



Operating instructions



MOVI-C[®] with MDR60A.. regenerative power supply



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1 General information

1.1 Structure of the safety notes

1.1.1 Meaning of signal words

The following table shows the graduation and meaning of the signal words in the safety notes.

Signal word	Meaning	Consequences if not observed
⚠ DANGER	Imminent danger	Death or severe injuries
⚠ WARNING	Possibly dangerous situation	Death or severe injuries
⚠ CAUTION	Possibly dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION	Useful information or tip: Simplifies handling of the product.	

1.1.2 Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

Hazard symbol	Meaning
	General hazard

2 Safety notes

2.1 Preliminary information

The following general safety notes serve the purpose of preventing injury to persons and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components, also observe the relevant warning and safety notes.

2.2 Duties of the user

As the user, you must ensure that the basic safety notes are observed and complied with. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it.

As the user, you must ensure that all of the work listed in the following is carried out only by qualified specialists:

- Setup and installation
- Installation and connection
- Startup
- Maintenance and repairs
- Shutdown
- Disassembly

Ensure that the persons who work on the product pay attention to the following regulations, conditions, documentation, and information:

- The national and regional regulations governing safety and the prevention of accidents
- Product safety label on the product
- All other associated project planning documents, installation and startup instructions, as well as connection and wiring diagrams
- Do not assemble, install, or operate damaged products
- All system-specific specifications and regulations

Ensure that systems in which the product is installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical work equipment and accident prevention regulations.

2.3 Target group

Specialist for mechanical work	Any mechanical work may be performed only by adequately qualified specialists. Specialists in the context of this documentation are persons who are familiar with the design, mechanical installation, troubleshooting, and maintenance of the product, and who possess the following qualifications: • Qualifications in the field of mechanics in accordance with the national regulations • Familiarity with this documentation
Specialist for electrotechnical work	Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product, and who possess the following qualifications: • Qualifications in the field of electrical engineering in accordance with the national regulations • Familiarity with this documentation
Additional qualifications	In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation. The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.
Instructed persons	All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

2.4 Designated use

The product is intended for control cabinet installation in electrical systems or machines.

When installed in electrical systems or machines, startup of the product is prohibited until it has been determined that the machine complies with local laws and guidelines.

Technical data and information on the connection conditions are provided on the nameplate and in chapter "Technical data" in the documentation. Always comply with the data and conditions.

Unintended or improper use of the product may result in severe injury to persons and damage to property.

Options and accessories from SEW-EURODRIVE may only be used in combination with products from SEW-EURODRIVE.

2.5 Transport

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product or the packaging is damaged, do not assemble, install, connect, or start up the product. If the packaging is damaged, the product itself may also be damaged.

Observe the following notes when transporting the device:

- Ensure that the product is not subject to mechanical impact.

If necessary, use suitable, adequately dimensioned transport aids.

Observe the notes on the climatic conditions in accordance with chapter "Technical data" in the corresponding product manual.

2.6 Creating a safe working environment

Before you work on the product, ensure a safe working environment. Observe the following basic safety notes:

2.6.1 Performing work on the product safely

Defective or damaged product

Never install defective or damaged products. Observe the following information to avoid injuries or damage:

- Before installation, check the product for external damage and replace a damaged product.

Hot surfaces

The surfaces of the product can become very hot during operation. Observe the following information to avoid burns:

- Let the product and its accessories cool down before touching it.
- Do not touch any surfaces of the product during operation, except for the control elements.
- Observe the information signs and product safety labels on the product.

Falling load

Observe the following information to avoid death or severe injury due to falling loads:

- Do not stand under the load.
- Secure the area where loads can fall down.
- Use personal protective equipment (such as helmet and safety shoes).
- Use a suitable lifting tool (chain hoist, forklift) and transport protection.

Rotating parts

When working on the product, there may be a risk of exposed rotating parts and uncontrolled movement of the components. Observe the following information to avoid body parts getting crushed or pulled in:

- Switch off the product before you start working on it.
- Observe all technical data of the product.
- Do not reach into the hazard zone.
- Observe the 5 safety rules.

Sharp edges

Observe the following information to avoid cuts caused by sharp or non-deburred cutting edges:

- Wear safety gloves.

2.6.2 Performing electrical work safely

Observe the following information to perform electrical work safely:

Electrical work may only be performed by an electrically skilled person or an electronically instructed person under the supervision of an electrically skilled person.

The fact that the operation or display elements are no longer illuminated does not indicate that the product has been disconnected from the supply system and no longer carries any voltage.

Live parts

Always adhere to the 5 safety rules for all work on electrical components:

1. Disconnect.
2. Secure the device against a restart.
3. Check that no voltage is applied.
4. Ground and short-circuit.
5. Cover or isolate neighboring live parts.

Depending on the situation, it is possible to deviate from rules 4 and 5. Observe standard EN 50110-1.

Dangerous voltage

When the system is switched on, dangerous voltages are present at all power connections as well as any cables and terminals that are connected. This is also the case even if the product is inhibited. Observe the following information to avoid the risk of electric shock:

- Do not touch any exposed live parts (e.g. male contacts, connectors, terminals).
- Secure all open live components with a touch guard.
- Before applying the supply voltage, make sure that all required covers are mounted.

Danger due to electric arc

An electric arc may occur when plug-in connections are disconnected or connected while voltage is applied (e.g. connection between drive and control). In order to avoid damaging electrical components, observe the following information:

- Do not disconnect power connections during operation.
- Do not connect power connections during operation.
- Ensure that the product is de-energized before disconnecting and connecting the plug-in connections.

Damage to property due to damaged or loose cables

To avoid damaging electrical components (e.g. cables and plug-in connections), observe the following information:

- Do not insert plug-in connections if cables are subjected to tensile stress.
- Do not kink cables when connecting plug-in connections.
- Replace loose or defective plug-in connections.
- Make sure that cables are not pinched or crushed.
- Do not run cables near or along a sharp edge.

Dangerous voltage due to charged capacitors

Voltage from charged capacitors can still be present in live components or power connections after disconnecting from the supply voltage. Observe the following information:

- Observe the following waiting period after disconnecting the supply voltage and before performing any electrical work: **10 minutes**.
- Ensure that the unit is de-energized.
- Observe the information signs and product safety labels on the product.

2.7 Installation/assembly

Ensure that the product is installed and cooled in accordance with the regulations in the documentation.

Protect the product from excessive mechanical strain. The product and its mounted components must not protrude into the path of persons or vehicles. Ensure that no components are deformed or no insulation spaces are modified, particularly during transportation. Electrical components must not be mechanically damaged or destroyed.

Observe the notes in chapter "Mechanical installation" (→  15) in the documentation.

2.8 Electrical installation

Ensure that all of the required covers are correctly attached after the electrical installation.

Make sure that preventive measures and protection devices comply with the applicable regulations (e.g. EN 60204-1 or EN 61800-5-1).

2.8.1 Required protective measure

Make sure that the product is correctly attached to the ground connection.

2.8.2 Stationary application

The necessary preventive measure for the product is:

Type of energy transfer	Preventive measure
Direct power supply	Ground connection

2.8.3 Regenerative operation

The drive is operated as a generator due to the kinetic energy of the system/machine. Before opening the connection box, secure the output shaft against rotation.

2.9 Protective separation

The product meets all requirements for protective separation of power and electronics connections in accordance with IEC 61800-5-1. The connected signal circuits must meet requirements according to SELV (**S**afety **E**xtra **L**ow **V**oltage) or PELV (**P**rotective **E**xtra **L**ow **V**oltage) to ensure protective separation. The installation must meet the requirements for protective separation.

In order to avoid exceeding the permitted contact voltages in SELV or PELV power circuits in the event of an error, continuous equipotential bonding is required in the vicinity of these power circuits. If this is not possible, other protective measures must be taken. These protective measures are described in IEC 61800-5-1.

2.10 Startup/operation

Make sure the connection boxes are closed and screwed before connecting the supply voltage.

Depending on the degree of protection, products may have live, uninsulated, and sometimes moving or rotating parts as well as hot surfaces during operation.

Additional preventive measures may be required for applications with increased hazard potential. Be sure to check the effectiveness of the protection devices after every modification.

In the event of deviations from normal operation, switch off the product. Possible deviations are increased temperatures, noise, or vibration, for example. Determine the cause. Contact SEW-EURODRIVE if necessary.

Risk of burns due to arcing: Do not disconnect power connections during operation. Do not connect power connections during operation.

When the system is switched on, dangerous voltages are present on all voltage-controlled product parts as well as any cables and terminals that are connected. This also applies even when the product is inhibited and the motor is in an idle state. Do not touch the components during operation.

If you disconnect the product from the voltage supply, do not touch any live components or power connections because capacitors might still be charged. Observe the following minimum switch-off time:

10 minutes.

Observe the corresponding information signs on the product.

The fact that the operation or display elements are no longer illuminated does not indicate that the product has been disconnected from the supply system and no longer carries any voltage.

Mechanical blocking or internal protective functions of the product can cause a motor standstill. Removing the cause of this problem or performing a reset can result in the machine or the system re-starting on its own. First, disconnect the product from the supply system before you start troubleshooting.

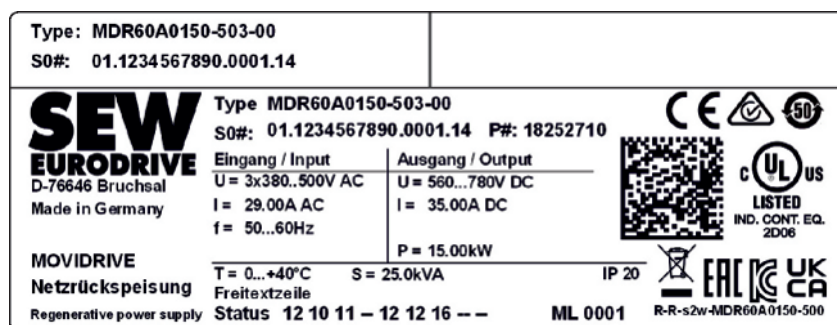
Risk of burns: The surface temperature of the product can exceed 60 °C during operation. Do not touch the product during operation. Let the product cool down before touching it.

3 Device structure

3.1 Nameplate

The nameplate is presented as an example.

With MDR60A..., the nameplate is located on the front of the device.



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3.2 Type designation

Example: MDR60A0150-503-00		
Product name	MD	MOVIDRIVE®
Device type	R	Regenerative power supply
Series	60	Not option-capable
Version	A	Version status of device series
Performance class	0150	15 kW
Connection voltage	5	5 = AC 380 to 500 V
EMC variant	0	No radio interference suppression
Connection type	3	3-phase
Variants	00	Standard
Options	/L	Painted printed circuit boards

3.3 Markings

3.3.1 Basic device

The regenerative power supply unit complies with the following directives and guidelines:

Mark	Definition
CE	The CE mark states compliance with the following European directives: • Low Voltage Directive 2014/35/EU • EMC Directive 2014/30/EU • Directive 2011/65/EU for limiting the use of certain hazardous substances in electric and electronic equipment

Mark	Definition
	The waste disposal of this product is performed in compliance with the WEEE Directive 2012/19/EU.
	The EAC mark states compliance with the requirements of the technical regulations of the Customs Union (Eurasian Economic Union), Armenia, Belarus, Kazakhstan, Kyrgyzstan, and Russia.
	The KC mark declares compliance with §3 of Article 58-2 for the Korean Radio Wave Act.
	The RCM mark declares compliance with the technical regulations of the Australian Communications and Media Authority (ACMA).
	The China RoHS mark states compliance with Directive SJ/T 11364-2014 for limiting the use of hazardous substances in electric and electronic equipment and their packaging.
	The UL and cUL marks state UL approval. cUL is equivalent to CSA approval.
	The NM mark states compliance with the following Moroccan directives ¹⁾ : • Low Voltage Directive no. 2573-14 (July 16, 2015) • EMC Directive N° 2574-14 (July 16, 2015)
	The UKCA mark states compliance with the following British directives ¹⁾ : • Low Voltage Directive S. I. 2016/1101 • EMC S. I. 2016/1091 • Directive S. I. 2012/3032 for limiting the use of certain hazardous substances in electrical and electronic equipment

1) The selectable approvals UKCA (Great Britain) and NM (Morocco) are mutually exclusive.

4 Mechanical installation

4.1 Installation notes

In accordance with the degree of protection, the device is intended exclusively for installation in a control cabinet.

Observe the following information:

- Only install the device on a level, low-vibration, and torsionally rigid support structure.
- Observe the weight of the device and the permissible tightening torques of the fasteners.
- Check the validity of the degree of protection using the information in the operating instructions and the data on the nameplate.
- Make sure that the cooling air supply is unobstructed; warm exhaust air from other devices must not influence the cooling.

4.2 Installation requirements

Check that the following conditions have been met:

- The device is undamaged (no damage caused by transport or storage).
- The ambient temperature corresponds to the specification in the operating instructions and the nameplate.

Refer to the ambient conditions in the **Product manual** > chapter "Technical data".

4.3 Minimum clearance and mounting position

Observe the following information:

- To ensure unobstructed cooling, leave a minimum clearance of 100 mm above and below the inverter housings. Ensure that the air circulation in this clearance is not impaired by cables or other installation equipment.
- Make sure that the inverters are not exposed to the exhaust air from other units.
- Only install the inverters vertically. Do not install them horizontally, tilted, or upside down.
- Lateral clearance is not required. The units can be arranged directly next to one another.

INFORMATION

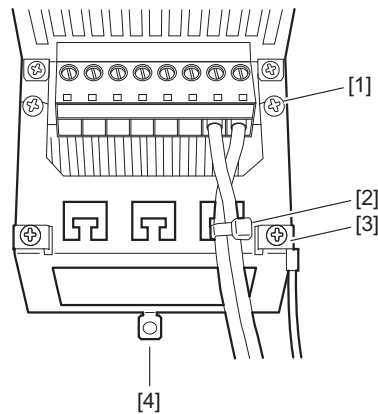


Observe the bending spaces in accordance with EN 61800-5-1.

4.4 Strain relief

MOVIDRIVE® MDR60A.. is supplied with a strain relief plate as standard. Install this strain relief plate with the retaining screws of the device.

Fasten the cable as shown in the figure.



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- [1] Retaining screw for strain relief plate/PE connection
- [2] Cable tie
- [3] PE connection
- [4] Additional fastening option for strain relief plate

5 Electrical installation

5.1 Installation notes

- Make sure you observe the safety notes during installation.
- To protect the MDR60A.. regenerative power supply, the ready for operation signal must be evaluated, see chapter "Evaluation of the ready signal".
- If you are using the MDR60A.. regenerative power supply as a brake module, make sure that the inverters that are connected via the DC link are connected to the supply system in accordance with the connection type.
- If you are using the MDR60A.. regenerative power supply as a supply and regenerative module do not connect the connected inverters to the supply system.

5.2 UL-compliant installation

INFORMATION



Due to UL requirements, the following chapter is always printed in English and in some cases in French, regardless of the language of this documentation.

INFORMATION



The UL label must be attached to the device or in close proximity to the device.

5.2.1 Field wiring power terminals

- MOVIDRIVE® MDR60A..: - Only use copper cables with a rated thermal value of 60/75 °C.
- Tighten terminals with the following permitted tightening torques:

Series	Size	in-lbs	Nm
MOVIDRIVE® MDR60A..	2	16	1.8

5.2.2 Short-circuit current rating

- Suitable for the use in current circuits with a maximum symmetrical short-circuit current of 200 kA:
 - MOVIDRIVE® MDR60A.. if the devices are installed with the corresponding MOVIDRIVE® drive inverter.
- Max. voltage is limited to 500 V.

5.2.3 Branch circuit protection

Integral semiconductor short-circuit protection does not replace the branch circuit fusing. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

The tables below list the permitted maximum fusing.

MOVIDRIVE® MDR60A..

MOVIDRIVE® MDR60A..	Max. line short circuit current ¹⁾	Max. line voltage	Max. fuse rating
0150	AC 200 kA	AC 500 V	AC 50 A / 600 V

1) If the MOVIDRIVE® MDR60A.. regenerative power supply unit is installed with the corresponding MOVIDRIVE® drive inverter.

5.2.4 Ambient temperature

The units are suitable for an ambient temperature of 40 °C, max. 60 °C with derated output current.

MOVIDRIVE® MDR60A..: To determine the output current rating at higher than 40 °C, the output current should be derated 3% per °C between 40 °C and 60 °C.

INFORMATION

Use only certified devices with a limited output voltage ($V_{\max} = \text{DC } 30 \text{ V}$) and limited output current ($I_{\max} = 8 \text{ A}$) as an external DC 24 V voltage source.

UL approval does not apply to operation in voltage supply systems with a non-earthed star point (IT systems).

5.2.5 Environmental Conditions

The units are for use in pollution degree 2 environments.

5.3 Special features of the DC link connection

The DC link carries a high DC voltage. Use 2 tightly twisted conductors or a 2-core shielded power cable. Select the cable cross section in accordance with the maximum permitted connection cross-section for the device. The nominal voltage of the cable is at least $V_0/V = \text{AC } 300/500 \text{ V}$.

The maximum length of the DC link connection is 10 m. Keep the connection as short as possible.

Observe country-specific and system-specific regulations when fusing the DC link or motor cables.

If the DC link terminals of the regenerative power supply are not sufficient for use as a supply and regenerative module, use a busbar subdistributor. The connections are made via terminals +UZ/-UZ. For regenerative power supplies, star-shaped wiring from the supply to the devices is required. For a detailed illustration, refer to chapter "Wiring diagrams" (→ 26).

If the MDR60A.. regenerative power supply is used as a brake module, connect the inverters exclusively to terminals +D/-D. Terminals +UZ/-UZ must not be assigned. For a detailed illustration, also refer to chapter "Wiring diagrams" (→ 26).

5.4 Selecting the residual current device

The device can cause a direct current in the PE conductor.

Proceed as follows to select the residual current device:

1. If using a residual current device is not mandatory according to the standards, SEW-EURODRIVE recommends not using a residual current device.
2. **WARNING! No reliable protection against electric shock if an incorrect type of residual current device is used. Severe or fatal injuries.** If a residual current device (residual current device RCD or residual current monitor RCM) is to be used, use an universal current sensitive RCD or RCM of type B.
3. If a residual current device is required, select the residual current device in accordance with the requirements for protecting persons, fire protection, or system protection. Observe the tripping characteristic, the deceleration, and the rated tripping current of the residual current device during selection.
4. During project planning, ensure that the operational leakage currents in the system are as low as possible.
5. If the operational leakage currents are too high, you can distribute the current supply among several residual current devices.

5.5 Polarity of the DC link connections

Ensure the correct polarity of the DC link connections. Reverse polarity of the DC link connections will destroy the connected units. The DC link connection carries a high DC voltage. Twist the DC link cables and route them only inside the control cabinet.

5.6 EMC-compliant installation

5.6.1 NF.. line filter

Observe the following information:

- Do not wire any other consumers between the line filter and the device.
- No switching is allowed between the line filter and the device.
- The connection cable between the line filter and the device does not have to be shielded.
- Limit the length of the cable between the line filter and the device to the required length.
- Always lay the cables before and after the line filter separately.
- **Under no circumstances** should the cables before and after the line filter be routed along the motor cable.

5.6.2 ND.. line choke

Observe the following information:

- The connection cable between line choke and inverter does not have to be shielded.
- Limit the length of the cable between the line choke and the line filter to the length that is absolutely necessary.

5.7 Evaluation of the ready signal

The ready for operation signal of the MDR60A.. regenerative power supply is revoked in the event of a thermal overload or power failure. There are 3 possible setups to respond to this signal. You can find these variants in the following subchapters.

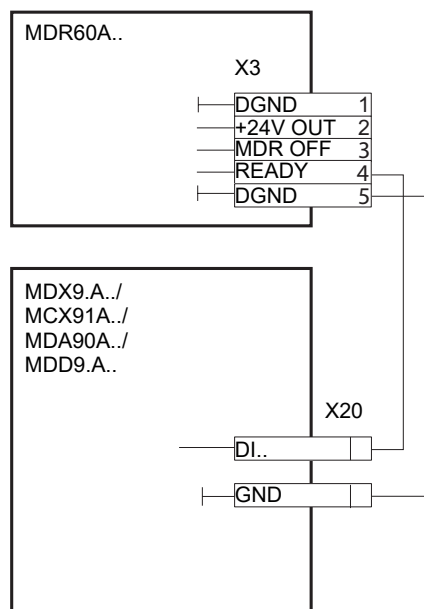
With variants 1 and 2, the focus is on thermal device protection. Variant 3 describes the controlled shutdown of the drives.

5.7.1 Variant 1: Immediate disconnection of the regenerative power supply from the supply system

To protect the MDR60A.. regenerative power supply against thermal overload, route the ready signal via the controller and thus switch off the line contactor of the regenerative power supply.

5.7.2 Variant 2: Immediate switch-off of the connected inverters

The following figure shows how to connect the MDR60A.. regenerative power supply to the inverter to evaluate variant 2. The "Ready" signal is connected to the "External fault" digital input.

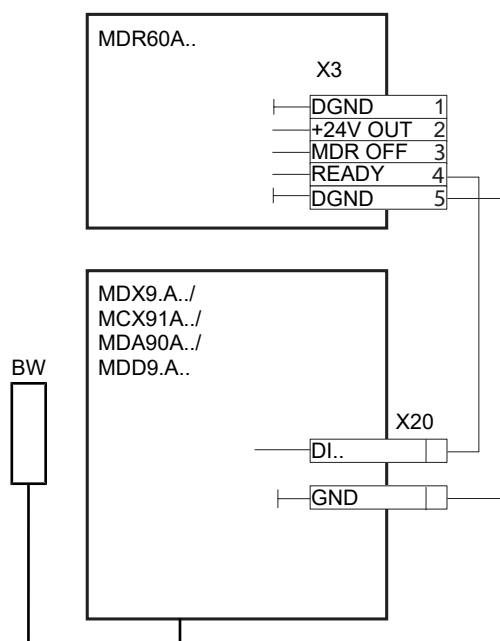


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The ready signal is applied to a digital input of all the connected inverters. For the parameterization and setting of the fault response, refer to chapter "Startup".

5.7.3 Variant 3: Stopping the connected inverters in a controlled manner

The following figure shows how to connect the MDR60A.. regenerative power supply to the inverter to evaluate variant 3. The "Ready" signal is connected to the "External fault" digital input. With this variant, you need a braking resistor (BW).



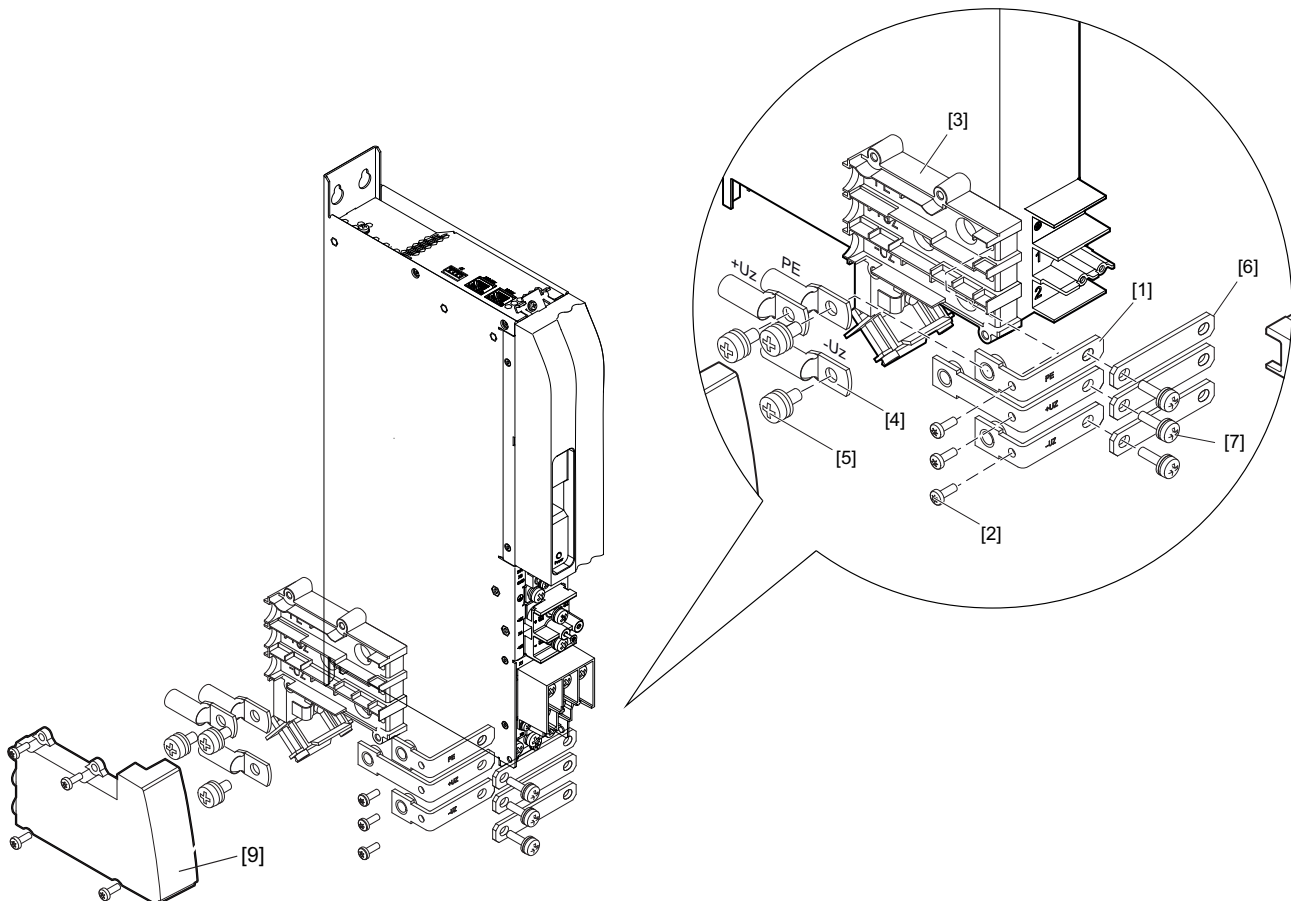
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The ready signal is applied to a digital input of all the connected inverters. For the parameterization and setting of the fault response, refer to chapter "Startup".

5.8 Connecting the brake module to MOVIDRIVE® modular

For connecting the MDR60A.. regenerative power supply to a MOVIDRIVE® modular MDP90A.. power supply module, you can use the connection set (28205952). You can use the DCP21A cable set (18131778) as the connection cable.

Install the connection set as shown in the following figure.



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- [1] Conductor rails
- [2] Screws
- [3] Insulator
- [4] Cable lugs from DCP21A
- [5] Screws
- [6] DC link busbars
- [7] Screws
- [9] Cover

5.9 Permitted tightening torques

Screw connection	Terminal	Tightening torques in Nm
Line connection	X1	1.8
DC link coupling	X2	1.8
Electronics terminals	X3	0.6
PE	PE	1.5
Safety cover	—	0.7

For the permitted tightening torques of the connected inverters, refer to the product manuals of the devices.

NOTICE

Failure to adhere to specified tightening torques.

Possible damage to the device.

- Always adhere to the specified tightening torques. Otherwise, excessive heat can develop which would damage the device.
- An excessive tightening torque can cause damage.

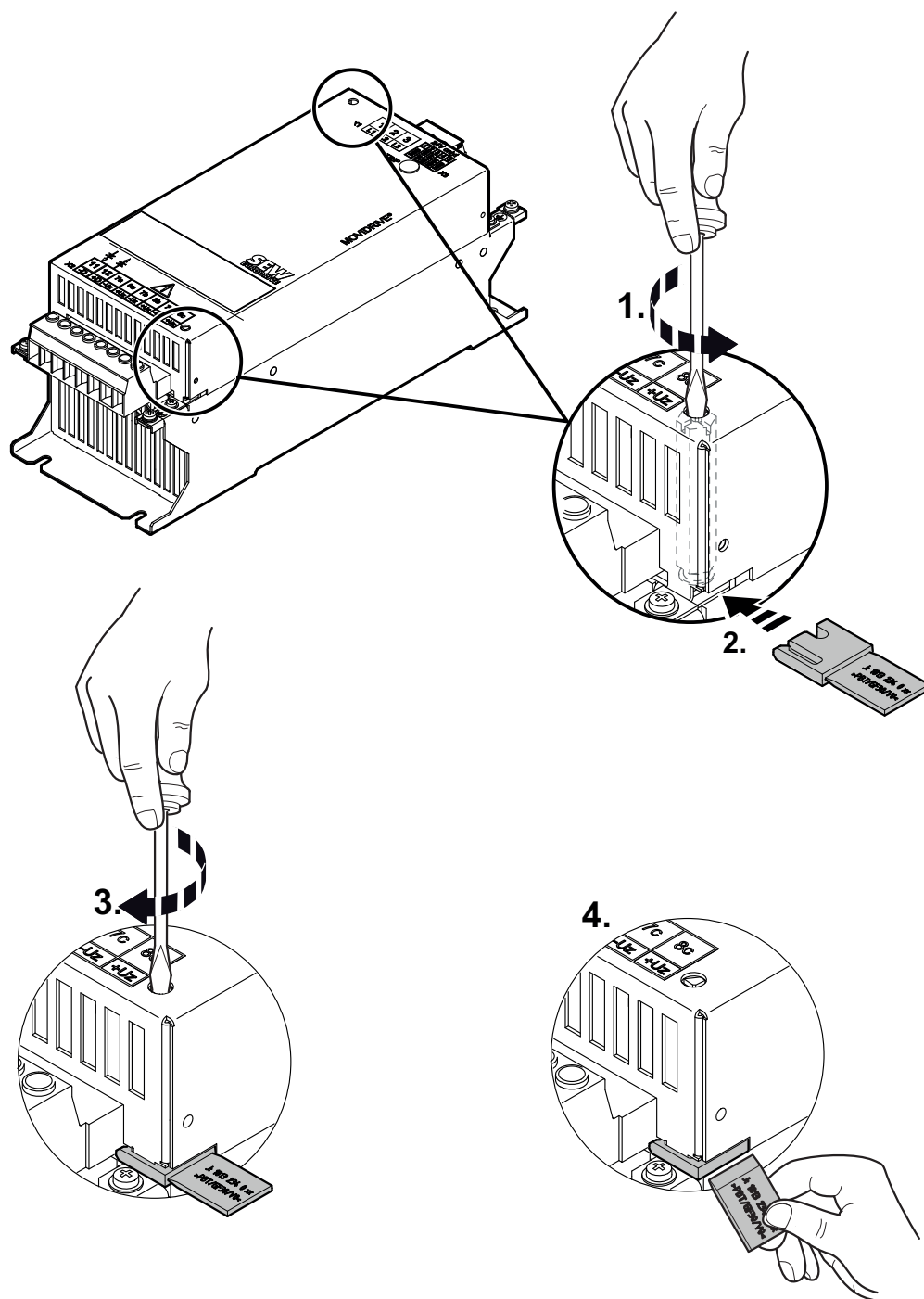
5.10 Permitted cable cross sections for the terminals

Designation	Terminal	Maximum cable cross section in mm ²
Line connection	X1	6
DC link coupling connection	X2	6
Signal terminal strip	X3	2.5

For the permitted cable cross sections of the connected inverters, refer to the product manuals of the devices.

5.11 Conversion into an IT network unit

Proceed as follows to convert the unit into an IT network unit:



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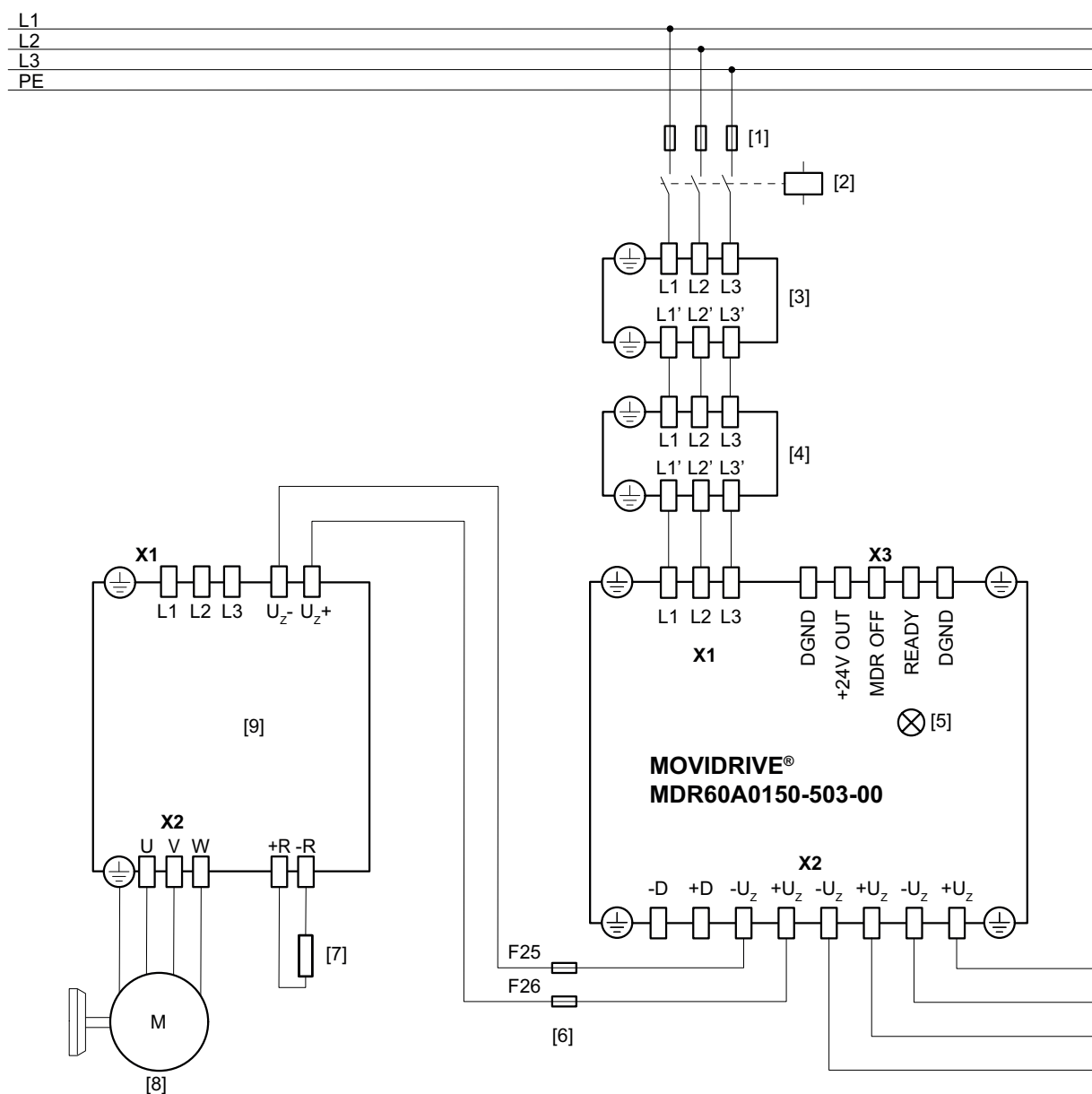
1. Loosen the two screws on the front side.
2. Insert the two isolation plates into the slot until they snap in.
3. Re-insert and tighten the two screws.
4. Brake the isolation plate at the pre-determined breaking point.

5.12 Terminal assignment

Terminal	Connection	Brief description
X1:1	L1	Line connection
X1:2	L2	
X1:3	L3	
⊕	PE	PE connection
X2:11	-D	DC link power connection via diode (Function as a brake module)
X2:12	+D	
X2:7a	-U _z	Direct DC link connection
X2:8a	+U _z	
X2:7b	-U _z	
X2:8b	+U _z	
X2:7c	-U _z	
X2:8c	+U _z	
X3:1	DGND	Reference potential
X3:2	DC +24 V output	24 V auxiliary voltage, only for supplying terminal X3:3
X3:3	Inhibit	Inhibit input
X3:4	Ready for operation	"Ready for operation" signal
X3:5	DGND	Reference potential

5.13 Wiring diagrams

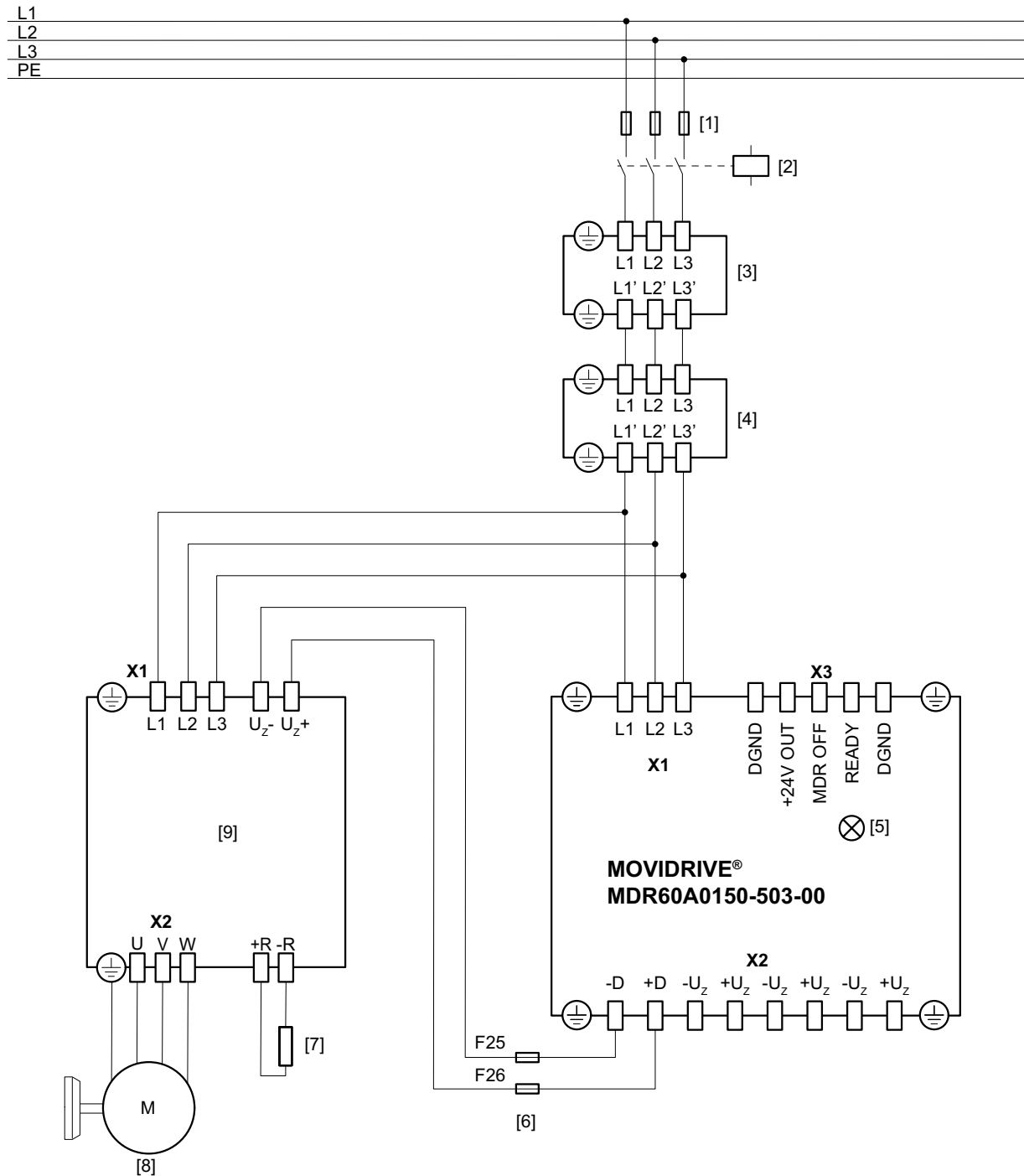
5.13.1 DC link connection with MDR60A.. regenerative power supply unit



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- [1] Line fuse
- [2] Line contactor
- [3] Line filter
- [4] Line choke
- [5] Status LED (TRIP)
- [6] Fuse for DC link
- [7] Braking resistor
- [8] Motor
- [9] Inverter

5.13.2 DC link connection with MDR60A.. regenerative power supply unit functioning as a brake module

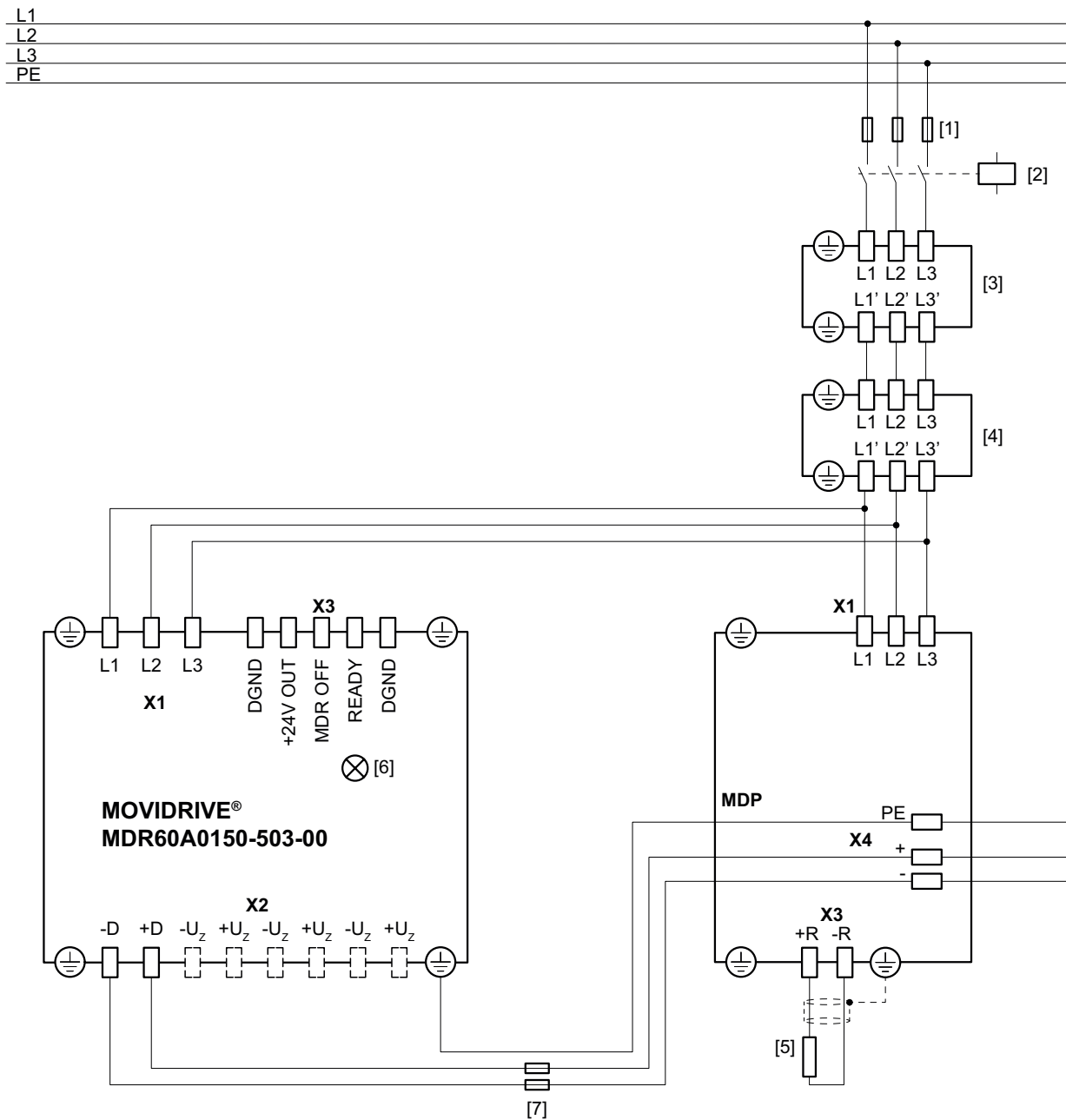


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- | | |
|-----|-------------------|
| [1] | Line fuse |
| [2] | Line contactor |
| [3] | Line filter |
| [4] | Line choke |
| [5] | Status LED (TRIP) |
| [6] | Fuse for DC link |

- [7] Braking resistor
- [8] Motor
- [9] Inverter

5.13.3 DC link connection with MDR60A.. regenerative power supply functioning as a brake module with MDP90A..



56633927051

- [1] Line fuse
- [2] Line contactor
- [3] Line filter
- [4] Line choke
- [5] Braking resistor
- [6] Status LED (TRIP)
- [7] Fuse for DC link

6 Startup

6.1 Startup information

Perform the following steps before startup:

1. **WARNING!** Electric shock caused by dangerous voltages. Severe or fatal injuries. De-energize the device. Observe the 5 safety rules in the chapter "Performing electrical work safely". Then wait at least 10 minutes.
2. **WARNING!** Risk of burns due to hot surfaces. Severe injury. Let the device and its accessories cool down before touching it.
3. Fit the protective covers of the system in accordance with regulations. This will avoid injuries.
⇒ Never start the device if the protective covers are not fitted.
4. With 3-phase devices, do not switch on the voltage supply more frequently than once every 60 seconds.

6.2 Evaluation of the ready signal

To protect the MDR60A.. regenerative power supply, the ready for operation signal must be evaluated. There are 3 options for evaluating the ready signal.

1. Immediate disconnection of the regenerative power supply from the supply system
The ready signal is transmitted directly to the controller. No additional settings are required on the device itself.
2. Immediate switch-off of the connected inverters
The ready signal is applied to a digital input of all the connected inverters. Parameterize this digital input to "External fault – active". Set the fault response to "Output stage inhibit".
3. Stopping the connected inverters in a controlled manner
The ready signal is applied to a digital input of all the connected inverters. Parameterize this digital input to "External fault – active". Set the fault response to either "Emergency stop + output stage inhibit" or "Application stop + output stage inhibit".

6.3 Startup of the inverters on an MDR60A.. supply and regenerative module

6.3.1 Settings on the device

For a DC link connection with MOVIDRIVE® system or MOVIDRIVE® technology inverters, the inverters can be configured as a module bus master or module bus slave. This configuration is made using the switch setting "S3 Module bus operating mode":

- If the switch is in the upper end position, the device is configured as a module bus master.
- If the switch is in the lower end position, the device is configured as a module bus slave.

If the MDR60A.. regenerative power supply is used as a supply and regenerative module, set the operating mode for all MOVIDRIVE® system or MOVIDRIVE® technology inverters to module bus master.

No special setting is required for MOVITRAC® advanced.

INFORMATION



Do not use a module bus cable to connect the inverters.

6.3.2 Settings in the MOVISUITE® engineering software

The following description requires the use of the MOVISUITE® engineering software. It is not possible to start up a DC link connection without the MOVISUITE® engineering software.

6.3.3 Configuring the voltage supply

Configure the voltage supply in the parameterization of the inverter under [Drive trains] > [Drive train 1] > [Controller]:

Proceed as follows:

1. In the *Voltage supply* parameter, select the setting "DC power or battery".
2. Enter the DC supply voltage in the *Nominal DC link voltage* parameter.
3. Activate the *DC link connection* parameter.
4. If more than one inverter is connected, enter the value that is specified by the overload capacity in the *Application limit – Apparent output current* parameter (see "Overload capacity").

6.3.4 Deactivating the line phase failure monitoring

Adjust the line phase failure monitoring under [Functions] > [Monitoring functions] > [Power supply monitoring]. Set the "Response to line phase failure" parameter to "No response".

6.3.5 Special features of size 5: DC link status information

If a size 5 device is connected to the MDR60A.. regenerative power supply, the inverter must receive the "Ready for operation" signal from the MDR60.. regenerative power supply. This information can be sent either via a digital input or a control bit in the process data.

Proceed as follows:

- Assign the "DC link ready" function to a digital input under [Functions] > [Inputs/Outputs] > [Basic unit].

or

- Assign the "DC link ready" function to a bit of the control word under [Functions] > [Setpoints] > [Control word].

If the DC link must not be connected to a load, the inverter remains in the "Not ready" state.

6.4 Startup of the inverters on the brake module

If only one inverter is connected to the brake module, only the voltage supply and the line voltage must be set via MOVISUITE®.

6.4.1 Settings for MOVIDRIVE® system or MOVIDRIVE® technology

For a DC link connection with MOVIDRIVE® system or MOVIDRIVE® technology inverters, the inverters must be configured as a module bus master or module bus slave. This configuration is made using the switch setting "S3 Module bus operating mode":

- If the switch is in the upper end position, the device is a module bus master.
- If the switch is in the lower end position, the device is a module bus slave.

Depending on the connection type, set the "S3 Module bus operating mode" switch as follows:

- Connection type A: In this configuration, both devices are set as module bus masters.
- Connection type B:
 - Set the large inverter on the supply system to module bus master.
 - Set the small inverter to module bus slave if the large inverter is a MOVIDRIVE® system or MOVIDRIVE® technology device.
 - Set the small inverter to module bus master if the large inverter is a MOVITRAC® advanced device.

For connection type A, you must not use a module bus cable.

A module bus cable is required for connection type B if 2 MOVIDRIVE® system or MOVIDRIVE® technology devices are connected.

6.4.2 Settings in the MOVISUITE® engineering software

The following description requires the use of the MOVISUITE® engineering software. It is not possible to start up a DC link connection without using the MOVISUITE® engineering software.

General settings for connection types A and B

The following settings are required for connection type A and connection type B.

Configure the voltage supply in the parameterization of the inverter under [Drive trains] > [Drive train 1] > [Controller]:

Proceed as follows:

1. In the *Voltage supply* parameter, select the setting "Grid directly".
2. In the *AC nominal voltage* parameter, enter the voltage of the AC grid.
3. Activate the *DC link connection* parameter.
4. In the *Application limit – Apparent output current* parameter, enter the value that is specified by the overload capacity (see "Overload capacity").

Additional settings for connection type B

The following settings are required for connection type B.

With connection type B, the setting for the power supply monitoring must be adjusted as soon as a MOVITRAC® advanced is present in the DC link connection:

1. Setting on the large inverter:
 - No adjustment required.
2. Setting on the smaller inverter:
 - Deactivate the fault response to line phase failure:

- In the parameterization, configure the fault response to line phase failure to the "No response" function under [Functions] > [Monitoring functions] > [Power supply monitoring] > [Response to line phase failure].

If a MOVITRAC® advanced is integrated into the DC link connection with connection type B, the larger inverter sends the information whether the DC link can be connected to a load. This information is transferred to the smaller inverter via a digital input or a control bit in the process data.

As long as the *DC link status* is set to [no load capacity], the smaller inverter remains in the [not ready] state. For this purpose, connect a suitably parameterized digital output of the larger inverter to a digital input of the smaller inverter.

5. Setting on the large inverter:

In the parameterization, configure a digital output to the "Ready for operation" function (8332.1) under [Functions] > [Inputs/outputs] > [Basic unit] > [Digital outputs].

6. Setting on the smaller inverter:

In the parameterization, configure a digital output to the "DC link ready" function (8332.4) under [Functions] > [Inputs/outputs] > [Basic unit] > [Digital outputs].

6.5 Startup of MDP90A.. on the brake module

The ready signal of the MDR60A.. regenerative power supply is evaluated on the axes of the MDA90A.. or MDD9.A.. axis module. For more information, refer to chapter "Evaluation of the ready signal" (→ 30).

7 Operation

7.1 Operating characteristics

The regenerative power supply unit permits safe operating characteristics at an overload capacity of $I_N = 150\%$ for at least 60 s when maintaining the power supply system prerequisites.

7.1.1 Inhibiting the DC-AC inverter of the regenerative power supply

To keep the grid disturbances low, the regenerative power supply automatically inhibits the DC-AC inverter if there is no regenerative power flow. Using a DC 24 V signal at terminal X3:3 (inhibit), the DC-AC inverter can also be inhibited.

For the MDR60A.. regenerative power supply, the minimum inhibit time is 1.5 s. If the DC 24 V signal is active for < 1.5 s, the regenerative power supply remains inhibited for 1.5 s. Afterwards, the regenerative power supply is enabled again immediately when the inhibition is removed.

To prevent rapid switch-on and switch-off processes, a minimum power-on time of 40 ms applies.

The regenerative power supply still reports the "ready" operating state while inhibited. Take this into account for the sequence control of your vehicle.

The MDR60A.. regenerative power supply can be operated if the regenerative power supply is inhibited via the digital input and the regenerative energy is discharged via braking resistors (operation like a frequency inverter).

INFORMATION



When using the MDR60A.. regenerative power supply as a brake module on MOVIDRIVE® modular with more than 5 axis modules, noise can develop if the axis modules are inhibited. To prevent this, SEW-EURODRIVE recommends to inhibit the MDR60A.. regenerative power supply via the binary input X3 if the axis system is inhibited. The inhibit must be removed when the axis is enabled.

8 Service

8.1 Status and operating displays of the LED

Supply system failures (affecting one or more phases) are detected within one supply system half-wave. The regenerative power supply function is inhibited and the ready signal revoked.

The return line voltage is also detected within one supply system half-wave. It is fed back automatically into the supply system after a switch-on delay of 200 ms. The ready signal is then set again.

The supply system rectifier of the regenerative power supply always remains active.

The ready signal is revoked when a thermal overload occurs in the regenerative power supply or in the event of a power failure. This ready signal must be evaluated in order to provide thermal protection for the regenerative power supply unit.

A braking resistor must be connected to the inverter to make it possible to bring the drives to a controlled stop in case of a line interruption or power failure. This resistor is only energized during braking when there is a line interruption.

Unit status / grid status	Response	Ready signal	Status LED (TRIP)
Power failure → MDR60A.. not ready or Unit fault	Power failure is detected under load within one supply system half-wave. Immediate regenerative power supply inhibit. Input rectifier remains switched on.	Not ready for operation	Red
Grid OK again and no unit fault → MDR60A.. ready	Grid OK is detected within one supply system half-wave. After a 200 ms switch-on delay ¹⁾ the regenerative power supply unit is automatically started.	Ready after 200 ms	Yellow

1) Guarantees safe operation in the event of contactor chatter.

8.2 Fault information

8.2.1 Regenerative power supply reset

After a switch-off the regenerative power supply is reset automatically.

Inverter

On the inverter, the response to "external error" results in an E26.01 "external error only with output stage approval" error message. This needs to be reset using the reset function.

8.3 SEW-EURODRIVE Service

If you are unable to rectify a fault, contact SEW-EURODRIVE Service. For addresses, refer to www.sew-eurodrive.com.

When contacting SEW-EURODRIVE Service, always specify the following information so that our service personnel can assist you more effectively:

- Information on the nameplate (e.g. type designation, serial number, part number, product key, purchase order number)
- Brief description of the application
- Error message on the status display
- Type of fault
- Accompanying circumstances
- Unusual events preceding the problems

8.4 Waste disposal

Dispose of the product and all parts separately in accordance with their material structure and the national regulations. Put the product through a recycling process or contact a specialist waste disposal company. If possible, divide the product into the following categories:

- Iron, steel or cast iron
- Stainless steel
- Magnets
- Aluminum
- Copper
- Electronic parts
- Plastics

The following materials are hazardous to health and the environment. These materials must be collected and disposed of separately:

- Oil and grease

Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.

- Screens
- Capacitors
- Rechargeable batteries
- Batteries

Waste disposal according to WEEE Directive 2012/19/EU

This product and its accessories may fall within the scope of the country-specific application of the WEEE Directive. Dispose of the product and its accessories according to the national regulations of your country.

For further information, contact the responsible SEW-EURODRIVE branch or an authorized partner of SEW-EURODRIVE.



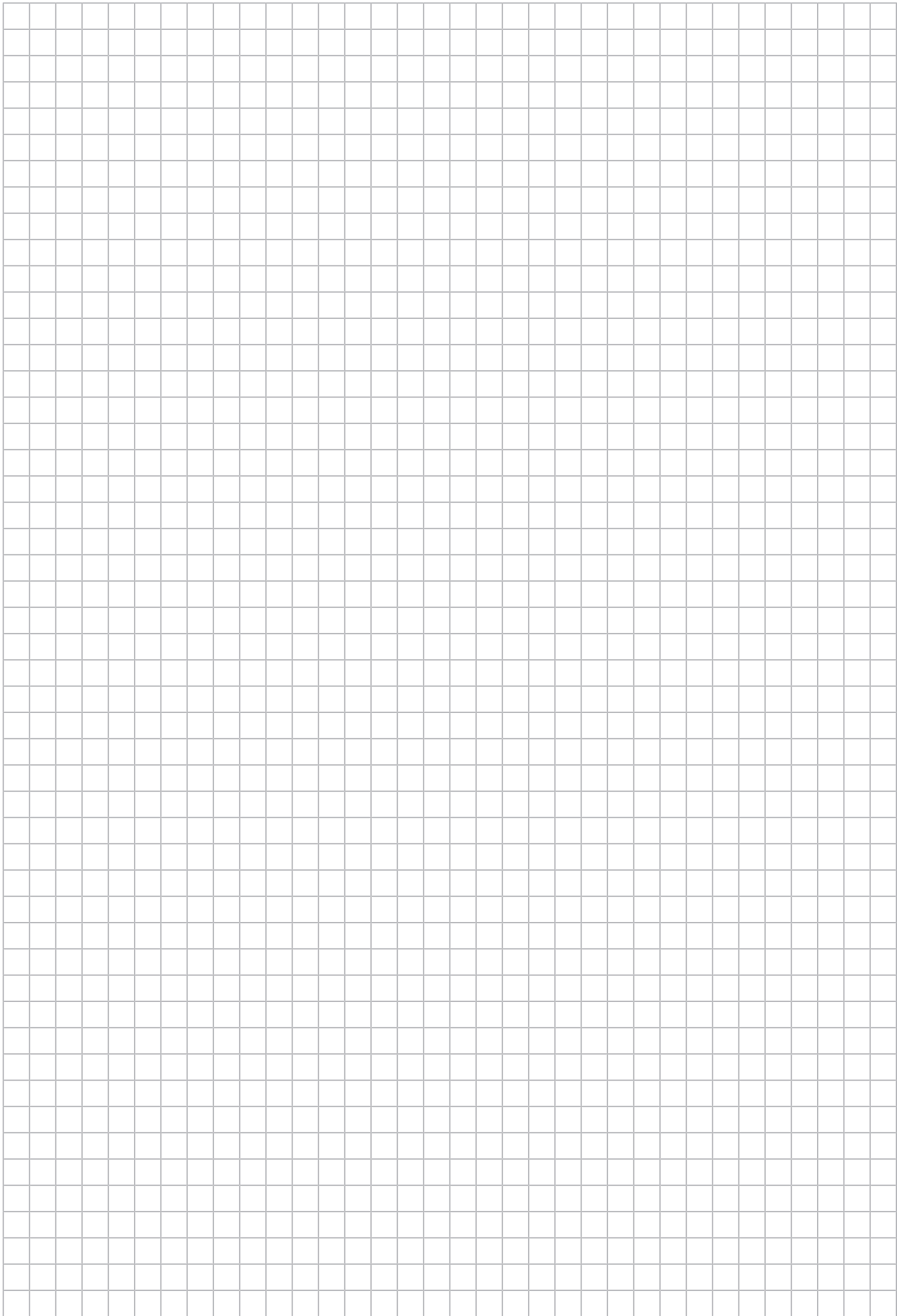
9 Inspection/maintenance

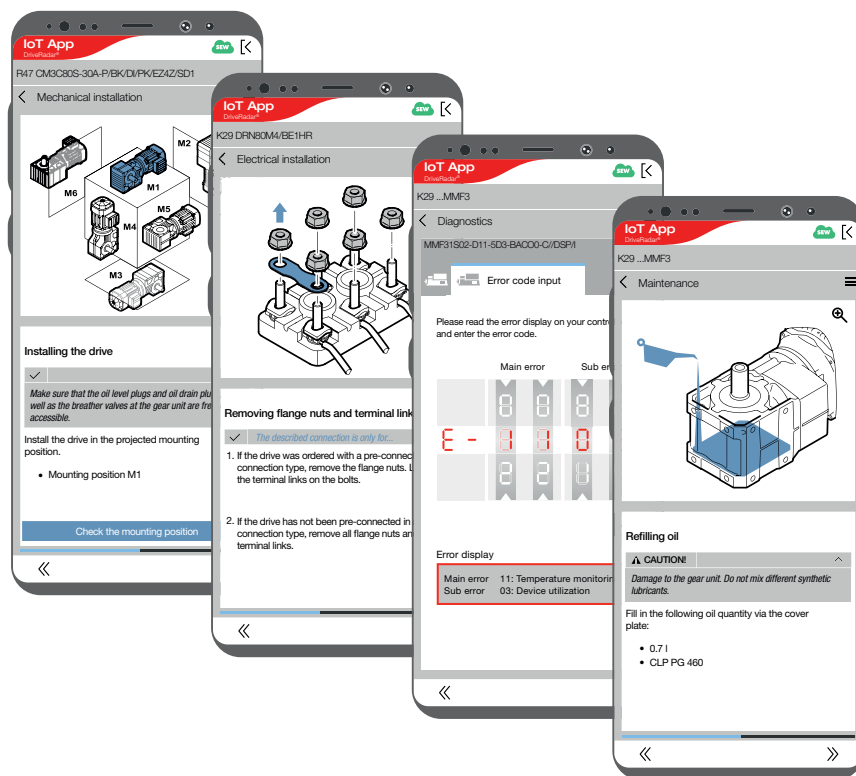
INFORMATION



Never open the device. Only SEW-EURODRIVE may perform repairs.

The device is maintenance-free. SEW-EURODRIVE does not stipulate any inspection work that has to be performed regularly.





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Driving the world

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