ABB MACHINERY DRIVES

ACS280 Cold-Plate drives

Quick installation and start-up guide

ACS280 manual list

Ecodesign information (EU 2019/1781)

About this document

3AXD50001017743 Rev B
Bilingual 2024-03-14

Original instructions.

3AXD50001017743

Safety instructions

WARNING! Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do electrical installation or maintenance work.

- Do not do work on the drive, motor cable, motor, or control cables when the drive is connected to the input power. Before you start the work, isolate the drive from all dangerous voltage sources and make sure that it is safe to start the work. Always wait for 5 minutes after disconnecting the input power to let the intermediate circuit capacitors discharge.
- Do not do work on the drive when a rotating permanent magnet motor is connected to it. A rotating permanent magnet motor energizes the drive, including its input and output terminals.

Unpack the delivery

Keep the drive in its package until you are ready to install it. After unpacking, protect the drive from dust, debris and moisture.

Make sure that these items are included:

- Drive
- Quick installation and start-up guide
- A set of spare EMC screws

Make sure that there are no signs of damage to the items.

Reform the capacitors

If the drive has not been powered up for a year or more, you must reform the DC link capacitors. The manufacturing date is on the type designation label. Refer to *Capacitor reforming instructions* (*3BFE64059629* [English]).

Select the cables and fuse

- Select the power cables. Obey the local regulations.

  Input power cable: ABB recommends to use symmetrical shielded cable (VFD cable) for the best EMC performance.

  Motor cable: Use symmetrical shielded cable (VFD cable) for the best EMC performance. Symmetrical shielded cable also reduces bearing currents, wear, and stress on motor insulation.

  Power cable types: In IEC installations, use copper or aluminum cables (if permitted). In UL installations, use only copper cables.

  Current rating: max. load current.

  Voltage rating: min. 600 V AC.

  Temperature rating: In IEC installations, select a cable rated for at least 70 °C (158 °F) maximum permissible temperature of conductor in continuous use. In UL installations, select a cable rated for at least 75 °C (167 °F).

  Size: Refer to ACS280 Hardware Manual (*3AXD50001017705* [English]).
- Select the control cables. Use double-shielded twisted-pair cable for analog signals. Use double-shielded or single-shielded cable for the digital, relay and I/O signals. Do not run 24 V and 115/230 V signals in the same cable.
- Protect the drive and input power cable with the correct fuses. Refer to *Fuses and typical power cable sizes*.

Examine the installation area

The drive has a degree of protection of IP00 / UL open type as standard and must be installed into cabinet/enclosure.

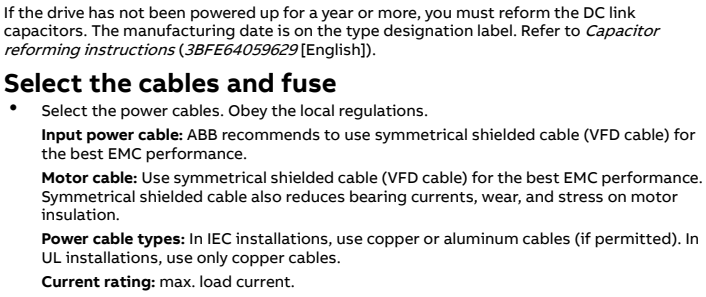
Examine the site where you will install the drive. Make sure that:

- There is sufficient free space around the drive for cooling, maintenance, and operation. For the minimum free space requirements, refer to Free space requirements.
- The ambient conditions meet the requirements. Refer to Ambient conditions.
- The installation surface is strong enough to support the weight of the drive. Refer to Dimensions and weights.
- The installation surface, floor and materials near the drive are not flammable.
- There are no sources of strong magnetic fields such as high-current single-core conductors or contactor coils near the drive. A strong magnetic field can cause interference or inaccuracy in the operation of the drive.
- The installation direction should obey the instruction in hardware manual. (*3AXD50001017705* [English]).

Install the drive

WARNING! ACS280 drive may become damaged if operated without a suitable heat-sink. Do not operate the drive without providing suitable heat-sink capacity for the drive and application requirement.

- **ACS280 must be mounted onto a suitable flat metallic surface with sufficiently low thermal resistance to allow dissipation of the heat produced.** For detailed information, please refer to the *Planning the cooling of the drive* in ACS280 Hardware Manual (*3AXD50001017705* [English]).



1. Make marks onto the surface for the mounting holes. Refer to Dimensions and weights. Download the mounting template on *library.abb.com*.
2. Drill the holes for the mounting screws. If necessary, install suitable plugs or anchors into the holes.
3. **Apply the thermal compound onto the cold-plate surface of the drive. About how to properly apply the thermal compound, refer to** ACS280 Hardware Manual (*3AXD50001017705* [English]).
4. Put the drive onto the mounting holes.
5. Tighten the mounting screws.

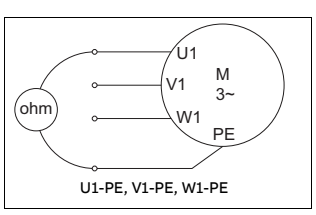
Measure the insulation resistance

Drive: Do not do voltage tolerance or insulation resistance tests on the drive, because this can cause damage to the drive.

Input power cable: Before you connect the input power cable, measure the insulation of the input power cable. Obey the local regulations.

Motor and motor cable:

1. Make sure that the motor cable is connected to the motor and disconnected from the drive output terminals T1/U, T2/V and T3/W.
2. Use a voltage of 1000 V DC to measure the insulation resistance between each phase conductor and the protective earth conductor. The insulation resistance of an ABB motor must be more than 100 Mohm (at 25 °C [77 °F]). For the insulation resistance of other motors, refer to the manufacturer's documentation.
   Moisture in the motor decreases the insulation resistance. If you think that there is moisture in the motor, dry the motor and do the measurement again.



U1-PE, V1-PE, W1-PE

Make sure that the drive is compatible with the grounding system

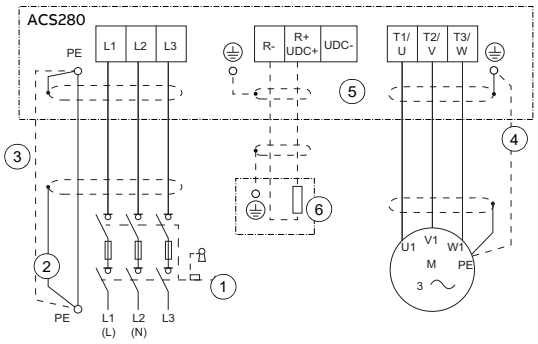
You can connect all drive types to a symmetrically grounded TN-S system (center-grounded wye). The drive is delivered with the metal EMC and VAR screws installed. There are also spare plastic EMC/VAR screw included in drive delivery. The table shows when to use the metal EMC/VAR screw (connect the internal EMC filter) or plastic EMC/VAR screw(disconnect the internal EMC filter).

Screw label	Grounding systems		
	Symmetrically grounded TN-S systems (center-grounded wye)	Corner-grounded delta, midpoint-grounded delta and TT systems	IT systems (ungrounded or high-resistance grounded)
EMC	Metal	Plastic	Plastic
VAR	Metal	Metal	Plastic

Note: Not all ACS280 drives have the EMC/VAR screw, check hardware manuals for details.

Connect the power cables

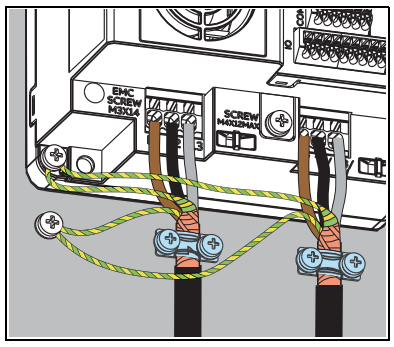
Connection diagram (shielded cables)



1. Disconnecting device.
2. Two protective earth (ground) conductors. Drive safety standard IEC/EN61800-5-1 requires two PE conductors, if the cross-sectional area of the PE conductor is less than 10 mm^2 Cu or 16 mm^2 Al. For example, you can use the cable shield in addition to the fourth conductor.
3. Use a separate grounding cable or a cable with a separate PE conductor for the line side, if the conductivity of the fourth conductor or shield does not meet the requirements for the PE conductor.
4. Use a separate grounding cable for the motor side, if the conductivity of the shield is not sufficient, or if there is no symmetrically constructed PE conductor in the cable.
5. Do the 360-degree grounding of the cable shield for the motor cable and brake resistor cable outside the drive and as close to the power terminals as possible. It is also recommended for the input power cable.
6. Brake resistor and resistor cable (optional).

Connection procedure (shielded cables)

For the tightening torques, refer to ACS280 Hardware Manual (*3AXD50001017705* [English]).

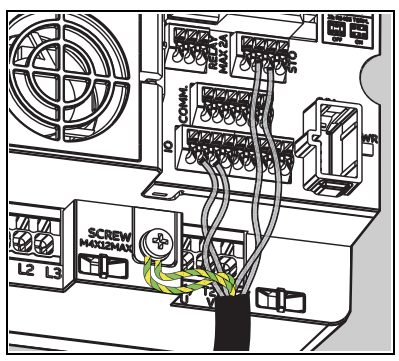


1. Strip the motor cable.
2. Twist the motor cable shield into a bundle, mark it and connect it to the grounding screw and ground the shield under the grounding clamp outside the drive close to the terminals.
3. Connect the phase conductors of the motor cable to terminals T1/U, T2/V and T3/W.
4. If you use a brake resistor, connect the brake resistor cable to terminals R- and UDC+. Use a shielded cable and ground the shield under the grounding clamp outside the drive close to the terminals.
5. Strip the input power cable.
6. If the input power cable has a shield, ground the shield under the grounding clamp outside the drive close to the terminals. Then twist the shield into a bundle, mark it and connect it to the grounding terminal.
7. Connect the PE conductor of the input power cable to the grounding terminal. If necessary, use a second PE conductor, connect to a second PE connection point which must be well conducted with the drive's cold plate and as close to the drive as possible.
8. In 3-phase drives, connect the phase conductors of the input power cable to terminals L1, L2 and L3. In 1-phase drives, connect the phase and neutral conductors to terminals L and N.
9. Mechanically attach the cables on the outside of the drive.

Connect the control cables

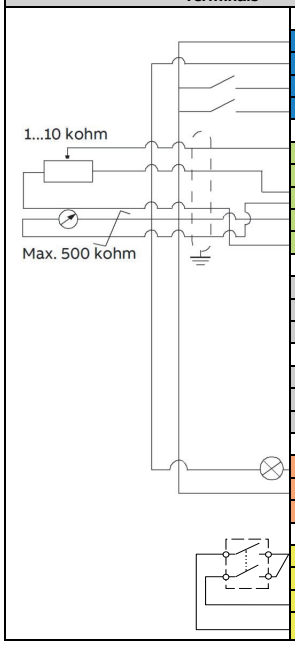
Connection procedure

Do the connections according to your control requirements. Keep the signal wire pairs twisted as near to the terminals as possible to prevent inductive coupling.



1. Strip a part of the outer shield of the control cable for grounding.
2. Use a screw to connect the outer shield to the grounding tab.
3. Strip the control cable conductors.
4. Connect the conductors to the correct control terminals. Insert the conductor into a push-in terminal. To release, pull the conductor with pushing the open/close button all the way down firmly with a flathead screwdriver.
5. Mechanically attach the control cables on the outside of the drive.

Default I/O connections (ABB standard macro)



Terminals		Descriptions
Digital I/O connections		
3	24 V	Aux. +24 V DC, max 200 mA
4	DGND	Aux. voltage output common
1	DI1	Stop (0) / Start (1)
2	DI2	Forward (0) / Reverse (1)
Analog I/O		
5	AI1	Speed reference (0…10V)
6	AI2	Not used
9	GND	Analog output circuit common
8	AO1/DO1	AO: Output frequency (0…10V)
7	10V	Ref. voltage +10 V DC
CANopen protocal		
10	CAN-H	Embedded CANopen (CAN)
11	CAN-L	
12	GND	
EIA-485 Modbus RTU		
13	A-	Embedded Modbus RTU (EIA-485)
14	B+	
15	GND	
Relay output		
16	RO NC	No fault [Fault (-1)]
17	RO COM	
18	RO NO	
Safe torque off (STO)		
19	S+	Safe torque off function (STO). Connected at factory. Drive starts only when both circuits are closed."
20	SGND	
21	S1	
22	S2	

For detailed information, please refer to *ABB Standard Marco* in ACS280 Firmware Manual (*3AXD50001017729* [English]).

Ratings

ACS280-04...	Input current		Output ratings								
	No choke	With choke	Max. current	Nominal use		Light-duty use			Heavy-duty use		
	I_1	I_1	I_{max}	I_2	P_N	I_{Ld}	P_{Ld}		I_{Hd}	P_{Hd}	
	A	A	A	A	kW	A	kW	hp	A	kW	hp
1-phase U_N = 230 V (range 208 … 240 V)											
03A7-1	6.9	4.8	4.3	3.7	0.55	3.5	0.55	0.75	2.4	0.37	0.5
06A9-1	12.6	9.2	8.1	6.9	1.1	6.6	1.1	1.5	4.5	0.75	1
09A8-1	21.8	17	13.5	9.8	2.2	9.3	2.2	2	7.5	1.5	2
12A2-1	23.9	21.1	17.6	12.2	3	11.6	3	3	9.8	2.2	3
3-phase U_N = 230 V (range 208… 240 V)											
03A7-2	4.5	3.7	4.3	3.7	0.55	3.5	0.55	0.75	2.4	0.37	0.5
06A9-2	7.1	6.9	8.1	6.9	1.1	6.6	1.1	1.5	4.5	0.75	1
09A8-2	12.1	9.8	13.3	9.8	2.2	9.3	2.2	3	7.4	1.5	2
12A2-2	16.2	12.2	17.6	12.2	3	11.6	3	3	9.8	2.2	3
17A5-2	21.2	17.5	22	17.5	4	16.7	4	5	12.2	3	3
3-phase U_N = 400 V (range 380 … 415 V)											
03A3-4	4.6	2.5	4.3	3.3	1.1	3.0	1.1	-	2.4	0.75	-
05A6-4	9	4.6	7.2	5.6	2.2	4.8	2.2	-	4	1.5	-
07A2-4	12	6	10.1	7.2	3	6	3	-	5.6	2.2	-
09A4-4	13	8	13	9.4	4	7.6	4	-	7.2	3	-
12A6-4	17.4	12.6	16.9	12.6	5.5	11	5.5	-	9.4	4	-
3-phase U_N = 460 V (range 440 … 480 V)											
03A3-4	3.5	2.1	4.3	-	-	3.0	-	1.5	2.1	-	1
05A6-4	6.9	3.8	7.2	-	-	4.7	-	3	3.4	-	2
07A2-4	9.2	5	10.1	-	-	6.0	-	3	4.8	-	3
09A4-4	10.3	6.7	13	-	-	7.6	-	5	6.3	-	3
12A6-4	14.8	11	16.9	-	-	11	-	7.5	7.6	-	5

Fuses and typical power cable sizes

For detailed information, please refer to the *Technical Data* in ACS280 Hardware Manual (*3AXD50001017705* [English]).

Terminal data for the power cables

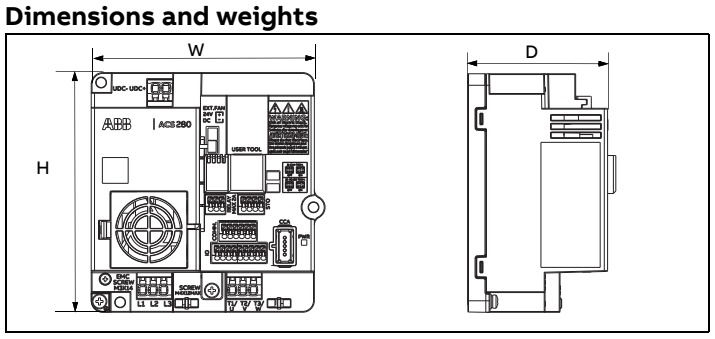
For detailed information, please refer to the *Technical Data* in ACS280 Hardware Manual (*3AXD50001017705* [English]).

Free space requirements

Frame size	Front		Top		Other sides	
	mm	in	mm	in	mm	in
R1	20	0.8	20	0.8	0	0
R2	30	1.2	30	1.2	0	0

For detailed information, please refer to the *Mechanical installation* in ACS280 Hardware Manual (*3AXD50001017705* [English]).

Dimensions and weights



ACS 280	Dimensions												Weights	
	H		W		D		M1		M2		M3			
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
R1	145	5.71	135	5.31	90	3.54	129	5.06	133	5.24	76	2.97	0.95	2.1
R2	196	7.72	141	5.55	90	3.54	134	5.26	182	7.17	90	3.54	1.33	2.94

Ambient conditions

Requirement	During operation (installed for stationary use)
Installation site altitude	0 … 1000 m above sea level without derating. 1000 … 2000 m above sea level with derating.
Surrounding air temperature	-10... +50 °C (14 … 122 °F) without derating. No frost allowed.
Relative humidity	<95% (IEC 60068-2-78) without condensation
Contamination levels	No conductive dust permitted.
Shock or free fall	Not permitted

Markings

The applicable markings are shown on the type label of the product.

CE UR UKCA EIP green WEEE TÜV Nord

Safe torque off (STO)

The drive has a Safe torque off function (STO) in accordance with IEC/EN 61800-5-2. It can be used, for example, as the final actuator device of safety circuits that stop the drive in case of danger (such as an emergency stop circuit).

When activated, the STO function disables the control voltage of the power semiconductors of the drive output stage, thus preventing the drive from generating the torque required to rotate the motor. The control program generates an indication as defined by parameter *31.22*. If the motor is running when Safe torque off is activated, it coasts to a stop. Closing the activation switch deactivates the STO. Any faults generated must be reset before restarting.

The STO function has a redundant architecture, that is, both channels must be used in the safety function implementation. The safety data given is calculated for redundant use, and does not apply if both channels are not used.

WARNING! The STO function does not disconnect the voltage from the main and auxiliary circuits of the drive.

Notes:

- If stopping by coasting is not acceptable, stop the drive and machinery using the appropriate stop mode before activating the STO.
- The STO function overrides all other functions of the drive.

Wiring

The safety contacts must open/close within 200 ms of each other.

Double-shielded twisted-pair cable is recommended for the connection. The maximum length of the cabling between the switch and the drive control unit is 300 m (1000 ft). Ground the shield of the cable at the control unit only.

Validation

To ensure the safe operation of a safety function, a validation test is required. The test must be carried out by a competent person with adequate expertise and knowledge of the safety function. The test procedures and report must be documented and signed by this person. Validation instructions of the STO function can be found in the drive hardware manual.

Technical data

- Minimum voltage at S1 and S2 to be interpreted as "1": 13 V DC
- STO reaction time (shortest detectable break): 1 ms
- STO response time: 5 ms (typical), 10 ms (maximum)
- Fault detection time: Channels in different states for longer than 200 ms
- Fault reaction time: Fault detection time + 10 ms
- STO fault indication (parameter *31.22*) delay: < 500 ms
- STO warning indication (parameter *31.22*) delay: < 1000 ms
- Safety integrity level (EN 62061): SIL 3
- Performance level (EN ISO 13849-1): PL e

The drive STO is a type A safety component as defined in IEC 61508-2.

For the full safety data, exact failure rates and failure modes of the STO function, refer to the drive hardware manual.

For detailed information about STO, please refer to *Safe Torque Off* chapter in ACS280 Hardware Manual (*3AXD50001017705* [English]).

Declaration of conformity

EU Declaration of Conformity

Machinery Directive 2006/42/EC

Declaration of Conformity

Supply of Machinery (Safety) Regulations 2008

ABB 机械类传动

ACS280 冷板变频器
快速安装和启动指导

ACS280手册清单

生态设计信息 (EU 2019/1781)

本手册信息

3AXD50001017743 版本 B
中英双语 2024-03-14

3AXD50001017743

安全须知

警告！ 请遵守安全须知，以防止人身伤亡或设备损坏。只有具备资质的电气工程师才允许对变频器进行安装或维护工作。

- 当变频器连接到输入电源时，不得在变频器、电机电缆、电机或控制电缆上进行任何操作。开始工作前，将变频器与所有危险电压源隔离，以确保安全性。断开输入电源后需等待 5 分钟，让中间电路的电容完成放电。
- 当旋转的永磁电机与变频器连接时，切勿对变频器执行任何操作。一台旋转的永磁电机将向变频器供电，包括其输入和输出端子。

拆箱

应将变频器保存在包装中，直到准备安装时再拆除包装。包装拆除后，须注意防止灰尘、碎屑和湿气侵入变频器。确保下列物品均包括在内：

- 变频器
- 快速安装和启动指南

确保物品没有损坏迹象。

电容器重整

如果变频器未通电一年或更长时间，则必须重整直流线路电容器。生产日期见型号标签上。参见《电容器重整说明》(3BFE64059629 [英文])。

选择电缆和保险丝

- 选择电源线。遵循当地规范。

  输入电源线： ABB 建议使用对称的屏蔽电缆（变频器电缆）以获得最佳的EMC性能。

  电机电缆： 使用对称的屏蔽电缆（变频器电缆）以获得最佳的 EMC 性能。对称的屏蔽电缆还可以减低轴承电流、减少磨损和电机绝缘上的应力。

  电源线类型： 在 IEC 安装中，应使用铜线或铝线（如允许）。在 UL 安装中，只能使用铜线。

  额定电流：最大负载电流。

  额定电压：最小 600V AC。

  额定温度： 在 IEC 安装中，如长期使用，则选择电缆的额定最高容许温度至少必须为 70°C（158°F）。UL 安装中，请选择额定温度至少为 75°C（167°F）的电缆。

  尺寸：典型的电缆尺寸和最大电缆尺寸请参见 ACS280 硬件手册技术数据一章 。
- 选择控制电缆。对模拟信号应使用双绞双屏蔽线。使用双屏蔽或单屏蔽电缆传输数字、中继和 I/O 信号。不得用同一根电缆承担24V 和 115/230V 信号。
- 使用正确的的熔断器保护变频器和输入电源线。请参见 ACS280 硬件手册 *熔断器和典型电缆尺寸*。

检查安装区域

本变频器必须安装在机柜 / 机箱中，防护等级符合 IP00/UL open type。

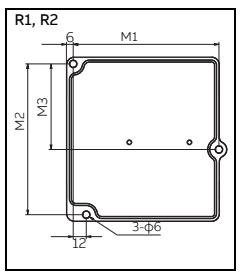
检查安装变频器的地点。确保：

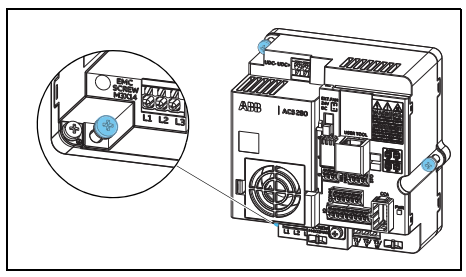
- 安装现场通风良好，热空气不会再循环。
- 变频器周围要有足够的自由空间，以便于进行冷却、维护和操作。如要了解最小空间要求，请参见 散热空间要求。
- 环境条件应符合要求。请参见 环境条件。
- 安装表面坚固程度应足以支撑变频器的重量。请参见 尺寸和重量。
- 安装表面、地板和变频器附近的材料均不易燃。
- 变频器附近不得有强磁场源，如大电流的单芯导体或接触器线圈。强磁场会使变频器在运行中受到干扰或产生误差。
- 变频器安装方向应遵循 ACS280 硬件手册的说明 (3AXD50001017712 [中文])。

安装变频器

警告！ ACS280 变频器如果没有合适的散热系统，可能会导致设备损坏。在没有为传动单元和应用设备提供合适的散热容量之前，不要对传动单元进行任何操作。

- **ACS280 变频器必须安装在合适的金属平面，具备足够低的热阻，以使所产生的热量得以散失。** 详细信息请参见 ACS280 硬件手册 (3AXD50001017712 [中文])。





1. 在安装开孔的表面做好记号，请参见尺寸和重量 或从*library.abb.com*下载安装模板。
2. 为安装螺钉钻孔。如必要，在孔中装入合适的塞子或锚柱。
3. **将导热膏涂在驱动器的冷板表面。关于如何正确使用导热胶，请参考硬件手册** (3AXD50001017712 [中文])。
4. 将变频器放置到安装孔上。
5. 拧紧安装螺钉。

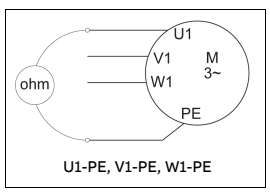
测量绝缘阻抗

变频器： 切勿在变频器上进行耐压或绝缘阻抗测试，这些都可能会导致损坏变频器。

输入电源线： 连接输入电源线前，测量输入电源线路的绝缘。遵循当地规范。

电机和电机电缆：

1. 确保电机电缆已连接到电机，并与变频器输出端子 T1/U、T2/V 和 T3/W断开。
2. 使用1000 VDC的电压来测量每相导体和保护性接地导体之间的绝缘阻抗。ABB 电机的绝缘电阻必须超过 100 Mohm（25°C [77 °F] 时）。对于其他电机的绝缘电阻，请参见其制造商提供的文档。电机内的湿气会降低绝缘阻抗。如果您认为电机内有湿气，请将电机干燥后再重新测量。



U1-PE, V1-PE, W1-PE

确保变频器与接地系统兼容

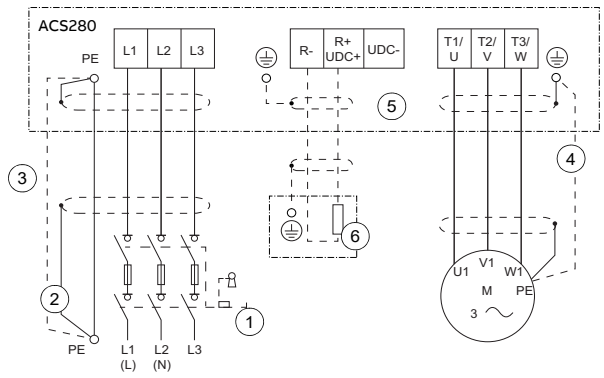
可将所有型号变频器连接到对称接地的 TN-S 系统（三相中性点接地）。变频器交付时已安装了金属 EMC 和 VAR 螺钉。还随机配备塑料 EMC/VAR 螺钉。金属型 EMC/VAR 螺钉 (连接内部 EMC 滤波器) 和塑料型 EMC / VAR 螺钉(断开内部 EMC 滤波器的连接) 的使用方法见下表。

螺钉标签	接地系统		
	对称接地的 TN-S 系统（三相中性点接地）	角接地系统，三角形中点接地和 TT 系统	IT 系统 （不接地或高阻抗接地系统）
EMC	金属	塑料	塑料
VAR	金属	金属	塑料

注意: 不是所有型号都有 EMC/VAR 螺钉，请参见 ACS280 冷板变频器硬件手册 (3AXD50001017712 [中文])。

连接动力电缆

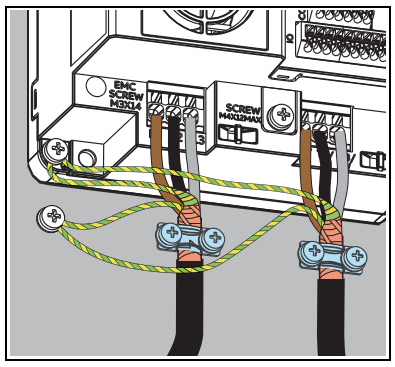
接线图（屏蔽电缆）



1. 断路装置。
2. 两条保护性接地导线。如果 PE 导线是横截面积小于 10 mm^2 铜线或 16 mm^2 的铝线，则变频器安全标准 IEC/EN 61800-5-1 要求要有两条 PE 导线。例如，可以在第四根导线之外使用单独的屏蔽电缆。
3. 如果第四根导线屏蔽层的导电能力不能满足保护接地导线的要求，则请使用单独的接地电缆或带有单独保护接地导体的电缆。
4. 如果屏蔽层的导电性不够，或者电缆中没有对称结构的保护接地导线，请为电机侧使用单独的接地电缆。
5. 电机电缆和制动电阻电缆需要对电缆屏蔽层在变频器外部进行360度接地，接地点应尽可能靠近接线端子，建议也对输入电源线使用此类接地。
6. 制动电阻器和电阻电缆（可选）。

接线步骤 （屏蔽电缆）

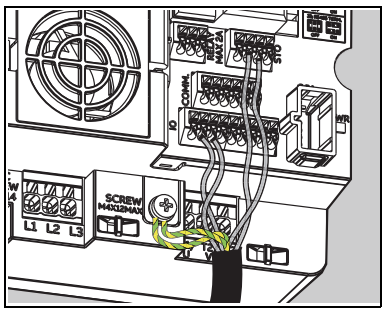
紧固力矩请参见动力电缆的端子数据。



1. 将电机电缆屏蔽层固定到接地螺钉。
2. 将电机电缆屏蔽层扭成一束，标记并连接到接地端子，并将屏蔽层在变频器外部，靠近端子的位置环接接地。
3. 将电机电缆的相线连接到端子 T1/U、T2/V 和 T3/W。
4. 如果使用制动电阻器，请将制动电阻电缆连接到端子 R- 和 UDC+。使用屏蔽电缆，并在传动外的接地螺钉将屏蔽层接地。
5. 剥制输入动力电缆。
6. 如果输入电源线有屏蔽层，则在传动外的接地螺钉将屏蔽层接地。将屏蔽层拧成一束，标记并连接到接地端子。
7. 将输入电源线的保护接地(PE)导线连接到接地端子。如必要，可使用第二根PE 导线, 连接到第二个PE连接点，该连接点必须与变频器的冷板良好导电，并尽可能靠近。
8. 在 3 相变频器中，将输入电源线的相导线连接到 L1、L2 和 L3 端子。在单相变频器中，将相导线和中性导线连接到 L和 N 端子。
9. 在变频器的外侧，以机械方式固定电缆。

连接控制电缆

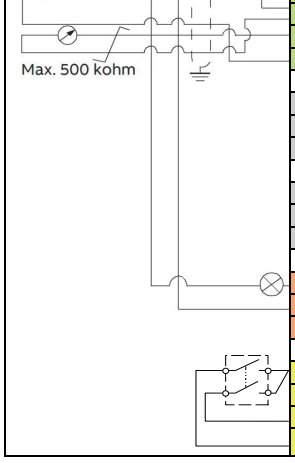
接线步骤



按照您的控制需求来进行接线。将信号线绞合在尽可能靠近端子处，以防电感耦合。

1. 剥开控制电缆的外屏蔽层的一部分，用于接地。
2. 使用螺钉将外屏蔽层接地。
3. 剥制控制电缆导线。
4. 将导线连接到正确的控制端子。将导线插入推入式端子；拔出导线时，请用平头螺丝刀向下按压开/关按钮。
5. 在传动的外侧，以机械方式固定控制电缆。

默认I/O连接（ABB标准宏）



端子		描述
数字I/O		
3	24 V	辅助+24 V DC，最大200 mA
4	DGND	辅助电压输出公共端
1	DI1	停止（0）/启动（1）
2	DI2	正向（0）/反向（1）
模拟 I/O		
5	AI1	速度给定值（0至10V）
6	AI2	未使用
9	GND	模拟输出电路公共端
8	AO1/DO1	模拟输出：输出频率 (0...10V)
7	10V	给定电压 +10 V DC
CANopen 协议		
10	CAN-H	内置 CANopen (CAN)
11	CAN-L	
12	GND	
EIA-485 Modbus RTU		
13	A-	内置 Modbus RTU (EIA-485)
14	B+	
15	GND	
继电器输出		
16	RO NC	无故障 [Fault (-1)]
17	RO COM	
18	RO NO	
安全转矩取消 (STO)		
19	S+	安全转矩取消（STO）。两个电路都必须闭合后方可启动变频器。该图显示了通过安全触点的安全电路的简化连接。如果不使用 STO，则让工厂安装的跳线留在原位。
20	SGND	
21	S1	
22	S2	

更多信息，请参见 ACS280 固件手册 *ABB 标准宏* 一章 (3AXD50001017736 [中文])。

额定值

ACS280-04...	输入电流		输出额定值								
	无电抗器	带电抗器	最大输出电流	额定应用		轻载应用			重载应用		
	I_1	I_1	I_{max}	I_2	P_N	I_{Ld}	P_{Ld}		I_{Hd}	P_{Hd}	
	A	A	A	A	kW	A	kW	hp	A	kW	hp
1-phase U_N = 230 V (范围 208 ... 240 V)											
03A7-1	6.9	4.8	4.3	3.7	0.55	3.5	0.55	0.75	2.4	0.37	0.5
06A9-1	12.6	9.2	8.1	6.9	1.1	6.6	1.1	1.5	4.5	0.75	1
09A8-1	21.8	17	13.5	9.8	2.2	9.3	2.2	2	7.5	1.5	2
12A2-1	23.9	21.1	17.6	12.2	3	11.6	3	3	9.8	2.2	3
3-phase U_N = 230 V (范围 208 ... 240 V)											
03A7-2	4.5	3.7	4.3	3.7	0.55	3.5	0.55	0.75	2.4	0.37	0.5
06A9-2	7.1	6.9	8.1	6.9	1.1	6.6	1.1	1.5	4.5	0.75	1
09A8-2	12.1	9.8	13.3	9.8	2.2	9.3	2.2	3	7.4	1.5	2
12A2-2	16.2	12.2	17.6	12.2	3	11.6	3	3	9.8	2.2	3
17A5-2	21.2	17.5	22	17.5	4	16.7	4	5	12.2	3	3
3-phase U_N = 400 V (范围 380 ... 415 V)											
03A3-4	4.6	2.5	4.3	3.3	1.1	3.0	1.1	-	2.4	0.75	-
05A6-4	9	4.6	7.2	5.6	2.2	4.8	2.2	-	4	1.5	-
07A2-4	12	6	10.1	7.2	3	6	3	-	5.6	2.2	-
09A4-4	13	8	13	9.4	4	7.6	4	-	7.2	3	-
12A6-4	17.4	12.6	16.9	12.6	5.5	11	5.5	-	9.4	4	-
3-phase U_N = 460 V (范围 440 ... 480 V)											
03A3-4	3.5	2.1	4.3	-	-	3.0	-	1.5	2.1	-	1
05A6-4	6.9	3.8	7.2	-	-	4.7	-	3	3.4	-	2
07A2-4	9.2	5	10.1	-	-	6.0	-	3	4.8	-	3
09A4-4	10.3	6.7	13	-	-	7.6	-	5	6.3	-	3
12A6-4	14.8	11	16.9	-	-	11	-	7.5	7.6	-	5

动力电缆的端子数据

有关动力电缆端子的详细数据，请参见 ACS280 冷板变频器硬件手册 *技术数据* 一章 (3AXD50001017712 [中文])。

熔断器和典型电缆尺寸

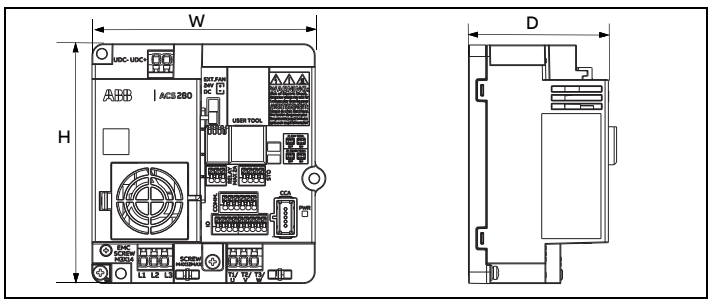
有熔断器和典型电缆尺寸的数据，请参见 ACS280 冷板变频器硬件手册 *技术数据* 一章 (3AXD50001017712 [中文])。

散热空间要求

外形尺寸	前方		上方		其它侧	
	mm	in	mm	in	mm	in
R1	20	0.8	20	0.8	0	0
R2	30	1.2	30	1.2	0	0

有关详细的安装要求，请参见 ACS280 冷板变频器硬件手册 *机械安装* 一章 (3AXD50001017712 [中文])。

尺寸和重量



外形尺寸	尺寸												重量	
	H		W		D		M1		M2		M3			
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
R1	145	5.71	135	5.31	90	3.54	129	5.06	133	5.24	76	2.97	0.95	2.1
R2	196	7.72	141	5.55	90	3.54	134	5.26	182	7.17	90	3.54	1.33	2.94

环境条件

要求	运行时 （固定安装）
安装地海拔	海拔 0 ... 1000 米以上无降容。 海拔 1000 ... 2000 米有降容。
环境温度	-10... +50 °C (14 ... 122 °F) 无降容。 无凝露。 降容信息参见变频器硬件手册 (3AXD50001017712 [中文])。
相对湿度	<95% (IEC 60068-2-78)，无凝露。
防污等级	不允许有导电粉尘
冲击或自动下落	不允许

标志

适用的标志显示在产品的型号标签上。

CE　UR　UKCA　EIP green　WEEE　TÜV Nord

安全转矩取消（STO）

变频器具有符合 IEC/EN 61800-5-2 标准的安全转矩取消功能（STO）。例如，可以作为安全电路的最终执行装置，在发生危险时停止变频器（如紧急停止电路）。

STO 功能激活时，可使变频器输出级的功率半导体的控制电压失效，这样可防止变频器产生使电机旋转的转矩。控制程序产生一个指示，该指示由参数*31.22* 定义。如果安全转矩取消功能激活时电机正在运行，则电机自由停机。关闭激活开关，停用 STO。任何产生的故障必须在重新启动前复位。

STO 功能采用冗余架构，即在安全功能实施中必须使用两个通道。本手册给出的安全数据是根据冗余应用计算的，如果不使用两个通道，这些安全数据就不适用。

警告！ STO 功能不会断开变频器主电路和辅助电路供电。

注意：

- 如果不接受自由停止方式，则在激活 STO 功能之前用合适的停止模式停止变频器和设备。
- STO 功能优先级高于变频器的所有其他功能。

接线

安全触点必须在 200 毫秒内相互打开/关闭。

推荐使用双屏蔽双绞线电缆进行连接。开关和变频器控制单元之间的电缆最大长度为 300 米（1000 英尺）。

仅在控制单元处将电缆的屏蔽层接地。

验证

为了确保安全转矩取消功能的安全运行，需要进行验证测试。该测试必须由具有足够专业知识和安全功能知识的合格人员进行。测试程序和报告必须形成文件并由此人签字。STO 功能的验证说明可以在变频器硬件手册中找到。

技术数据

- S1 和 S2 处的最小电压至少为DC 13 V时方可为 1。
- STO 反应时间（最短可检测间隔）：1 ms
- STO 响应时间：5 ms (通常), 10 ms (最大)
- 故障检测时间：通道处于不同的状态超过 200 ms
- 故障反应时间：故障检测时间 + 10 ms
- STO 故障显示（参数 *31.22* ）延迟：< 500 ms
- STO 警告显示（参数 *31.22* ）延迟：< 1000 ms
- 安全完整性等级（EN 62061）：SIL3
- 性能等级（EN ISO 13849-1）：PLe

变频器 STO 是IEC 61508-2 中定义的 A 型安全元件。如要了解 STO 功能的全部安全数据、确切的故障率和故障模式，请参见变频器硬件手册。

更多有关 STO 的详细信息请参见 ACS280 冷板变频器硬件手册 *安全转矩取消* 一章 (3AXD50001017712 [中文])。

符合性声明

ABB

EU Declaration of Conformity

Machinery Directive 2006/42/EC

We
Manufacturer: ABB Beijing Drive Systems Co., Ltd.
Address: No.1, Block D, A-10 Jiuxianqiao Beilu, Chaoyang District, Beijing 100015, P.R. China.
Phone: +86 010 58217788
declare under our sole responsibility that the following frequency converters:

Model ACS280, followed by -04, followed by S or N, followed by -03A3, -03A7, -05A6, -06A9, -07A2, -09A4, -09A8, -12A2, -12A6, -17A5, followed by -1, -2, or -4.

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

The following harmonized standards have been applied:

EN 61800-5-2:2007	Adjustable speed electrical power drive systems – Part 5-2: Safety requirements - Functional
EN IEC 62061:2021	Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 13849-1:2023	Safety of machinery – Safety-related parts of control systems. Part 1: General principles for design
EN ISO 13849-2:2012	Safety of machinery – Safety-related parts of the control systems. Part 2: Validation
EN 60204-1:2018	Safety of machinery – Electrical equipment of machines – Part 1: General requirements

The following other standards have been applied:

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

The products referred in this Declaration of conformity fulfil the relevant provisions of other European Union Directives which are notified in Single EU Declaration of conformity 3AXD10001912494.

ABB

Authorized to compile the technical file: ABB Oy, Hiomotie 13, 00380 Helsinki, Finland

Beijing, 19 Jan 2024
Signed for and on behalf of:

Yu Wang
Local Division Manager
ABB Beijing Drive Systems Co., Ltd.

XuMing Wang
Product Engineering and Quality Manager
ABB Beijing Drive Systems Co., Ltd.

ABB

UK CA

Declaration of Conformity

Supply of Machinery (Safety) Regulations 2008

We
Manufacturer: ABB Beijing Drive Systems Co., Ltd.
Address: No.1, Block D, A-10 Jiuxianqiao Beilu, Chaoyang District, Beijing 100015, P.R. China.
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with regard to the safety function
Safe torque-off
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The following designated standards have been applied:

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EN IEC 62061:2021	Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems
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EN ISO 13849-2:2012	Safety of machinery – Safety-related parts of the control systems. Part 2: Validation
EN 60204-1:2018	Safety of machinery – Electrical equipment of machines – Part 1: General requirements

The following other standards have been applied:

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

ABB

The products referred in this declaration of conformity fulfil the relevant provisions of other UK statutory requirements, which are notified in a single declaration of conformity 3AXD10001912504.

Authorized to compile the technical file:
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Beijing, 19 Jan 2024
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