ABB general purpose drives
Quick installation and start-up guide
ACSS80-01 drives
Frames R1 to R9
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You can find manuals and other product documents in PDF format on the Internet. See section Document library on the Internet on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

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

![QR Code](image-url)

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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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#### IEC type ACS580

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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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* 130% overload only
** 125% overload only

### UL

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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.
Quick installation guide
ACS580-01 drives
Frames R1 to R4
R1...R4 Quick installation guide

This guide briefly describes how to install the drive. For complete information on installation, see ACS580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000018826 [English]). For start-up instructions, see chapter Quick start-up guide on page 55.

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

See table I on page 7 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 ACS580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000018826 [English]).

Protect the drive and input power cable

See table II on page 8 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 67.

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 67:

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 67.

2. Switch off the power from the drive.

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

Install the cable box

Only for frames IP21, R1….R2 and IP55, R1….R2.

See figures B1 and B2 on page 67.

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 67.

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 18.

**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 18.

**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 19.

<table>
<thead>
<tr>
<th>Frame sizes</th>
<th>EMC filter (EMC)</th>
<th>Ground-to-phase varistor (VAR)</th>
<th>Symmetrically grounded TN systems (TN-S systems)</th>
<th>Corner grounded TN systems</th>
<th>IT systems (ungrounded or high-resistance grounded [&gt;30 ohms])</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1...R3</td>
<td>EMC (1 screw)</td>
<td>Do not disconnect</td>
<td>Disconnect</td>
<td>Disconnect</td>
<td>Disconnect</td>
</tr>
<tr>
<td></td>
<td>- VAR (1 screw)</td>
<td>Do not disconnect</td>
<td>Disconnect</td>
<td>Disconnect</td>
<td></td>
</tr>
<tr>
<td>R4</td>
<td>EMC (2 screws)</td>
<td>Do not disconnect</td>
<td>Frame R4 cannot be used in corner grounded TN systems</td>
<td>Disconnect</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- VAR (1 screw)</td>
<td>Do not disconnect</td>
<td>Frame R4 cannot be used in corner grounded TN systems</td>
<td>Disconnect</td>
<td></td>
</tr>
</tbody>
</table>

Check the table on page 18.
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 67.
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.
Wiring R1...R2

Note: These are instructions for conduit wiring. For cable wiring, see the ACS580 Hardware manual, publication number 3AXD50000018826.

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 in the ACS580 Hardware manual, publication number 3AXD50000018826. If you ignore them, injury or death, or damage to the equipment can occur. Option slot 2 in frames R1...R5 is at UDC potential. You must disconnect power supplies before installing or removing an I/O extension module.

See figure on page 22.

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 27. 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 17.
Power wiring torque table

<table>
<thead>
<tr>
<th>Frame size</th>
<th>R1</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lb-ft</td>
<td>N-m</td>
</tr>
<tr>
<td>T1/U, T2/V, T3/W</td>
<td>0.4</td>
<td>1.2...1.5</td>
</tr>
<tr>
<td>L1, L2, L3</td>
<td>0.4</td>
<td>1.2...1.5</td>
</tr>
<tr>
<td>R+, R-</td>
<td>0.4</td>
<td>1.2...1.5</td>
</tr>
<tr>
<td>PE Ground</td>
<td>1.1</td>
<td>1.5</td>
</tr>
</tbody>
</table>
**Wiring R3**

**Note:** These are instructions for conduit wiring. For cable wiring, see the ACS580 Hardware manual, publication number 3AXD50000018826.

**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 in the ACS580 Hardware manual, publication number 3AXD50000018826. If you ignore them, injury or death, or damage to the equipment can occur. Option slot 2 in frames R1…R5 is at U_PDC potential. You must disconnect power supplies before installing or removing an I/O extension module.

See figure on page 24.

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 27. 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 XS. (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 17.
Wiring R4

**Note:** These are instructions for conduit wiring. For cable wiring, see the ACS580 Hardware manual, publication number 3AXD50000018826.

**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](image)

**WARNING!** If installing modules, obey the instructions in Safety instructions in the ACS580 Hardware manual, publication number 3AXD50000018826. If you ignore them, injury or death, or damage to the equipment can occur. Option slot 2 in frames R1…R5 is at UDC potential. You must disconnect power supplies before installing or removing an I/O extension module.

See figure on page 26.

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 27. 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 17.

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

### Power wiring torque table

| Frame size          | R4 Type 12 |  |
|---------------------|------------|----------------
|                     | lb-ft | N-m |
| T11, T21, T31, W11 | 3.0   | 4.0 |
| T1, T2, L1, L2     | 3.0   | 4.0 |
| UDC+ and UDC-      | 3.0   | 4.0 |
| PE Ground          | 1.1   | 1.5 |
Default I/O connections

Default I/O connections of the ABB Standard macro are shown below.

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

Wire sizes:
- 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

Tightening torques: 0.5…0.6 Nm (0.4 to 0.6 ft·lb)
Install optional modules, if any

See chapter Electrical installation in ACS580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000018826 [English]).

Reinstall cover

See figure J on page 70.

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

For start-up instructions, see chapter Quick start-up guide on page 55.
ABB general purpose drives
Quick installation guide
ACS580-01 drives
Frame R5
This guide briefly describes how to install the drive. For complete information on installation, see ACS580-07 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000018826 [English]). For start-up instructions, see chapter Quick start-up guide on page 55.

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 MYYWRXXX. 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

See table / on page 9 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 ACS580-01 (0.75 to 250 kW, 1.0 to 350 hp) hardware manual (3AXD50000018826 [English]).

Protect the drive and input power cable

See table II on page 9 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 71.

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 71.

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 71.

2. Switch off the power from the drive.

3. IP21, Remove the module cover: Loosen the retaining screws with a screwdriver (3a) and lift the cover from the bottom onwards (3b) and then up (3c).

4. IP21, Remove the box cover: Loosen the retaining screws with a screwdriver (4a) and slide the cover downwards (4b).

5. IP55, Remove the front cover: Loosen the retaining screws with a screwdriver (4a) and lift the cover from the bottom onwards (4b) and then up (4c).

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 34.

  **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 34.

  **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 35.

<table>
<thead>
<tr>
<th>Frame sizes</th>
<th>EMC filter (EMC)</th>
<th>Ground-to-phase varistor (VAR)</th>
<th>Symmetrically grounded TN systems (TN-S systems)</th>
<th>Corner grounded TN systems</th>
<th>IT systems (ungrounded or high-resistance grounded (&gt;30 ohms))</th>
</tr>
</thead>
<tbody>
<tr>
<td>R5</td>
<td>EMC (2 screws)</td>
<td>-</td>
<td>Do not disconnect</td>
<td>Frame R5 cannot</td>
<td>Disconnect</td>
</tr>
<tr>
<td></td>
<td>VAR (1 screw)</td>
<td></td>
<td>Do not disconnect</td>
<td>be used in corner</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>grounded TN systems.</td>
<td></td>
</tr>
</tbody>
</table>

1. Symmetrically grounded TN systems (TN-S systems)
2. Corner grounded TN systems
3. IT systems (ungrounded or high-resistance grounded (>30 ohms))

---

![Diagrams of drive connections](drive_connections.png)
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 71.
3. To disconnect the internal EMC filter, remove the two EMC screws.
4. To disconnect the ground-to-phase varistor, remove the varistor screw.

Wiring R5

Note: These are instructions for conduit wiring. For cable wiring, see the ACS580 Hardware manual, publication number 3AXD50000018826.

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 in the ACS580 Hardware manual, publication number 3AXD50000018826. If you ignore them, injury or death, or damage to the equipment can occur. Option slot 2 in frames R1...R5 is at UDC potential. You must disconnect power supplies before installing or removing an I/O extension module.
See figure on page 37.

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 38. 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 33.

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

Power wiring torque table

<table>
<thead>
<tr>
<th>Frame size</th>
<th>lb-ft</th>
<th>N·m</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1, T2, T3, T3W</td>
<td>4.1</td>
<td>5.6</td>
</tr>
<tr>
<td>L1, L2, L3</td>
<td>4.1</td>
<td>5.6</td>
</tr>
<tr>
<td>UDC+ and UDC-</td>
<td>4.1</td>
<td>5.6</td>
</tr>
<tr>
<td>PE Ground</td>
<td>1.1</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Default I/O connections

Default I/O connections of the ABB Standard macro are shown below.

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>Reference voltage and analog inputs and outputs</td>
</tr>
<tr>
<td>1…10 kohm</td>
<td>X1</td>
</tr>
<tr>
<td>1 V</td>
<td>X1</td>
</tr>
<tr>
<td>1…10 V</td>
<td>X1</td>
</tr>
<tr>
<td>1…10 nA</td>
<td>X1</td>
</tr>
<tr>
<td>1…10 mV</td>
<td>X1</td>
</tr>
<tr>
<td>1…10 mA</td>
<td>X1</td>
</tr>
<tr>
<td>2</td>
<td>AO1</td>
</tr>
<tr>
<td>3</td>
<td>AO2</td>
</tr>
<tr>
<td>4</td>
<td>AO3</td>
</tr>
<tr>
<td>5</td>
<td>AO4</td>
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<td>6</td>
<td>AO5</td>
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<td>AO6</td>
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<td>AO7</td>
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<td>AO8</td>
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<td>AO9</td>
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<td>AO31</td>
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<td>AO32</td>
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<td>35</td>
<td>AO34</td>
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<tr>
<td>36</td>
<td>AO35</td>
</tr>
<tr>
<td>37</td>
<td>AO36</td>
</tr>
<tr>
<td>38</td>
<td>AO37</td>
</tr>
</tbody>
</table>

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

Wire sizes:
- 0.2…2.5 mm² (24…14 AWG): Terminals +24V, DGND, DCOM, B+, A-, DGND, Ext. 24V
- 0.14…1.5 mm² (28…16 AWG): Terminals DI, AI, AO, AGND, RO, STO

Tightening torques: 0.5…0.6 N·m (0.4…0.6 lbf·ft)
Install optional modules, if any

See chapter *Electrical installation in ACS580-01 (0.75 to 250 kW, 1.0 to 350 hp)* hardware manual (3AXD5000000018826 [English]).

Reinstall cover

See figure H on page 74.

1. **IP21, Reinstall the box cover**: Slide the cover upwards (1a) and tighten the retaining screws (1b).

2. **IP21, Reinstall the module cover**: Put the tabs on the inside of the cover top in their counterparts on the housing (2a), press the cover at the bottom (2b) and tighten the retaining screws (2c).

3. **IP55, Reinstall the front cover**: Put the tabs on the inside of the cover top in their counterparts on the housing (3a), press the cover at the bottom (3b) and tighten the retaining screws (3c).

For start-up instructions, see chapter *Quick start-up guide* on page 55.
R6…R9 Quick installation guide

This guide briefly describes how to install the drive. For complete information on installation, see ACS580-01 (0.75 to 250 kW) hardware manual (3AXD50000018826 [English]). For start-up instructions, see chapter Quick start-up guide on page 55.

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.
- 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:

<table>
<thead>
<tr>
<th>YY</th>
<th>WW</th>
<th>Year</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>14, 15, ...</td>
<td>2013, 2014, 2015, ...</td>
<td></td>
</tr>
<tr>
<td>01, 02, 03, ...</td>
<td>for week 1, week 2, week 3, ...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

See table / on page 11 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 ACS580-01 (0.75 to 250 kW) hardware manual (3AXD50000018826 [English]).

Protect the drive and input power cable

See table II on page 11 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 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 B on page 75.

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.

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 46.

  **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 46.
**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 47.

<table>
<thead>
<tr>
<th>Frame sizes</th>
<th>EMC filter (EMC)</th>
<th>Ground-to-phase varistor (VAR)</th>
<th>Symmetrically grounded TN systems (TN-S systems)</th>
<th>Corner grounded TN systems</th>
<th>IT systems (ungrounded or high-resistance grounded [&gt;30 ohms])</th>
</tr>
</thead>
<tbody>
<tr>
<td>R6…R9</td>
<td>-</td>
<td>Do not disconnect</td>
<td>Disconnect</td>
<td>Disconnect</td>
<td>Disconnect</td>
</tr>
</tbody>
</table>

1. Drive PE N L3 L2 L1
2. Drive
3. Drive PE L3 L2 L1

*Note: The diagrams illustrate the connection points for each frame size.*
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 75.
3. To disconnect the internal EMC filter, remove the two EMC screws.
4. To disconnect the ground-to-phase varistor, remove the varistor screw.
Wiring R6…R9

Note: These are instructions for conduit wiring. For cable wiring, see the ACS580 Hardware manual, publication number 3AXD50000018826.

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 49.

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 50. 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 45.
Power wiring torque table

<table>
<thead>
<tr>
<th>Frame size</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
<th>R9</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1, U, T2, T3</td>
<td>lb-ft</td>
<td>N-m</td>
<td>lb-ft</td>
<td>N-m</td>
</tr>
<tr>
<td></td>
<td>22.1</td>
<td>30.5</td>
<td>29.5</td>
<td>30.5</td>
</tr>
<tr>
<td>L1, L2, L3</td>
<td>22.1</td>
<td>30.5</td>
<td>29.5</td>
<td>30.5</td>
</tr>
<tr>
<td>UDC+ and UDC-</td>
<td>22.1</td>
<td>30.5</td>
<td>29.5</td>
<td>30.5</td>
</tr>
<tr>
<td>PE Ground</td>
<td>1.1</td>
<td>1.5</td>
<td>1.1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Note: UDC+ and UDC- terminals are used for external brake chopper units.
Default I/O connections

Default I/O connections of the ABB Standard macro are shown below.

1) All control boards do not have switches S1, S2 and S3. In that case, select voltage or current for inputs AI1 and AI2 and output AO1 with parameters. See the firmware manual.

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

Wire sizes: 0.14…2.5 mm² (26…16 AWG); All terminals

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

1) All control boards do not have switches S1, S2 and S3. In that case, select voltage or current for inputs AI1 and AI2 and output AO1 with parameters. See the firmware manual.
Install optional modules, if any
See chapter Electrical installation in ACS580-01 (0.75 to 250 kW) hardware manual (3AXD50000018826 [English]).

Install side plates and covers
See figure R6…R9 Figures E on page 77.

**IP21**
1. Reinstall the side plates of the cable entry box. Tighten the retaining screws with a 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 screwdriver.

**IP55**
1. Reinstall the module cover. Tighten the two retaining screws with a screwdriver.

For start-up instructions, see chapter Quick start-up guide on page 55.
Quick start-up guide

This guide describes how to start-up the drive using the First start assistant on the assistant control panel.

Before you start

Ensure that the drive has been installed as described in chapter R1…R4 Quick installation guide on page 15, in chapter R5 Quick installation guide page 31 or in chapter R6…R9 Quick installation guide on page 43.

Start-up with the First start assistant on an assistant control panel

<table>
<thead>
<tr>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make sure that the installation work is complete. Make sure that cover of the drive and the cable box, if included, are on place.</td>
</tr>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hints on using the assistant control panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Use keys ( and ) to move the cursor and/or change values depending on the active view.</td>
</tr>
<tr>
<td>Key shows a context sensitive help page.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 – First start assistant guided settings: Language, date and time, and motor nominal values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have the motor name plate data at hand. Power up the drive.</td>
</tr>
</tbody>
</table>
The First start assistant guides you through the first start-up.

The assistant begins automatically. Wait until the control panel enters the view shown on the right. Select the language you want to use by highlighting it (if not already highlighted) and pressing OK.

Note: After you have selected the language, it takes a few minutes for the control panel to wake up.

Select Start set-up and press Next.

Select the localization you want to use and press Next.

Change the units shown on the panel if needed.
- Go to the edit view of a selected row by pressing .
- Scroll the view with and .
Go to the next view by pressing Next.

To select a value in an edit view:
- Use and to select the value.
Press Save to accept the new setting, or press Cancel to go back to the previous view without making changes.
Set the date and time as well as date and time display formats.

- Go to the edit view of a selected row by pressing ( ).
- Scroll the view with ( ) and ( )
- Go to the next view by pressing (Next).

To change a value in an edit view:
- Use ( ) and ( )
- 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.

To give the drive a name that will be shown at the top, press ( ).

If you do not want to change the default name (ACS580), continue straight to the set-up of the motor nominal values by pressing (Next).

For information on editing text, see ACS580 standard control program firmware manual (SAX150000016097 [English]).

Refer to the motor nameplate for the following nominal value settings of the motor. Enter the values exactly as shown on the motor nameplate.

Example of a nameplate of an induction (asynchronous) motor:

<table>
<thead>
<tr>
<th>ABB Motors</th>
</tr>
</thead>
<tbody>
<tr>
<td>3538000016097</td>
</tr>
</tbody>
</table>
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. Motor nominal cosΦ and nominal torque are optional. Press (Next) to continue.

This step is optional, and requires rotating the motor. Do not do this if it could cause any risk, or if the mechanical set-up does not allow it. To do the direction test, select "Spin the motor" and press (Next).

Press Start key on the panel to start the drive. Check the direction of the motor. If it is forward, select "Yes, motor is spinning forward" and press (Next) to continue. If the direction is not forward, select "No, fix direction" and press (Next) to continue.

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).
The first start is now complete and the drive is ready for use. Press (Done) to enter the Home view.

The Home view monitoring the values of the selected signals is shown on the panel.

2 – Additional settings in the Primary settings menu

Make any additional adjustments, for example macro, ramps and limits, starting from the Main menu – press (Menu) to enter the Main menu. Select Primary settings and press (Select) or (Esc). We recommend that you make at least these additional settings:

- Choose a macro or set start, stop and reference values individually
- Ramps
- Limits

With the Primary settings menu, you can also adjust settings related to the motor, PID, fieldbus, advanced functions and clock, region and display. In addition, the menu contains item to reset the panel Home view.

To get more information on the Primary settings menu items, press (Help) to open the help page.
### 2 – Additional settings: Start, stop and reference values

If you do not wish to use a macro, define the settings for start, stop and reference:
- Select Start, stop, reference and press (Select) (or ).
- Adjust the parameters according to your needs. Select a parameter and, depending on the parameter type, press (Edit) or press (Select) (or ).
- When you change the settings, you also change the use of the I/O signals in the drive. Make sure the actual I/O wiring and the use of I/O in the control program match each other. You can check the current I/O use in the I/O menu under the Main menu.
- After making the adjustments, go back to the Primary settings menu by pressing (Back).

### 2 – Additional settings: Ramps (acceleration and deceleration times for the motor)

- Select Ramps and press (Select) (or ).
- Adjust the parameters according to your needs. Select a parameter and press (Edit).
- After making the adjustments, go back to the Primary settings menu by pressing (Back).
2 – Additional settings: Limits

Adjust the parameters according to your needs. Select a parameter and press \( \text{Edit} \). After making the adjustments, go back to the **Primary settings** menu by pressing \( \text{Back} \).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum frequency</td>
<td>0.00 Hz</td>
</tr>
<tr>
<td>Maximum frequency</td>
<td>10.00 Hz</td>
</tr>
<tr>
<td>Maximum current</td>
<td>324 A</td>
</tr>
</tbody>
</table>

Select Limits and press \( \text{Select} \) (or \( \text{Edit} \)).

Adjust the parameters according to your needs. Select a parameter and press \( \text{Edit} \). After making the adjustments, go back to the **Primary settings** menu by pressing \( \text{Back} \).
<table>
<thead>
<tr>
<th>Language</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DA</td>
<td>DE</td>
</tr>
<tr>
<td>ES</td>
<td>FI</td>
</tr>
<tr>
<td>FR</td>
<td>IT</td>
</tr>
<tr>
<td>NL</td>
<td>PL</td>
</tr>
<tr>
<td>PT</td>
<td>RU</td>
</tr>
<tr>
<td>SV</td>
<td>TR</td>
</tr>
<tr>
<td>ZH</td>
<td></td>
</tr>
</tbody>
</table>

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Compliance with the European Machinery Directive 2006/42/EC

Declaration of conformity

EU Declaration of Conformity
(According to Machinery Directive 2006/42/EC)

Manufacturer: ABB Oy, Drives
Address: Hiettalo 13, P.O. Box 184, 00381 Helsinki, Finland.

This declaration of conformity is made by:

EC Certificate of Conformity
Identification No. AC0588-01 (frame sizes R5, R6, R7)

with regard to the following conformity and safety requirements:

EN 60204-1:2014
EN ISO 13850:2016
EN 62061:2015
EN ISO 13497-2:2015
EN ISO 14114-1:2015 + AC: 2018
EN ISO 14114-2:2018

Other used standards:

The products referred in this Declaration of Conformity meet the relevant provisions of the Low Voltage Directive 2014/35/EC and Machinery Directive 2006/42/EC.

Person authorised to complete the technical file:

Name: Risto Myhrinen
Address: P.O. Box 184, FIN-00381 Helsinki, Finland

Helsinki: 31.10.2015

Signed by:

Corin Mihăilescu
VP President
ABB Oy

EC/0000000100
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**B1**

- IP21 R1…R2
- IP21 R3…R4
- IP55 R1…R3
- IP55 R4

**B2**

- R1
- R2
- R3…R4

**B3**

- **ONLY IT AND CORNER-GROUNDED TN SYSTEMS**
- R1…R4
- R1…R3

**C1**

- ACS580-01 R1…R4

See page 17.
R6…R9 Figures A

<table>
<thead>
<tr>
<th></th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
<th>R9</th>
</tr>
</thead>
<tbody>
<tr>
<td>a (mm/in)</td>
<td>571/22.5</td>
<td>650/25.5</td>
<td>701/27.6</td>
<td>718/28.3</td>
</tr>
<tr>
<td>b (mm/in)</td>
<td>531/20.9</td>
<td>583/22.9</td>
<td>658/25.9</td>
<td>658/25.9</td>
</tr>
<tr>
<td>c (mm/in)</td>
<td>213/8.4</td>
<td>245/9.7</td>
<td>263/10.4</td>
<td>345/13.6</td>
</tr>
<tr>
<td>d &gt; (mm/in)</td>
<td>300/11.8</td>
<td>300/11.8</td>
<td>300/11.8</td>
<td>300/11.8</td>
</tr>
<tr>
<td>e &gt; (mm/in)</td>
<td>300/11.8</td>
<td>300/11.8</td>
<td>300/11.8</td>
<td>300/11.8</td>
</tr>
<tr>
<td>kg/lb</td>
<td>IP21</td>
<td>IP21</td>
<td>IP21</td>
<td>IP21</td>
</tr>
<tr>
<td></td>
<td>42/93</td>
<td>54/119</td>
<td>69/152</td>
<td>97/214</td>
</tr>
<tr>
<td></td>
<td>IP55</td>
<td>IP55</td>
<td>IP55</td>
<td>IP55</td>
</tr>
<tr>
<td></td>
<td>43/95</td>
<td>56/124</td>
<td>77/176</td>
<td>100/390</td>
</tr>
</tbody>
</table>

IP21

IP55

IP21

ONLY IT AND CORNER-GROUNDED TN SYSTEMS

See page 46

L1

L2

L3

ACS580

ACS580

EMC

VAR

ACS580

ACS580

EMC

PE

PE

PE

U1-V1, U1-W1, V1-W1

U1-PE, V1-PE, W1-PE

M3~

U1

V1

W1 PE

L1 L2 L3

1000 V DC ≥ 100 mm

U1-V1, U1-W1, V1-W1

U1-PE, V1-PE, W1-PE

6000

ONLY IT AND CORNER-GROUNDED TN SYSTEMS
R6...R9 Figures E
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.