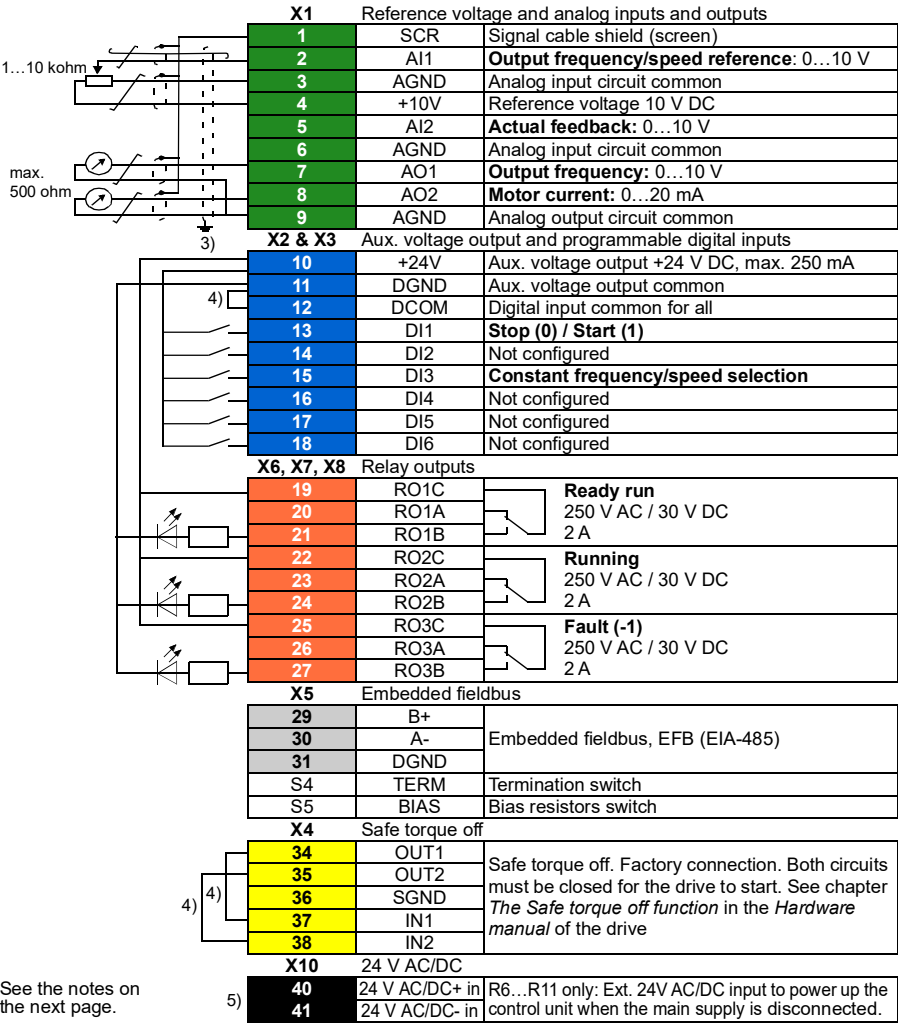
Frame size	R5	
	lb-ft	N-m
T1/U, T2/V, T3/W	4.1	5.6
L1, L2, L3	4.1	5.6
UDC+ and UDC-	4.1	5.6
PE Ground	1.1	1.5

Default I/O connections

This is the default configuration of control connections for water and waste water applications.

Default control connections for the Water default

R5



Terminal sizes:

R1...R5: 0.2...2.5 mm² (24...14 AWG): Terminals +24V, DGND, DCOM, B+, A-, DGND, Ext. 24V

0.14...1.5 mm² (26...16 AWG): Terminals DI, AI, AO, AGND, RO, STO

R6...R9: 0.14...2.5 mm² (all terminals)

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

R5

Notes:

- 3) Ground the outer shield of the cable 360 degrees under the grounding clamp on the grounding shelf for the control cables.
- 4) Connected with jumpers at the factory.
- 5) Only frames R6...R11 have terminals 40 and 41 for external 24 V AC/DC input.

Input signals

- Analog frequency reference (AI1)
- Start/stop selection (DI1)
- Constant speed/frequency selection (DI3)

Output signals

- Analog output AO1: Output frequency
 - Analog output AO2: Motor current
 - Relay output 1: Ready run
 - Relay output 2: Running
 - Relay output 3: Fault (-1)
-

Install optional modules, if any

See chapter *Electrical installation* in ACQ580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000035866 [English]).

Reinstall cover

R5 See figure [H](#) on page [81](#).

1. IP21, Reinstall the box cover: Slide the cover upwards (1a) and tighten the retaining screws (1b) with a T20 Torx screwdriver.
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) with a T20 Torx screwdriver.
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) with a T20 Torx screwdriver.

For start-up instructions, see chapter [Quick start-up guide](#) on page [65](#).

ABB drives for water

Quick installation guide

ACQ580-01 drives

Frames R6 to R9

R6-
R9



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R6...R9 Quick installation guide

This guide briefly describes how to install the drive. For complete information on installation, see *ACQ580-01 (0.75 to 250 kW) hardware manual* (3AXD50000035866 [English]). For start-up instructions, see chapter *Quick start-up guide* on page 65.

To read a manual, go to www.abb.com/drives/documents and search for the document number.

**R6-
R9**

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 electrician, 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.
 - Use the lifting eyes of the drive when you lift the drive. Do not tilt the drive. The drive is heavy and its center of gravity is high. An overturning drive can cause physical injury.
 - Make sure that debris from borings and grindings 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.
-

Check if capacitors need to be reformed

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

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: 13, 14, 15, ... for 2013, 2014, 2015, ...

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.

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.

R6-
R9

Ensure the cooling

See table I on page 19 for the losses. 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 (3AXD50000035866 [English]).

Protect the drive and input power cable

See table II on page 20 for the fuses.

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



Warning! The drive module is heavy (42 to 103 kg / 93 to 227 lb). Use a suitable lifting device. Do not lift the module manually. Make sure that the wall and the fixing devices can carry the weight.

See figure R6...R9 Figures A on page 83.

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 [83](#).

1. Check the insulation of the motor cable and motor before connecting it to 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 an ABB motor must exceed 100 Mohm (reference value at 25 °C or 77 °F). For the insulation resistance of other motors, see the manufacturer's instructions.

**R6-
R9**

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

Check the compatibility with IT (ungrounded) and corner-grounded TN systems

■ EMC filter

The internal EMC filter is not suitable for use on an IT (ungrounded) system or on a corner-grounded TN system. Disconnect the EMC filter before connecting the drive to the supply network. Check the table on page [56](#).



WARNING! Do not install the drive with the internal EMC filter connected on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohms] power system), otherwise the system will be connected to ground potential through the EMC filter capacitors of the drive. This can cause danger, or damage the drive.

Do not install the drive with the internal EMC filter connected on a corner-grounded TN system, otherwise the drive will be damaged.

Note: When the internal EMC filter is disconnected, the drive EMC compatibility is considerably reduced.

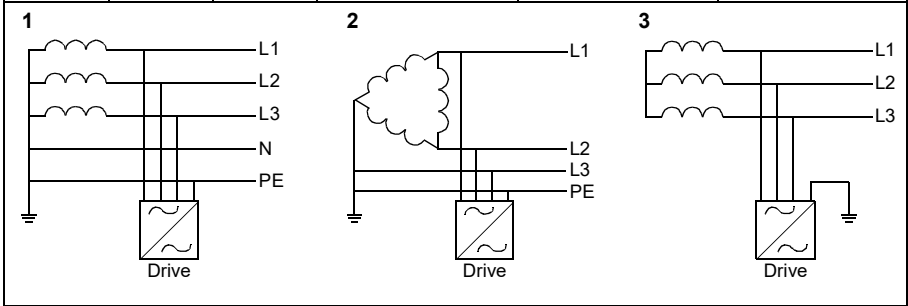
■ Ground-to-phase varistor

The ground-to-phase varistor is not suitable for use on an IT (ungrounded) system. Disconnect the ground-to-phase varistor before connecting the drive to the supply network. Check the table on page [56](#).

WARNING! Do not install the drive with the ground-to-phase varistor connected on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohms] power system), otherwise the varistor circuit can be damaged.

Check from the table below if you have to disconnect the EMC filter (EMC) or ground-to-phase varistor (VAR). For instructions on how to do this, see page 57.

Frame sizes	EMC filter (EMC)	Ground-to-phase varistor (VAR)	Symmetrically grounded TN systems (TN-S systems) ¹	Corner grounded TN systems ²	IT systems (ungrounded or high-resistance grounded [>30 ohms]) ³
R6...R9	EMC (2 screws)	-	Do not disconnect	Disconnect	Disconnect
	-	VAR (1 screw)	Do not disconnect	Do not disconnect	Disconnect

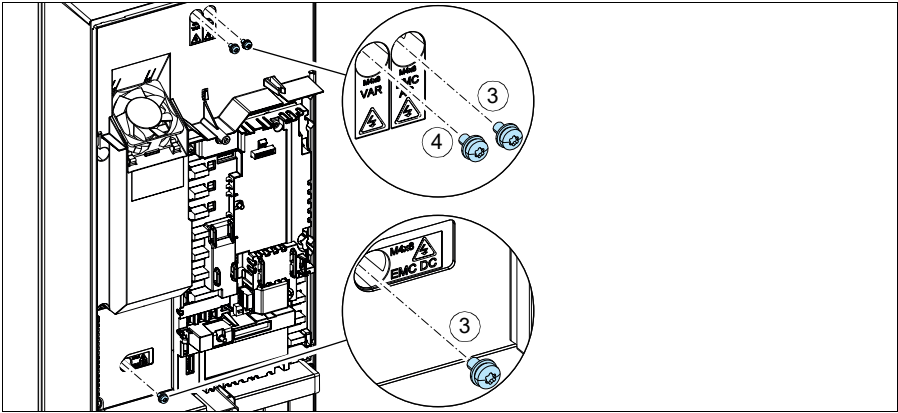


■ Disconnect EMC filter or ground-to-phase varistor, if needed

To disconnect the internal EMC filter or ground-to-phase varistor, if needed, do as follows:

1. Switch off the power from the drive.
2. Open the front cover, if not already opened, see steps 5, IP21 and 5, IP55 in figure [R6...R9 Figures A](#) on page 83.
3. To disconnect the internal EMC filter, remove the two EMC screws.
4. To disconnect the ground-to-phase varistor, remove the varistor screw.

R6-
R9



Wiring R6...R9

Note: These are instructions for conduit wiring. For cable wiring, see the ACQ580 *Hardware manual*, publication number 3AXD50000035866.

Note: In US deliveries, options are already installed at the factory. If installing on site, see the appropriate option module manual for specific installation and wiring.

See figure on page 59.

R6-
R9

1. Install thin-wall conduit clamps for IP21/UL Type 1 or liquid-tight conduit connectors for IP55/UL Type 12 (not supplied). Type 12 has a Pressfit gasket.
2. Connect conduit runs for input power, motor and control cables to the conduit box. Ensure grommets (pointing down) are inserted into all unused holes.
3. Route the input power and motor wiring through separate conduits.
4. Strip wires.
5. Connect the motor and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.

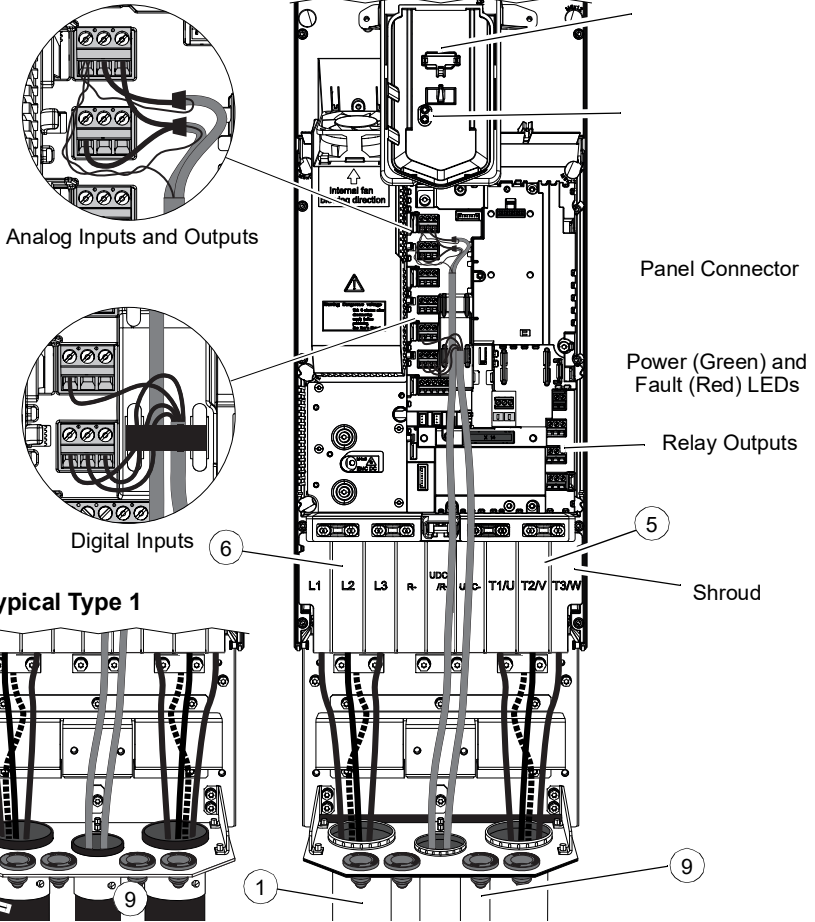
Note: *Frames R8...R9* — If you connect only one conductor to the connector, we recommend that you put it under the upper pressure plate.

6. Connect the input power and ground wires to the drive terminal. Tighten the screws to torques shown in the Power wiring torque table.
7. *Frames R8...R9* — If parallel cables are used, install the parallel power cables.
8. Reinstall the shroud on the power terminals and the conduit box side plates.
9. Route the control cables through the conduit (not the same conduit as either input power or motor wiring).
10. Strip the control cable sheathing and twist the copper screen into a pig-tail.
11. Refer to page 60. Connect the ground screen pig-tail for digital and analog I/O cables. (Ground only at drive end.)
12. Connect the ground screen pig-tail for Embedded fieldbus, EFB (EIA-485) cables at X5. (Ground only at drive end.)
13. Strip and connect the individual control wires to the drive terminals. Tighten the screws to 0.4 lb-ft (0.5...0.6 N-m).



WARNING! To avoid danger or damage to the drive on IT systems and corner grounded TN systems, see section [Check the compatibility with IT \(ungrounded\) and corner-grounded TN systems](#) on page 55.

R7 Type 12

R6-
R9

Note: UDC+ and UDC- terminals are used for external brake chopper units.

Power wiring torque table

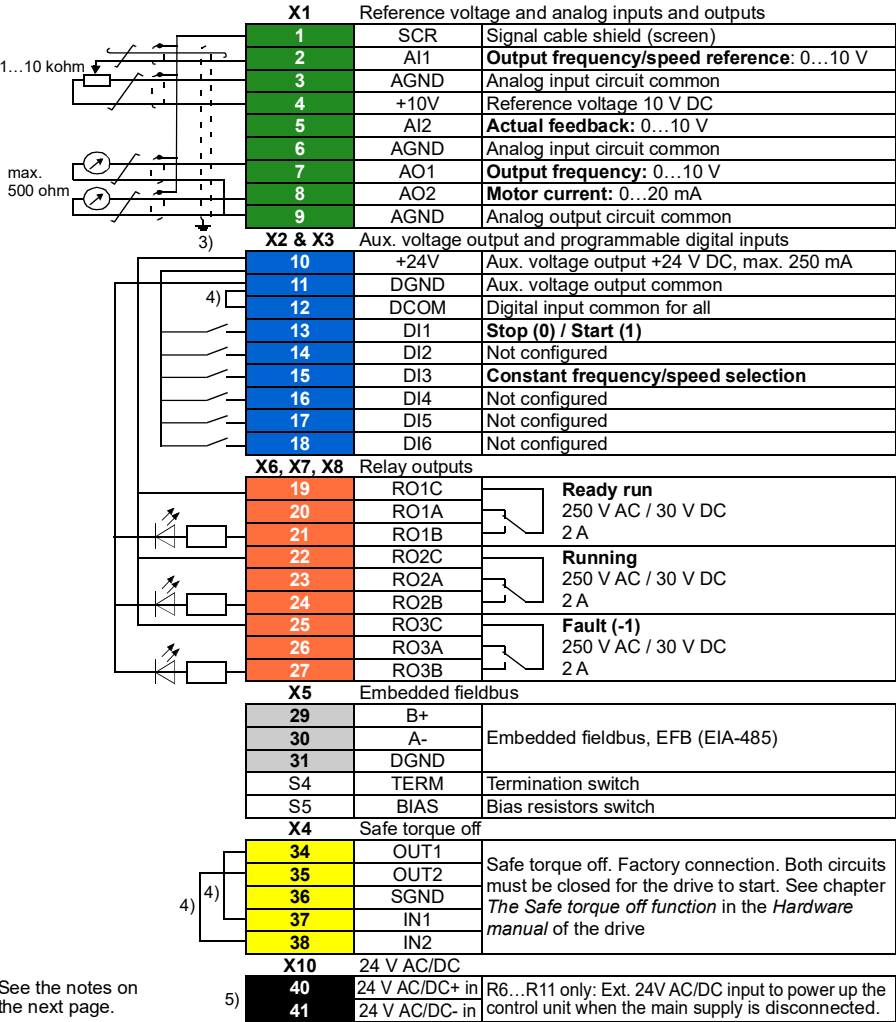
Frame size	R6		R7		R8		R9	
	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m	lb-ft	N-m
T1/U, T2/V, T3/W	22.1	30	29.5	40	29.6	40	51.6	70
L1, L2, L3	22.1	30	29.5	40	29.6	40	51.6	70
UDC+ and UDC-	22.1	30	29.5	30	29.5	40	51.6	70
PE Ground	1.1	1.5	1.1	1.5	1.1	1.5	1.1	1.5

Default I/O connections

This is the default configuration of control connections for water and waste water applications.

Default control connections for the Water default

R6-
R9



Terminal sizes:

R1...R5: 0.2...2.5 mm² (24...14 AWG): Terminals +24V, DGND, DCOM, B+, A-,
DGND, Ext. 24V
0.14...1.5 mm² (26...16 AWG): Terminals DI, AI, AO, AGND, RO, STO

R6...R9: 0.14...2.5 mm² (all terminals)

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

Notes:

- 3) Ground the outer shield of the cable 360 degrees under the grounding clamp on the grounding shelf for the control cables.
- 4) Connected with jumpers at the factory.
- 5) Only frames R6...R11 have terminals 40 and 41 for external 24 V AC/DC input.

**R6-
R9**

Input signals

- Analog frequency reference (AI1)
- Start/stop selection (DI1)
- Constant speed/frequency selection (DI3)

Output signals

- Analog output AO1: Output frequency
- Analog output AO2: Motor current
- Relay output 1: Ready run
- Relay output 2: Running
- Relay output 3: Fault (-1)

Install optional modules, if any

See chapter *Electrical installation* in ACQ580-01 (0.75 to 250 kW) hardware manual (3AXD50000035866 [English]).

Install side plates and covers

See figure [R6...R9 Figures E](#) on page 85.

IP21

R6-
R9

1. Reinstall the side plates of the cable entry box. Tighten the retaining screws with a T20 Torx screwdriver.
2. Slide the cover of the cable entry box on the module from below until the cover snaps into place.
3. Reinstall the module cover. Tighten the two retaining screws with a T20 Torx screwdriver.

IP55

Reinstall the module cover. Tighten the two retaining screws with a T20 Torx screwdriver.

For start-up instructions, see chapter [Quick start-up guide](#) on page 65.

ABB drives for water

Quick start-up guide

ACQ580-01 drives

Frames R1 to R9

R1-
R4

R5

R6-
R9



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Quick start-up guide

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

Before you start









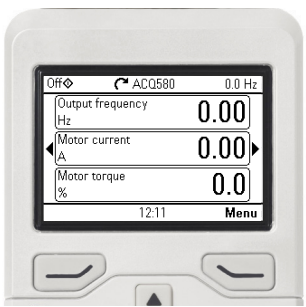
Ensure that the drive has been installed as described in

Start-up with the First start assistant on a Hand-Off-Auto control panel

R1-
R4

R5

R6-
R9


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. De-couple the driven machine 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 (Options and Menu 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: Language, date and time, and motor nominal values	
<input type="checkbox"/>	Have the motor or pump name plate data at hand. Power up the drive.

R1-
R4

R5

R6-
R9

<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.</p> <p>Select the language you want to use by highlighting it (if not already highlighted) and pressing (OK).</p> <p>Note: After you have selected the language, it takes a few minutes for the control panel to wake up.</p>	
<input type="checkbox"/>	<p>Select Start set-up 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"> Go to the edit view of a selected row by pressing . Scroll the view with and . <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"> Use and to move the cursor left and right. Use and to change the value. Press (Save) to accept the new setting, or press (Cancel) to go back to the previous view without making changes. 	
<input type="checkbox"/>	<p>Change the units shown on the panel if needed.</p> <ul style="list-style-type: none"> Go to the edit view of a selected row by pressing . Scroll the view with and . <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 (Next).</p> <p>For information on editing text, see <i>ACQ580 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"> • Scroll the view with and . <p>Motor nominal $\cos\Phi$ and nominal torque are optional.</p> <p>Press (Next) to continue.</p>	
<input type="checkbox"/>	<p>Adjust the limits according to your needs.</p> <ul style="list-style-type: none"> • Go to the edit view of a selected row by pressing . • Scroll the view with and . <p>Go to the next view by pressing (Next).</p>	

R1-
R4

R5

R6-
R9

R1-
R4

R5

R6-
R9

<input type="checkbox"/>	<p>If you want to make a backup of the settings made so far, select Backup and press (Next). If you do not want to make a backup, select Not now and press (Next).</p>	
<input type="checkbox"/>	<p>The first start is now complete and the drive is ready for use. Press (Done) to enter the Home view.</p>	
<input type="checkbox"/>	<p>The Home view monitoring the values of the selected signals is shown on the panel.</p> <p>For changing the signals and their display style shown in the Home view, see <i>ACH-AP-x assistant control panels user's manual</i> (3AUA0000085685 [English]).</p>	

2 – Additional settings in the Primary settings menu

<input type="checkbox"/>	<p>Make any additional adjustments, for example, pump protections, starting from the Main menu – press (Menu) to enter the Main menu. Select Primary settings and press (Select) (or).</p> <p>In the Primary settings menu, select Pump protections and press (Select) (or).</p> <p>To get more information on the Primary settings menu items, press to open the help page.</p>	
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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.

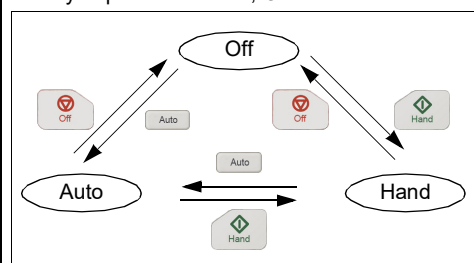
- Top row of the view shows Auto.

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
<div>  Fault 7081 Aux code: 0000 0000 Control panel loss 12:41:43 Control panel loss fault </div>			
Hide		12:42	Reset

R1-
R4

R5

R6-
R9

R1-
R4

R5

R6-
R9



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Compliance with the European Machinery Directive 2006/42/EC

Declaration of conformity



R1-
R4

R5

R6-
R9

EU Declaration of Conformity

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

is in conformity with the relevant requirements of European Union Directives, which have been notified in this single declaration that consists of individual Declarations of conformity, provided that the equipment is selected, installed and used according to given instructions.

The harmonised standards and other standards, which have been applied, are specified on the individual Declarations of conformity for particular EU directive.

EU Directives		
Low Voltage Directive	2014/35/EU	LVD
EMC Directive	2014/30/EU	EMC
Machinery Directive	2006/42/EC	MD
RoHS Directive	2011/65/EU	ROHS

Individual EU Declaration of Conformity:

Product	LVD	EMC	MD	ROHS
ACQ580-01	3AXD10000485132		3AXD10000486283	3AXD10000497771

Helsinki, 20 Apr 2016

Manufacturer representative:


Tuomo Häysniemi
Vice President, ABB Oy

Compliance with the European Machinery Directive 2006/42/EC

NOTICE

The ratings listed below are NOT included in the compliance directive and do not carry the CE mark.

R1- R4	ACQ580-01-343A-2	125 HP at 230 V
R5	ACQ580-01-396A-2	150 HP at 230 V

These ratings do carry UL listing (cULus).

R6- R9	UL PENDING	
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ABB drives for water

Quick installation guide

ACQ580-01 drives

Installation figures

R1-
R4

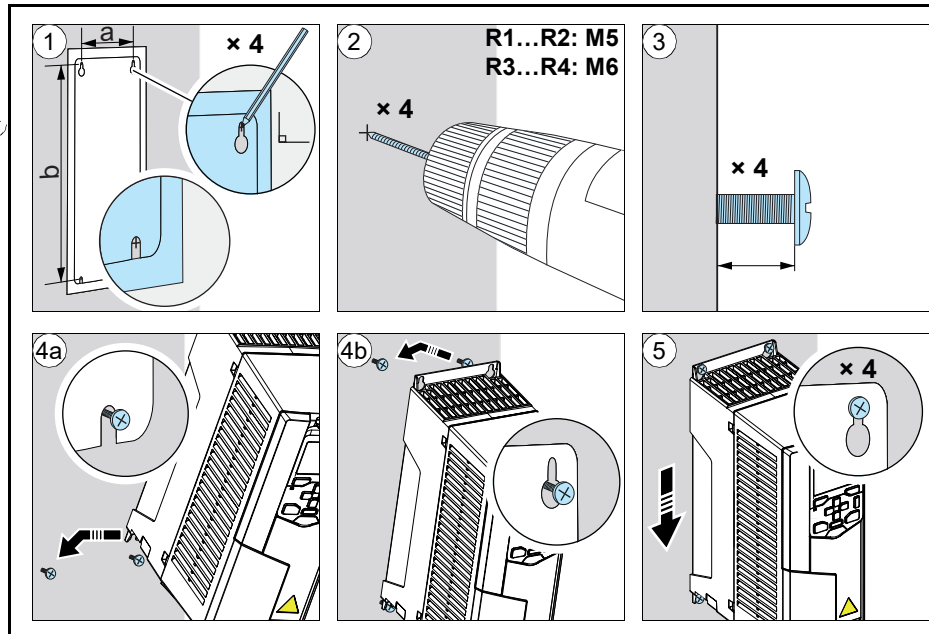
R5

R6-
R9

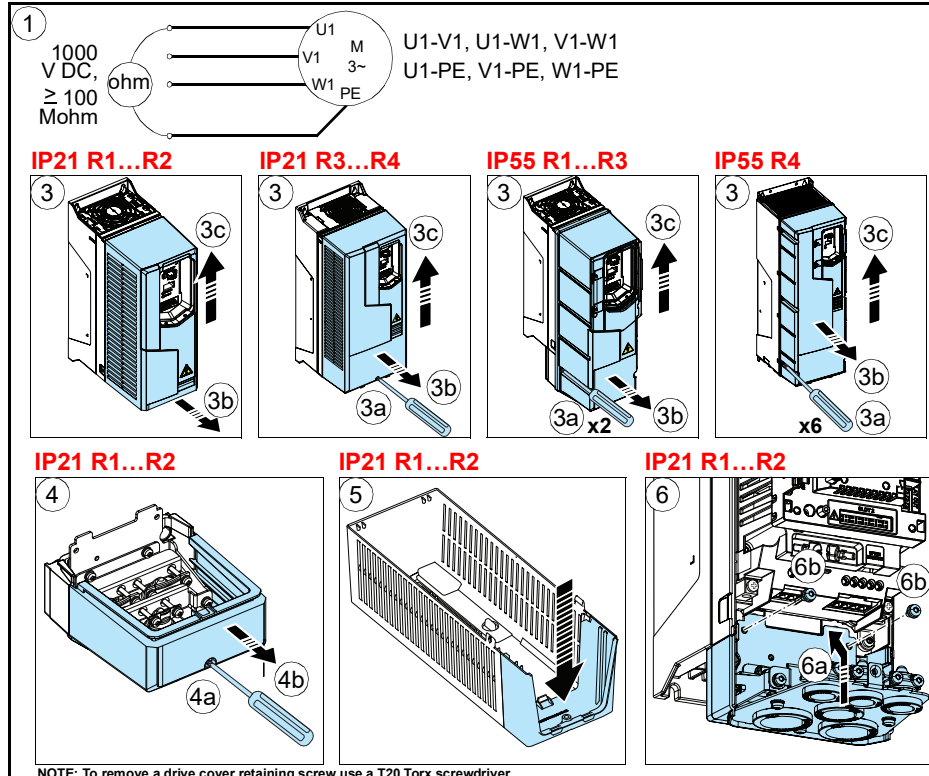


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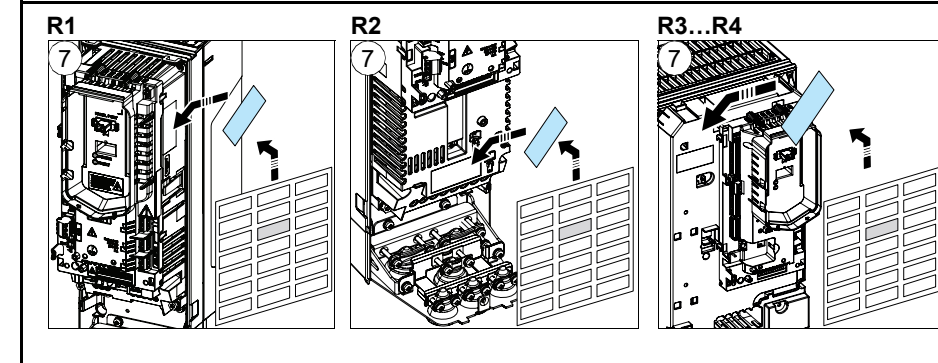
R1...R4 Figures A



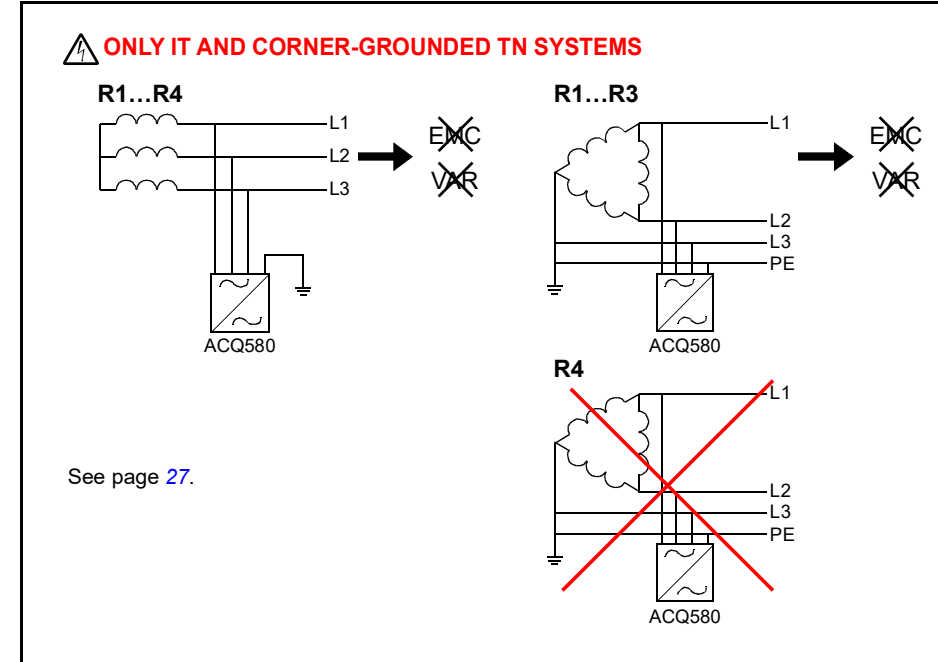
B1



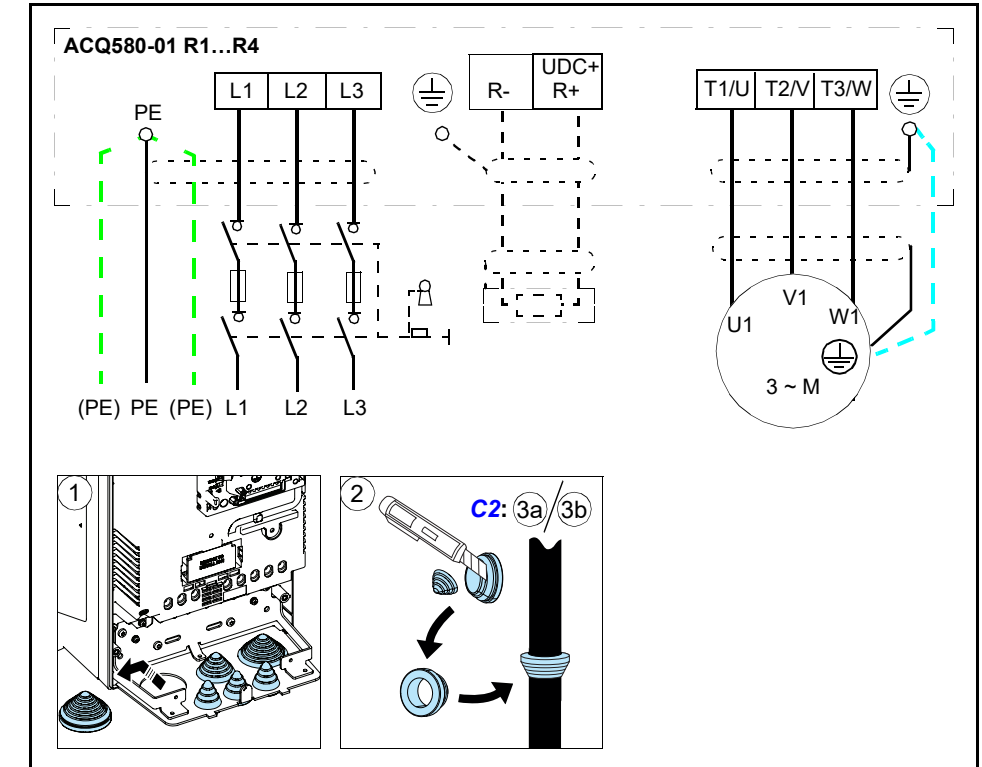
B2



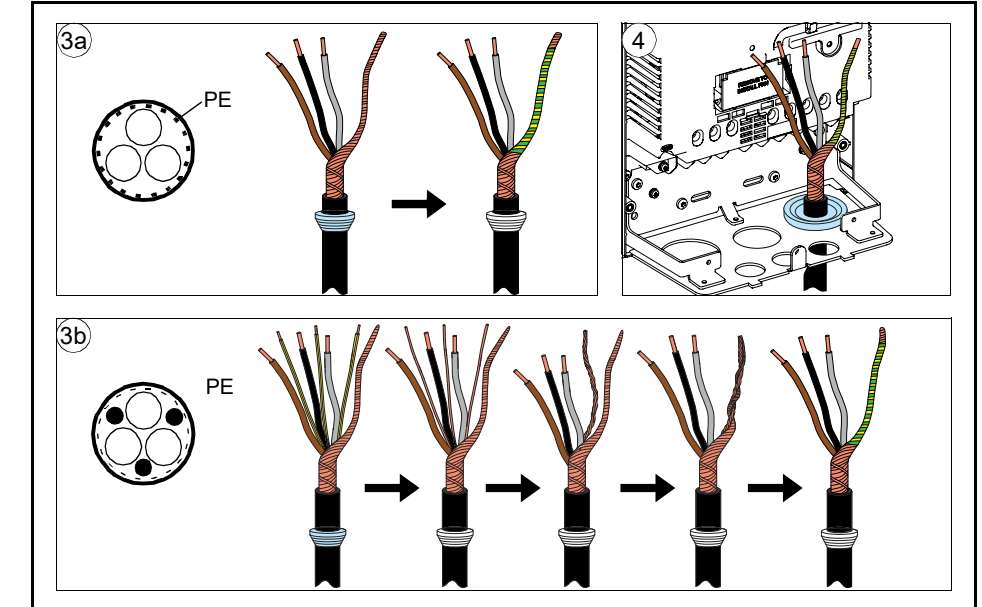
B3



C1



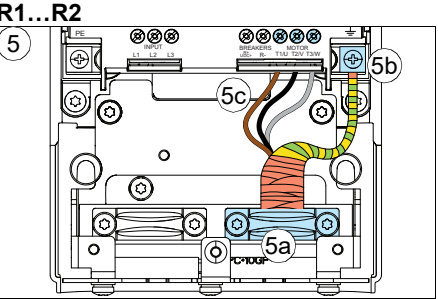
C2



D

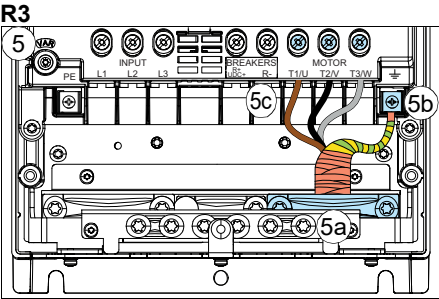
R1...R2

5



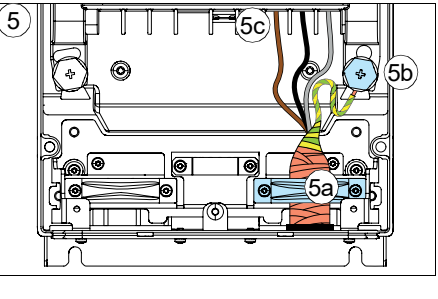
R3


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


R4

5

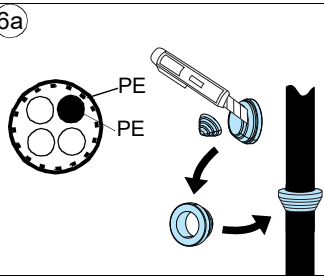


Frame size	R1		R2	
	N·m	lbf·ft	N·m	lbf·ft
T1/U, T2/V, T3/W	0.5...0.6	0.4	1.2...1.5	1.1
PE, \oplus	1.5	1.1	1.5	1.1
	1.2	0.9	1.2	0.9

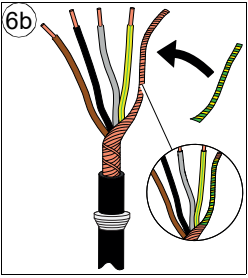
Frame size	R3		R4	
	N·m	lbf·ft	N·m	lbf·ft
T1/U, T2/V, T3/W	2.5...4.5	3.3	4.0	3.0
PE, \oplus	1.5	1.1	2.9	2.1
	1.2	0.9	1.2	0.9

E1

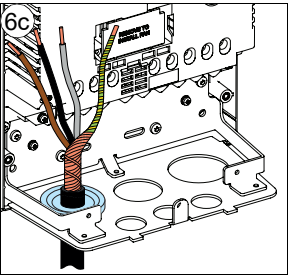
6a



6b



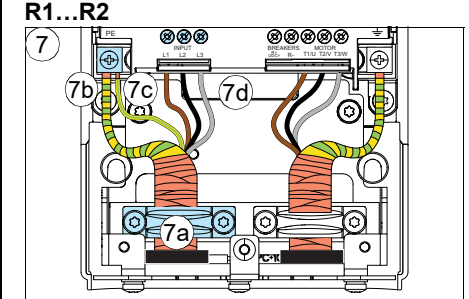
6c



E2

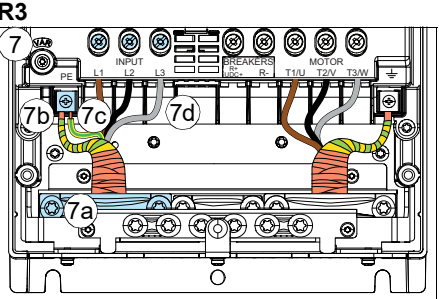
R1...R2

7



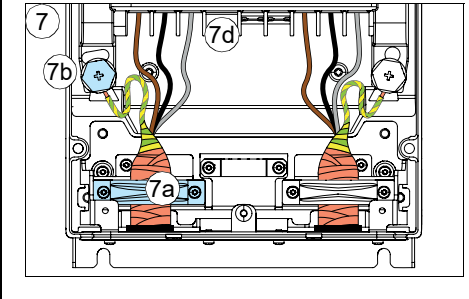
R3


7




R4

7



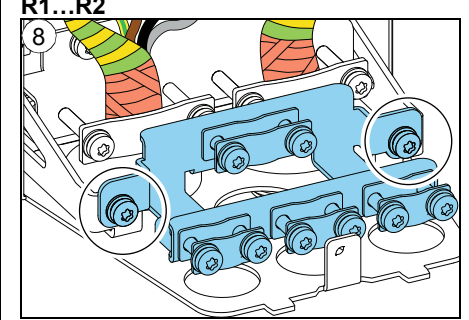
Frame size	R1		R2	
	N·m	lbf·ft	N·m	lbf·ft
L1, L2, L3	0.5...0.6	0.4	1.2...1.5	1.1
PE, \oplus	1.5	1.1	1.5	1.1
	1.2	0.9	1.2	0.9

Frame size	R3		R4	
	N·m	lbf·ft	N·m	lbf·ft
L1, L2, L3	2.5...4.5	3.3	4.0	3.0
PE, \oplus	1.5	1.1	2.9	2.1
	1.2	0.9	1.2	0.9

F

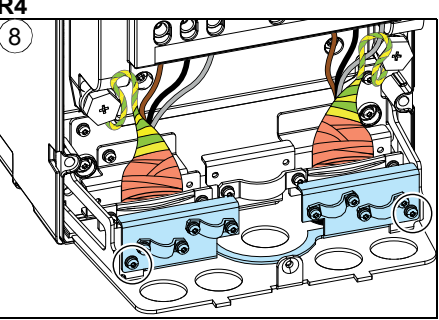
R1...R2

8



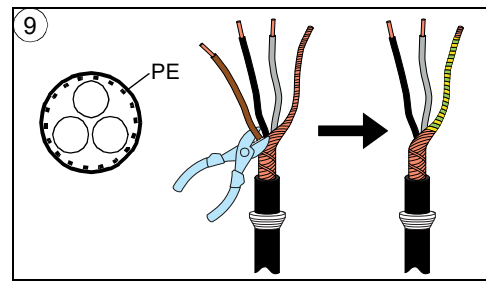
R4

8



G1

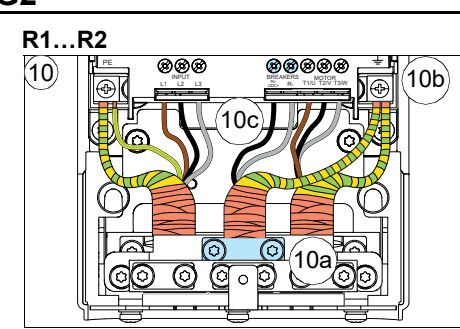
9



G2

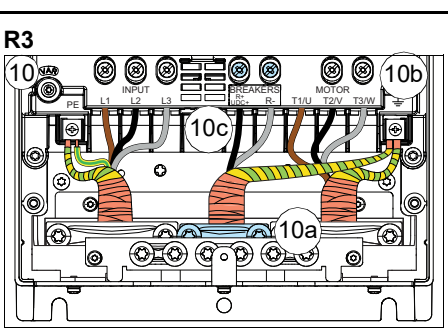
R1...R2


10



R3

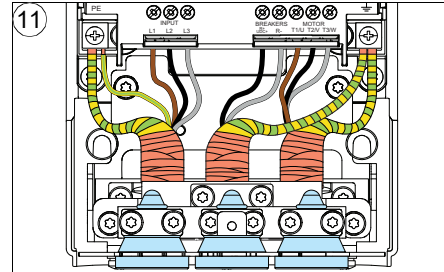
10



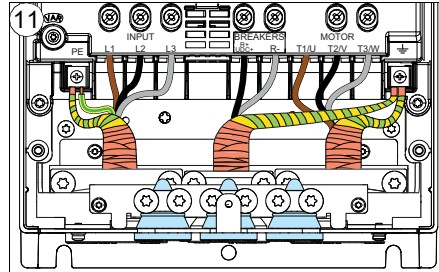
Frame size	R1		R2		R3	
	N·m	lbf·ft	N·m	lbf·ft	N·m	lbf·ft
R-, R+	0.5...0.6	0.4	1.2...1.5	1.1	2.5...4.5	3.3
PE, \oplus	1.5	1.1	1.5	1.1	1.5	1.1
	1.2	0.9	1.2	0.9	1.2	0.9

R1...R4 Figures H

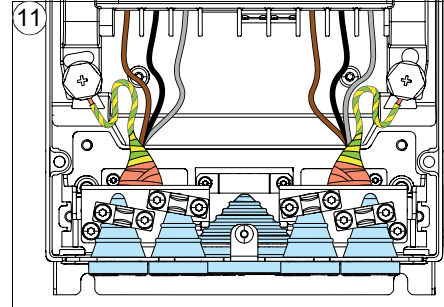
R1...R2



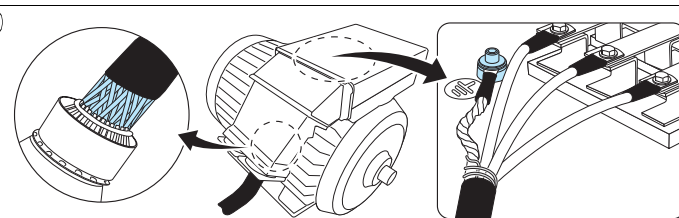
R3



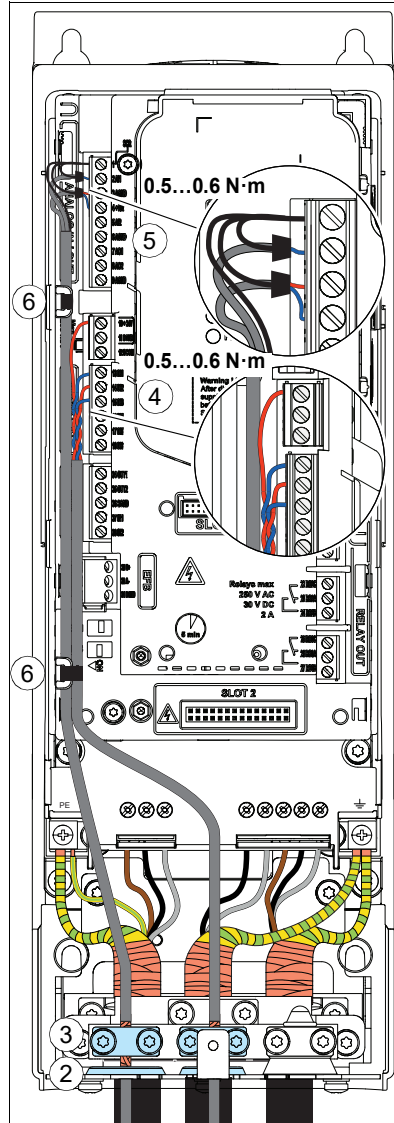
R4



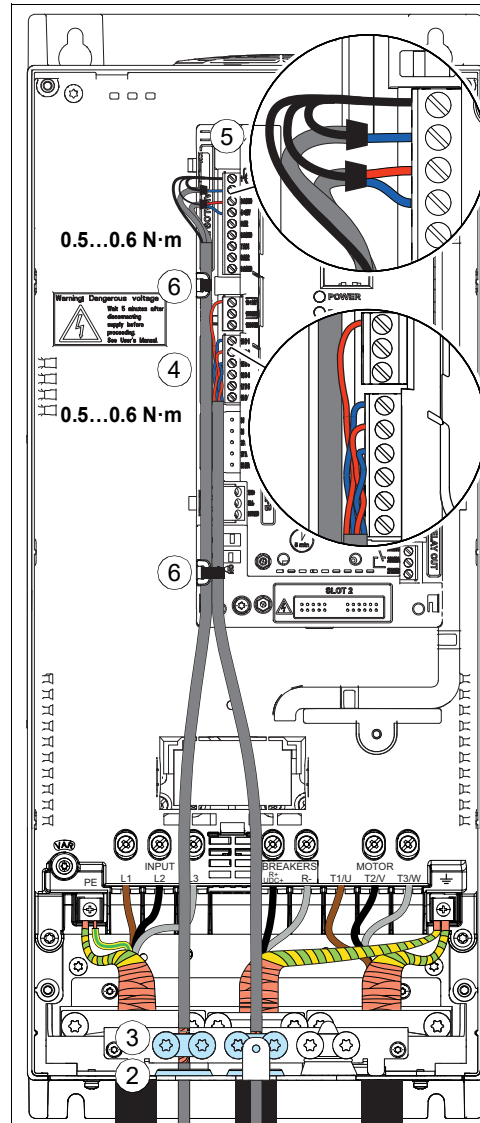
13



R1...R2

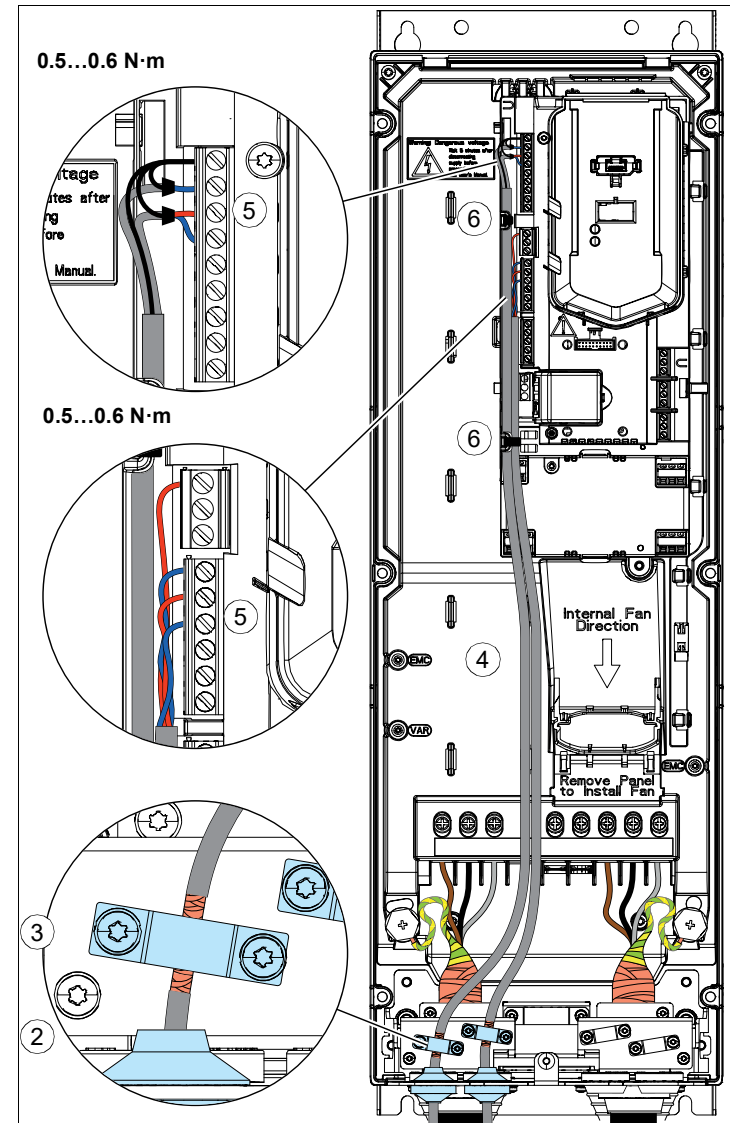


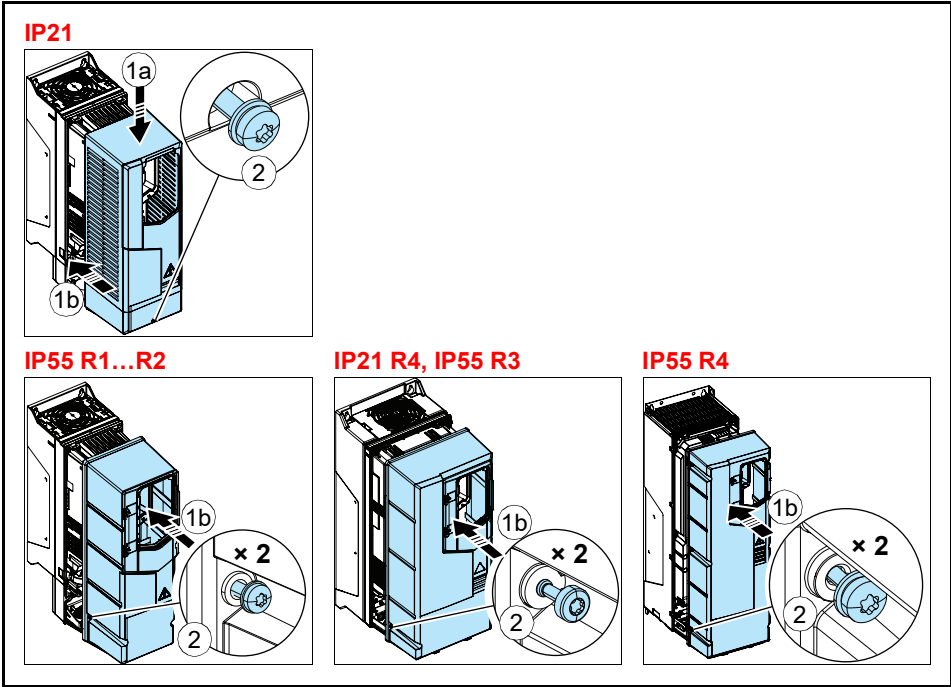
R3



I2

R4





R5 Figures A

1

	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	7.9	200	7.9
e >	200	7.9	200	7.9

	R5 IP21		R5 IP55	
	kg	lb	kg	lb
	28.3	62.4	28.6	63.1

2

3

4 IP21

5 IP21

NOTE: To remove a drive cover retaining screw use a T20 Torx screwdriver.

6 IP21

7 IP21

8 IP21

9

10

B

1

3 IP21

4 IP21

5 IP55

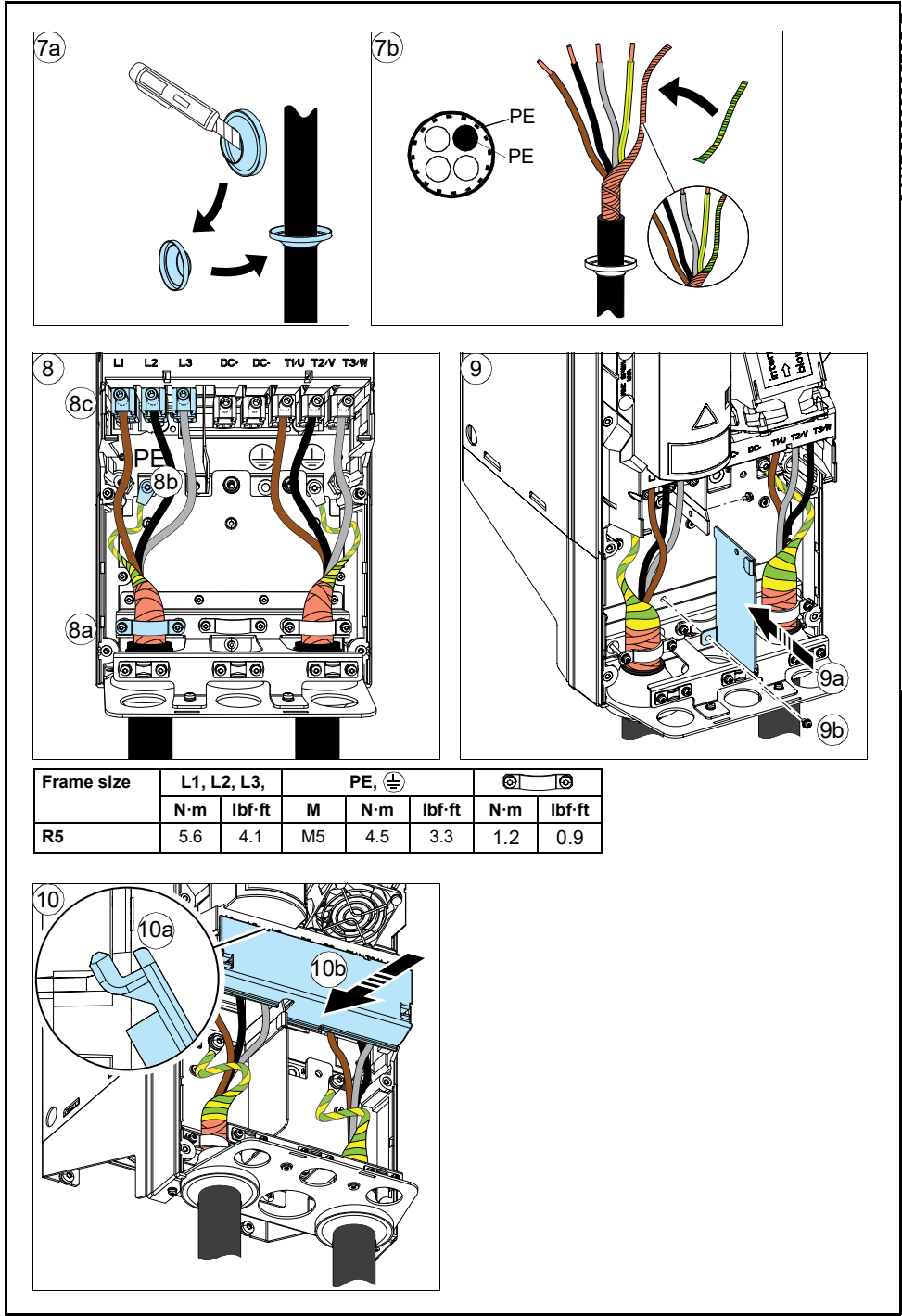
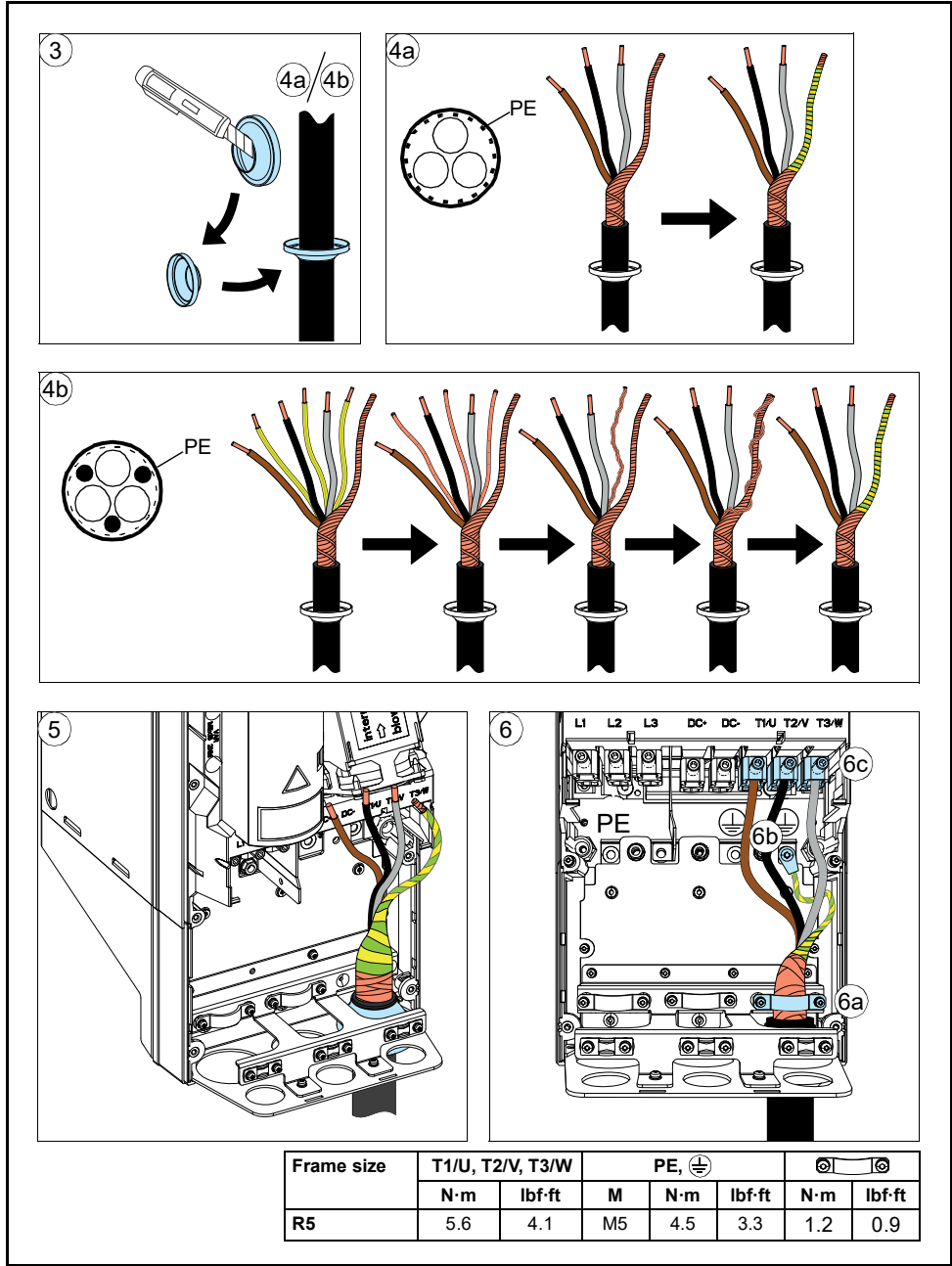
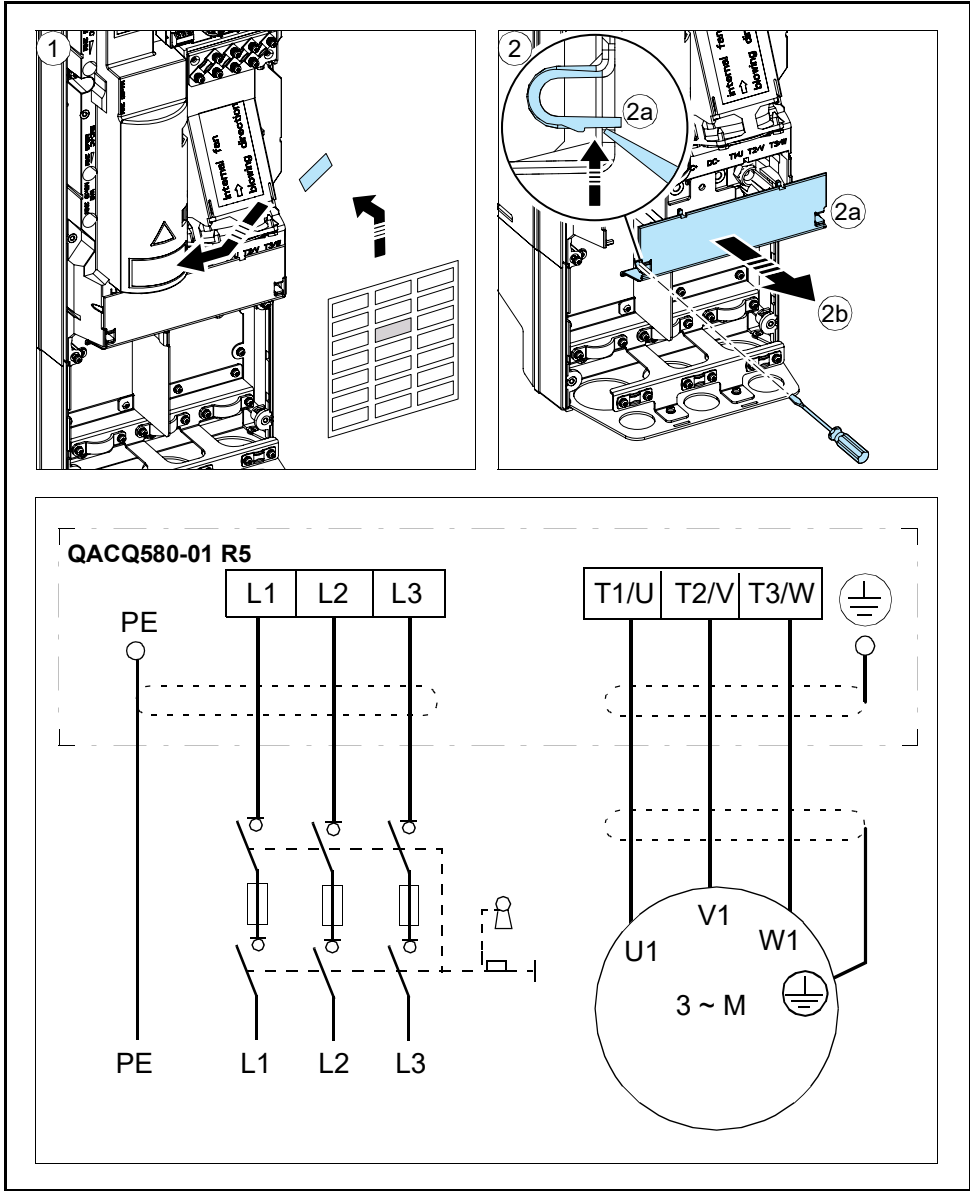
6

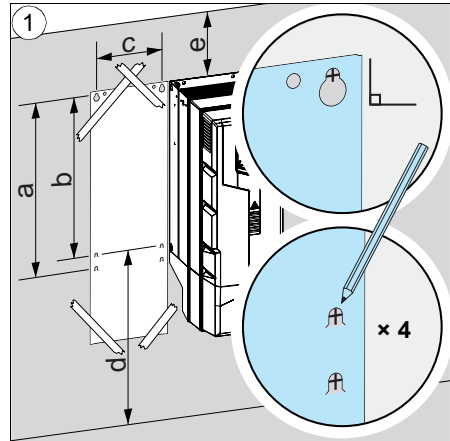
1000 V DC, ≥ 100 Mohm

U1-V1, U1-W1, V1-W1
U1-PE, V1-PE, W1-PE

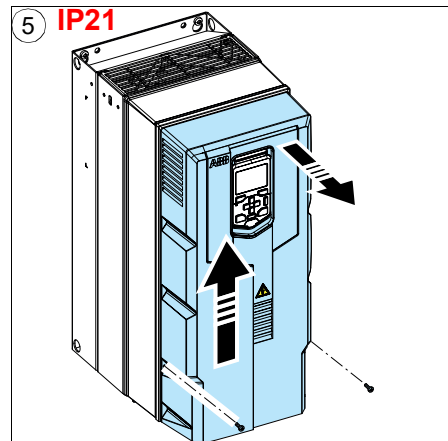
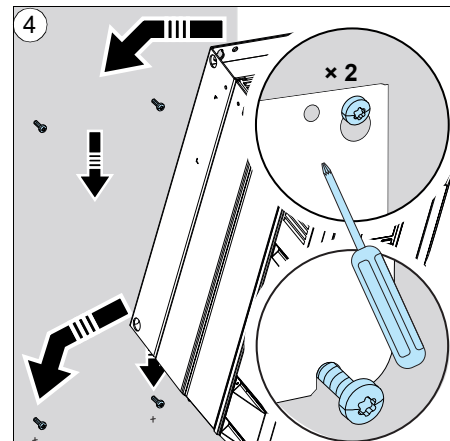
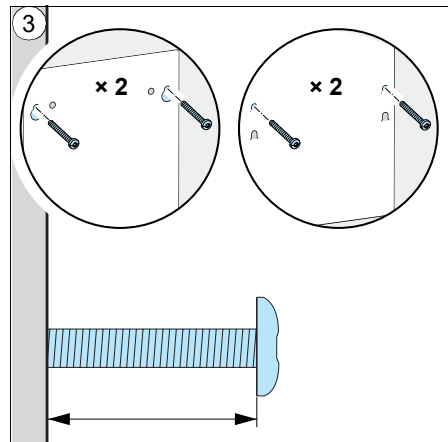
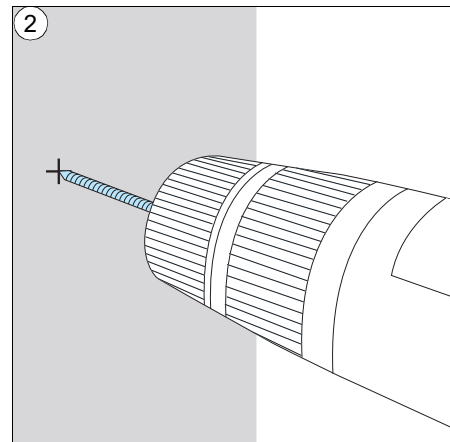
ONLY IT SYSTEMS

See page 43

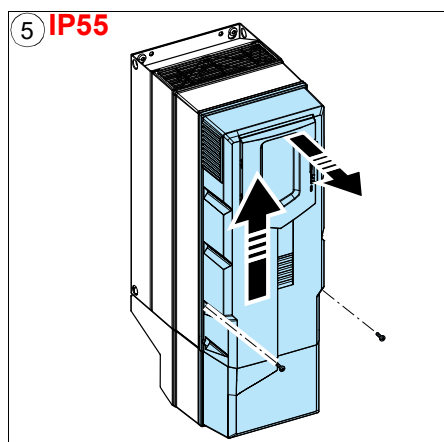
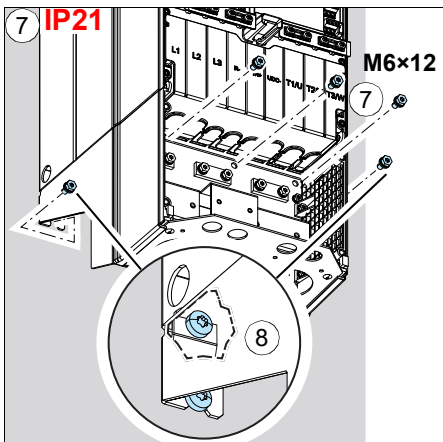
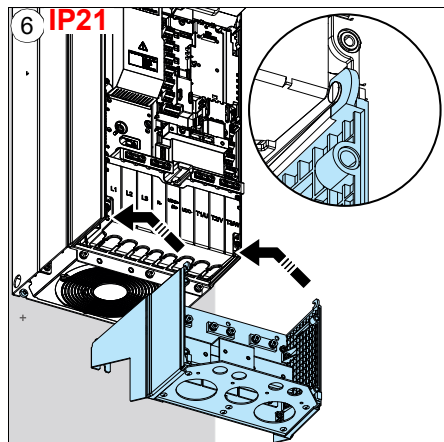




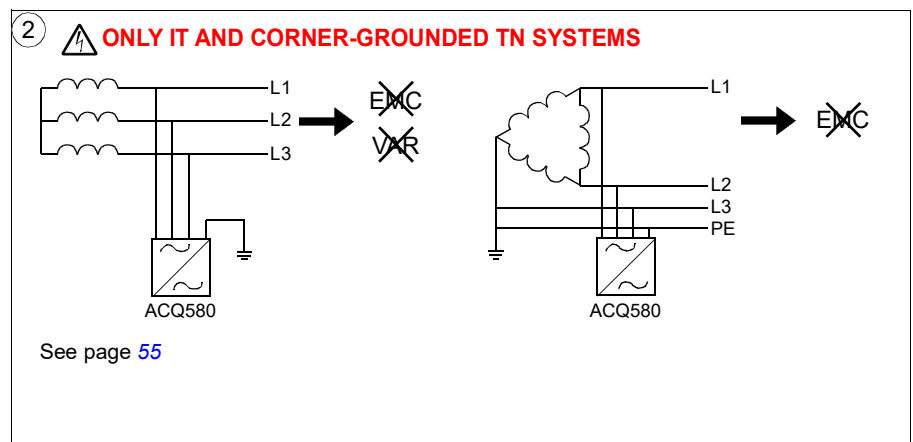
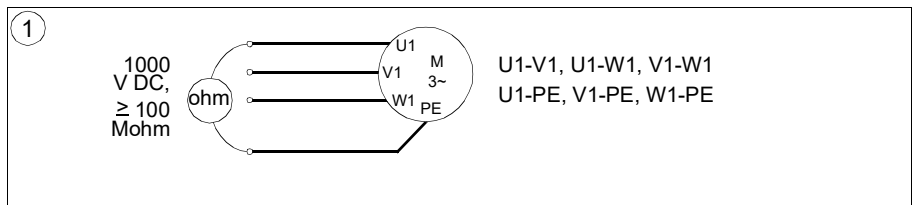
	R6	R7	R8	R9
a (mm/in)	571/ 22.5	623/ 24.5	701/ 27.6	718/ 28.3
b (mm/in)	531/ 20.9	583/ 22.9	658/ 25.9	658/ 25.9
c (mm/in)	213/ 8.4	245/ 9.7	263/ 10.4	345/ 13.6
d > (mm/in)	300/ 11.8	300/ 11.8	300/ 11.8	300/ 11.8
e > (mm/in)	200/ 7.9	200/ 7.9	200/ 7.9	200/ 7.9
kg/lb	IP21 42/93	IP21 54/119	IP21 69/152	IP21 97/214
	IP55 43/95	IP55 56/124	IP55 77/170	IP55 103/227



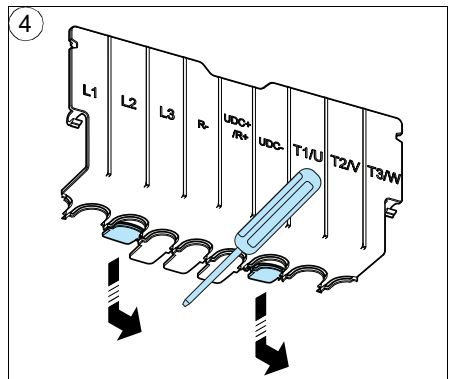
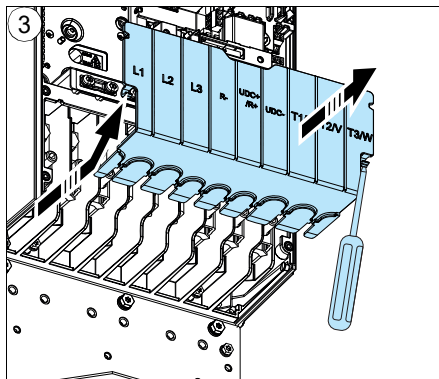
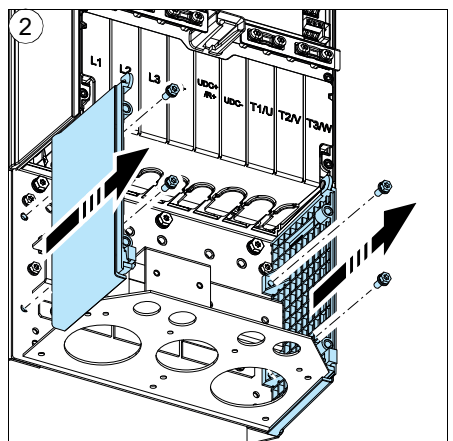
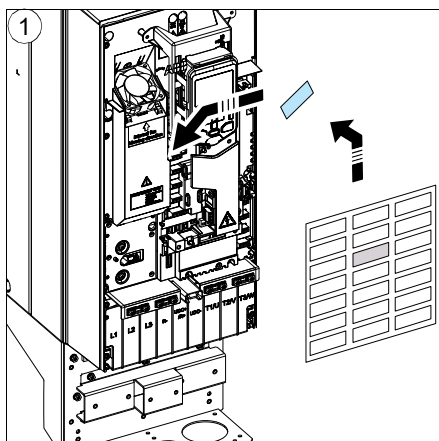
NOTE: To remove a drive cover retaining screw use a T20 Torx screwdriver.

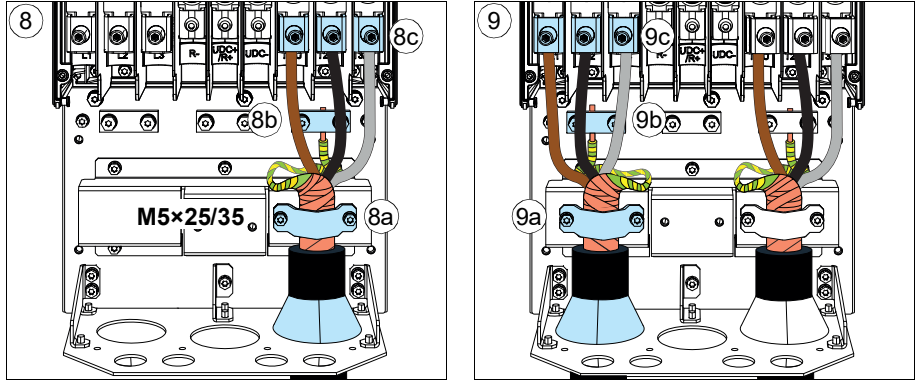
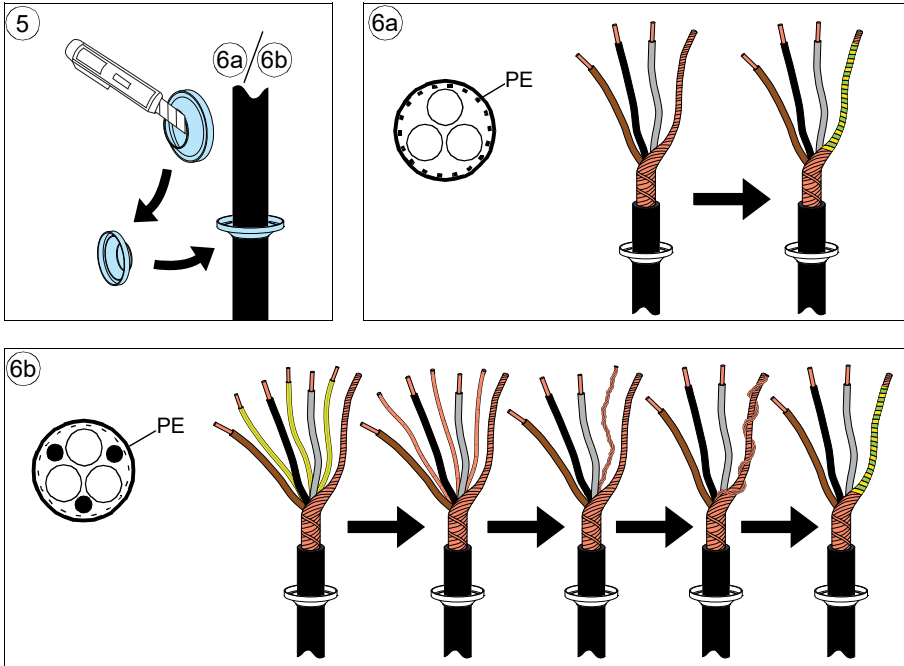
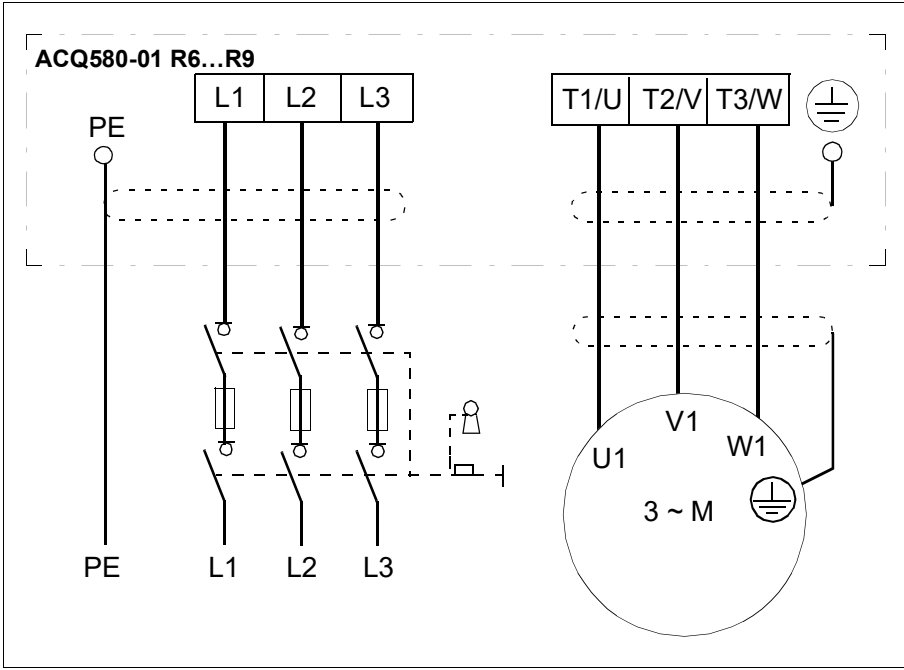


B



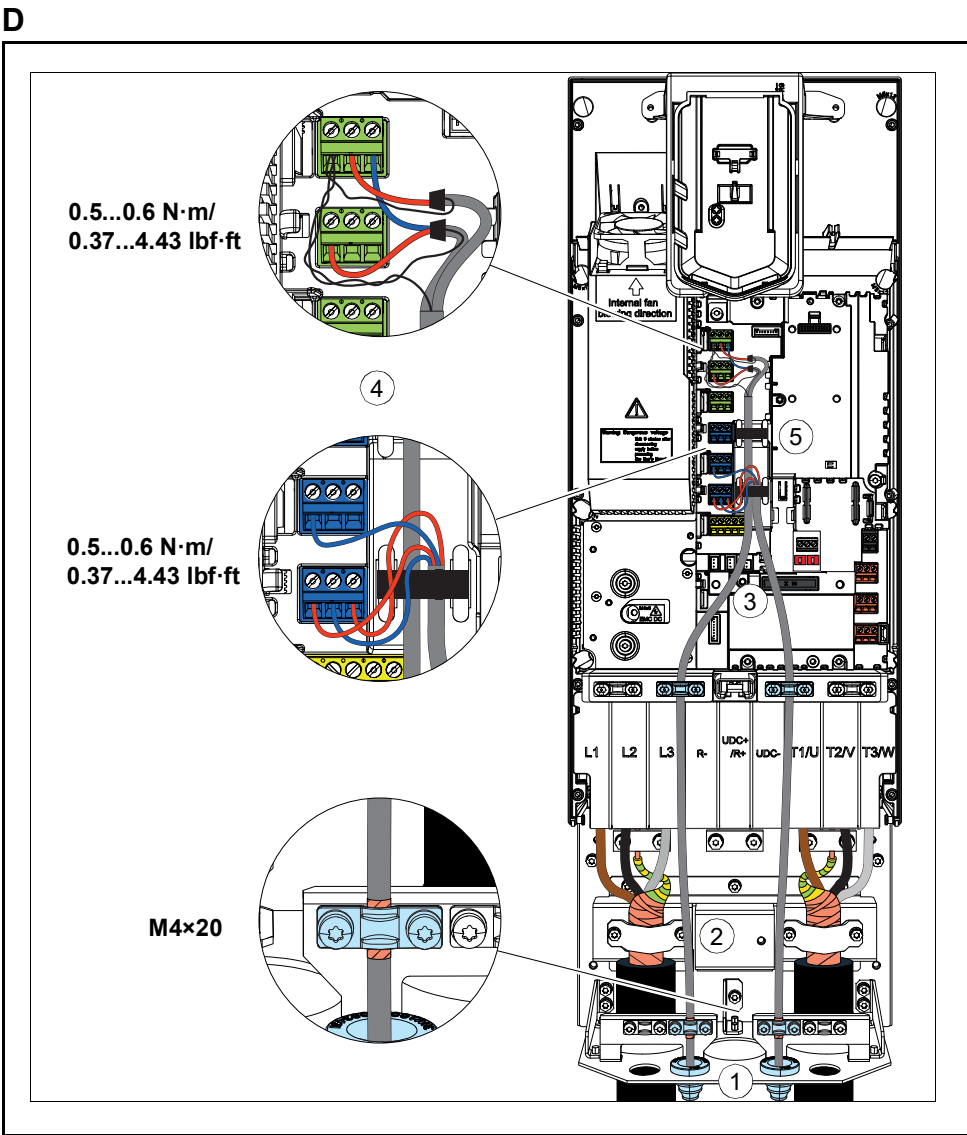
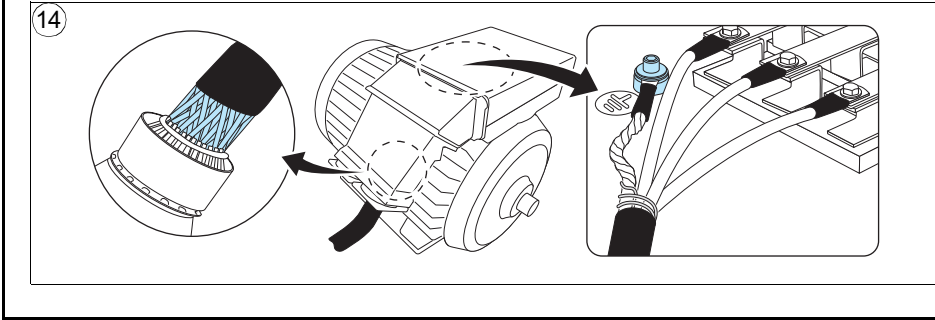
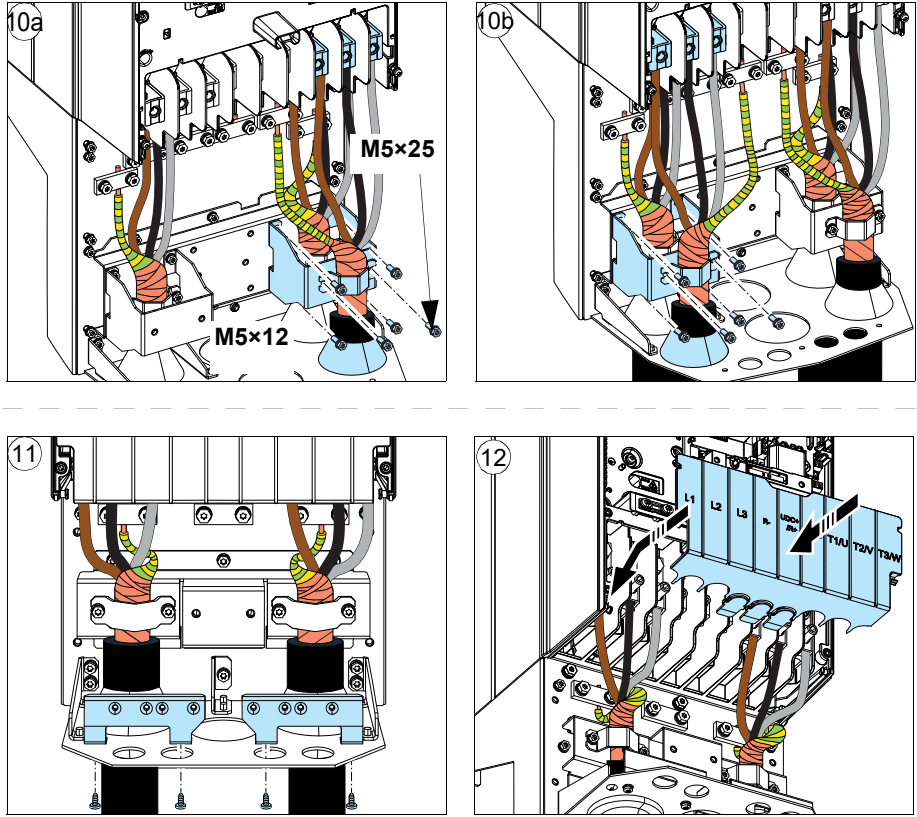
C

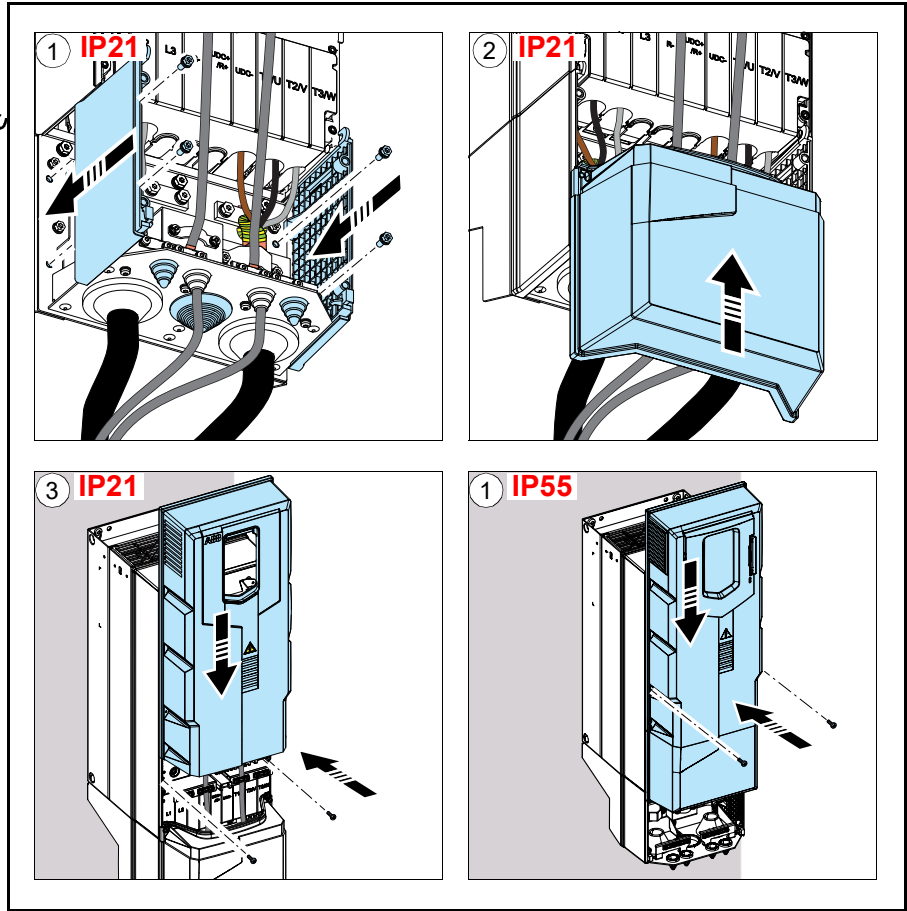




	R6		R7		R8		R9	
	N·m	lbf·ft	N·m	lbf·ft	N·m	lbf·ft	N·m	lbf·ft
L1, L2, L3, T1/U, T2/V, T3/W	30	22	40	30	40	30	70	52
PE	10	7	10	7	10	7	10	7

R8...R9 only





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.

Product training

For information on ABB product training, navigate to 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.

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.

Contact us

www.abb.com/drives

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