

ABB 水应用变频器

# ACQ580-04 变频器模块

## 快速安装指导



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# 相关手册列表

安全须知	代码(英文)	代码(中文)
变频器/变流器/逆变器安全须知	3AXD50000037978	
<hr/>		
变频器硬件手册和指导		
ACQ580-04 变频器模块 (200 至 500 kW) 硬件手册	3AXD50000048677	
ACQ580-04 变频器模块 (200 to 500 kW) 快速安装指导	3AXD50000048678	
ACX-AP-x 助手型控制盘用户手册	3AUA0000085685	3AXD50000022895
<hr/>		
变频器固件手册		
ACQ580 泵控制程序固件手册	3AXD50000035867	3ABD00045443
ACQ580 泵控制程序快速启动指导	3AXD50000048773	
<hr/>		
选件手册和指导		
DPMP-02/03 控制盘安装平台安装指导	3AUA0000136205	
CCA-01 通讯适配器快速指导	3AXD50000018457	
CDPI-01 通讯适配器模块用户手册	3AXD50000009929	
CPTC-02 ATEX- 认证热敏电阻保护模块 , Ex II (2) GD (+L537+Q971) 用 户手册	3AXD50000030058	
FDNA-01 DeviceNet™ 适配器模块用户手册	3AFE68573360	
FEIP-21 EtherNet/IP 现场总线适配器模块用户手册	3AXD50000158621	
FENA-01/-11/-21 Ethernet 适配器模块用户手册	3AUA0000093568	
FMBT-21 Modbus/TCP 适配器模块用户手册	3AXD50000158607	
FPBA-01 PROFIBUS DP 适配器模块用户手册	3AFE68573271	
FPNO-21 PROFINET 现场总线适配器模块用户手册	3AXD50000158614	
FSCA-01 RS-485 适配器模块用户手册	3AUA0000109533	
FOCH du/dt 滤波器硬件手册	3AFE68577519	
<hr/>		
工具和维护手册及指南		
Drive composer PC 工具用户手册	3AUA0000094606	
整流器模块电容器充电说明	3BFE64059629	
NETA-21 远程监控工具用户手册	3AUA0000096939	
NETA-21 远程监控工具安装和启动指南	3AUA0000096881	

您可以在网站上查找PDF格式的手册和其它产品文件。请参阅封底内的[互联网文档库](#)一节。对于在“文档资料库”内没有提供的手册，请联络当地的ABB代表。

下面的代码将在线列出适用于本产品的手册。



ACQ580-04 手册



Ecodesign信息

(EU 2019/1781 和 SI 2021 No. 745)

# 中文 – 快速安装指导

## 本指导内容

本指导提供了如何将传动模块安装到柜体中的一般说明。示例安装是在 600 毫米宽的 Rittal VX25 柜体中进行的。本指导适用于按照国际 IEC 和 NEC 北美规范进行的安装操作。

## 遵循安全指导

请参阅第 [21](#) 页的图 A。如果您忽视这些说明，可能会导致伤亡或设备损坏。



**警告！** 小心搬运传动模块。向下轻按支撑脚并向侧面转动以打开支撑脚 (1, 2)。切勿倾斜传动模块。**传动模块很重并且其重心较高。** 倾斜超过 5 度时模块将翻倒。切勿在无人照看的情况下将此模块放置在倾斜地面上。为防止传动模块跌落，将传动模块推入柜体之前，应使用链条将顶部吊环固定到柜架上。执行此工作时最好请其他人员帮忙。用一只脚踩在模块底座上施加恒定压力，以防模块向后翻倒。



**警告！** 如果激活变频器控制程序的故障自动复位或自动重启功能，请确保不会发生任何危险状况。这些功能使变频器在发生故障或电力中断后，自动复位并继续运行。如果激活了这些功能，则必须按照 IEC/EN/UL 61800-5-1 第 6.5.3 节的规定，在装置上贴上清晰的标示，如“本机自动启动”。



**警告！** 如果您不是具备资质的电气专业人员，请勿进行安装或维护工作。开始进行任何安装或维护工作前，请仔细阅读这些步骤。

1. 明确标示出作业地点和设备。
2. 断开所有可能的电源连接。
  - 断开变频器主断路器。
  - 打开电源变压器主断路器。变频器中的主断路设备不会断开变频器中交流输入电源母线的电压。
  - 确保不会重新连接。锁定断路器到断开位置并张贴警示通知。遵循正确的锁定方法和张贴程序。
  - 触碰控制电缆前，断开所有从控制电路提供的外部电源。
  - 在断开传动连接后，请在继续前总是等待 5 分钟让中间电路电容放电。
3. 采取保护措施，防止接触工作区内的任何带电部件。
4. 在靠近裸露的导体时要特别小心。
5. 测量以确定设备不带电。
  - 使用优质电压检测器。
  - 确保传动模块输入电源端子 (L1/U1、L2/V1、L3/W1) 和接地 (PE) 之间电压接近于 0 V。
  - 确保传动模块 UDC+ 与 UDC- 端子和接地 (PE) 之间电压接近于 0 V。
6. 按当地规范要求安装临时接地线。
7. 向电气安装作业的负责人索取工作许可证。

## 拆开传动模块的外包装

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。请参阅 [相关手册列表](#) 或联系 ABB 技术支持人员。

## 选择电缆和保险丝

选择电源线。遵循当地规范。

- **电源输入电缆：** 使用对称的屏蔽电缆（VFD 电缆）以获得最佳的 EMC 性能。NEC 安装：也可以使用具有连续导电率的导管，且导管两端必须接地。
- **电机电缆：** ABB 建议使用对称的屏蔽 VFD 电机电缆，以减少轴承电流及电机绝缘件上的磨损和应力，从而提供最佳的 EMC 性能。尽管不作推荐，但进行 NEC 安装时，可以在具有连续导电率的导管内使用导体。导管两端接地。
- **电源电缆类型：** IEC 安装：铜电缆和铝电缆。  
NEC 安装：仅允许使用铜导体。
- **额定电流：** 最大负载电流。
- **额定电压（最小）：** IEC 安装：600 V AC 电缆可以用于高达 500 V AC 的场合。NEC 安装：1000 V AC 用于 480 V AC 电机。600 V AC 用于 480 V AC 电源线。
- **额定温度：** IEC 安装：选择连续使用时导体的额定最大容许温度至少为 70°C (158°F) 的电缆。  
NEC 安装：至少使用 75°C (167°F) 导体。如果载流能力取决于 75°C (167°F) 导体的性能，则绝缘温度可以更高。

选择控制电缆。对模拟信号应使用双屏蔽双绞线。使用双屏蔽或单屏蔽电缆传输数字、中继和 I/O 信号。不得用同一根电缆发送 24 V 和 115/230 V 信号。

使用正确的的熔断器保护变频器和输入电源线。请参阅 [中文 - 技术数据](#)。

## 检查安装情况

检查变频器安装地点。确保：

- 安装现场应通风良好或有充分的冷却措施来带走变频器散发出的热量。
- 变频器的环境条件符合规范。请参阅 [环境条件](#)。
- 变频器下方材料为阻燃材料。
- 安装面应尽可能接近垂直，并足够坚固以支撑变频器。
- 变频器周围要有足够的空间，以便于进行冷却、维护和操作。如要了解最低空间要求，请参阅 [尺寸、重量和自由空间要求](#)。
- 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。

## 确保变频器与接地系统兼容

可以将变频器连接到对称接地的 TN-S 系统（中心接地 Y 形系统）。如果将变频器安装到不同的系统上，则可能需要卸下压敏电阻螺丝（断开压敏电阻电路的连接）。

对称接地的 TN-S 系统 (中心接地 Y 形系统)	角接地三角形系统和中性点接地三角形系统	IT 系统（不接地或高阻抗接地系统）	TT 系统 <sup>1), 2)</sup>
<b>IEC 安装</b>			

对称接地的 TN-S 系统 (中心接地 Y 形系统)	角接地三角形系统和中性点接地三角形系统	IT 系统 (不接地或高阻抗接地系统)	TT 系统 <sup>1), 2)</sup>
不得拆除 EMC 或 VAR 螺丝。	不得拆除 EMC 或 VAR 螺丝。	拆除 VAR 螺丝。不得拆除 EMC 螺丝。	拆除 VAR 螺丝。不得拆除 EMC 螺丝。
<b>NEC 安装</b>			
默认情况下, EMC 或 VAR 螺丝已卸下。			不适用

<sup>1)</sup> 必须在供电系统中安装一个残余电流装置。在 NEC 安装操作中, 仅能使用 1000 安培或以上的残余电流装置。

<sup>2)</sup> ABB 不保证 EMC 的类别或变频器内置接地漏电检测器的运行。

## 将传动模块装入柜体中

步骤	任务	图片	页码
1	将打孔的部位安装在柜体背面。	B	21
2	将支撑轨和基座导板安装到柜体底架上。	B	21
3	将可伸缩插拔式斜轨安装到基座导板上。	B	21
4	选件 +B051: 从透明塑料护罩两侧拆下护板。	C	21
5	将固定支架安装到传动模块上。	D	21
6	选件 +B051: 如果柜体中无底板并且传动模块底部需要达到 IP20 级保护, 应在传动模块上安装底部格栅。	D	21
7	选件 +B051: 将顶部金属护罩安装到传动模块上。	D	21
8	选件 +B051: 将背面护罩安装到传动模块上。	D	21
9	为防止传动模块跌落, 用链条将其吊环固定到柜体上。	E	21
10	将传动模块沿可伸缩插拔式斜轨推进机柜内。	E	21
11	拆下斜轨。	E	21
12	将传动模块固定到基座导板上。	F	21
13	在柜体背面将传动模块从其顶部固定到打孔的部位上。注意: 固定支架将传动模块固定在柜体上。	F	21

## 测量输入电缆、电机电缆和电机的绝缘情况

步骤	任务	图片	页码
1	在将输入电缆连接到变频器前, 测量其绝缘电阻。遵循当地规范。	-	-
2	在电机端将电机电缆屏蔽层接地。要使干扰降至最低水平, 在电缆接入处提供 360 度接地或尽可能地缩短屏蔽层接地的裸露部分。	H	22
3	电缆从变频器断开后, 测量电机电缆和电机的绝缘电阻。测量每相导线和 PE 导体之间的绝缘电阻。使用 1000 V DC 的测量电压。ABB 电机的绝缘电阻必须超过 100 Mohm (参考值为 25°C)。对于其他电机的绝缘电阻, 请参阅其制造商的说明。电机内部的湿气会降低绝缘阻抗。如果您认为有湿气, 请将电机干燥后再重新测量。	I	22

## 连接电线 (并安装选件 +B051 护罩)

请参阅第 22 页的图 G。

步骤	任务 (电机线缆)	图片	页码
1	将接地端子安装到传动模块底座上。	J	22
2	将电机电缆连接到柜体上。在柜体入口处对电缆屏蔽层进行 360 度接地。	K	22
3	将电机线缆双绞线屏蔽层连接到接地端子。	L	22
4	在传动模块中手动旋入并拧紧绝缘子。将 T3/W2 连接端子连接到绝缘子上。   警告! 螺钉长度或紧固力矩切勿超过安装图纸中给出的数值。否则将损坏绝缘子并导致模块架处出现危险电压。 	M	22
5	将相线 T3/W2 连接到 T3/W2 端子上。	N	22
6	将 T2/V2 连接端子连接到绝缘子上。请参阅第 4 步中的警告。	-	-
7	将相线 T2/V2 连接到 T2/V2 连接端子上。	-	-
8	将 T1/U2 连接端子连接到绝缘子上。请参阅第 4 步中的警告。	-	-

## 6 中文 - 快速安装指导

步骤	任务 (电机线缆)	图片	页码
9	将相线 T1/U2 连接到 T1/U2 端子上。	-	-
10	选件 +B051 (如果柜体中无底板并且需要 IP20 级防护) : <ul style="list-style-type: none"><li>小心地在内部透明塑料护罩上为要连接的电缆钻出足够大的孔。磨平孔边缘。切削孔到边缘之间的护罩，使护罩围住线缆。</li><li>从护罩两侧拆下塑料护板。</li></ul>	O	23
11	选件 +B051: 按图 O 所示，将内部透明塑料护罩安装在电机线缆周围。	P	23
12	选件 +B051: 从出口的透明护罩两侧拆下塑料护板。将护罩安装到传动模块上。	Q	23
13	选件 +B051: 将下方前盖安装到传动模块上。	Q	23

步骤	任务 (输入线缆)	图片	页码
1	在柜体入口处对输入电缆屏蔽层 (如存在) 进行 360 度接地。	-	-
2	将输入电缆的绞合屏蔽层和独立的接地电缆 (如存在) 连接到柜体的母排接地线上。	-	-
3	选件 +B051: <ul style="list-style-type: none"><li>小心地在入口透明塑料护罩上为要连接的电缆钻出足够大的孔。</li><li>根据护罩中的对齐孔，使孔在垂直方向对齐。磨平孔边缘。</li><li>从护罩两侧拆下塑料护板。</li><li>将电缆牢牢固定到柜体上，以防与孔边缘发生摩擦。</li></ul>	R	23
4	选件 +B051: 将输入线缆导线穿过透明塑料护罩中钻孔。	S	23
5	将输入电源线缆导线连接到 L1/U1、L2/V1 和 L3/W1 连接母线上。	T	23
6	选件 +B051: 将透明塑料护罩以及输入线缆同时移至最终位置。安装前透明塑料护罩。	U	24
7	安装上前盖。	U	24
8	从传动模块排气口拆下纸板保护盖。	U	24
9	选件 +B051: 在透明塑料护罩侧面为要连接的电缆钻孔。将侧面和顶部护罩安装到传动模块上。	V	24

## 安装空气挡板

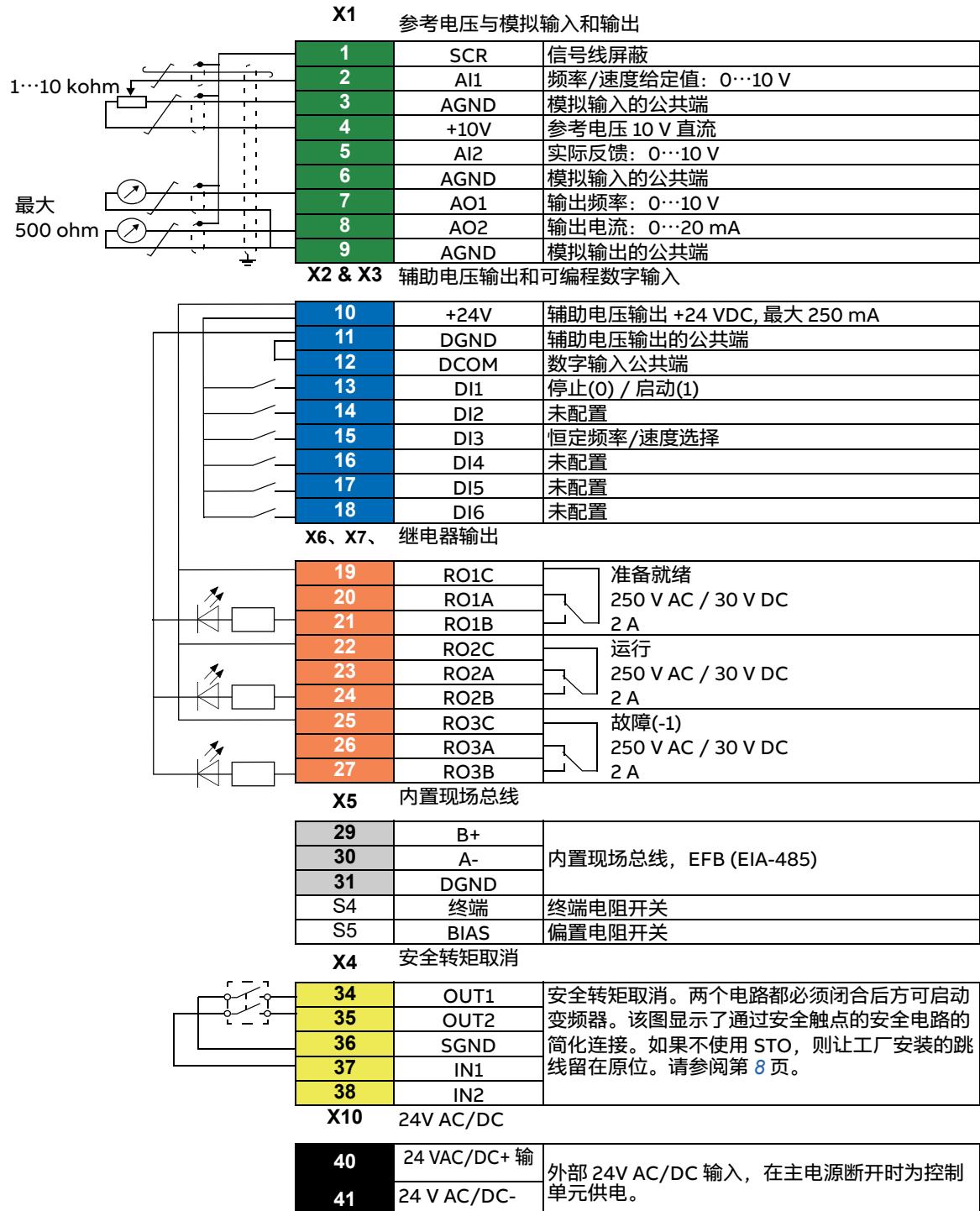
请参阅第 24 页的图 W 和硬件手册中的柜体安装规划指南。

## 连接控制电缆

步骤	任务	图片	页码
1	在柜体入口处将所有外部控制电缆的外屏蔽层进行 360 度接地。	X	24
2	将外部控制线缆成对电缆屏蔽接地至控制单元下方的接地夹上。使护罩另一端处于未连接状态或使用 3.3 nF/630 V 等纳法级高频电容器间接接地。	X	24
3	将导线连接到控制单元适当端子上。请参阅第 7 页。	X	24
4	如果交付的货物中包括选件模块，则为其接线	-	-

## ■ 默认 I/O 连接

水应用默认配置的默认 I/O 连接方式如下所示。



辅助电压输出 +24V (X2:10) 的总负载能力为 6.0 W (250 mA / 24 V DC)。

数字输入 DI1…DI5 同样支持 10 到 24 V AC

电缆规格: 0.14…2.5 mm<sup>2</sup> (26…16 AWG): 所有终端

紧固力矩: 0.5…0.6 N·m (0.4 lbf·ft)

## 安全转矩取消 (STO)

该变频器具有符合 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 STO 功能激活时电机正在运行，则电机会自由停止。关闭激活开关将停用 STO。产生的任何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电压。

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 ms 内各自打开/关闭。ABB 建议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 m (1000 ft)。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

在 IN1 和 IN2 的最小电压被解释为“1”	13 V DC
STO 反应时间（最短可检测间隔）	1 ms
STO 响应时间	2 ms (典型), 30 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 故障指示（参数 31.22）延迟	< 500 ms
STO 警告指示（参数 31.22）延迟	< 1000 ms
整体性安全等级 (EN 62061)	SIL 3
性能级别 (EN ISO 13849-1)	PL e

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，请参阅变频器硬件手册。

# EN – Quick installation guide

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## Contents of this guide

This guide gives general instructions on how to install the drive module into a cabinet. The example installation is made in 600 mm wide Rittal VX25 enclosure. The guide is applicable to the global IEC and NEC North American installations.

EN

## Obey the safety instructions

See figure A on page 21. If you ignore the instructions, injury or death, or damage to the equipment can occur.



**WARNING!** Handle the drive module carefully. Open the support legs by pressing each leg a little down and turning it aside (1, 2).

Do not tilt the drive module. It is **heavy** and its **center of gravity is high**. The module will overturn from a sideways tilt of 5 degrees. Do not leave the module unattended on a sloping floor.

To prevent the drive module from falling, attach its top lifting lugs with chains to the enclosure frame before you push the module into the enclosure. Work carefully, preferably with help from another person. Keep a constant pressure with one foot on the base of the module to prevent the module from falling on its back.



**WARNING!** If 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. If these functions are activated, the installation must be clearly marked as defined in IEC/EN/UL 61800-5-1, subclause 6.5.3, for example, “THIS MACHINE STARTS AUTOMATICALLY”.



**WARNING!** If you are not a qualified electrical professional, do not do installation or maintenance work. Go through these steps before you begin any installation or maintenance work.

1. Clearly identify the work location and equipment.
2. Disconnect all possible voltage sources.
  - Open the main disconnector of the drive enclosure.
  - Open the disconnector of the supply transformer. The main disconnecting device in the drive enclosure does not disconnect the voltage from the AC input power busbars of the drive enclosure.
  - Make sure that reconnection is not possible. Lock the disconnectors to the open position and attach a warning notice to them. Follow the correct lock out and tag out procedures.
  - Disconnect any external power sources from the control circuits before you touch the control cables.
  - After you disconnect the drive, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you continue.

- EN**
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 quality voltage tester.
    - Make sure that the voltage between the drive module input power terminals (L1/U1, L2/V1, L3/W1) and the grounding (PE) busbar is close to 0 V.
    - Make sure that the voltage between the drive module UDC+ and UDC- terminals and the grounding (PE) busbar is close to 0 V.
  6. Install temporary grounding as required by the local regulations.
  7. Ask the person in control of the electrical installation work for a permit to work.
- 

## Unpack the drive module

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 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. See [Related documents](#) or contact ABB technical support.

## Select the cables and fuses

Select the power cables. Obey the local regulations.

- **Input power cable:** Use symmetrical shielded cable (VFD cable) for the best EMC performance. NEC installations: Conduit with continuous conductivity is also allowed and must be grounded on both ends.
- **Motor cable:** ABB recommends symmetrically shielded VFD motor cable to reduce bearing current and wear and stress on motor insulation and to provide the best EMC performance. Although not recommended, conductors inside continuously conductive conduit is allowed in NEC installations. Ground conduit on both ends.
- **Power cable types:** IEC installations: Copper and aluminum cables. NEC installations: Only copper conductors are allowed.
- **Current rating:** max. load current.
- **Voltage rating (minimum):** IEC installations: 600 V AC cable is accepted for up to 500 V AC. NEC installations: 1000 V AC for 480 V AC motors. 600 V AC for 480 V AC power line.
- **Temperature rating:** IEC installations: Select a cable rated for at least 70 °C (158 °F) maximum permissible temperature of conductor in continuous use. NEC installations: Use 75 °C (167 °F) conductors minimum. Insulation temperature can be higher as long as the ampacity is based on 75 °C (167 °F) conductors.

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. See [EN – Technical data](#).

## Examine the installation

Examine the drive installation site. Make sure that:

- The installation site is sufficiently ventilated or cooled to remove heat from the drive.
- The ambient conditions of the drive meet the specifications. See [Ambient conditions](#).
- The material below the drive is non-flammable.
- The installation surface is as close to vertical as possible and strong enough to support the drive.
- There is sufficient free space around the drive for cooling, maintenance and operation. For the minimum free space requirements, see [Dimensions, weights and free space requirements](#).
- 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.

EN

## Make sure that the drive is compatible with the grounding system

You can connect the drive to symmetrically grounded TN-S system (center-grounded wye). If you install the drive to a different system, you may need to remove the varistor screw (disconnect the varistor circuit).

Symmetrically grounded TN-S systems (center grounded wye)	Corner-grounded delta and midpoint-grounded delta systems	IT systems (ungrounded or high-resistance grounded)	TT systems <sup>1), 2)</sup>
<b>IEC installation</b>			
Do not remove EMC or VAR screws.	Do not remove EMC or VAR screws.	Remove VAR screw. Do not remove EMC screw.	Remove VAR screw. Do not remove EMC screw.
<b>NEC installation</b>			
EMC and VAR screws are removed as default.			Not applicable

<sup>1)</sup> A residual current device must be installed in the supply system. In NEC installations the residual current device is only required at or above 1000 amps.

<sup>2)</sup> ABB does not guarantee the EMC category or the operation of the ground leakage detector built inside the drive.

## Install the drive module in a enclosure

Step	Task	Figure	Page
1	Install the punched section to the back of the enclosure frame.	B	21
2	Install the support rails and pedestal guide plate to the enclosure bottom frame.	B	21
3	Install the telescopic insertion/extraction ramp to the pedestal guide plate.	B	21
4	<u>Option +B051:</u> Remove the sheeting from the clear plastic shrouds from both sides.	C	21
5	Install the fastening bracket to the drive module.	D	21
6	<u>Option +B051:</u> Install the bottom grille to the drive module if there is no bottom plate in the enclosure and degree of protection of IP20 is needed for the drive module from the bottom side.	D	21
7	<u>Option +B051:</u> Install the top metallic shroud to the drive module.	D	21

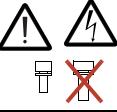
Step	Task	Figure	Page
8	Option +B051: Install the back shrouds to the drive module.	D	21
9	To prevent the drive module from falling, attach its lifting lugs with chains to the enclosure frame.	E	21
10	Push the drive module into the enclosure along the telescopic insertion/extraction ramp.	E	21
11	Remove the ramp.	E	21
12	Attach the drive module to the pedestal guide plate.	F	21
13	Attach the drive module from its top to the punched section at the enclosure back. <b>Note:</b> The fastening bracket grounds the drive module to the enclosure frame.	F	21

## Measure the insulation of the input and motor cables and the motor

Step	Task	Figure	Page
1	Measure the insulation resistance of the input cable before you connect it to the drive. Obey local regulations.	-	-
2	Ground the motor cable shield at the motor end. For minimal interference, make a 360-degree grounding at the cable entry, or keep the pig tail short.	H	22
3	Measure the insulation resistance of the motor cable and motor when the cable is disconnected from the drive. Measure the insulation resistance between each phase conductor and the PE conductor. Use a measuring voltage of 1000 V DC. The insulation resistance of an ABB motor must be more than 100 Mohm (reference value at 25 °C). For the insulation resistance of other motors, see the manufacturer's instructions. Moisture inside the motor decreases the insulation resistance. If you think that there is moisture, dry the motor and do the measurement again.	I	22

## Connect the power cables (and install the shrouds for option +B051)

See figure G on page 22.

Step	Task (motor cables)	Figure	Page
1	Install the grounding terminal to the drive module base.	J	22
2	Run the motor cables to the enclosure. Ground the cable shields 360 degrees at the enclosure entry.	K	22
3	Connect the twisted shields of the motor cables to the grounding terminal.	L	22
4	Screw in and tighten the insulators to the drive module by hand. Install the T3/W2 connection terminal to the insulators.	M	22
	 <b>WARNING!</b> Do not use longer screws or greater tightening torque than given in the installation drawing. Doing either can damage the insulator and cause dangerous voltage to be present at the module frame.		
5	Connect the phase T3/W2 conductors to the T3/W2 terminal.	N	22
6	Install the T2/V2 connection terminal to the insulators. See the warning in step 4.	-	-
7	Connect the phase T2/V2 conductors to the T2/V2 connection terminal.	-	-
8	Install the T1/U2 connection terminal to the insulators. See the warning in step 4.	-	-
9	Connect the phase T1/U2 conductors to the T1/U2 terminal.	-	-
10	<u>Option +B051 (if there is no bottom plate in the enclosure and degree of protection of IP20 is needed):</u> <ul style="list-style-type: none"> <li>Carefully step drill sufficiently big holes to the inner clear plastic shrouds for the motor cables to be connected. Smooth the hole edges. Cut the shroud from the holes to the edge to make it possible to put the shroud around the cables.</li> <li>Remove the plastic sheeting from both sides of the shrouds.</li> </ul>	O	23
11	Option +B051: Put the inner clear plastic shrouds of figure O around the motor cables.	P	23
12	Option +B051: Remove the plastic sheeting from both sides of the output clear plastic shroud. Install the shroud to the drive module.	Q	23

Step	Task (motor cables)	Figure	Page
13	Option +B051: Install the lower front cover to the drive module.	Q	23

Step	Task (input cables)	Figure	Page
1	Ground the input cable shields (if present) 360 degrees at the enclosure entry.	-	-
2	Connect the twisted shields of the input cables and separate ground cable (if present) to the enclosure grounding busbar.	-	-
3	<u>Option +B051:</u> <ul style="list-style-type: none"> <li>• Carefully step drill sufficiently big holes to the cable entry clear plastic shroud for the cables to be connected.</li> <li>• Align the holes in the vertical direction according to the alignment holes in the shroud. Smooth the hole edges.</li> <li>• Remove the plastic sheeting from both sides of the shroud.</li> <li>• Attach the cables firmly to the enclosure frame to prevent chafing against the hole edges.</li> </ul>	R	23
4	Option +B051: Put the conductors of the input cables through the drilled holes in the clear plastic shroud.	S	23
5	Connect the input power cable conductors to the L1/U1, L2/V1 and L3/W1 connection busbars.	T	23
6	Option +B051: Move the clear plastic shroud along the input cables to its final position. Install the front clear plastic shroud.	U	24
7	Install the upper front cover.	U	24
8	Remove the cardboard protective covering from the drive module air outlet.	U	24
9	Option +B051: Cut a hole in the side clear plastic shroud for the cable entry clear plastic shroud. Install the side and top shrouds to the drive module.	V	24

## Install the air baffles

See figure [W](#) on page [24](#) and *Generic cabinet planning instructions* in the hardware manual.

## Connect the control cables

Step	Task	Figure	Page
1	Ground the outer shields of all external control cables 360 degrees at the enclosure entry.	X	24
2	Ground the pair-cable shields of external control cables to a grounding clamp below the control unit. Leave the other end of the shields unconnected or ground them indirectly via a high-frequency capacitor with a few nanofarads, eg, 3.3 nF / 630 V.	X	24
3	Connect the conductors to the appropriate terminals of the control unit. See page <a href="#">14</a> .	X	24
4	Wire the option modules if included in the delivery	-	-

## Default I/O connections

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

EN

**X1 Reference voltage and analog inputs and outputs**

1	SCR	Signal cable shield (screen)
2	AI1	<b>Output frequency/speed reference:</b> 0...10 V
3	AGND	Analog input circuit common
4	+10V	Reference voltage 10 V DC
5	AI2	<b>Actual feedback:</b> 0...10 V
6	AGND	Analog input circuit common
7	AO1	<b>Output frequency:</b> 0...10 V
8	AO2	<b>Output current:</b> 0...20 mA
9	AGND	Analog output circuit common

**X2 & X3 Aux. voltage output and programmable digital inputs**

10	+24V	Aux. voltage output +24 V DC, max. 250 mA
11	DGND	Aux. voltage output common
12	DCOM	Digital input common for all
13	DI1	<b>Stop (0) / Start (1)</b>
14	DI2	Not configured
15	DI3	<b>Constant frequency/speed selection</b>
16	DI4	Not configured
17	DI5	Not configured
18	DI6	Not configured

**X6, X7, X8 Relay outputs**

19	RO1C	<b>Ready run</b> 250 V AC / 30 V DC 2 A
20	RO1A	
21	RO1B	
22	RO2C	<b>Running</b> 250 V AC / 30 V DC 2 A
23	RO2A	
24	RO2B	
25	RO3C	<b>Fault (-1)</b> 250 V AC / 30 V DC 2 A
26	RO3A	
27	RO3B	

**X5 Embedded fieldbus**

29	B+	
30	A-	Embedded fieldbus, EFB (EIA-485)
31	DGND	
S4	TERM	Termination switch
S5	BIAS	Bias resistors switch

**X4 Safe torque off**

34	OUT1	Safe torque off. Both circuits must be closed for the drive to start. The drawing shows the simplified connection of a safety circuit through safety contacts. If STO is not used, leave the factory-installed jumpers in place.	
35	OUT2		
36	SGND		
37	IN1		
38	IN2		

**X10 24 V AC/DC**

40	24 V AC/DC+ in	Ext. 24V AC/DC input to power up the control unit when the main supply is disconnected.
41	24 V AC/DC- in	

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

Digital inputs DI1...DI5 also support 10 to 24 V AC

Wire sizes: 0.14...2.5 mm<sup>2</sup> (26...16 AWG): All terminals

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

## 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 STO 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 in this manual 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. ABB recommends that you use the double-shielded twisted-pair cable 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

<b>Minimum voltage at IN1 and IN2 to be interpreted as “1”</b>	13 V DC
<b>STO reaction time (shortest detectable break)</b>	1 ms
<b>STO response time</b>	2 ms (typical), 30 ms (maximum)
<b>Fault detection time</b>	Channels in different states for longer than 200 ms
<b>Fault reaction time</b>	Fault detection time + 10ms
<b>STO fault indication (parameter 31.22) delay</b>	< 500 ms
<b>STO warning indication (parameter 31.22) delay</b>	< 1000 ms
<b>Safety integrity level (EN 62061)</b>	SIL 3
<b>Performance level (EN ISO 13849-1)</b>	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.

# 中文 - 技术数据

## 额定值、熔断器和典型的电缆尺寸

- 1) 无过载容量的典型电机功率（额定应用）。千瓦额定值适用于大多数 IEC 4 极电机。以马力为单位的额定功率适用于大多数的 NEMA 4 极电机。
- 2) 对于 IEC 安装，ABB 推荐使用 aR 熔断器。
- 3) 必须使用推荐的分支电路保护装置，以满足 IEC/EN/UL 61800-5-1 和 CSA C22.2 No. 274 认证的要求。
- 4) IEC 61439-1: 变频器适用于在本表中给出的保险丝保护下，输出电流不超过 65 kA 的电路。
- 5) IEC 安装: 电缆规格是基于最多 9 根电缆并排敷设在电缆桥架内，三层桥架垂直布置，环境温度 30 °C，PVC 绝缘，表面温度 70 °C(EN 60204-1 及 IEC 60364-5-52/2001) 的情况。其它情况，请依据当地的安全规范选择电缆，使其与变频器的输入电压和负载电流相匹配。
- 6) 当变频器在额定输出频率的 90% 和电机额定电流的 100% 运行时的典型驱动损耗。参见 IEC 61800-9-2。

ACQ580-04---IEC 额定值	输入电流		输出电流		电机功率 <sup>1)</sup>		超快速 aR 熔断器 <sup>2)3)(Bussmann)</sup>		典型动力 电缆 (铜) <sup>5)</sup>		典型功率 损耗 <sup>6)</sup>		外形 尺寸			
	I <sub>1</sub>	I <sub>2</sub>	I <sub>LD</sub>	I <sub>HD</sub>	P <sub>LD</sub>	P <sub>HD</sub>	DIN 43653	(DIN 43620 <sup>4)</sup>	mm <sup>2</sup>	W						
	A	A	A	A	kW	kW										
<b>U<sub>n</sub> = 400 V</b>																
505A-4	505	505	485	361	250	200	170M6012	170M8557D	3 × (3×95)	6492	R10					
585A-4	585	585	575	429	315	250	170M6014	170M8557D	3×(3×120)	6840	R10					
650A-4	650	650	634	477	355	250	170M6014	170M8557D	3×(3×150)	8046	R10					
725A-4	725	725	715	566	400	315	170M6016	-	3 × (3×185)	8108	R11					
820A-4	820	820	810	625	450	355	170M6269	-	3 × (3×240)	9652	R11					
880A-4	880	880	865	725*	500	400	170M6269	-	3 × (3×240)	10887	R11					

ACQ580-04---IEC 额定值	输入电流		输出电流		电机功率 <sup>1)</sup>		超快速 aR 熔断器 <sup>2)3)(Bussmann)</sup>		典型动力电缆 (铜) <sup>5)</sup>		典型功率损耗 <sup>6)</sup>		外形尺寸			
	I <sub>1</sub>	I <sub>2</sub>	I <sub>LD</sub>	I <sub>HD</sub>	P <sub>LD</sub>	P <sub>HD</sub>	DIN 43653	(DIN 43620 <sup>4)</sup>	mm <sup>2</sup>	W						
	A	A	A	A	hp	hp										
<b>U<sub>n</sub> = 480 V</b>																
505A-4	483	505	483	361	400	300	170M6012	170M8557D	3 × (3×95)	6492	R10					
585A-4	573	585	573	414	450	350	170M6014	170M8557D	3×(3×120)	6840	R10					
650A-4	623	650	623	477	500	400	170M6014	170M8557D	3×(3×150)	8046	R10					
725A-4	705	725	705	566	600	450	170M6016	-	3 × (3×185)	8108	R11					
820A-4	807	820	807	625	700	500	170M6269	-	3 × (3×240)	9652	R11					
880A-4	807	880	807	625	700	500	170M6269	-	3 × (3×240)	10887	R11					

### 端子数据

螺钉尺寸	L1/U1、L2/V1、L3/W1、T1/U2、T2/V2、T3/W2 和 UDC+、UCD-、带 +H356 和 R+ 和 R- 带 +D150：全尺寸端子							接地端子			
	可接受的最大电缆尺寸							紧固力矩		紧固力矩	
	mm <sup>2</sup>			AWG			N·m	lbf·ft	N·m	lbf·ft	
M12	4 × (3 × 240)			4 × (3 × 500) MCM			50...75	37...55	20	14.75	

### 能源效率数据 (生态设计)



符合 IEC-61800-9-2 的能效数据可从 ecodesign 工具获得。  
(<https://ecodesign.drivestmotors.abb.com>).

## 尺寸、重量和自由空间要求

外形尺寸	高度		宽度		深度		重量	
	mm	in	mm	in	mm	in	kg	lb
<b>IP00/IP20, UL 类型开放/UL 类型 1 (选项 +B051)</b>								
R10	1462	57.55	350	13.78	529	20.81	161	355
R11	1662	65.43	350	13.78	529	20.81	199	439

变频器模块周围距离机柜背板和前门需要有20 mm (0.79 in)的自由空间。

## 环境条件

安装高度	对于 TN 和 TT 中性点接地网络系统和 IT 非角接地网络系统：海拔 0 至 4000 m (13123 英尺)。对于 TN、TT 和 IT 角落接地网络系统：海拔 0 至 2000 m (6561 ft)。输出电流必须在海拔超过 1000 m (3281 ft) 时降容。在 1000 m (3281 ft) 以上每 100 m (328 ft) 降容为 1%。
周围气温	运行：-15 … +55 °C (5 … 131 °F)。不允许结霜。超过 40 °C (104 °F) 每升高 1 °C (1.8 °F)，额定输出电流必须降容 1%。存储（在包装中）：-40 至 +70 °C (-40 至 +158 °F)。

## 标记

在变频器的型号标签上可看到相应的标记。



## 符合性声明

**ABB**

**EU Declaration of Conformity**  
Machinery Directive 2006/42/EC

We, Manufacturer:  
Address:  
Phone:  
declare under our sole responsibility that the following product:

**Frequency converters**  
**AC5500-DV-S4**  
with regard to the safety function  
**Safe Torque Off**

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

The following harmonized standards have been applied:  
EN 60068-2-2007  
EN 62050-2005  
+ AC/2010 + A1/2013 + A2/2015  
EN ISO 13849-1/2005  
EN ISO 13849-2/2012  
EN 6004-1/2018  
The following other standards have been applied:  
IEC 61000-2-2010, parts 1-2  
IEC 61800-5-2/2016

The product(s) referred in this Declaration of conformity fulfill(s) the relevant provisions of other European Union Directives which are notified in Single EU Declaration of conformity 3A(X)200000497692.

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

Helsinki, May 7, 2021  
Signed for and on behalf of:   
Tuomo Tarula  
Local Division Manager, ABB Oy  
Document number 3A(X)200000497692

**ABB**

**Declaration of Conformity**  
Supply of Machinery (Safety) Regulations 2008

We, Manufacturer:  
Address:  
Phone:  
declare under our sole responsibility that the following product:

**Frequency converters**  
**AC5500-DV-S4**  
with regard to the safety function  
**Safe Torque Off**

is in conformity with the relevant safety component requirements of the Supply of Machinery (Safety) Regulations 2008, when the listed safety function is used for safety component functionality.

The following designated standards have been applied:  
EN 60068-2-2007  
EN 62050-2005  
+ AC/2010 + A1/2013 + A2/2015  
EN ISO 13849-1/2005  
EN ISO 13849-2/2012  
EN 6004-1/2018  
The following other standards have been applied:  
IEC 61000-2010, parts 1-2  
IEC 61800-5-2/2016

The product(s) referred in this declaration of conformity fulfill(s) the relevant provisions of other UK statutory requirements, which are notified in a single declaration of conformity 3A(X)200000326271.

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Helsinki, May 7, 2021  
Signed for and on behalf of:   
Harri Mustonen  
Local Division Manager, ABB Oy  
Document number 3A(X)200000326271

# EN – Technical data

## Ratings, fuses and typical power cables

- 1) Typical motor power with no overload capacity (nominal use). The kilowatt ratings apply to most IEC 4-pole motors. The horsepower ratings apply to most NEMA 4-pole motors.
- 2) For IEC installations, ABB recommends aR fuses.
- 3) The recommended branch protection fuses must be used to maintain the IEC/EN/UL 61800-5-1 and CSA C22.2 No. 274 certifications.
- 4) **IEC 61439-1:** The drive is suitable for use on a circuit capable of delivering not more than 65 kA when protected by the fuses given in this table.
- 5) **IEC Installations:** The cable sizing is based on max. 9 cables laid on a cable ladder side by side, three ladder type trays one on top of the other, ambient temperature 30 °C, PVC insulation, surface temperature 70 °C (EN 60204-1 and IEC 60364-5-52/2001). For other conditions, size the cables according to local safety regulations, appropriate input voltage and the load current of the drive.
- 6) Typical drive losses when it operates at 90% of the nominal output frequency and 100% of the motor nominal current. See IEC 61800-9-2.

ACQ580-04-... IEC ratings	Input current		Output current		Motor power <sup>1)</sup>		Ultraparad aR fuses <sup>2)3)</sup> (Bussmann)		Typical power cable (Copper) <sup>5)</sup>	Typical power loss <sup>6)</sup>	Frame size
	I <sub>1</sub>	I <sub>2</sub>	I <sub>LD</sub>	I <sub>HD</sub>	P <sub>LD</sub>	P <sub>HD</sub>	DIN 43653	DIN 43620 <sup>4)</sup>	mm <sup>2</sup>	W	
	A	A	A	A	kW	kW					
<b>U<sub>n</sub> = 400 V</b>											
505A-4	505	505	485	361	250	200	170M6012	170M8557D	3 × (3×95)	6492	R10
585A-4	585	585	575	429	315	250	170M6014	170M8557D	3 × (3×120)	6840	R10
650A-4	650	650	634	477	355	250	170M6014	170M8557D	3 × (3×150)	8046	R10
725A-4	725	725	715	566	400	315	170M6016	-	3 × (3×185)	8108	R11
820A-4	820	820	810	625	450	355	170M6269	-	3 × (3×240)	9652	R11
880A-4	880	880	865	725*	500	400	170M6269	-	3 × (3×240)	10887	R11

ACQ580-04-... IEC ratings	Input current		Output current		Motor power <sup>1)</sup>		Ultraparad aR fuses <sup>2)3)</sup> (Bussmann)		Typical power cable (Copper) <sup>5)</sup>	Typical power loss <sup>6)</sup>	Frame size
	I <sub>1</sub>	I <sub>2</sub>	I <sub>LD</sub>	I <sub>HD</sub>	P <sub>LD</sub>	P <sub>HD</sub>	DIN 43653	DIN 43620 <sup>4)</sup>	mm <sup>2</sup>	W	
	A	A	A	A	hp	hp					
<b>U<sub>n</sub> = 480 V</b>											
505A-4	483	505	483	361	400	300	170M6012	170M8557D	3 × (3×95)	6492	R10
585A-4	573	585	573	414	450	350	170M6014	170M8557D	3 × (3×120)	6840	R10
650A-4	623	650	623	477	500	400	170M6014	170M8557D	3 × (3×150)	8046	R10
725A-4	705	725	705	566	600	450	170M6016	-	3 × (3×185)	8108	R11
820A-4	807	820	807	625	700	500	170M6269	-	3 × (3×240)	9652	R11
880A-4	807	880	807	625	700	500	170M6269	-	3 × (3×240)	10887	R11

### Terminal data

Screw size	L1/U1, L2/V1, L3/W1, T1/U2, T2/V2, T3/W2 and UDC+, UCD- with +H356 and R+ and R- with +D150: full-size terminals						Grounding terminal	
	Maximum accepted cable size				Tightening torque			
	mm <sup>2</sup>		AWG		N·m	lbf·ft		
M12	4 × (3 × 240)		4 × (3 × 500) MCM		50...75	37...55	20	14.75

## Energy efficiency data (ecodesign)



Energy efficiency data according to IEC-61800-9-2 is available from the ecodesign tool.  
(<https://ecodesign.drivemotors.abb.com>).

## Dimensions, weights and free space requirements

Frame size	Height		Width		Depth		Weight	
	mm	in	mm	in	mm	in	kg	lb
<b>IP00/IP20, UL Type Open/UL Type 1 (option +B051)</b>								
R10	1462	57.55	350	13.78	529	20.81	161	355
R11	1662	65.43	350	13.78	529	20.81	199	439

20 mm (0.79 in) free space is required around the drive module from the enclosure back panel and front door.

## Ambient conditions

<b>Installation site altitude</b>	For TN and TT neutral grounded network systems and IT non corner-grounded network systems: 0 to 4000 m (13123 ft) above sea level. For TN, TT and IT corner grounded network systems: 0 to 2000 m (6561 ft) above sea level. The output current must be derated at altitudes above 1000 m (3281 ft). The derating is 1% for each 100 m (328 ft) above 1000 m (3281 ft).
<b>Surrounding air temperature</b>	<u>Operation</u> : -15...+55 °C (5 ...131 °F). Frost is not permitted. The rated output current must be derated by 1% for each 1 °C (1.8 °F) over 40 °C (104 °F). <u>Storage (in the package)</u> : -40 to +70 °C (-40 to +158 °F).

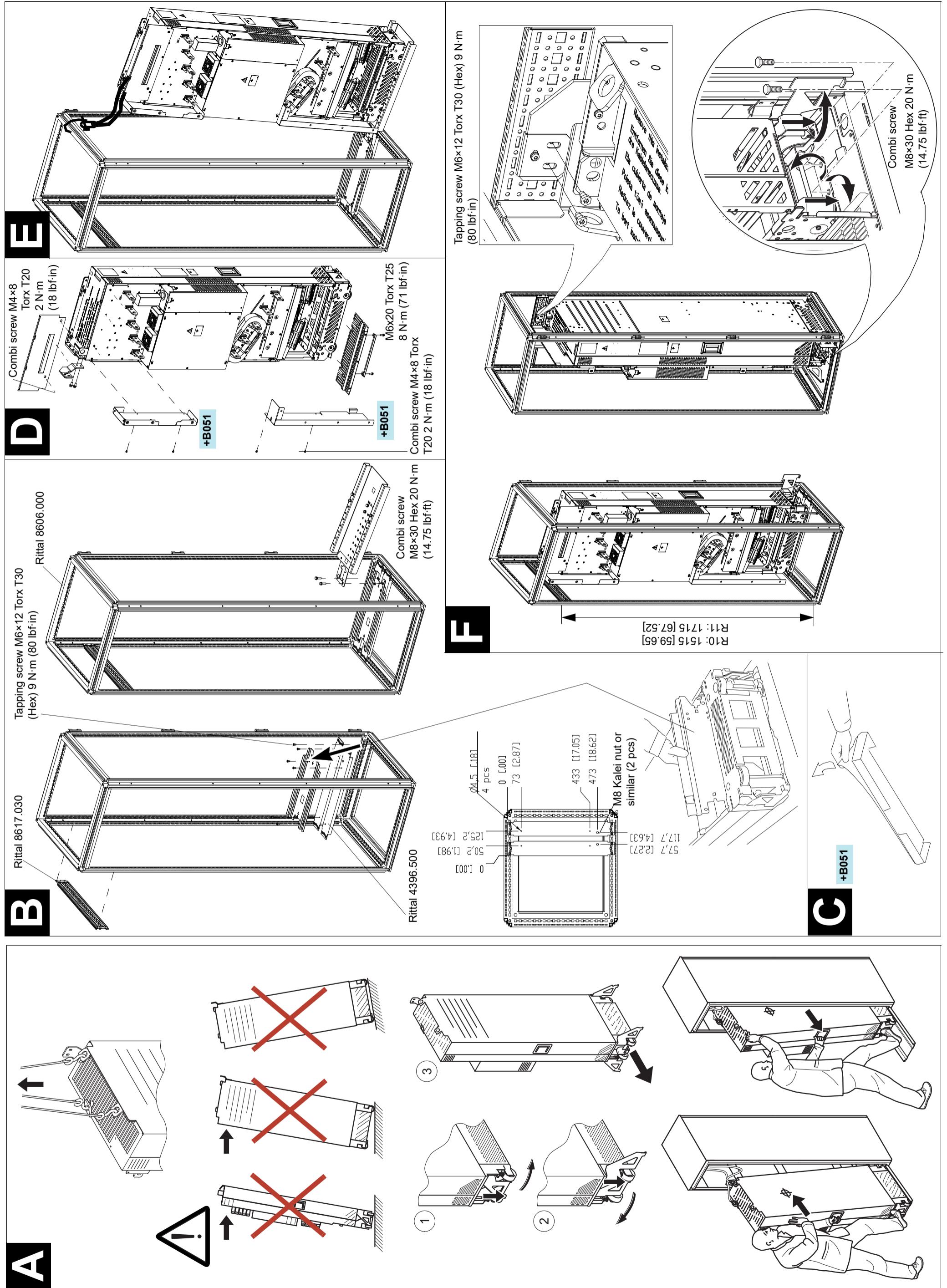
## Markings

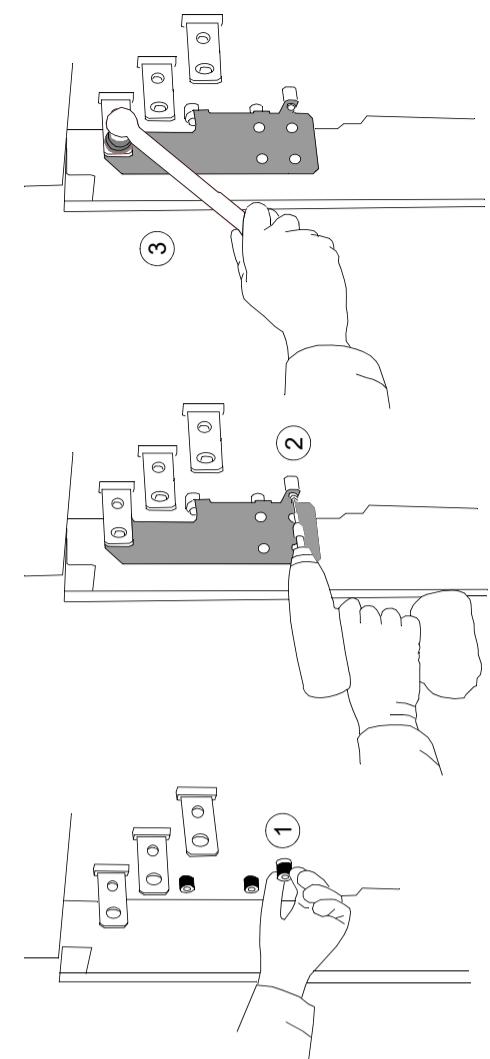
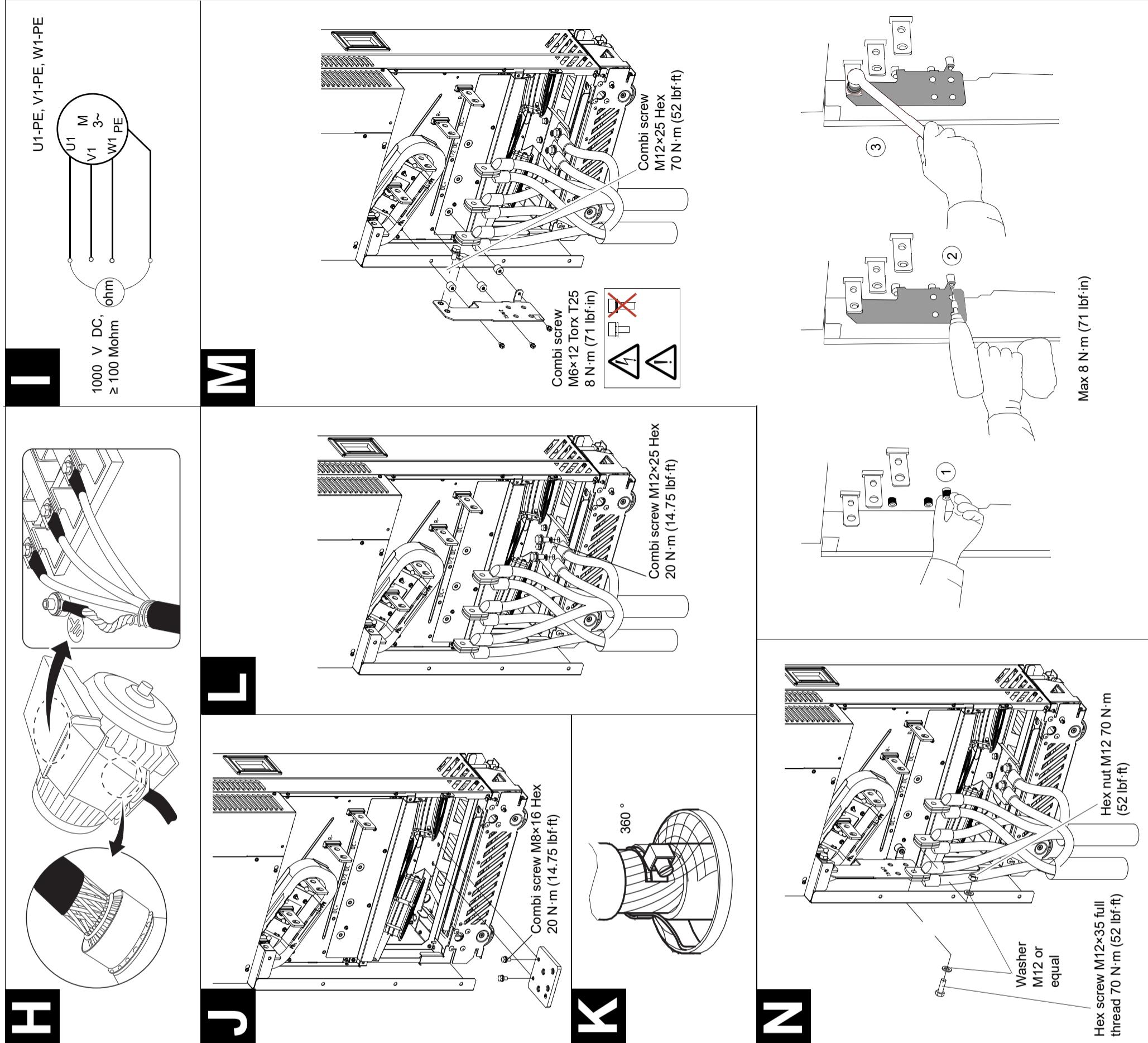
The applicable markings are shown on the type designation label of the drive.



## Declarations of conformity



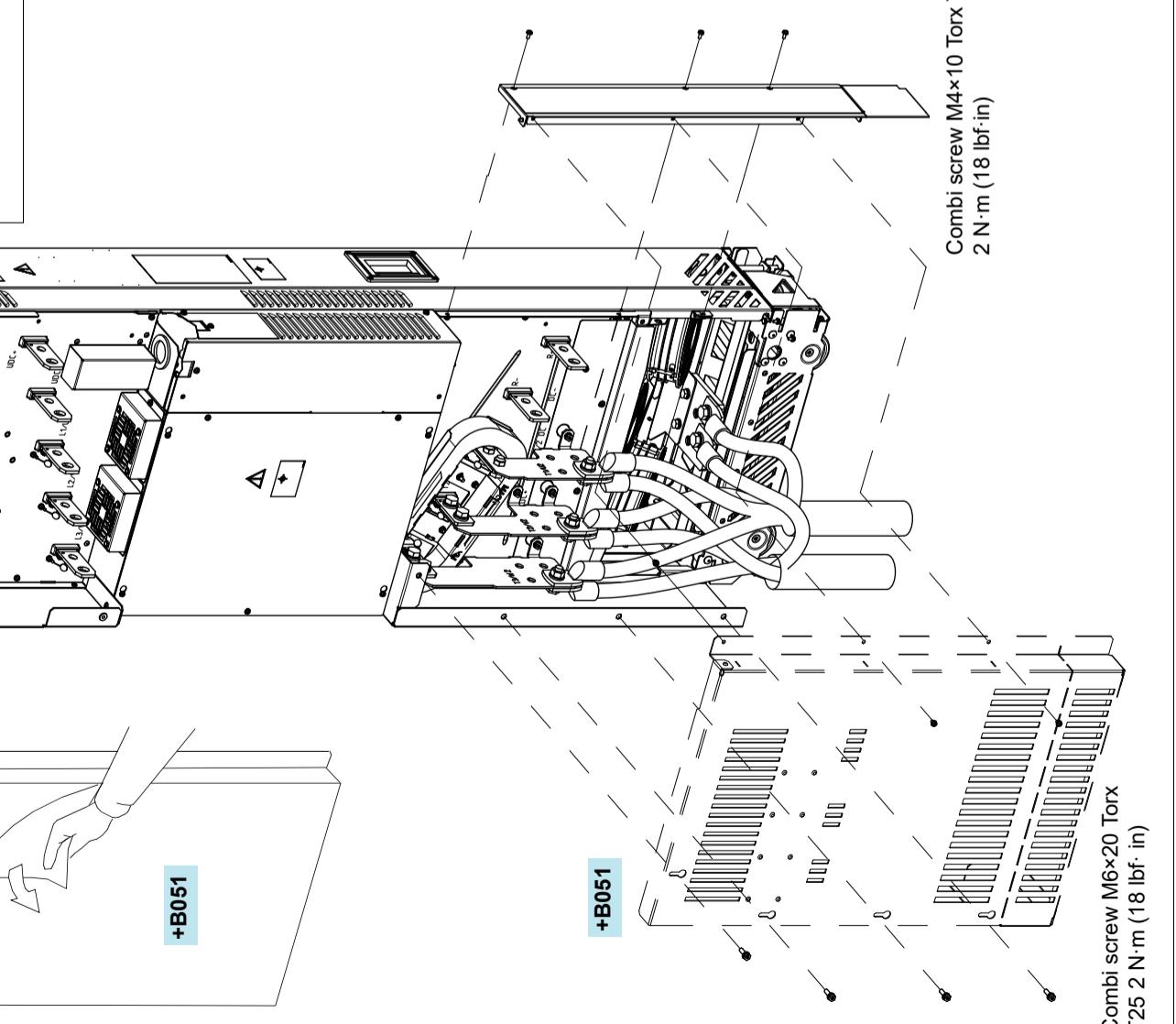
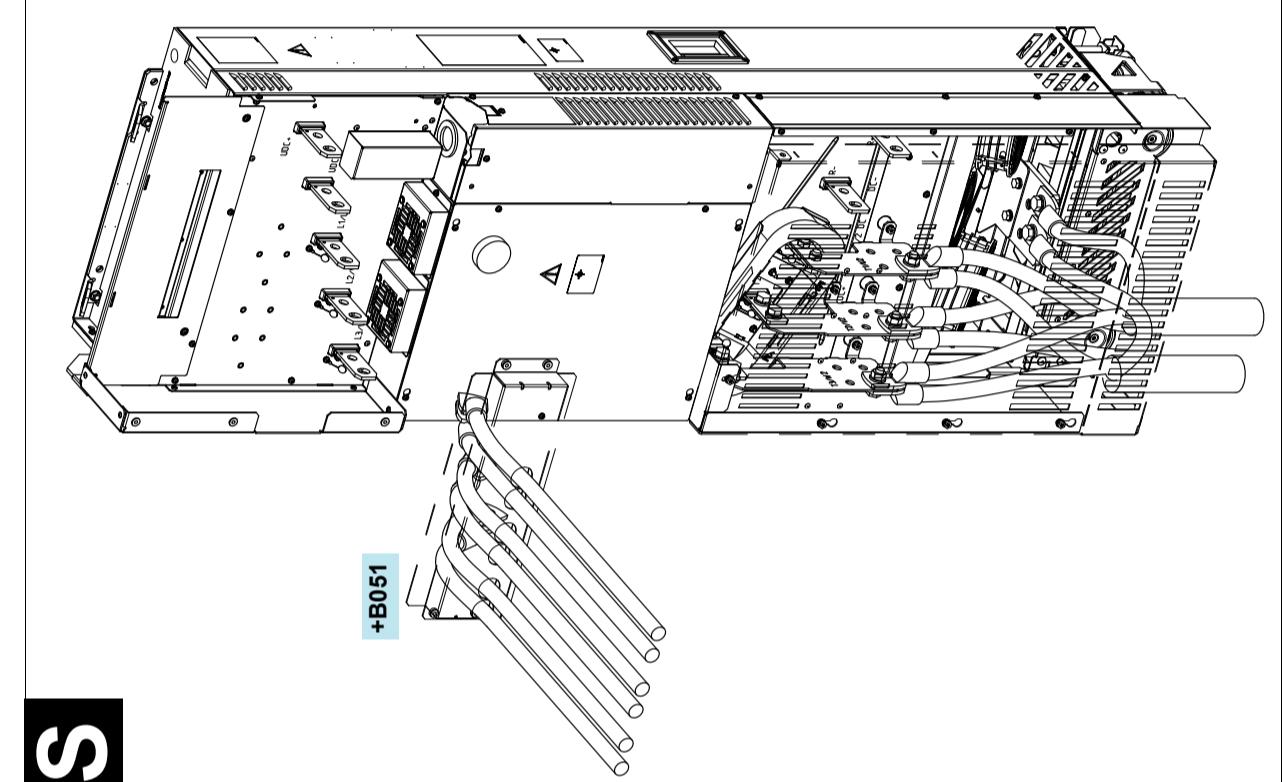
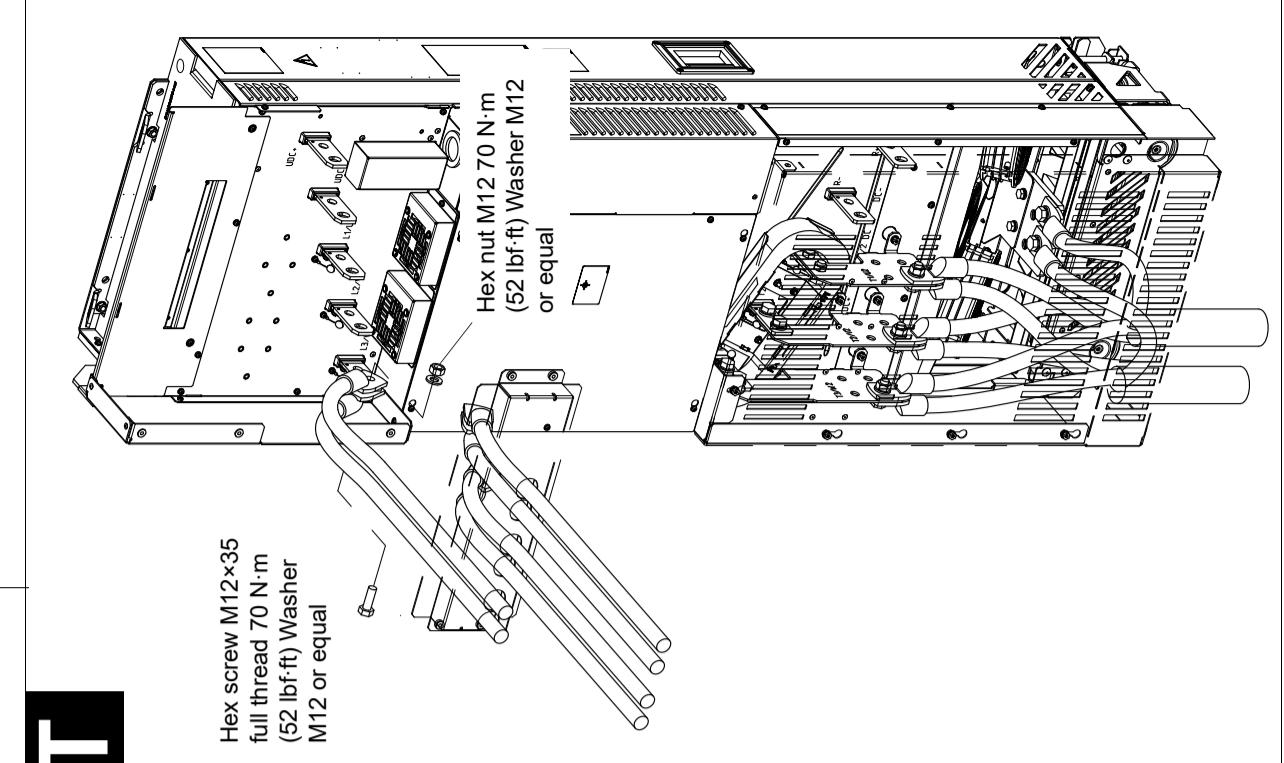
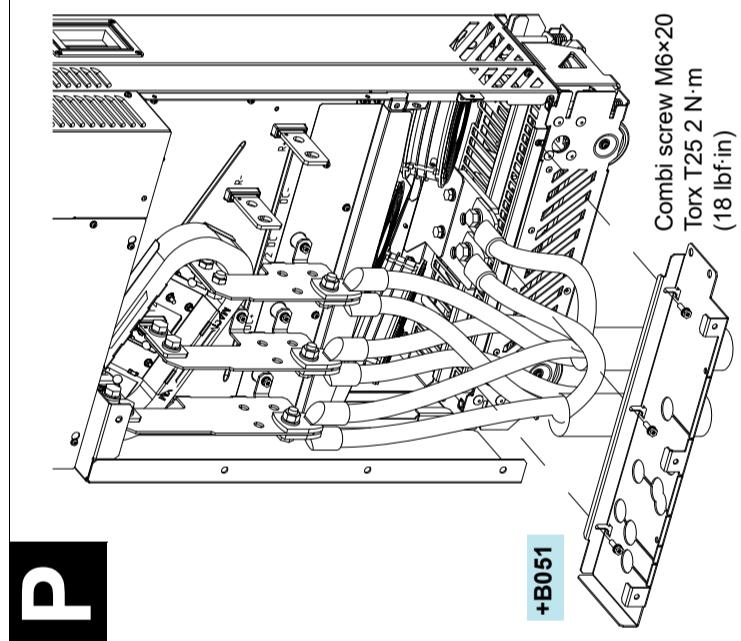
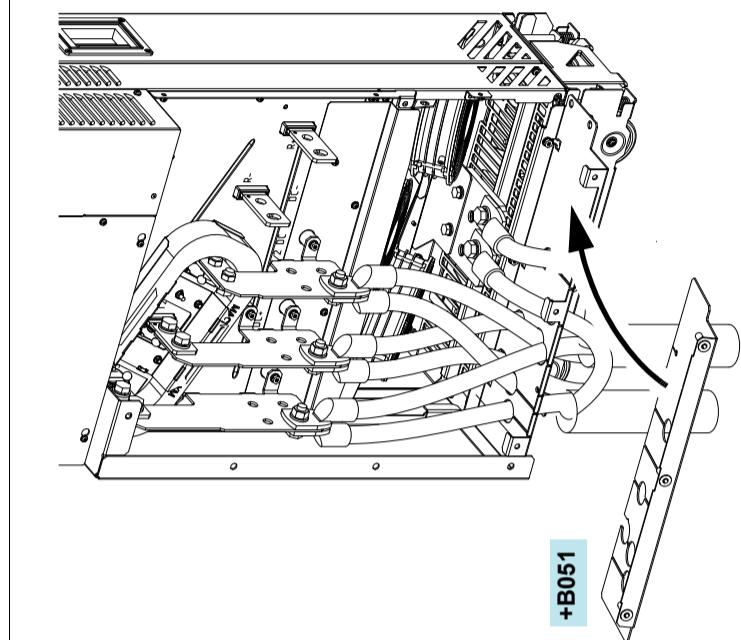
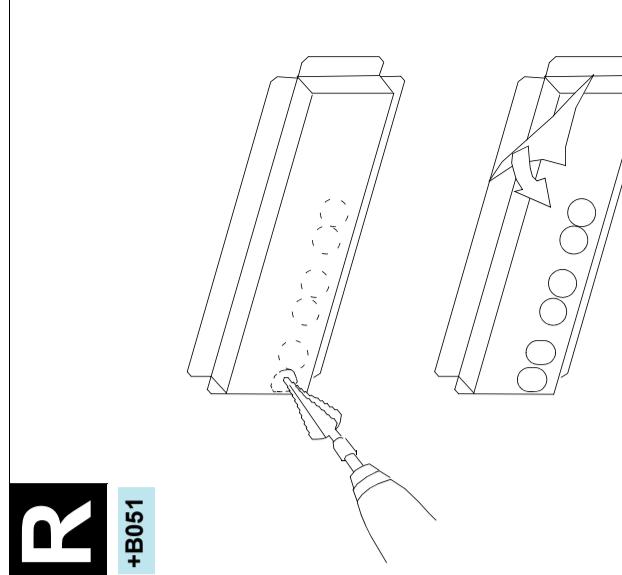


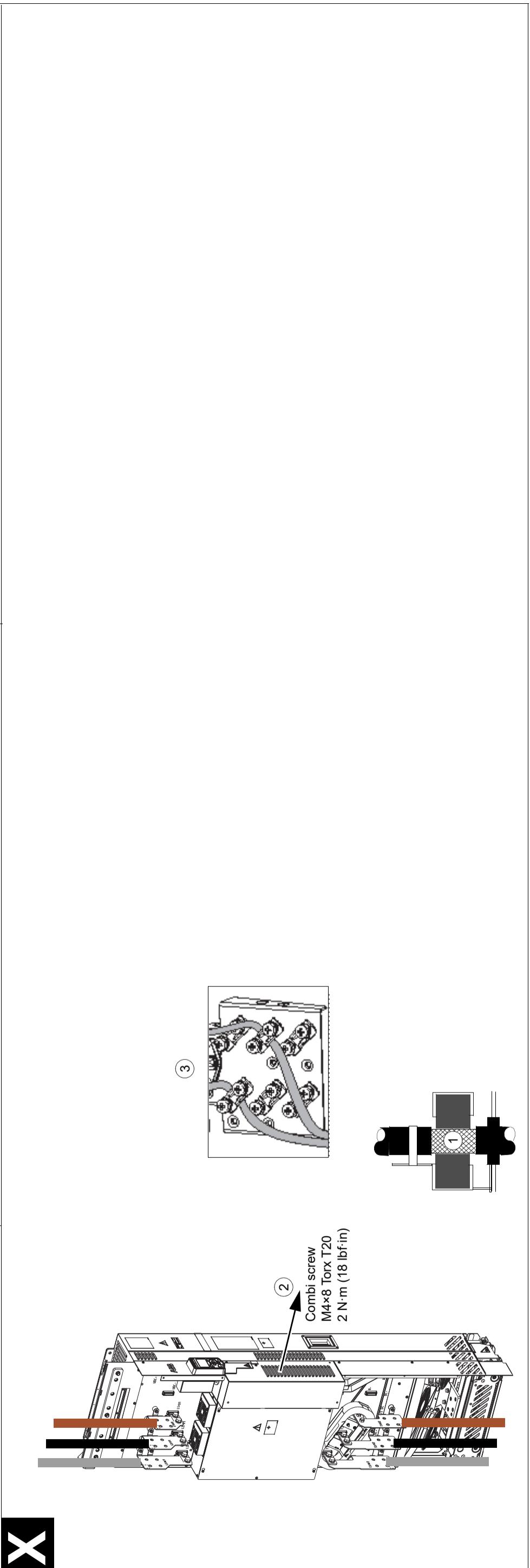
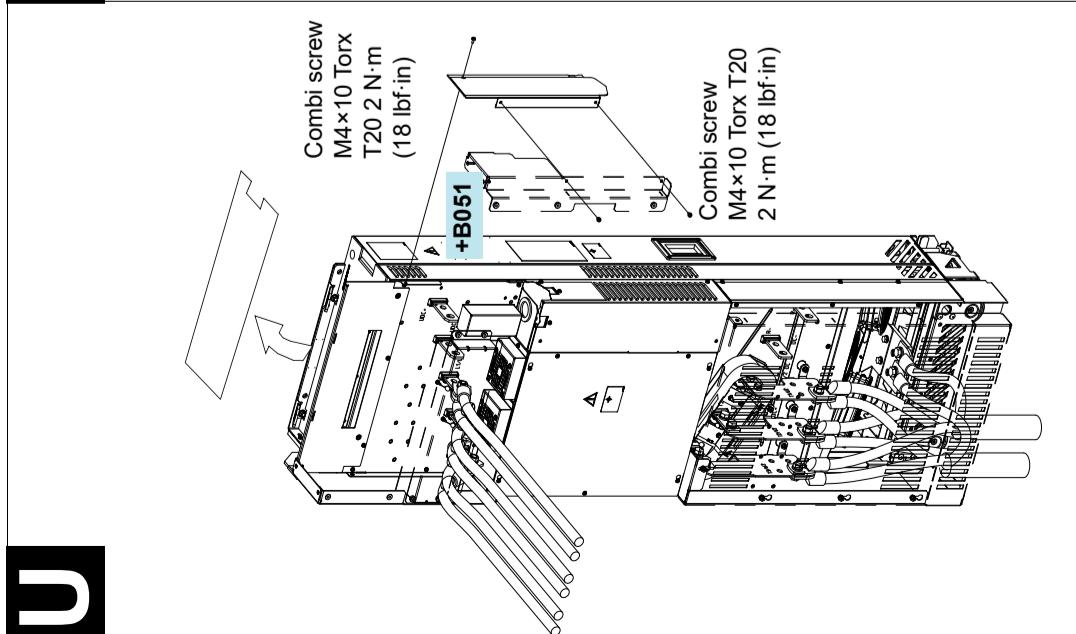
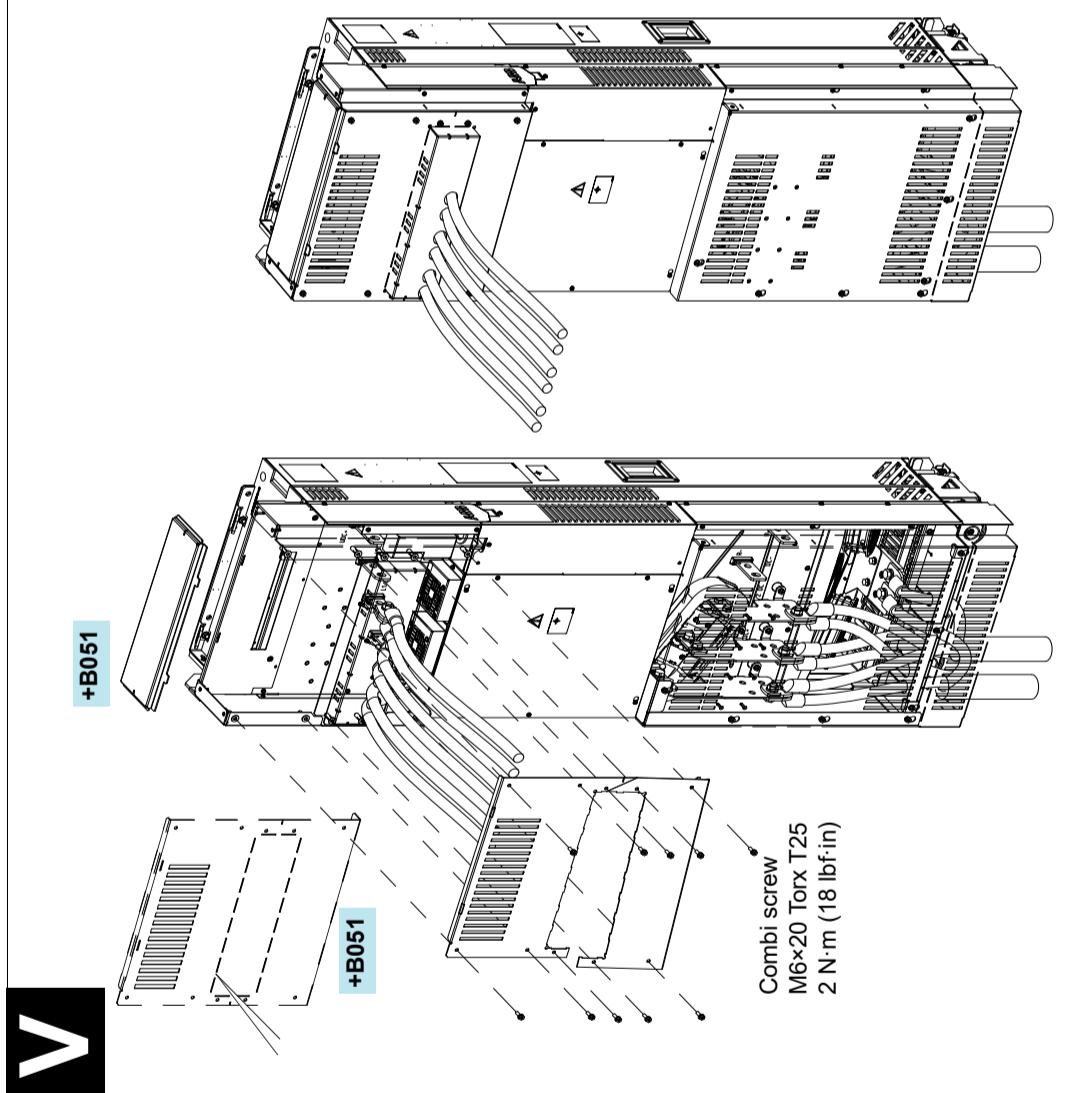
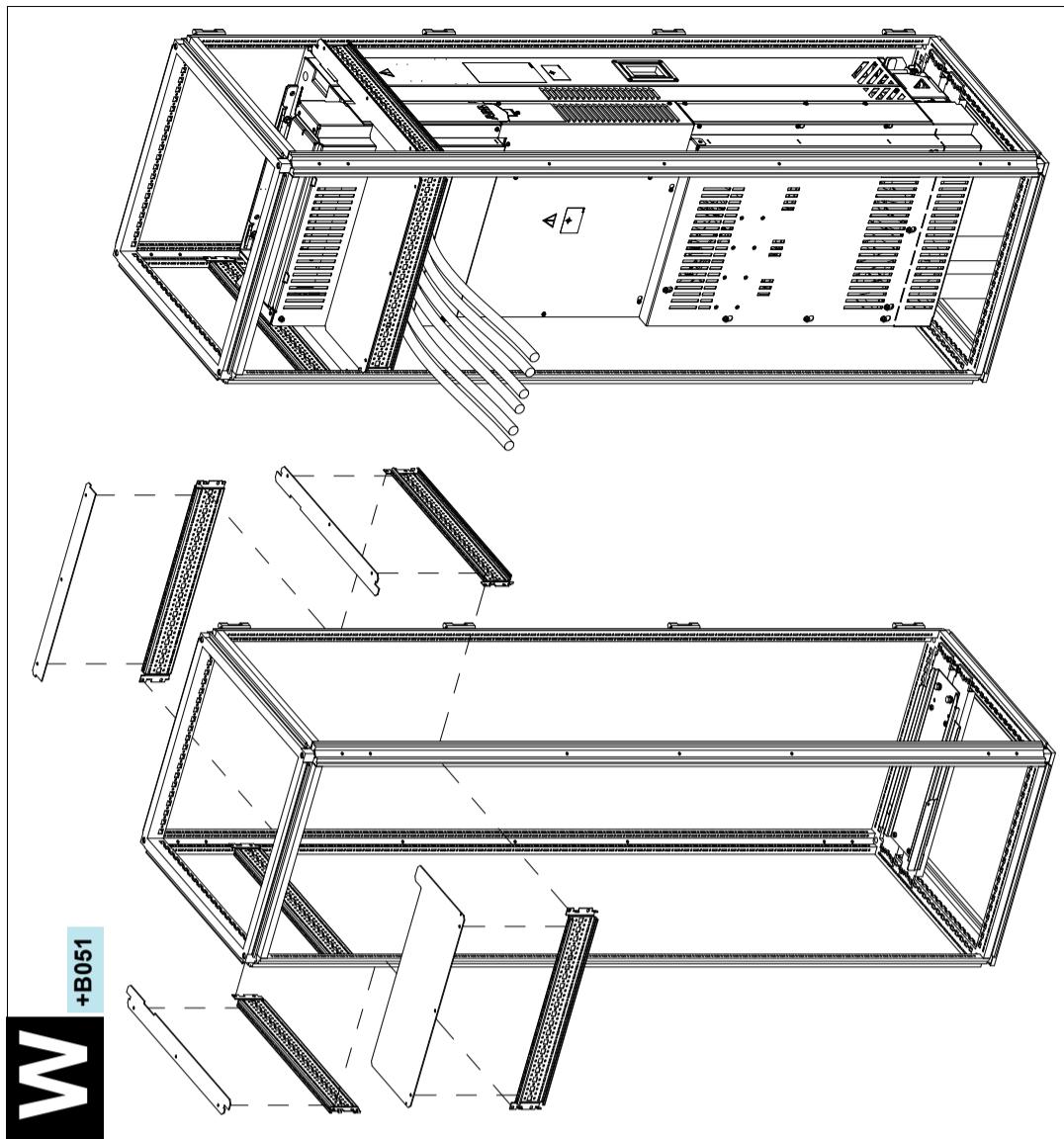


Max 8 N·m (71 lbf·in)

Hex nut M12 70 N·m (52 lbf·ft)

Washer M12 or equal  
Hex screw M12x35 full thread 70 N·m (52 lbf·ft)





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