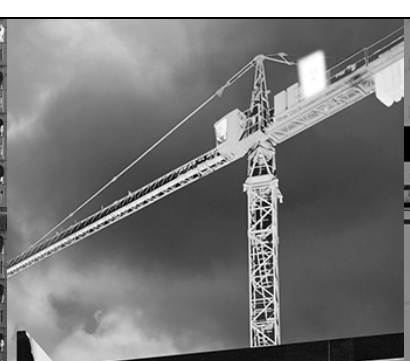
SEW EURODRIVE

Operating Instructions

MOVIDRIVE® MDR60A/61B Regenerative Power Supply Unit

Edition 06/2011

19300816 / EN

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Contents

1 General Information

1.1 Use of this documentation

The documentation is an integral part of the product and contains important information on operation and service. The documentation is written for all employees who assemble, install, startup, and service this product.

The documentation must be accessible and legible. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of the signal words

The following table shows the grading and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent danger	Severe or fatal injuries
⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries
⚠ **CAUTION**	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment
INFORMATION	Useful information or tip: Simplifies the handling of the drive system.	

1.2.2 Structure of the section-related safety notes

Section safety notes do not apply to a specific action, but to several actions pertaining to one subject. The used symbols indicate either a general or a specific hazard.

This is the formal structure of a section safety note:

⚠ SIGNAL WORD

Type and source of danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Structure of the embedded safety notes

Embedded safety notes are directly integrated in the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

- ⚠ **SIGNAL WORD** Nature and source of hazard.

  Possible consequence(s) if disregarded.

  – Measure(s) to prevent the danger.

1.3 Rights to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the documentation. Read the documentation before you start working with the unit!

1.4 Exclusion of liability

You must comply with the information contained in this documentation to ensure safe operation of the MOVIDRIVE® MDX60B/61B regenerative power supply unit and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of the documentation. In such cases, any liability for defects is excluded.

1.5 Copyright notice

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1.6 Product names and trademarks

All brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

2 Safety Notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and adhered to. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation or if you require further information, please contact SEW-EURODRIVE.

2.1 General

Never install or start up damaged products. Submit a complaint to the shipping company immediately in the event of damage.

During operation, regenerative power supply units can have live, bare and movable or rotating parts as well as hot surfaces, depending on their degree of protection.

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property.

Refer to the documentation for additional information.

2.2 Target group

Only qualified electricians are authorized to install, startup or service the units or correct unit faults (observing IEC 60364 or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 as well as national accident prevention guidelines).

Qualified personnel in the context of these basic safety notes are: All persons familiar with installation, assembly, startup and operation of the product who possess the necessary qualifications.

Any activities regarding transportation, storage, operation, and disposal must be carried out by persons who have been instructed appropriately.

2.3 Designated use

Regenerative power supply units are components intended for installation in electrical systems or machines.

In case of installation in machines, startup of the regenerative power supply unit (meaning the start of designated use) is prohibited until it is determined that the machine meets the requirements stipulated in the Machinery Directive 2006/42/EC; EN 60204 must be observed.

Startup (i.e. the start of designated use) is only permitted under observance of the EMC (2004/108/EC) directive.

Regenerative power supply units meet the requirements stipulated in the low voltage directive 2006/95/EC. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these drive inverters.

You must observe the technical data and information on the connection requirements as provided on the nameplate and in the documentation.

2.4 Transportation and storage

You must observe the notes on transportation, storage and proper handling. Observe the climatic conditions as stated in the section "General technical data".

2.5 Installation

The units must be installed and cooled according to the regulations and specifications in the corresponding documentation.

Protect the regenerative power supply units from improper strain. Ensure that components are not deformed and/or insulation spaces are maintained, particularly during transportation. Avoid contact with electronic components and contacts.

Drive inverters contain components that can be damaged by electrostatic energy and improper handling. Prevent mechanical damage or destruction of electric components (may pose health risk)

The following applications are prohibited unless the unit is explicitly designed for such use:

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications which are subject to mechanical vibration and impact loads in excess of the requirements in EN 61800-5-1.

2.6 Electrical connection

Observe the applicable national accident prevention guidelines when working on live drive inverters (for example, BGV A3).

Electrical installation is to be carried out in compliance with pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.

You will find notes on EMC compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, in the documentation of the drive inverters. Always observe these notes even with drive inverters bearing the CE marking. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

Protective measures and protection devices must comply with the regulations in force (e.g. EN 60204 or EN 61800-5-1).

Required preventive measure: Grounding the unit.

MOVIDRIVE® B, size 7 has an additional display LED under the lower front cover. The lit display LED indicates a DC link voltage. Do not touch power connections. Check that there is no voltage present before touching power connections even if the LED display indicates that there is no voltage.

2.7 Safe disconnection

The unit meets all requirements for safe disconnection of power and electronic connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection.

2.8 Operation

Systems with integrated regenerative power supply units must be equipped with additional monitoring and protection devices according to the applicable safety guidelines,

such as the law governing technical equipment, accident prevention regulations, etc. The operating software may be used to make changes to the drive inverter.

Do not touch live components or power connections immediately after disconnecting the drive inverters from the supply voltage because there may still be some charged capacitors. Note the respective reference plates on the drive inverter.

Keep all covers and doors closed during operation.

The fact that the status LED and other display elements (such as the display LED on size 7 units) are no longer illuminated does not indicate that the unit has been disconnected from the power supply and no longer carries any voltage.

Check that there is no voltage present before touching power connections even if the LED display indicates that there is no voltage.

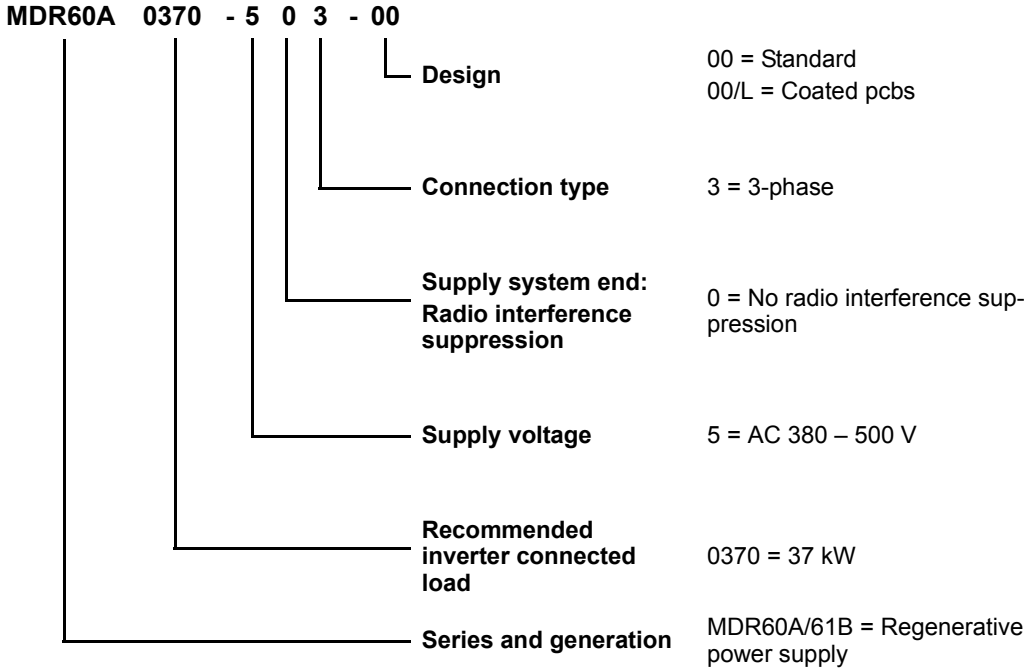
Mechanical blocking or internal safety functions of the unit can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive restarting automatically. If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the supply system before correcting the error.

3 Unit Structure

3.1 Type designation, nameplates and scope of delivery

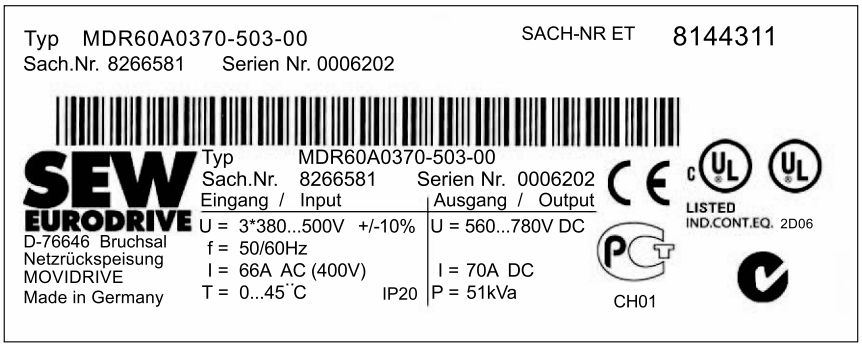
3.1.1 Type designation

The following diagram shows the type designation of the MOVIDRIVE® MDX60/61B regenerative power supply unit:



3.1.2 Example: Nameplate sizes 2 - 4

With MDR60A size 2 – 4, the nameplate is locate on the front of the device.



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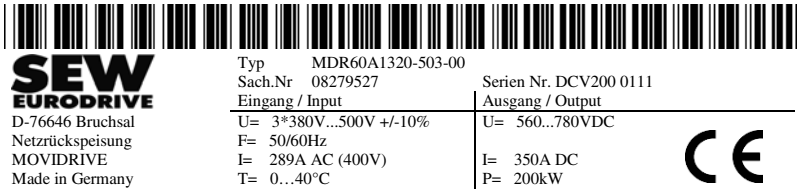
3.1.3 Example: Nameplate size 6

With MDR60A size 6, the nameplate is locate on the front of the device.



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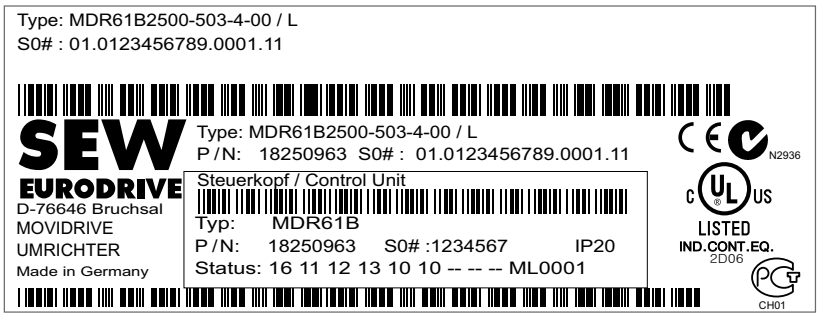
3.1.4 Example: System nameplate size 7

With MDR61B size 7, the system nameplate is located on the top front cover.



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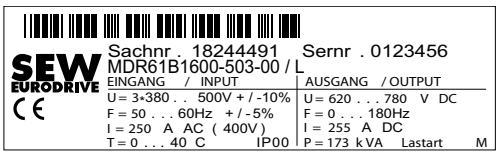
3.1.5 Example: Nameplate power section size 7

With MDR61B size 7 the power section nameplate is located top left in the device.



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3.2 Scope of delivery

3.2.1 Size 2

- 1 mounting bracket
- 2 pieces isolation plates
- 2 pieces terminal clips
- 2 pan head screws
- 3 cable ties
- 3 pluggable terminals

3.2.2 Size 3

- no additional scope of delivery.

3.2.3 Size 4

- 2 covers
- 2 cover plates
- 4 neck collar screws
- 8 pan head screws
- 1 cover plates
- 1 screen
- 4 pan head screws

3.2.4 Size 6

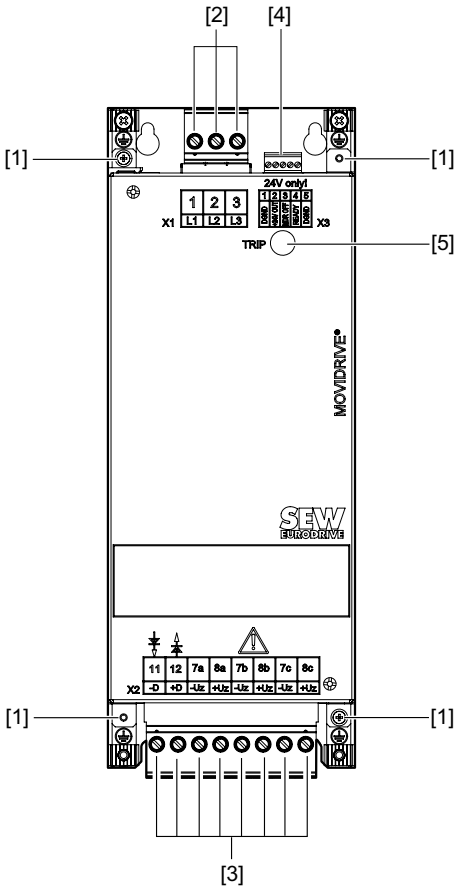
- 5 FR-2 plates for isolating the power terminals
- 5 plastic caps for covering the power terminals

3.2.5 Size 7

- 1 shielding plate
- 2 contact clips
- 3 pan head screws

3.3 Size 2

MOVIDRIVE® MDR60A0150-503-00(/L)



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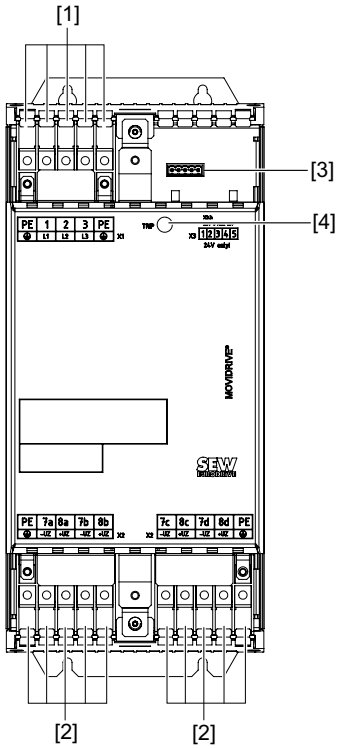
[1] PE connection
[2] X1: Power supply connection 1/L1, 2/L2, 3/L3
[3] X2: DC link connection
[4] X3: Signal terminal strip binary inputs and outputs
[5] Status LED

3.4 Size 3

MOVIDRIVE® MDR60A0370-503-00(/L)



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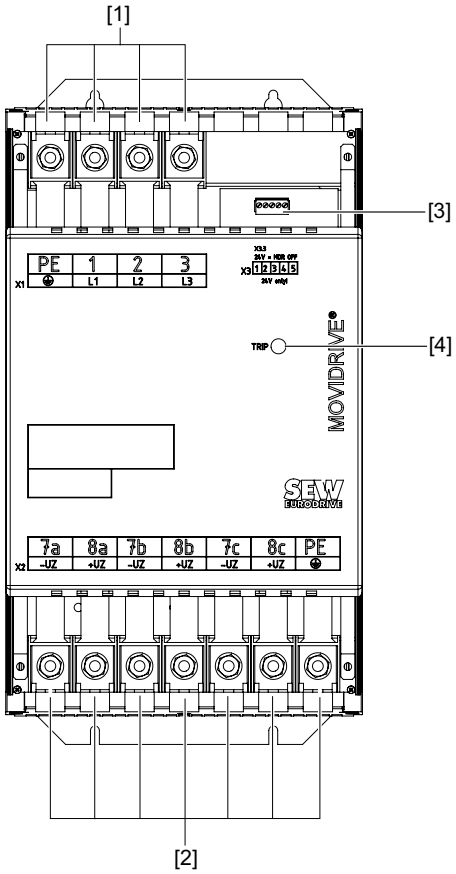
[1] X1: Line connection 1/L1, 2/L2, 3/L3 and PE connection
[2] X2: DC link connection and PE connection
[3] X3: Signal terminal strip binary inputs and outputs
[4] Status LED

3.5 Size 4

MOVIDRIVE® MDR60A0750-503-00(/L)



[1] X1: Line connection 1/L1, 2/L2, 3/L3 and PE connection

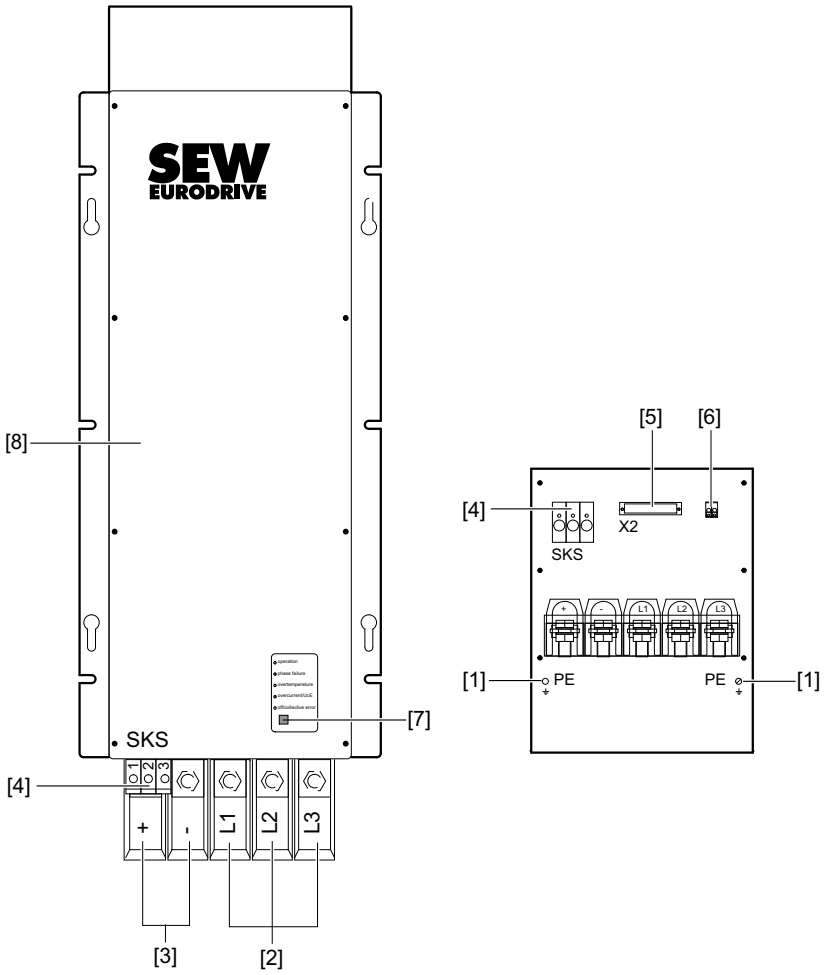
[2] X2: DC link connection and PE connection

[3] X3: Signal terminal strip binary inputs and outputs

[4] Status LED

3.6 Size 6

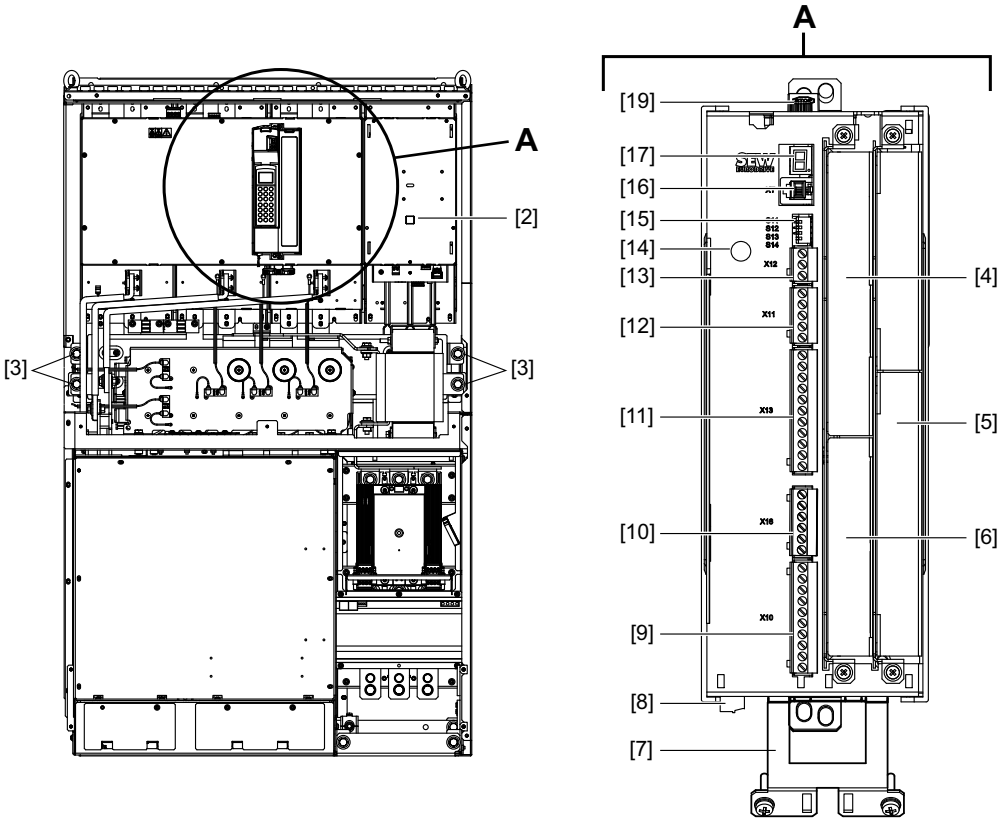
MOVIDRIVE® MDR60A1320-503-00



[1] PE connection
[2] line connection 1/L1, 2/L2, 3/L3
[3] Connection for DC link coupling $-U_Z$ $+U_Z$
[4] Terminal strip SKS (do not wire!)
[5] Signal terminal strip binary inputs and outputs
[6] Inhibit input A1/A2
[7] Status LED
[8] Voltage selection switch (internal)

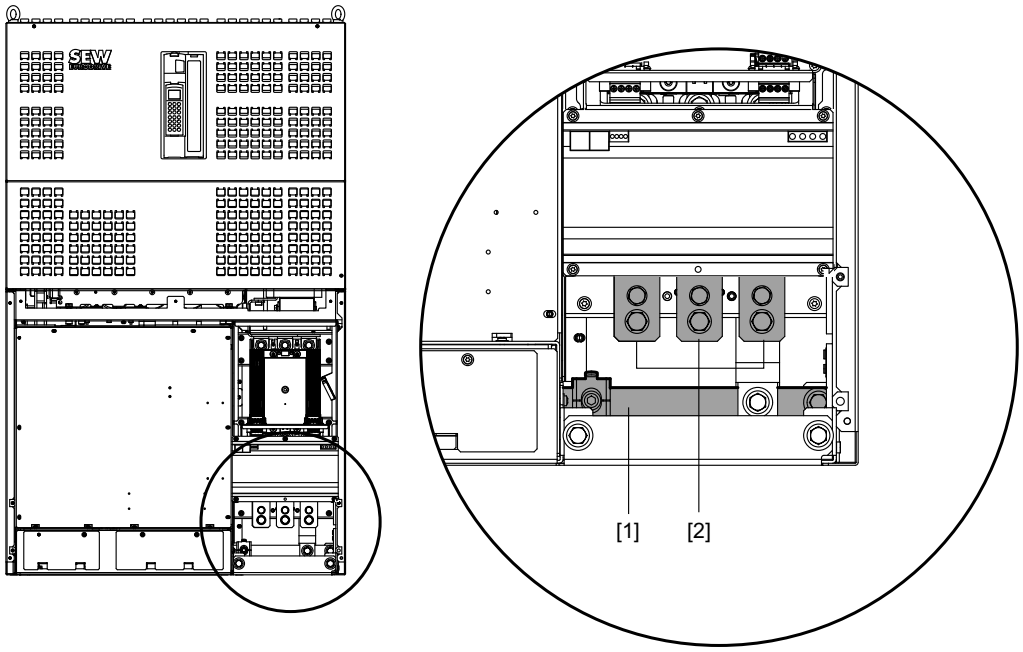
3.7 Size 7

MOVIDRIVE® MDR61B1600-503-00/L and MDR2500-503-00/L



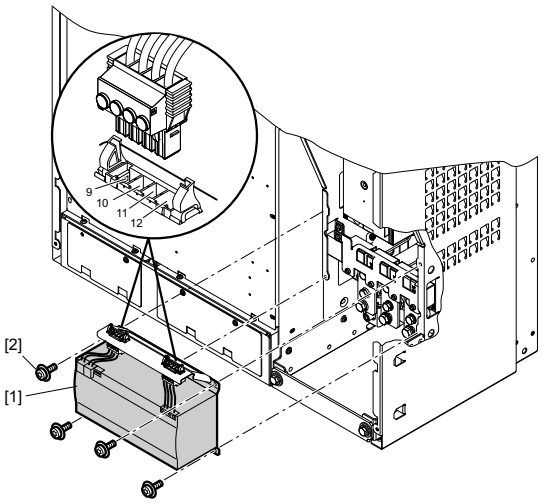
[2] DC link voltage display
[3] Connection for DC link coupling $-U_Z$ $+U_Z$
[4] Fieldbus slot (cannot be used)
[5] Extension slot (cannot be used)
[6] Encoder slot (cannot be used)
[7] Shield clamp for signal cables
[8] X17: Signal terminal strip for safety contacts for safe stop
[9] X10: Signal terminal strip binary outputs
[10] X16: Signal terminal strip binary outputs
[11] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[12] no function
[13] X12: Signal terminal strip system bus (SBus)
[14] Grounding screw M4 × 14
[15] DIP switches S11 ... S13 (S14 no function
[16] XT: Slot for DBG60B keypad or UWS21B serial interface
[17] 7-segment display
[19] Memory card

3.7.1 MOVIDRIVE® MDR61B power connections



[1] PE connection rail (thickness = 10 mm)
[2] X1: Power supply connection 1/L1, 2/L2, 3/L3

3.7.2 MOVIDRIVE® MDR61B switched-mode power supply unit



[1] DC power supply unit
[2] Screw

4 Installation (MDR60A0150/0370/0750 and MDR61B1600/2500)

This chapter illustrates the installation of the following regenerative power supply units:

- MOVIDRIVE® MDR60A0150-503-00
- MOVIDRIVE® MDR60A0370-503-00
- MOVIDRIVE® MDR60A0750-503-00
- MOVIDRIVE® MDR61B1600-503-00/L
- MOVIDRIVE® MDR61B2500-503-00/L

4.1 Installation notes

- **You must observe the safety notes during installation**
- **In order to protect the MDR60A/61B regenerative power supply unit, you have to evaluate the ready signal (→ chapter "Startup").**
- **For operation with MOVIDRIVE® MDR60A/61B, do not connect the power supply connections of the individual MOVIDRIVE® MDX60B/61B inverters to the power supply! (the MOVIDRIVE® MDR60A0150-503-00 installed as a brake module is excepted)**

⚠ WARNING

During operation, the heat sink temperature may rise to more than 70 °C.

Risk of burns and fire.

- Choose a suitable installation location.
- Do not touch the heat sink.

4.1.1 Tightening torques

- Only use **genuine connection elements**. Observe the **permitted tightening torques** of the power terminals for MOVIDRIVE® inverters.

4.1.2 Minimum clearance and mounting position

- Observe the minimum wire bending spaces in accordance with EN 61800-5-1.
- Only install the units **vertically**. You must not install them horizontally, tilted or upside down.
- Ensure unobstructed cooling air supply and make sure that the units are not subjected to heated air from nearby components.
- Observe the following clearances:
  - **MDR60A0150/0370:** Above and below at least 100 mm (3.9 in).
  - **MDR60A0750 and MDR61B1600/2500:** Above at least 100 mm (3.9 in). With temperature-sensitive components such as contactors or fuses, at least 300 mm (11.8 in).
  - No clearance required on the side The units can be arranged directly next to one another.

4.1.3 Separate cable ducts

- Route **power cables** and **electronics cables** in **separate cable ducts**.

4.1.4 Fuses and earth-leakage circuit breaker

- Install the **input fuses at the beginning of the supply system lead** after the supply bus junction (observe the wiring diagram for basic unit, power section and brake).
- SEW-EURODRIVE recommends not to use earth-leakage circuit breakers in plants with frequency inverters as an earth-leakage circuit breaker reduces the plant availability.

⚠ WARNING

Wrong type of earth-leakage circuit breaker installed.

Severe or fatal injuries.

The unit can cause direct current in the protective earth. If you use an earth-leakage circuit breaker (FI) for protection in the event of direct or indirect contact, you may only connect a type B earth-leakage circuit breaker (FI) on the supply side of the device.

4.1.5 Polarity of the DC link connections

- You must observe the **correct polarity of the DC link connections. False polarity** of the DC link connections will cause **irreparable damage to the connected units!** The DC link connection carries a high DC voltage (approximately 900 V). Twist the DC link cables and only route them inside the control cabinet.

4.1.6 Connecting inverters to the MOVIDRIVE® MDR60A/61B regenerative power supply unit

- If you use cables to connect inverters to the regenerative power supply unit, you have to connect the inverters in **star connection**. Make sure to consult the installation notes in the operating instructions for the inverter.

4.1.7 Permitted mounting the braking resistors

⚠ WARNING

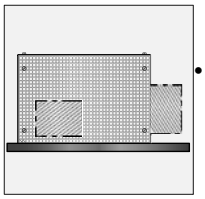
Non-permissible installation might lead to an accumulation of heat in the braking resistor due to reduced convection. A tripping temperature contact or an overheated braking resistor can lead to a system standstill.

Adhere to the following minimum distances:

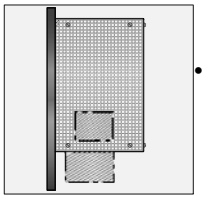
- About 200 mm to adjacent components and walls
- About 300 mm to above components/ceilings

Grid resistors

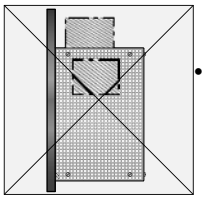
You must fulfill the following requirements for mounting the grid resistors:



- **Permitted**: Mounting on horizontal surfaces.



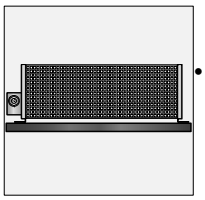
- **Permitted**: Mounting on vertical surfaces with terminals pointing downwards when there is a perforated sheet at the top.



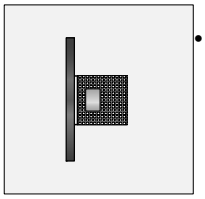
- **Not permitted**: Mounting on vertical surfaces with terminals pointing upwards, to the right or left. (The connection terminals can be placed within the steel grid, where appropriate. Ensure the proper position of connection terminals also in this case).

Wire resistors

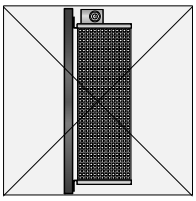
You must fulfill the following requirements for mounting the wire resistors:



- **Permitted**: Mounting on horizontal surfaces.



- **Permitted**: Mounting on vertical surfaces when there is a perforated sheet at the top or connection terminals at the bottom



- **Not permitted**: Mounting on vertical surfaces when the connection terminals are at the top.

4.1.8 Connection of braking resistors

- Use **two tightly twisted leads or a 2-core shielded power cable**. Cable cross section according to trip current I_F of F16. The rated voltage of the cable must amount to at least V_0/V = 300 V / 500 V (in accordance with DIN VDE 0298).
- Protect the braking resistor (except for BW90-P52B) using a **bimetallic relay** (→ wiring diagram for basic unit, power section and brake). Set the **trip current** according to the **technical data of the braking resistor**. SEW-EURODRIVE recommends using an overcurrent relay from trip class 10 or 10A in accordance with EN 60947-4-1.
- For braking resistors of the **BW...-T / BW...-P** series, the **integrated temperature switch/overcurrent relay can be connected using a 2-core shielded cable** as an **alternative** to a bimetallic relay.
- **Flat-type braking resistors** have internal thermal overload protection (fuse which cannot be replaced). Install the **flat-type braking resistors** together with the appropriate **touch guard**.

4.1.9 Operating braking resistors

- The connection leads to the braking resistors carry a **high pulsed DC voltage** during rated operation.

⚠ WARNING

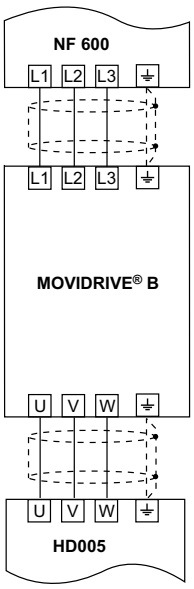
The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_N.

Risk of burns and fire.

- Choose a suitable installation location. Braking resistors are usually mounted on top of the control cabinet.
- Do not touch the braking resistors.

4.1.10 EMC-compliant installation

- All cables except for the supply system lead must be **shielded**. As an alternative to the shielding, the option HD.. (output choke) can be used for the motor cable to achieve the emitted interference limit values. .



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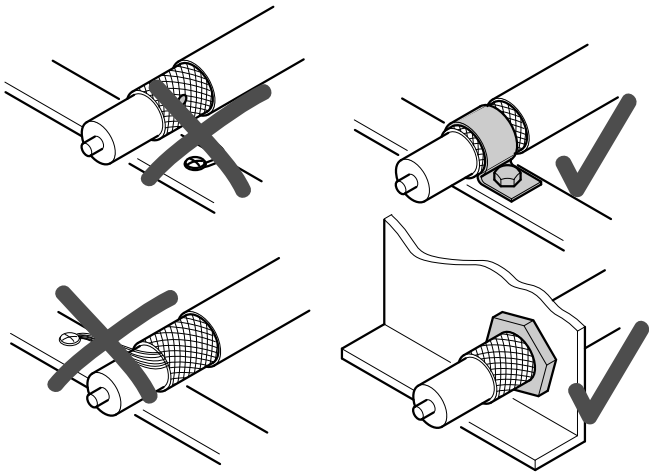
Shielded cables

- When using shielded motor cables, e.g. prefabricated motor cables from SEW-EURODRIVE, you must keep the **unshielded conductors between the shield and connection terminal of the inverter as short as possible**.
- Apply the **shield by the shortest possible route and make sure it is grounded over a wide area at both ends**. Ground one end of the shield using an interference suppression capacitor (220 nF/50 V) to avoid ground loops. If using double-shielded cables, ground the outer shield on the inverter end and the inner shield at the other end.



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Correct shield connection using metal clamp (shield clamp) or cable gland

- You can also use **earthed sheet-metal ducts or metal pipes** to **shield the cables**. **Route** the **power and signal cables separately**.
- Ground the **inverter** and **all additional units to ensure high-frequency compatibility** (wide area, metal-on-metal contact between the unit housing and ground, e.g. unpainted control cabinet mounting panel).

INFORMATION

- MOVIDRIVE® B is a product with restricted availability in accordance with EN 61800-3. It may cause EMC interference. In this case, it is recommended for the operator to take suitable measures.
- For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

NF.. line filter

- With the NF.. line filter option, the MOVIDRIVE® MDR60A/61B regenerative power supply unit size 2, 3, and 7 can meet the requirements of limit value class C2.
- Do not switch between the line filter and the MOVIDRIVE® MDX60A/61B regenerative power supply unit.
- Install the **line filter close to the regenerative power supply unit** but outside the minimum clearance for cooling.
- Keep the **length of the cable between the line filter and regenerative power supply unit to an absolute minimum**, and never more than 400 mm. Unshielded, twisted cables are sufficient. Use unshielded cables for the supply system connection as well.

Interference emission category

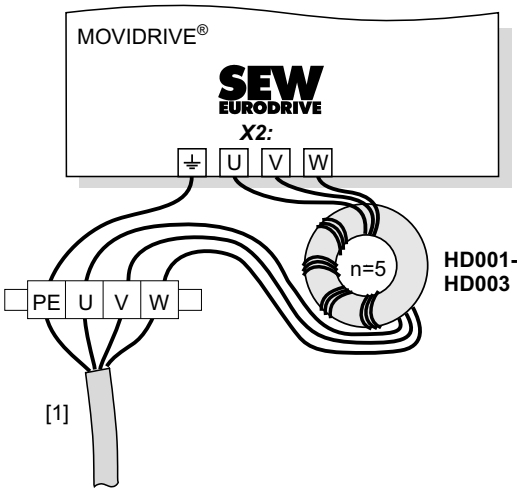
Compliance with category C2 according to EN 61800-3 has been tested in a CE typical drive system. SEW-EURODRIVE can provide detailed information on request.

NOTICE

This product can cause high-frequency interferences in residential areas which can require measures for interference suppression.

HD... output choke

- Install the **output choke close to the inverter** but outside the minimum clearance for cooling.
- For HD001 ... HD003: Route **all three phases (U, V, W) of the motor cable [1] through the output choke**. To achieve a higher filter effect, **do not route the PE conductor through the output choke**.



1804844811

Connection of output choke HD001 – HD003

[1] Motor cable

4.1.11 Installation notes for size 7

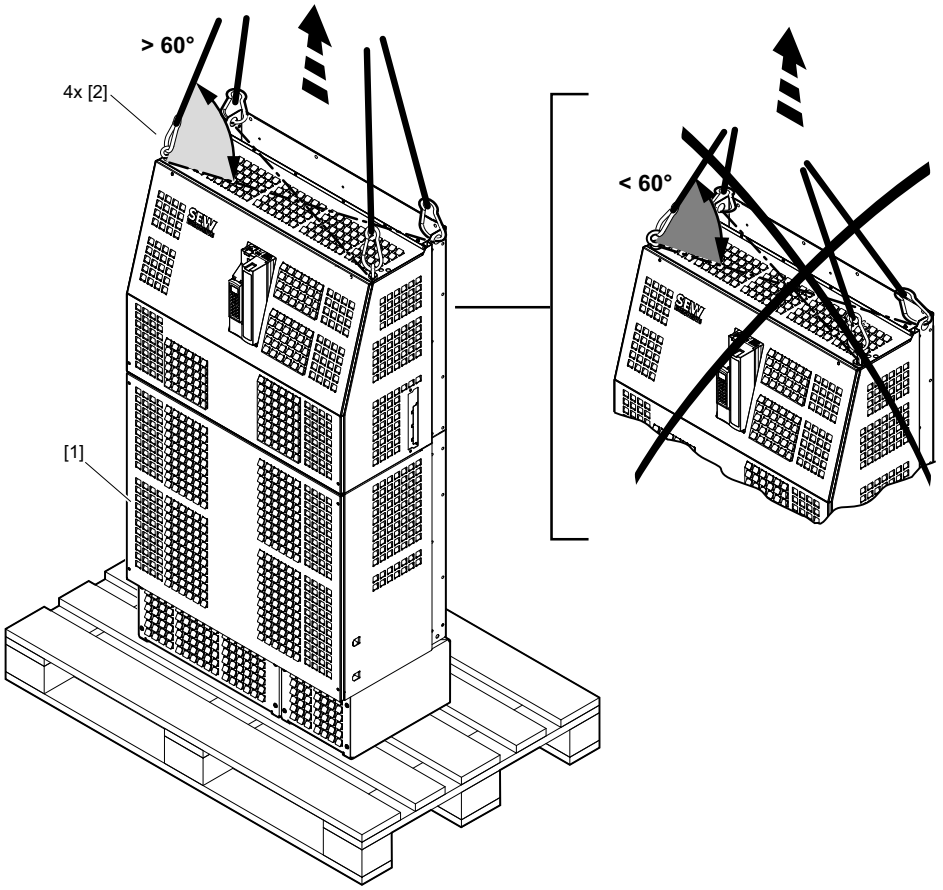
MOVIDRIVE® units size 7 (1600 - 2500) have 4 fixed eyebolts [2] for transport. You may only use these 4 lifting eyes [2] for installation.

⚠ WARNING

Suspended load.

Danger of fatal injury if the load falls.

- Do not stand under the suspended load.
- Secure the danger zone.
- Always use all 4 lifting eyes.
- Align the lifting eyes with the direction of tension



2077398155

[1] Installed front cover
[2] 4 lifting eyes

4.2 Information regarding UL

4.2.1 Power terminals

- MOVIDRIVE® MDR60A0150 – 0750 and MOVIDRIVE® MDR61B1600 – 2500: Only use copper cables with a rated thermal value of 60/75 °C.
- Tighten terminals to in-lbs (Nm) as follows:

MOVIDRIVE®	Size	in-lbs	Nm
MDR60A/61B	2	16	1.8
	3	31	3.5
	4	120	14
	7	620	70

4.2.2 Short circuit current rating

- Suitable for the use in current circuits with a maximum short circuit current of 200000 A:
  - MOVIDRIVE® MDR60A0150 – 0750 and MOVIDRIVE® MDR61B1600 – 2500 if they are installed with the corresponding MOVIDRIVE® inverter.

    Max. voltage is limited to 500 V.

4.2.3 Branch circuit protection

Integral solid state short circuit protection does not provide branch circuit protection. 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/61B

MOVIDRIVE® MDR60A/61B	Max. line short circuit current[1)]	Max. line voltage	Max. fuse rating
0150	AC 200000 A	AC 500 V	AC 50 A / 600 V
0370	AC 200000 A	AC 500 V	AC 100 A / 600 V
0750	AC 200000 A	AC 500 V	AC 175 A / 600 V
1600	AC 200000 A	AC 500 V	AC 400 A / 600 V
2500	AC 200000 A	AC 500 V	AC 600 A / 600 V

1) If the MOVIDRIVE® MDR60A/61B regenerative power supply unit is installed with the corresponding MOVIDRIVE® inverter.

4.2.4 Ambient temperature

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

MOVIDRIVE® MDR60A0150 – 0750: To determine the output current rating at higher than 40 °C, the output current should be derated 3.0 % per °C between 40 °C and 60 °C.

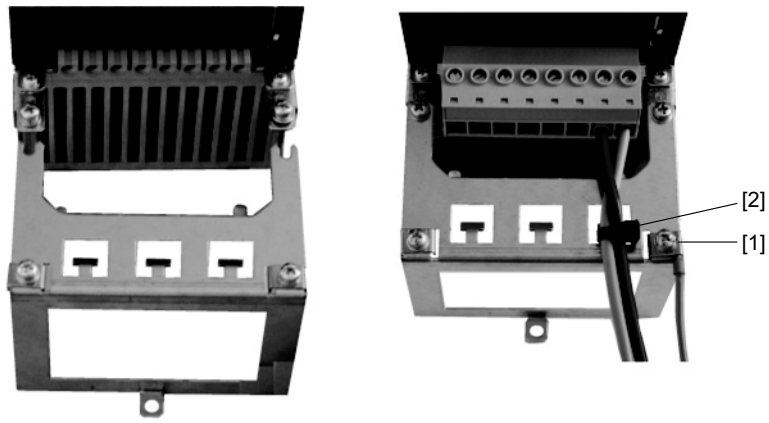
MOVIDRIVE® MDR61B1600 – 2500: To determine output current rating at higher than 40 °C, the output current should be derated 2.5% per °C between 40 °C and 50 °C, and 3% per °C between 50 °C and 60 °C.

	INFORMATION
	• Use only tested units with a **limited output voltage** (U_{max} = DC 30 V) and **limited output current** (I_{max} = 8 A) as an **external DC 24 V voltage source**. • **UL certification does not apply to operation in voltage supply systems with a non-grounded star point (IT systems).**

4.3 Strain relief

4.3.1 Strain relief for MOVIDRIVE MDR60A0150-503 size 2

MOVIDRIVE® MDR60A0150-503 size 2 is provided with a strain relief as standard. Install this strain relief with the retaining screw of the device.

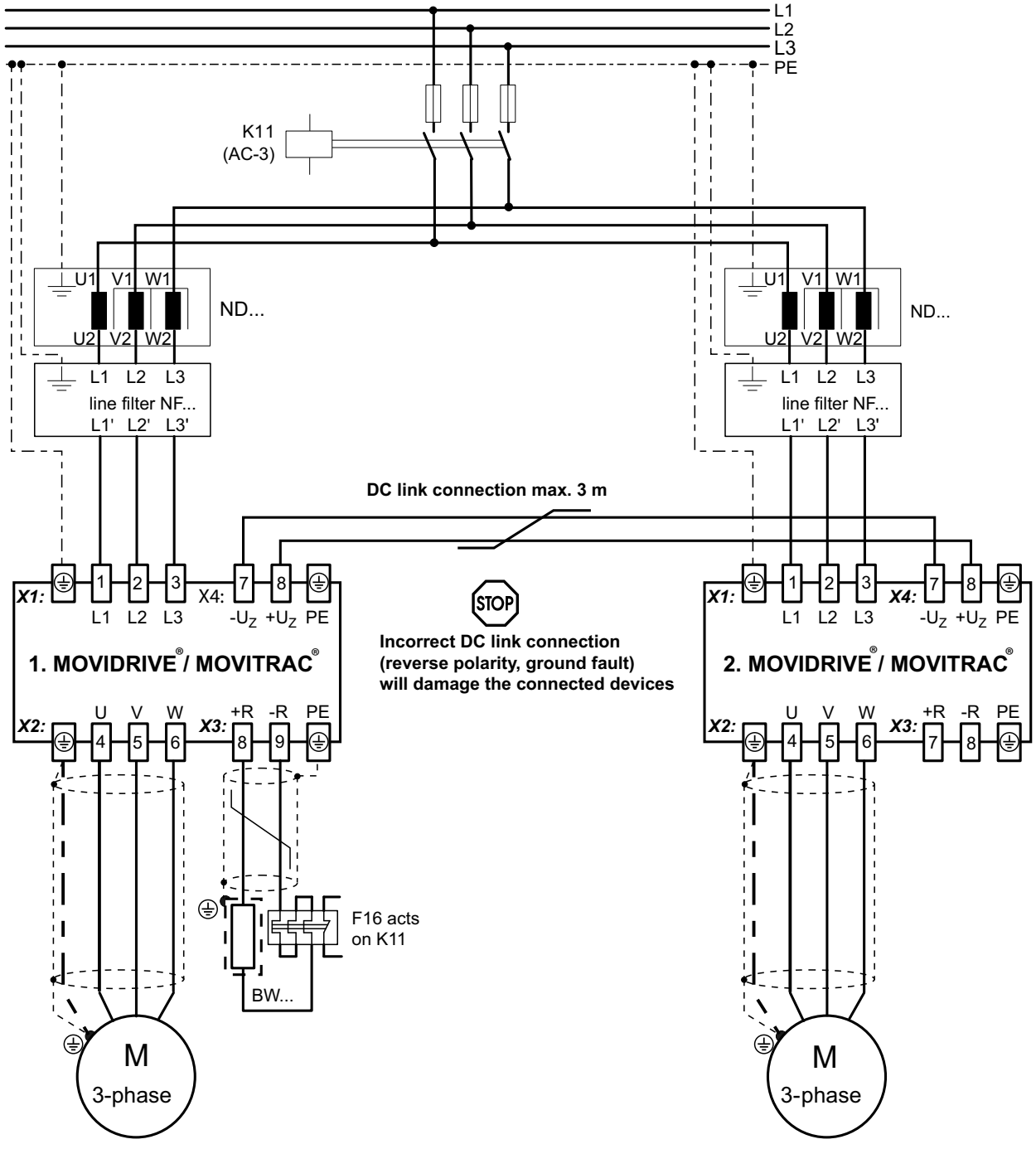


[1] Strain relief

[2] PE connection

4.4 Wiring diagrams

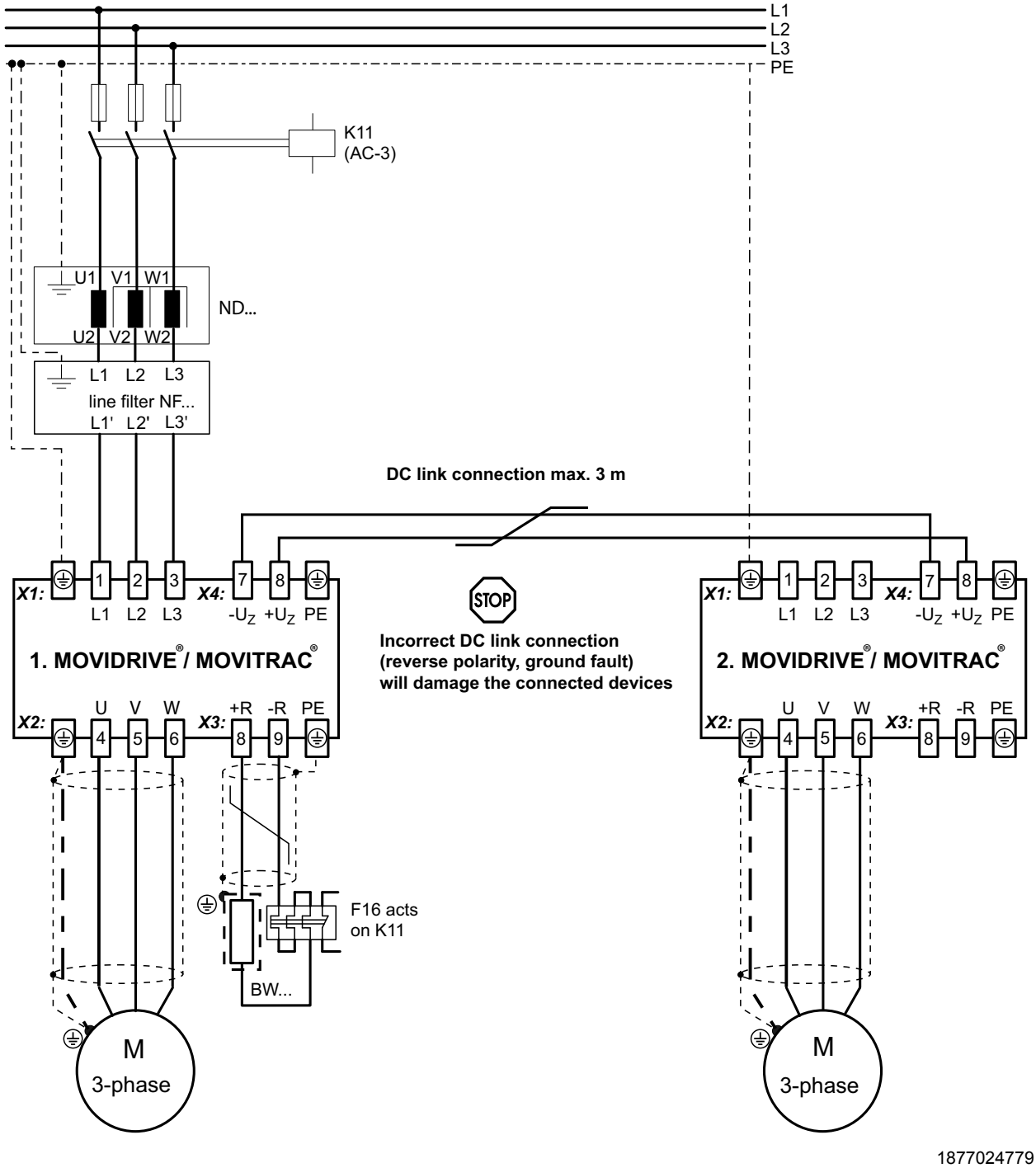
4.4.1 DC link connection without MDR60A/61B regenerative power supply unit in connection type A



INFORMATION

- MOVIDRIVE® MDX61B1600/2000/2500 size 7 must be installed without line choke (ND..).

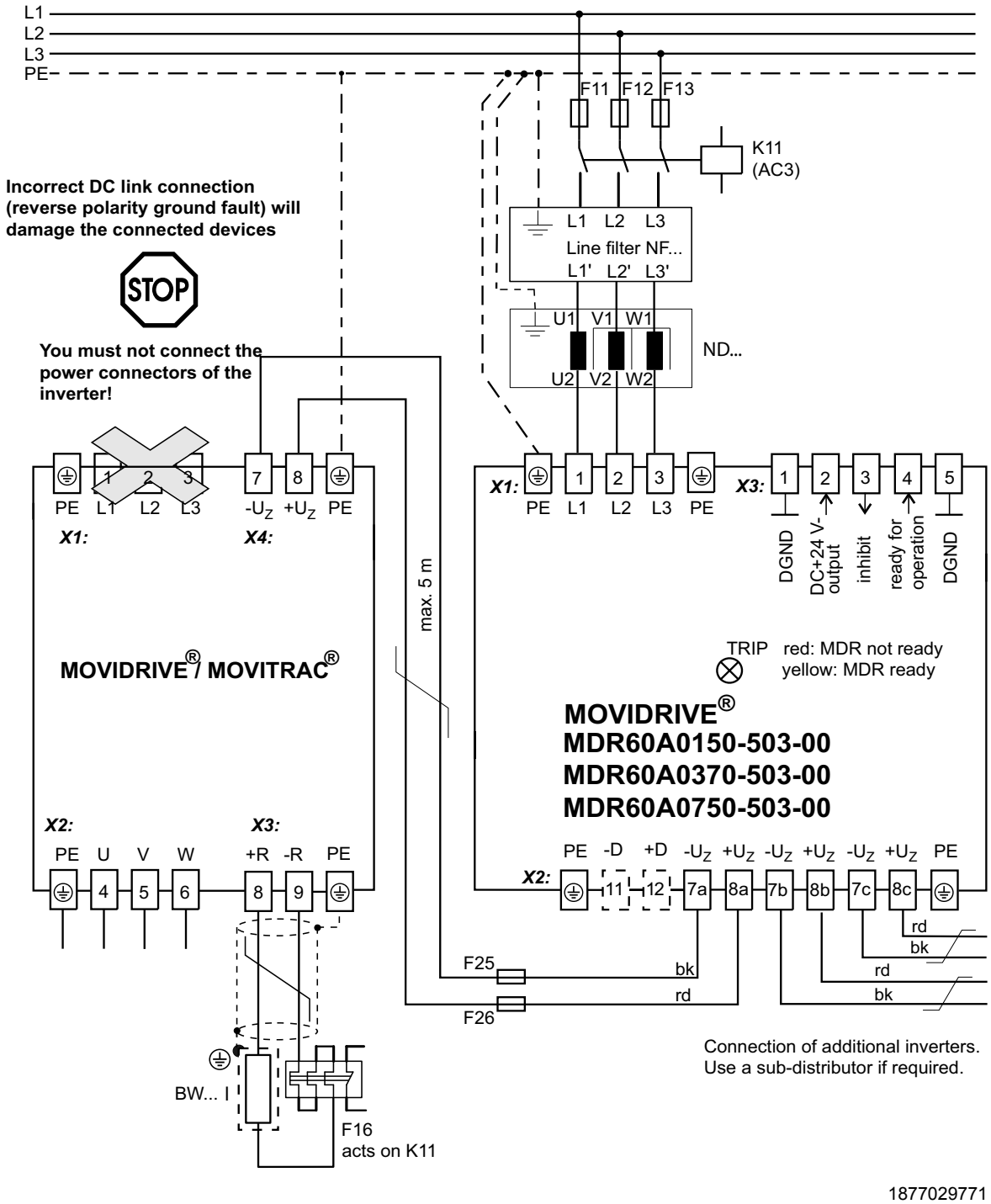
4.4.2 DC link connection without MDR60A/61B regenerative power supply unit in connection type B



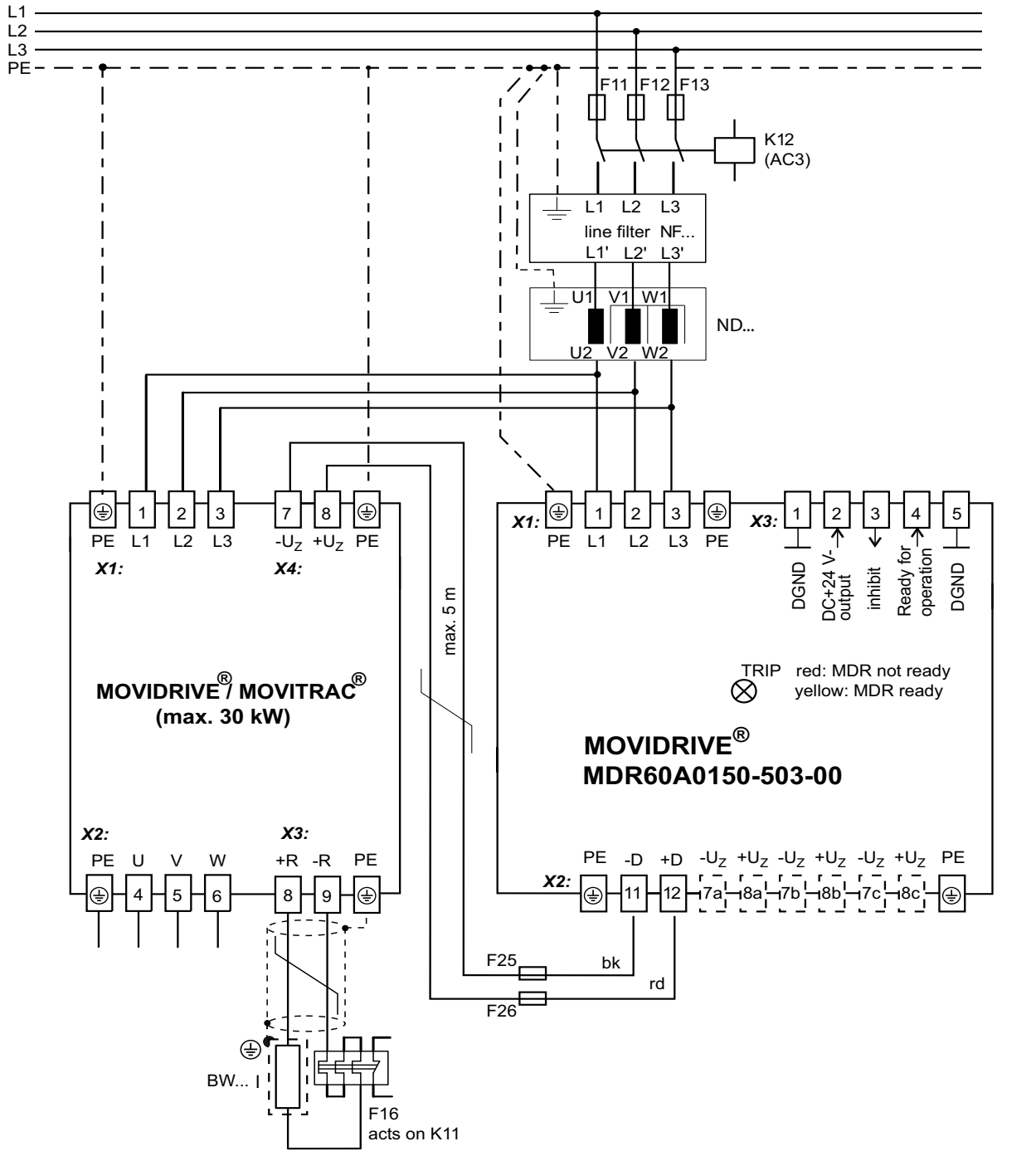
INFORMATION

- MOVIDRIVE® MDX61B1600/2000/2500 size 7 must be installed without line choke (ND..).
- Use MDX62B1600 inverters only in conjunction with MOVIDRIVE® MDX61B1600/2000 size 7 in connection type B. Observe section "Connection type B" (page).

4.4.3 DC link connection with MDR60A0150/0370/0750 regenerative power supply unit



4.4.4 DC link connection with MDR60A0150 regenerative power supply unit as brake module



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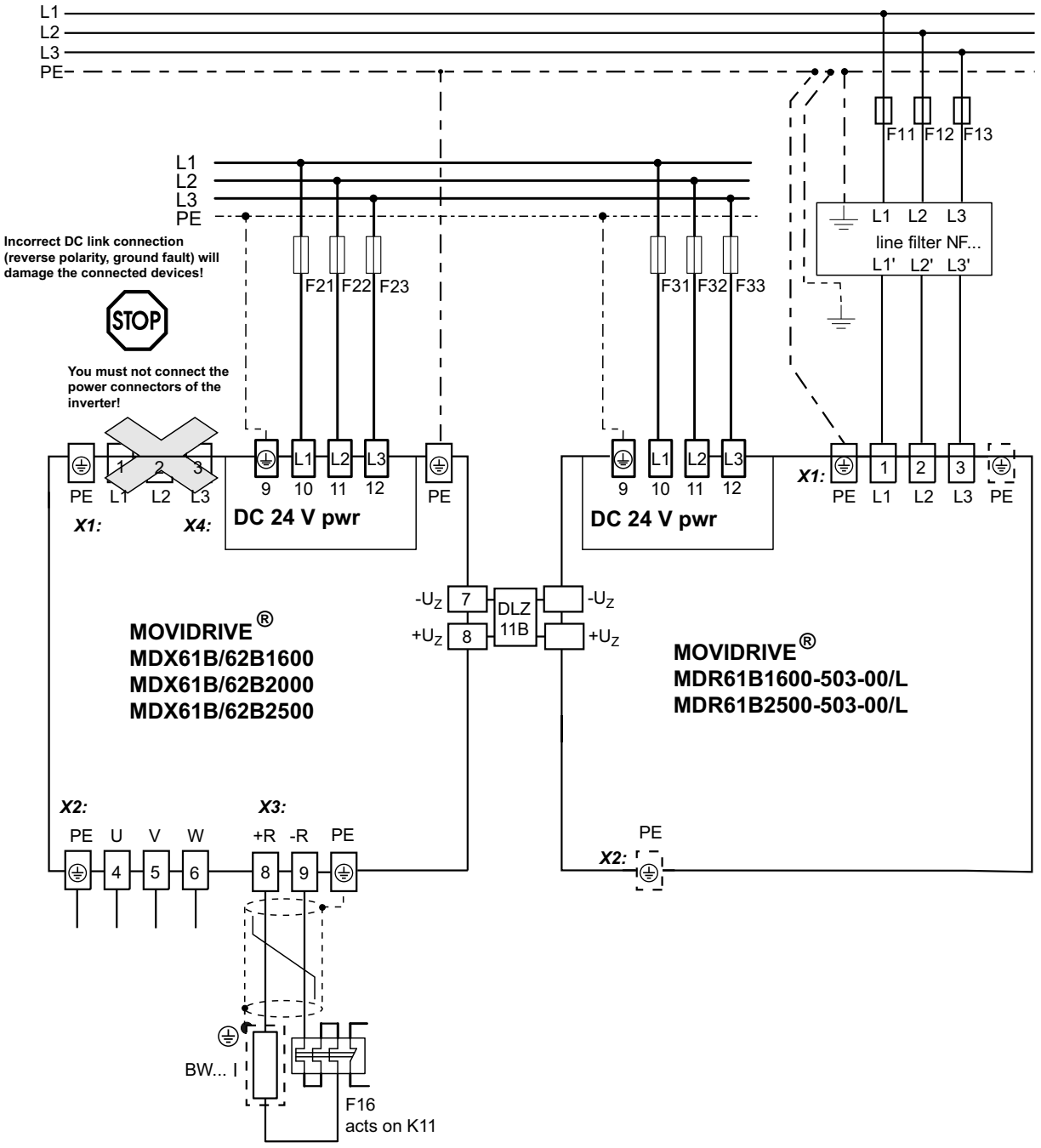
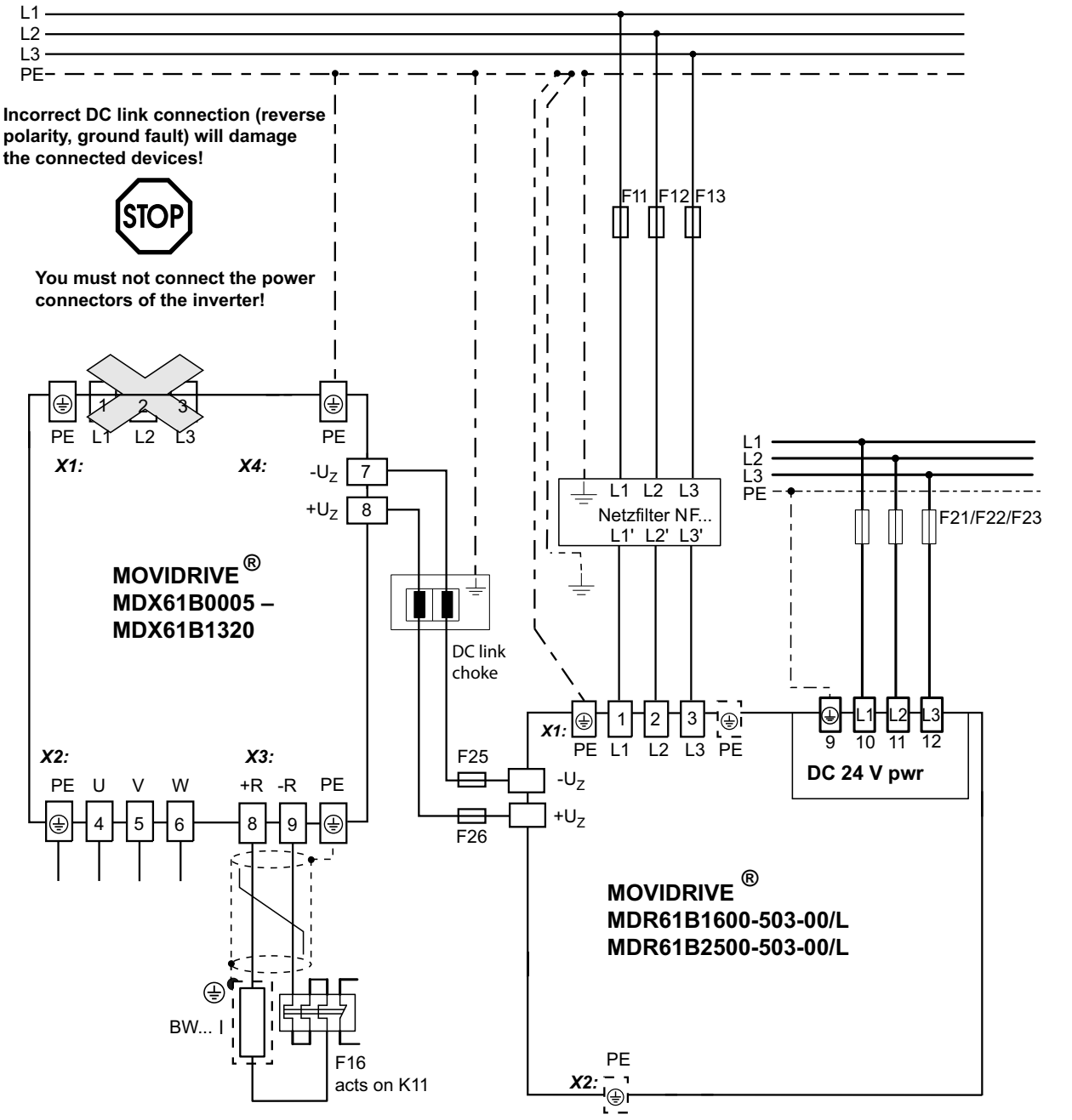
4.4.5 DC link connection with MDR61B1600/2500 regenerative power supply unit

In conjunction with MOVIDRIVE® MDX61B/62B1600 – 2500 (size 7)



3347843723

In conjunction with MOVIDRIVE® MDX61B0005 – 1320 (size 0 – 6)



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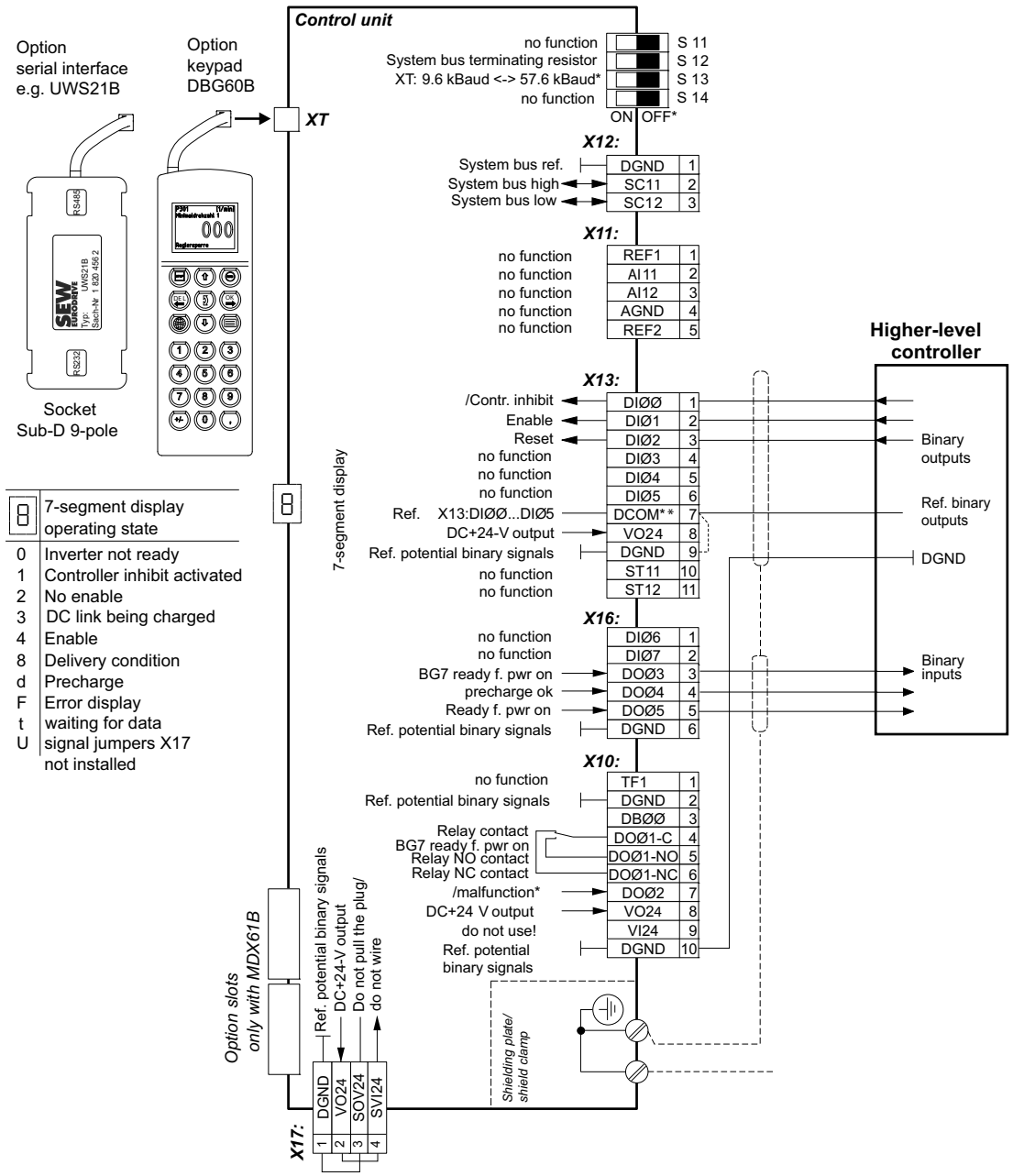
4.4.6 Signal terminals MDR61B1600/2500



3377869323

* Factory setting

** If the binary inputs are connected to the DC 24 V voltage supply X13:8 "VO24", install a jumper between X13:7 (DCOM) and X13:9 (DGND) on MOVIDRIVE®.

DGND (X10, X12, X13, X16, X17) is connected with PE as standard (threaded hole, see chapter "Unit structure"). You can establish galvanic isolation by removing the M4 x 14 grounding screw.

INFORMATION

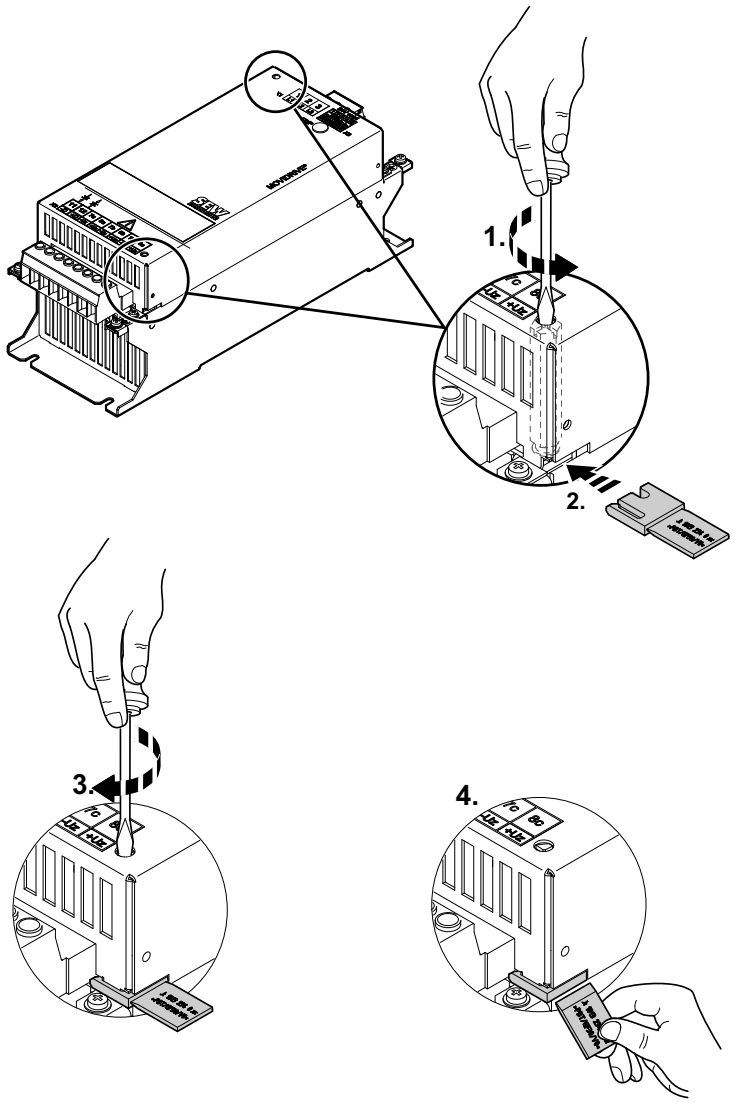
The following applies to the MOVIDRIVE® MDR61B1600/2500 regenerative power supply unit:

- For supply voltages > 480 V, set the "Enable" and "Controller inhibit" signals simultaneously

4.5 Conversion into an IT network unit

4.5.1 MOVIDRIVE® MDR60A0150 size 2 into an IT system device

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

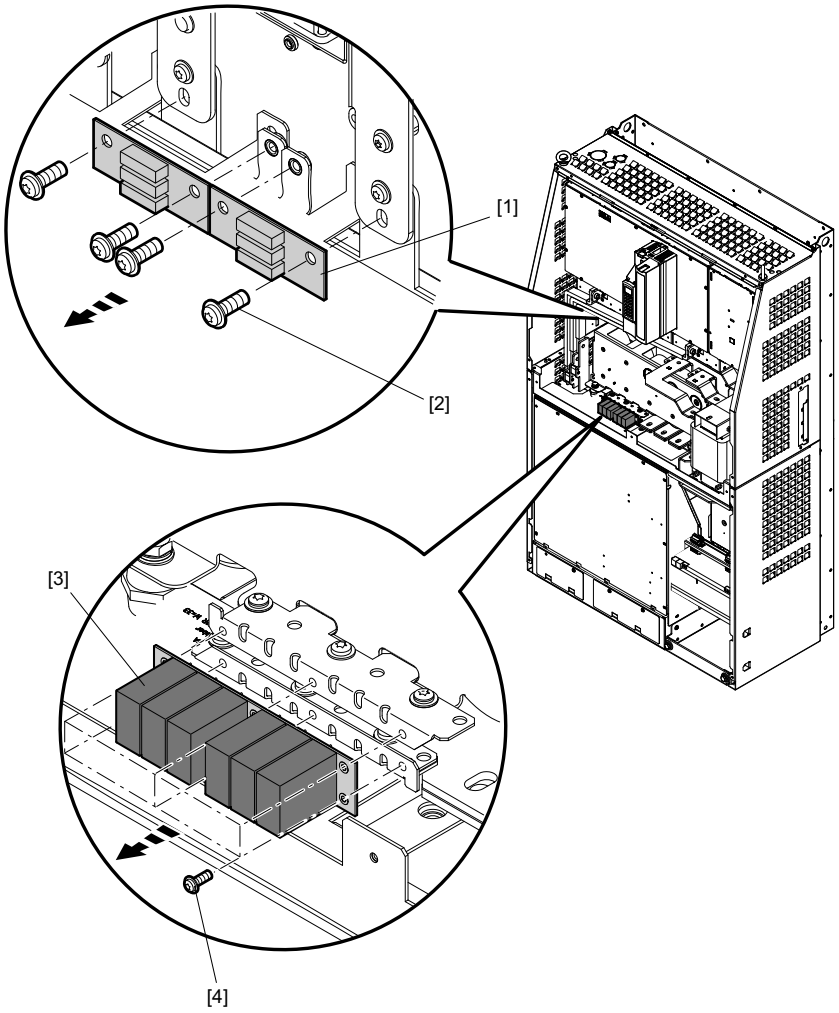


1. Loosen the 2 screws at the front of size 2.
2. Insert the 2 isolation plates into the slot until it snaps in.
3. Re-insert and tighten the 2 screws.
4. Brake the isolation plate at the pre-determined breaking point.

4.5.2 MOVIDRIVE® MDR61B1600/2500 size 7 into an IT system device

Size 7 is equipped with 4 "radio interference suppression" subassemblies [1] & [3], which are connected from $+U_Z$ to PE and from $-U_Z$ to PE. The subassemblies are located under the phase modules.

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



3436829835

1. Remove the front cover and the touch guard.
2. Loosen the 4 screws [2].
3. Remove the 2 subassemblies [1].
4. Screw the 2 screws of the phase module – DC link connection back in.
5. Loosen the 6 screws [4].
6. Remove the 2 "radio interference suppression" subassemblies [3].

4.6 Touch guard for power terminals

⚠ WARNING

Uncovered power connections.

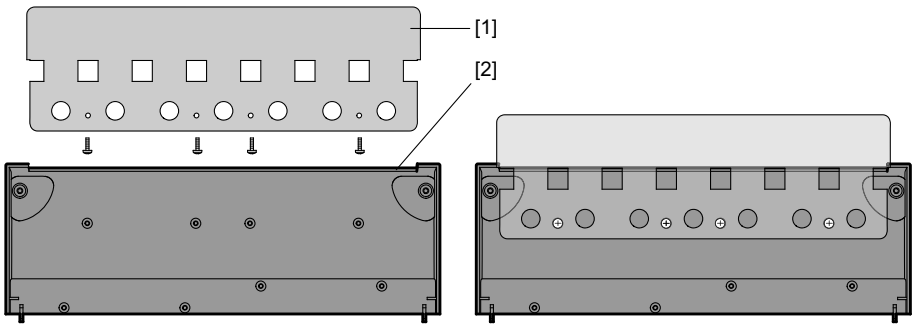
Severe or fatal injuries from electric shock.

- Install the touch guard according to the regulations.
- Never start the unit if the touch guard is not installed.

4.6.1 Touch guard for MOVIDRIVE® MDR60A0750 size 4

The MOVIDRIVE® MDR60A0750 size 4 units include 2) touch guard elements and 8 retaining screws as standard. Install the touch guard on both covers of the power terminals.

The following figure shows the touch guard for MOVIDRIVE® MDR60A0750 size 4.



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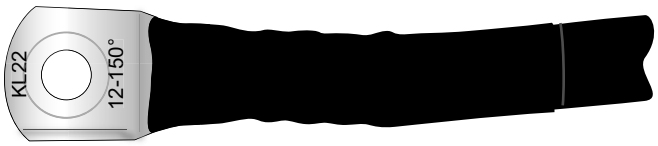
The touch guard comprises the following parts:

[1] Cover plate
[2] Connection plate

The MOVIDRIVE® MDR60A0750 regenerative power supply unit meets IP10 under the following prerequisites only:

- Touch guard is fully installed
- Shrink tubing is installed on the power cables of all power terminals (see following picture)



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INFORMATION

If the above conditions are not met, the MOVIDRIVE® MDR60A0750 regenerative power supply units size 4 meet IP00.

Touch guard DLB11B

The MOVIDRIVE® MDR60A0750 regenerative power supply unit size 4 meets IP20 in conjunction with the DLB11B touch guard Proceed as follows to install the **DLB11B touch guard**:

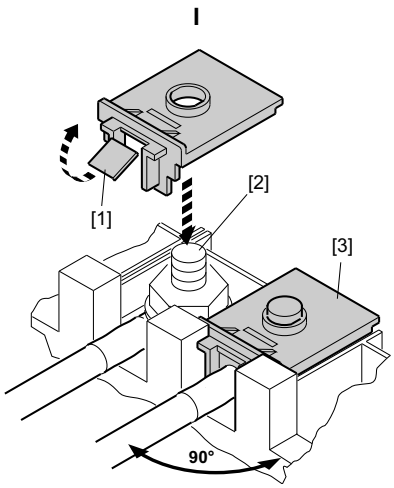
- Figure I: Power terminal with connected power cable with a cable cross section of < 35 mm^2 (AWG2):

  Remove the plastic saddle [1] and push the DLB11B touch guard [3] on the respective stud [2] of the power terminal. Make sure that the cable output is straight. Install the cover for the power terminals.

- Figure II: Power terminal without connected power cable:

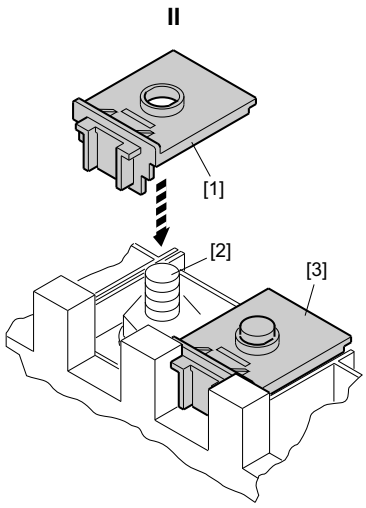
  Push the DLB11B touch guard [1] on the respective stud [2]. Install the cover for the power terminals.

- The touch guard does not have to be connected to the PE terminals.



1805413643

[1] Plastic saddle
[2] Terminal stud
[3] Correctly mounted touch guard

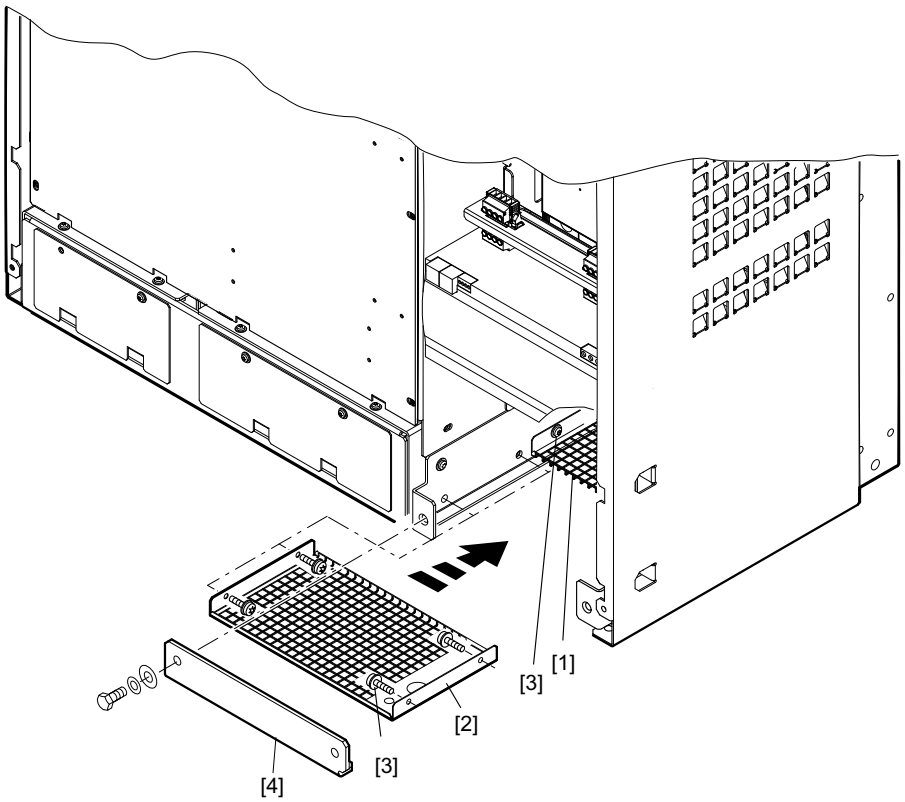


1805519115

[1] Touch guard
[2] Terminal stud
[3] Correctly mounted touch guard

4.6.2 MOVIDRIVE® MDR61B1600/2500 size 7 touch guard

Degree of protection IP20 is achieved for the MOVIDRIVE® MDR61B1600/2500 regenerative power supply unit size 7 if the DLB31B touch guard (part no 1 823 689 8) is trimmed to size by the customer and mounted in front and behind the power connections.



3348308747

[1] Touch guard at the back
[2] Touch guard at the front
[3] Screws
[4] Strut at the line input

INFORMATION

If the above conditions are not met, MOVIDRIVE® units size 7 have degree of protection IP00.

4.7 Optional scope of delivery for size 7

4.7.1 General information

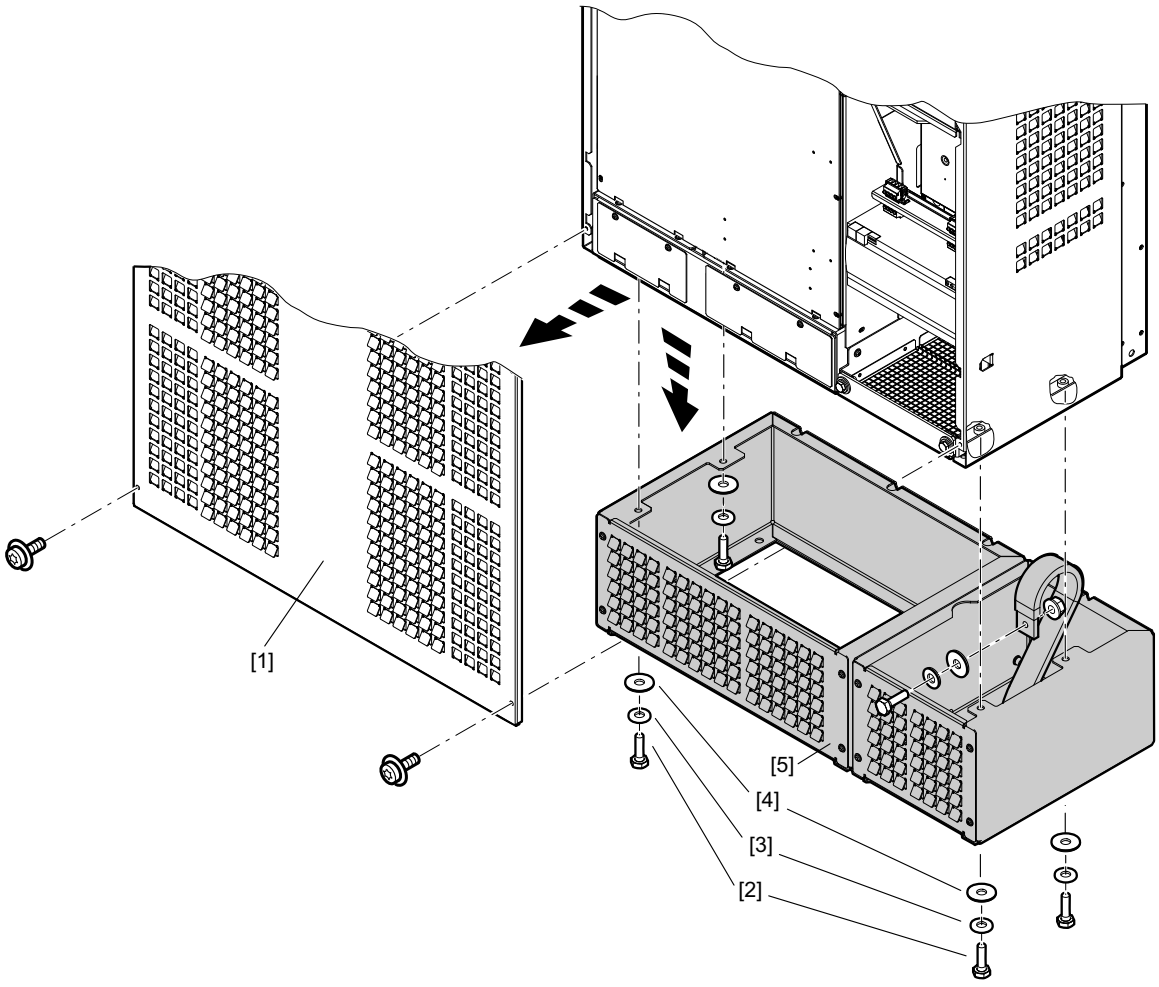
INFORMATION

Observe the permitted tightening torques when you work on the size 7 unit.

Component	Screws	Tightening torque	
		[Nm]	[lb in]
Cover screws	M5 × 25	1.4 - 1.7	12 - 15
Screws with integral disk	M4	1.7	15
	M5	3.4	30
	M6	5.7	50
Conductor rail screws	M10	20	180
Insulating spacer	M10 (SW32)	30	270

4.7.2 DLS31B mounting base

The **DLS31B mounting base** with mounting material (part number: 1 823 627 8) is used **to fasten the MOVIDRIVE® MDR61B1600/2500 regenerative power supply unit, size 7 in the control cabinet**. MOVIDRIVE® MDR61B size 7 must be screwed onto the mounting base immediately after installation (see following figure). Do not take MOVIDRIVE® B size 7 into operation until the mounting base has been completely mounted.



3348303115

The mounting material is enclosed in a plastic bag

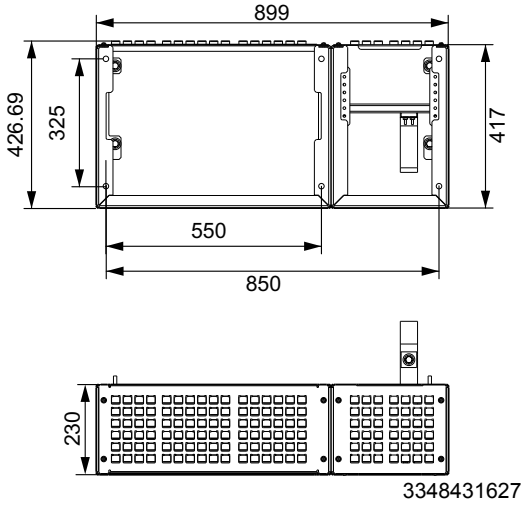
[1] Front cover
[2] Machine screw M10 × 30 hexagon socket
[3] Lock washer
[4] Washer
[5] Front cover mounting base

Proceed as follows to connect the mounting base to the MOVIDRIVE® B MDR61B size 7:

1. Loosen (not unscrew!) the 4 retaining screws of the front cover [1] until you can lift it off. Remove the front cover [1].
2. Remove the 2 front covers of the mounting base.
3. The following steps apply to each of the 4 mounting holes.
   - Place the lock washer [3] and the washer [4] onto the hex head screw [2] M10×30.
   - Plug the pre-mounted hex head screw into the mounting bore and tighten it.
   - Apply thread locking compound.
4. Screw the PE strap to the PE busbar with the pre-mounted M10×35 screw.
5. Reinstall the 2 front covers of the mounting base.
6. Install the front cover [1] onto the unit and fasten it using the 4 retaining screws.

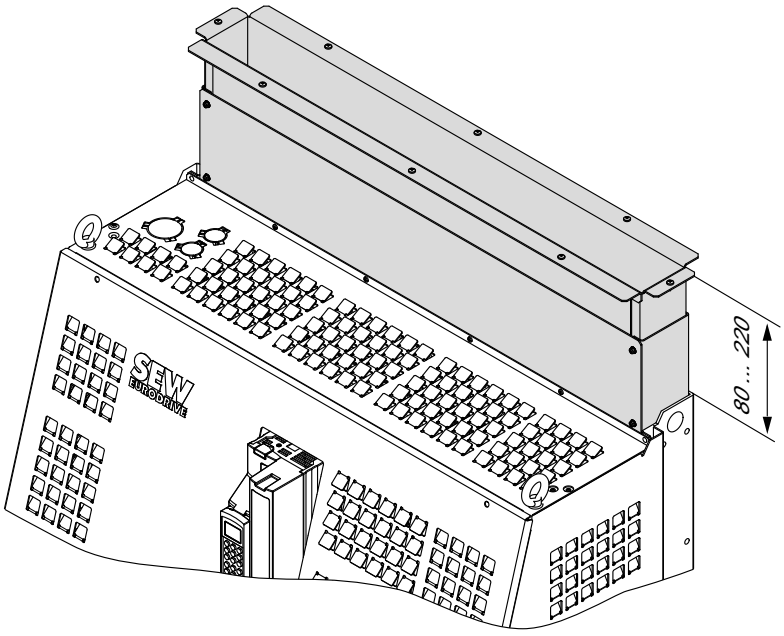
DLS31B mounting base wiring diagram

The following figure shows the dimensions of the DLS31B mounting base.



4.7.3 DLK31B air duct

A **DLK31B air duct** (part no.: 1 823 458 5) is available as an option to dissipate heat of MOVIDRIVE® MDR61B1600/2500 size 7. Install the air duct in such a way that it points vertically upwards (see below figure).



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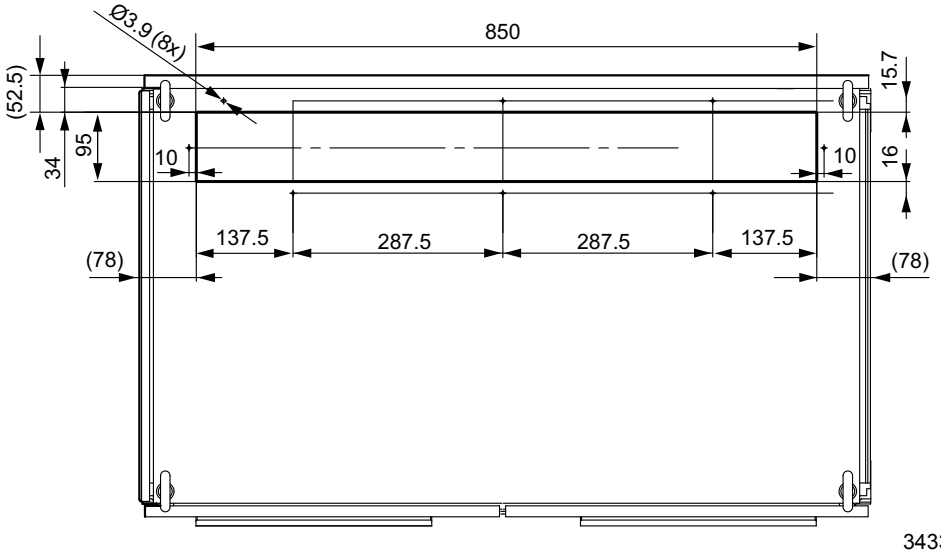
Roof cut-out for DLK31B air duct

The following figure shows the cut-out of the control cabinet roof for the DLK31B air duct.



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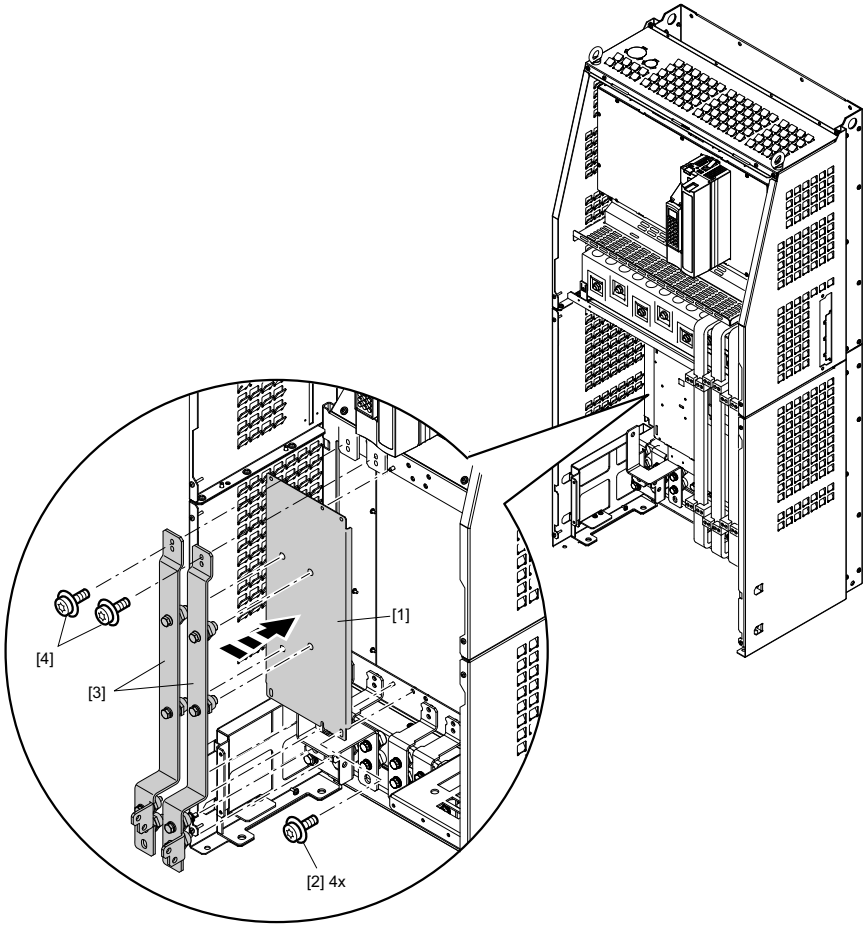
4.7.4 DC link adapter 2Q DLZ12B

The **DC link adapter 2Q DLZ12B** (part no.: 1 822 729 5) can be used to provide a DC link connection at the bottom of the unit:

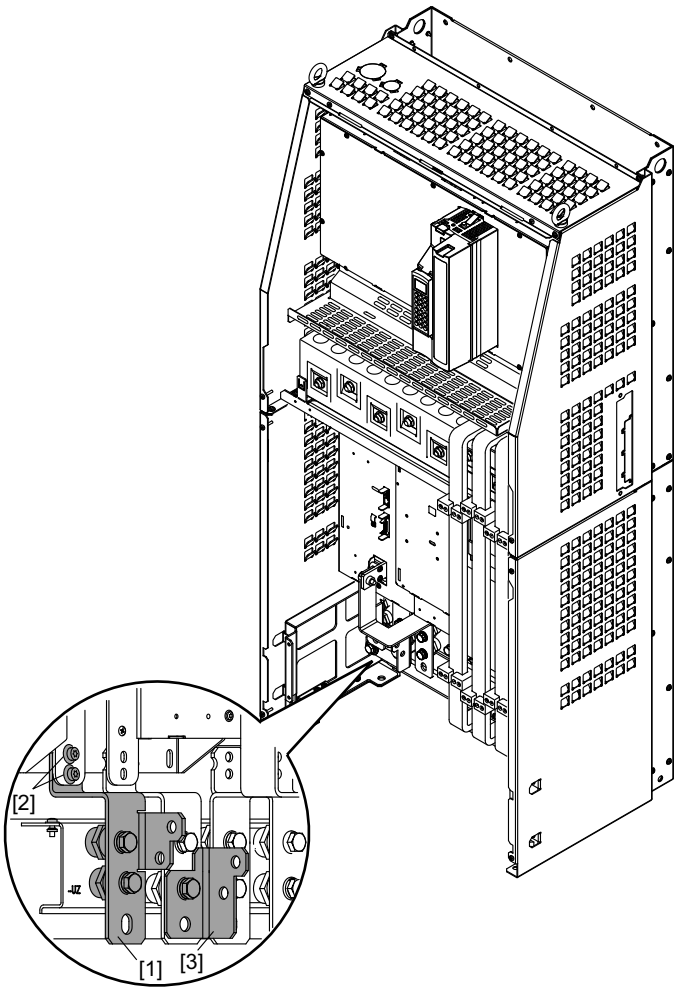


2276336523

1. Loosen the 4 screws of both the upper and lower cover and remove them.
2. Loosen the 5 screws of the insert and remove it.
3. Place the cover panel on the fastening pin of the slot for the brake chopper module.
4. Position the 2 upper retaining screws [2] of the cover panel [1] in the frame. Position the 2 lower retaining screws of the cover panel in the frame.
5. Screw the insulating spacers tightly to the cover panel [1].
6. Screw the insulating spacers tightly to the frame (bottom).
7. Position the 2 screws of the fixing strap $-U_Z$ at the DC link (top left).
8. Position the 2 screws of the fixing strap $+U_Z$ at the DC link (top right).
9. Position the 4 screws of the fixing straps $-U_Z$ and $+U_Z$ on the insulating spacer.
10. Tighten all screws of the fixing scraps $-U_Z$ and $+U_Z$.
11. Replace the covers.

4.7.5 DC link adapter 4Q DLZ14B

The **DC link adapter 4Q DLZ14B** (part number:1 822 728 7) can be used to provide a DC link connection at the bottom of the unit:



2276334603

1. Loosen the 4 screws of the upper cover and remove it.
2. Loosen the 4 screws of the lower cover and remove it.
3. Position the 2 screws of the conductor rail [1] $-U_Z$ on the brake chopper module (bottom left) on the insulating spacer.
4. Position the 2 screws of the conductor rail [1] $-U_Z$ on the insulating spacer.
5. Tighten all screws of the fixing strap $-U_Z$.
6. Screw on the angle bracket [3].
7. Replace the covers.

4.7.6 Side panel for DC link coupling

To connect 2 units via the DLZ11B or DLZ31B DC link coupling side by side, you have to open the side panel of the MOVIDRIVE®.

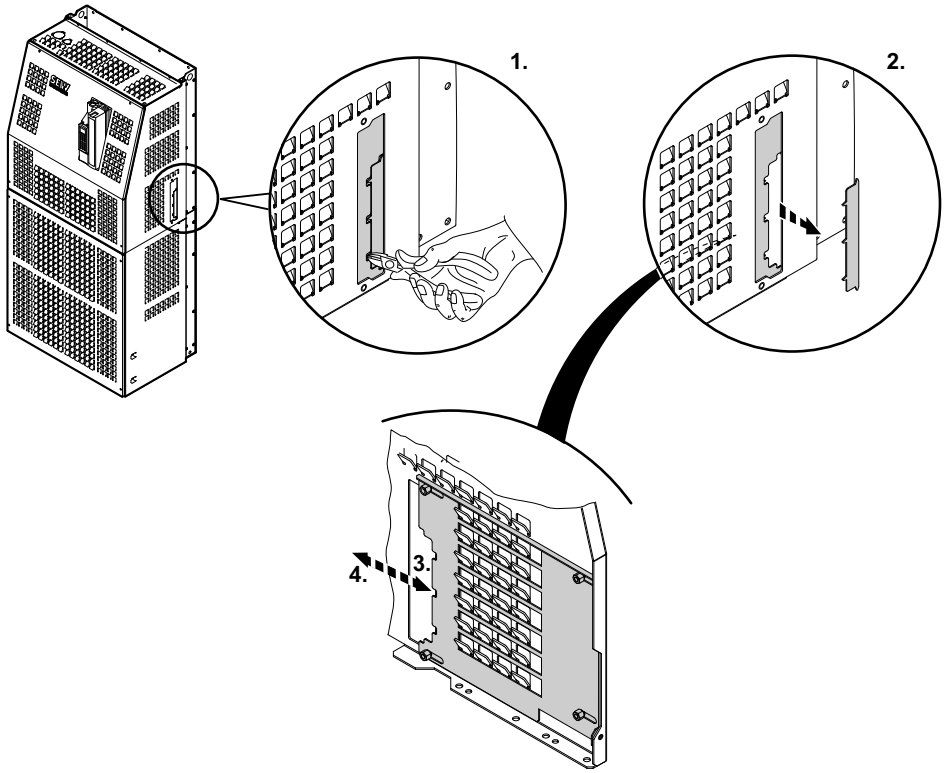
Proceed as follows to prepare the MOVIDRIVE® for the side-by-side connection:

⚠ CAUTION

Sharp edges

Minor injuries.

- Wear suitable protective gloves when cutting.



3919054475

1. Use cutting pliers to cut an opening according to the figure.
2. Remove the metal you have cut out.
3. When the front cover is open, the sliding door to the DC link connection can be moved.
4. When you screw on the front cover, the sliding door to the DC link connection is closed and fixed.

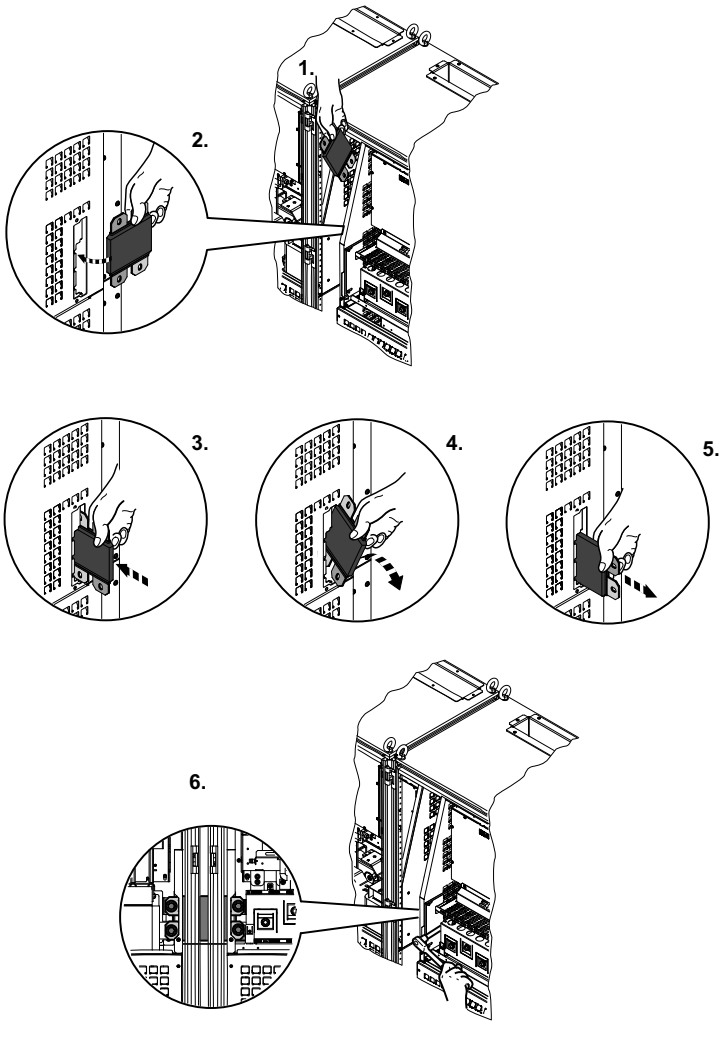
4.7.7 DLZ11B DC link coupling

You can use the **DLZ11B DC link coupling** to connect 2 size 7 units side by side. The DLZ11B DC link coupling is available in three different lengths:

- 100 mm (part number: 1 823 193 4)
- 200 mm (part number: 1 823 566 2)
- 300 mm (part number: 1 823 567 0)

Proceed as follows to connect 2 units side by side:

1. Depending on the DC link coupling, the units that you want to connect must be installed at ground level and 100 mm, 200 mm or 300 mm apart from each other.
2. Loosen the 4 screws of the upper cover and remove it.
3. Loosen the 4 screws of the lower cover and remove it.
4. Cut the opening in the side panel according to chapter "Side panel for DC link coupling" (page 50).
5. Insert the DC link connections into the units.
   - Insert the **100 mm DC link connection** vertically into the unit.
   - Turn the 100 mm DC link connection in the unit by 90°.



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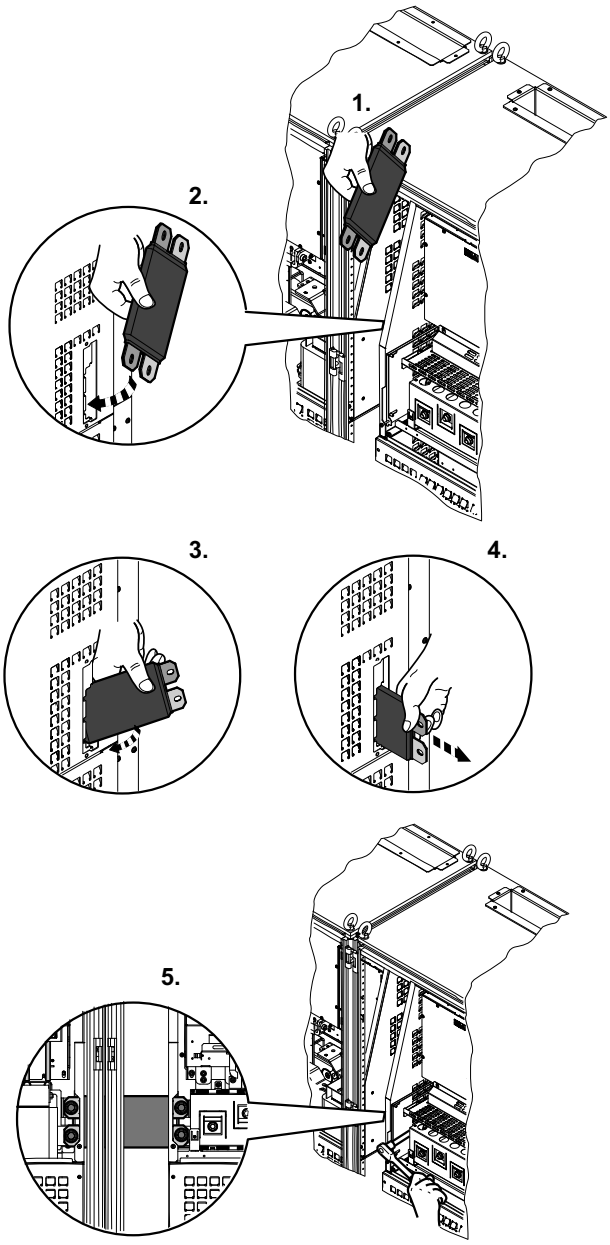
   - Insert the **200 mm and 300 mm DC link connection** into the one unit skewed up to the stop.

- Tip the DC link connection into the second unit from above

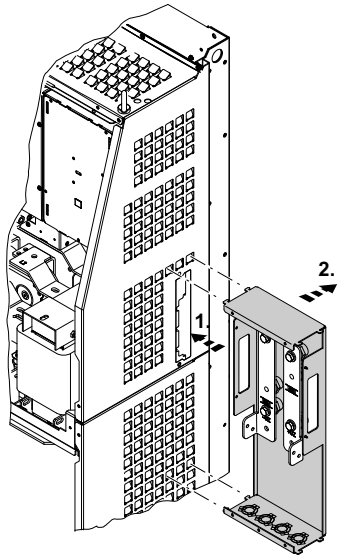


3919719051

6. Screw the DC link coupling to one unit first. before attaching it to the other units.
7. Tighten the screws.
8. Replace the covers.

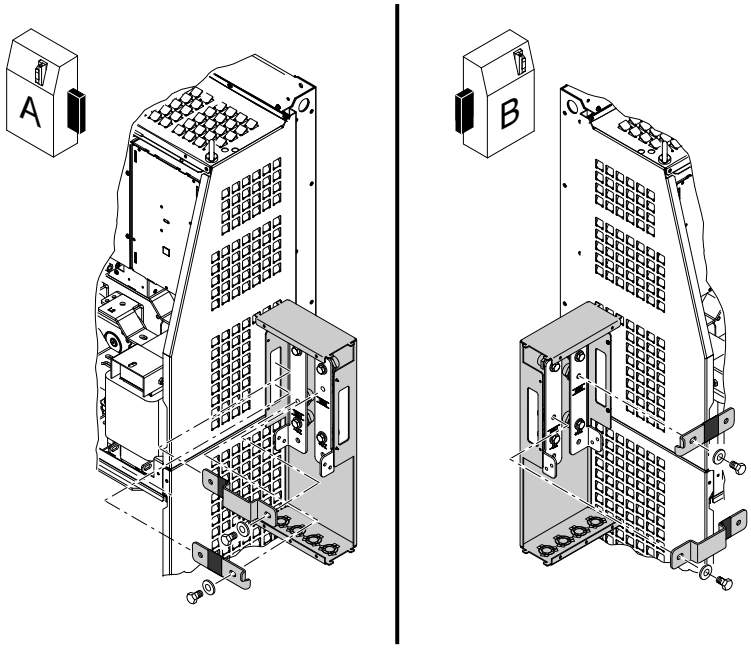
4.7.8 DLZ31B DC link coupling

To connect a size 7 unit and a smaller unit side by side, you can use the **DLZ31B DC link coupling** (part number: 1 823 628 6):



3435514891

1. Loosen the 4 screws of the upper cover and remove it.
2. Loosen the 5 screws of the cover of the DC link coupling and remove the cover.
3. Cut the opening in the side panel according to chapter "Side panel for DC link coupling" (page 50).
4. Mount the DC link coupling to the side panel of the size 7 unit.
5. Mount the DC link coupling to the side panel of the size 7 unit with 2 tapping screws.



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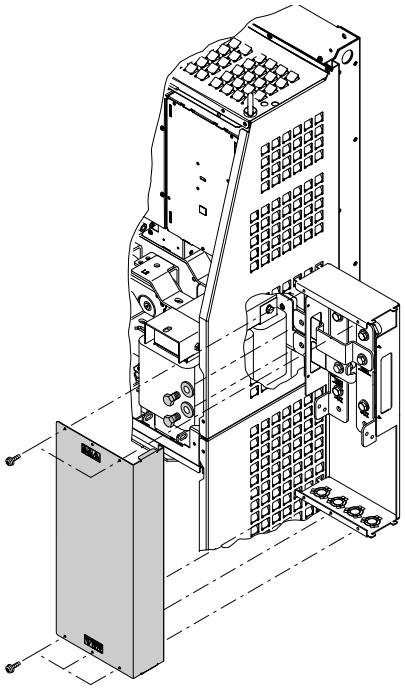
6. Insert the DC link connections into the units. Observe the arrangement of the conductor rails depending on the mounting position.
   - Mounting position A: Long conductor rail with bracket at the top, short conductor rail at the bottom
   - Mounting position B: Short conductor rail at the top, long conductor rail with bracket at the bottom
7. Fasten the DC link connections with screws in the size 7 unit first, then in the DC link coupling.
8. Tighten the screws.



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9. Replace the covers.

Connection options per conductor rail

You have the following options to connect the conductor rail:

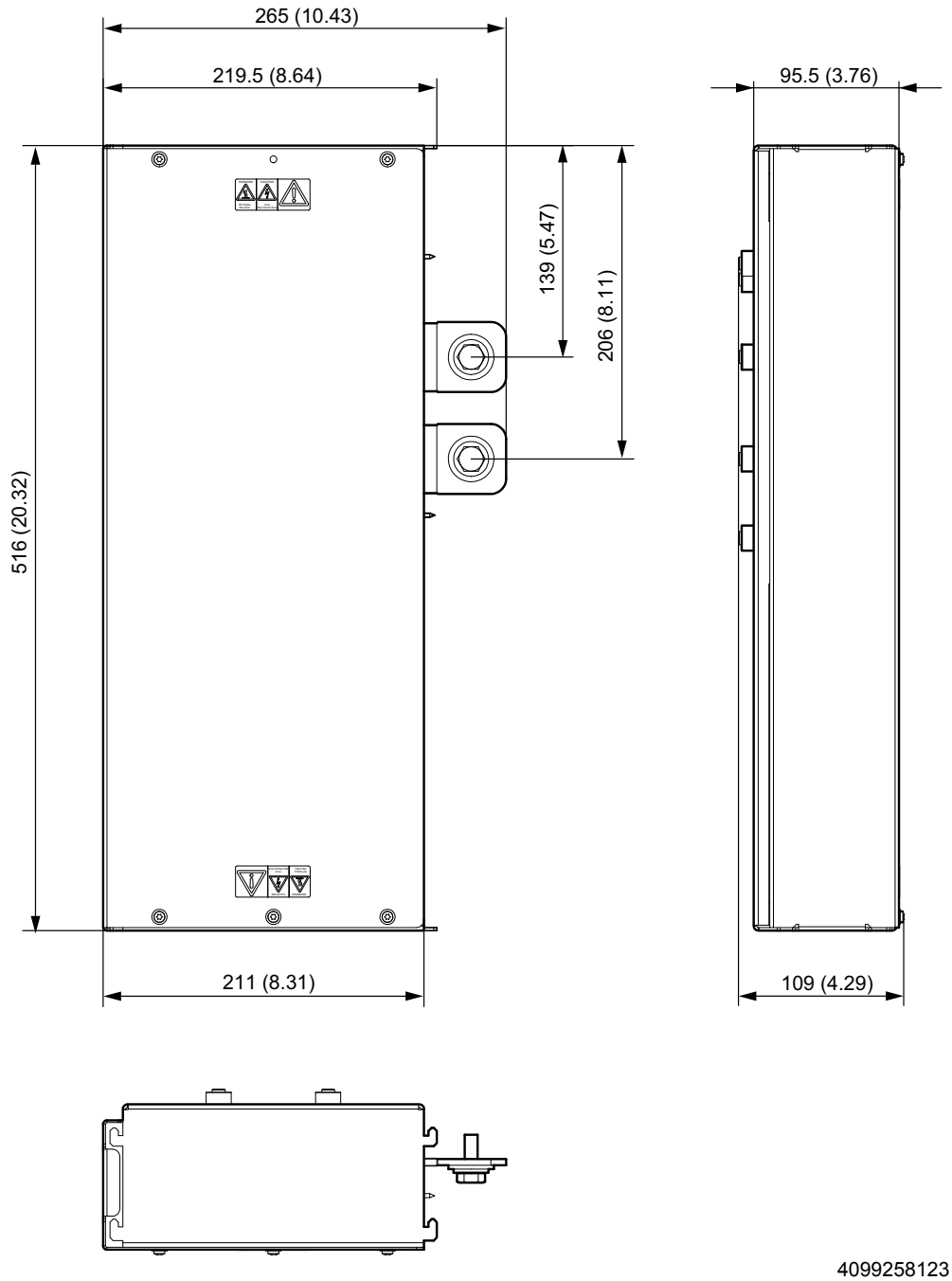
- 2 bores with a 7 mm diameter
- 1 bore with an 11 mm diameter

Observe the following installation notes in addition:

- Connection of max 2 × 150 mm^2 per conductor rail
- Provide the cable lugs with heat shrink tubing
- Provide for sufficient voltage distance between the screw ends and the metal parts
- There are 4 optional positions for M20 or M32 cable openings
- Use the provided edge protection for cables ≥ 150 mm^2.

DLZ31B DC link coupling dimension drawing

The following figure shows the dimensions of the DLZ31B DC link coupling.



5 Startup (MDR60A0150/0370/0750 and MDR61B1600/2500)

This chapter illustrates the startup of the following regenerative power supply units:

- MOVIDRIVE® MDR60A0150-503-00
- MOVIDRIVE® MDR60A0370-503-00
- MOVIDRIVE® MDR60A0750-503-00
- MOVIDRIVE® MDR61B1600-503-00/L
- MOVIDRIVE® MDR61B2500-503-00/L

5.1 Evaluation of the ready signal

The ready signal of the regenerative power unit is revoked when a thermal overload occurs in MDR60A or in case of power failure. When this message is issued, you **must** perform one of the following actions:

A Disconnect the regenerative power supply unit immediately from the power supply.

B Turn off the inverters connected to the regenerative power supply unit immediately.

C Turn off the inverters connected to the regenerative power supply unit with a delay.

D Bring the drive to a controlled stop.

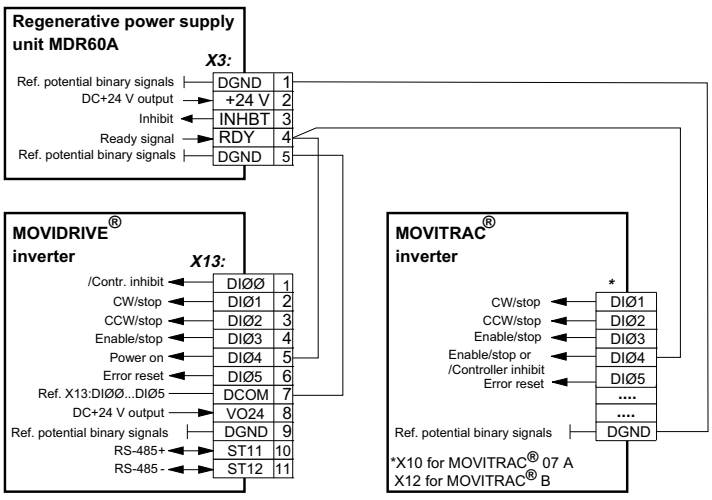
Points A, B and C are concerned with the thermal protection of the unit while D is principally concerned with stopping the drives.

5.1.1 Response A: Disconnect regenerative power unit from the power supply immediately

MDR60A ready signal wiring diagram

To protect the MOVIDRIVE® MDR60A against thermal overload, you have to use the ready signal to disconnect the line contactor K11 from the regenerative power supply unit.

The following diagram shows how the ready signal (ready) from the MDR60A regenerative power supply unit size 2 – 4 must be connected to the "Power on" binary input of the inverter in order to perform evaluation in accordance with responses B... D.



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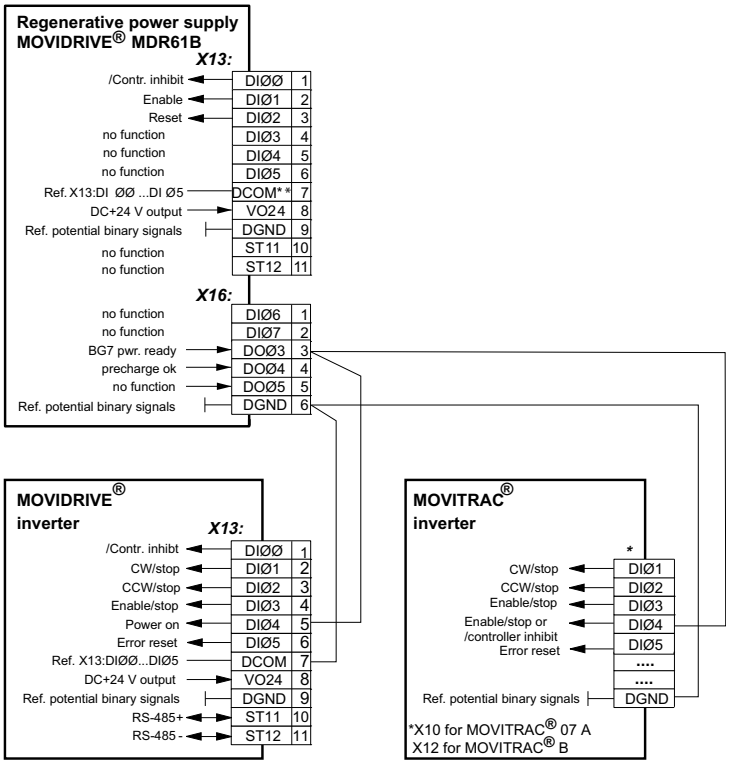
MDR61B ready signal wiring diagram

The following diagram shows how the ready signal (SIZE 7 READY FOR POWER ON) from the MDR61B regenerative power supply unit size 7 must be connected to the "Power on" binary input of the inverter in order to perform evaluation in accordance with responses B... D.



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5.1.2 Response B: Turn off the inverters connected to the regenerative power unit immediately

MOVIDRIVE®: The ready signal is applied to a digital input of all the connected inverters. Parameterize this input to "Power on" (P60_). This allows you to switch off the inverter (P521 "Power off response = /CONTROLLER INHIBIT") Set the "Power off response time" (P520) to 0 seconds.

Inverter parameter settings:

– P520 (Power off response time) = "0 sec."

– P521 (Power off response) = "/CONTROLLER INHIBIT"

– P60_ (binary input) = "POWER ON"

MOVITRAC® 07: Connect terminal X3:4 "Ready" on MDR60A to a binary input programmed to "/Controller inhibit".

5.1.3 Response C: Turn off the inverters connected to the regenerative power supply unit after delay time (not for MOVITRAC® 07):

The following possibility is available if supply system failures during motor operation should not immediately give rise to an inverter switch-off, e.g. if the power supply system quality is poor:

Proceed as described for response B. Set the "Power off response time" (P520) to ≥ 300 ms so that the ON delay (200 ms) of the regenerative power supply unit is bypassed once supply voltage has returned. Supply system failures that do not last longer than the power off response time minus 200 ms do not cause the inverters to disconnect.

If power supply failures should not cause inverters to disconnect in regenerative operation, the inverters must be equipped with braking resistors.

Inverter parameter settings:

– P520 (Power off response time) = "0.3 ... 5.0 sec."
– P521 (Power off response) = "/CONTROLLER INHIBIT"
– P60_ (binary input) = "POWER ON"

5.1.4 Response D: Controlled stop

MOVIDRIVE®: The inverters must be fitted with braking resistors in order to allow the drives to be brought to a controlled stop (emergency stop ramp) in the event of a power failure or a fault in the unit. Observe chapter "Braking resistor selection" (page).

Proceed as described for response B. The emergency stop ramp must be initiated immediately and set as short as possible so that the drive is still in regenerative operation when it comes to a stop. Set the "Power off response time" (P520) to 0 sec

Inverter parameter settings:

– P137 (emergency stop ramp) = "xxx sec."
– P520 (Power off response time) = "0 sec."
– P521 (Power off response) = "EMERGENCY STOP"
– P60_ (binary input) = "POWER ON"

MOVITRAC® 07: Connect terminal X3:4 "Ready" on MDR60A to a binary input programmed to "Enable/stop" and set the stop ramp (P136).

5.2 Parameter setting P52_ "Power off control"

Program a MOVIDRIVE® binary input (P60_/P61_) to "Power on" to enable evaluation of an external power on signal. The ready signal from the MOVIDRIVE® MDR60A regenerative power supply unit is used as the power on signal.

- The parameter factory setting is underlined.
- Parameter setting P52_ is **not** available for MOVITRAC® 07A MOVITRAC® B

5.2.1 P520 Power off response time

Setting range: 0 – 5 s (step width: 0.1 s)

Use this parameter to set the delay time. There will be no response to a power failure during the delay period. The power off response time must be set to ≥ 300 ms because the ready signal of the regenerative power supply unit is set to a "0" signal for 200 ms in the event of brief power supply system failures. The delay time is not effect when P520 < 300 ms.

5.2.2 P521 Power off response

Setting range: CONTROL.INHIBIT EMERGENCY STOP

The power off response takes effect if the power on signal = "0" and the power off response time has elapsed. The power off response does not produce an error message in the inverter. The following settings can be made:

- CONTROLLER INHIBIT

  The output stage is inhibited (= high-resistance) and the brake is applied or a motor without a brake coasts to a stop. The drive restarts when the power on signal = "1".

- EMERGENCY STOP

  A stop is initiated using the emergency stop ramp (t14/t24). The brake is applied when the start/stop speed (P300/P310) is reached. The emergency stop is interrupted and the drive restarted if the power on signal changes to "1" during the stopping procedure.

5.3 Startup with DBG60B keypad

You can startup the MOVIDRIVE® MDR61B regenerative power supply unit with the DBG60B keypad (as of keypad firmware version 15). You can use the keypad to display and set parameters.

The DBG60B keypad cannot be used in conjunction with the MOVIDRIVE® MDR60A regenerative power supply unit.

5.4 Operation of MOVITOOLS® MotionStudio

You can startup the MOVIDRIVE® MDR61B regenerative power supply unit with the MOVITOOLS® MotionStudio engineering software. You can use the engineering software to display and set parameters.

MOVITOOLS® MotionStudio cannot be used in conjunction with the MOVIDRIVE® MDR60A regenerative power supply unit.

5.4.1 Via MOVITOOLS® MotionStudio

Tasks

The software package enables you to perform the following tasks with consistency:

- Establishing communication with units
- Executing functions with the units

Establishing communication with other units

The SEW Communication Server is integrated into the MOVITOOLS® MotionStudio software package for establishing communication with the units.

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the units communicate via these communication channels using their communication options. You can operate up to four communication channels at the same time.

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS-485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT®
- Fieldbus (PROFIBUS DP/DP-V1)
- Tool Calling Interface

The available channels can vary depending on the units and its communication options.

Executing functions with the units

The software package offers uniformity in executing the following functions:

- Parameterization (for example in the parameter tree of the unit)
- Startup
- Visualization and diagnostics
- Programming

The following basic components are integrated into the MOVITOOLS® MotionStudio software package, allowing you to use the units to execute functions:

- MotionStudio
- MOVITOOLS®

All functions communicate using **tools**. MOVITOOLS® MotionStudio provides the right tools for every unit type.

Technical support

SEW-EURODRIVE offers you a 24-hour service hotline.

Simply dial **(+49) 0 18 05** and then enter the letters **SEWHELP** via the telephone keypad. Of course, you can also dial **(+49) 0 18 05 - 7 39 43 57**.

Online help

After installation, the following types of help are available to you:

- The documentation is displayed in a help window after you start the software.

  If the help window does not appear at the start, deactivate the "Display" control field, in the menu under [Settings] / [Options] / [Help].

  If the help window appears again, activate the "Display" control field, in the menu under [Settings] / [Options] / [Help].
- Context-sensitive help is available for the fields which require you to enter values. For example, you can use the <F1> key to display the ranges of values for the unit parameters.

5.4.2 First steps

Starting the software and creating a project

Proceed as follows to start MOVITOOLS® MotionStudio and create a project:

1. Start the MOVITOOLS® MotionStudio from the Windows start menu via:

   [Start]/[Programs]/[SEW]/[MOVITOOLS-MotionStudio]/[MOVITOOLS-MotionStudio]
2. Create a project with name and storage location.

Establishing communication and scanning the network

Proceed as follows to establish a communication with MOVITOOLS® MotionStudio and scan your network:

1. Set up a communication channel to communicate with your units.

   For detailed information on how to configure a communication channel, see the section regarding the relevant communication type.
2. Scan your network (unit scan). Press the [Start network scan] button [1] in the toolbar.

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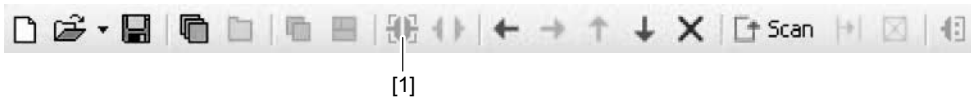
3. Select the unit you want to configure.
4. Right-click to open the context menu.

   As a result you will see a number of unit-specific tools to execute various functions with the units.

Starting up the units (online)

Proceed as follows to start up the units (online):

1. Switch to the network view.
2. Click on "Switch to online mode" [1] in the toolbar.



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[1] "Switch to online mode" symbol

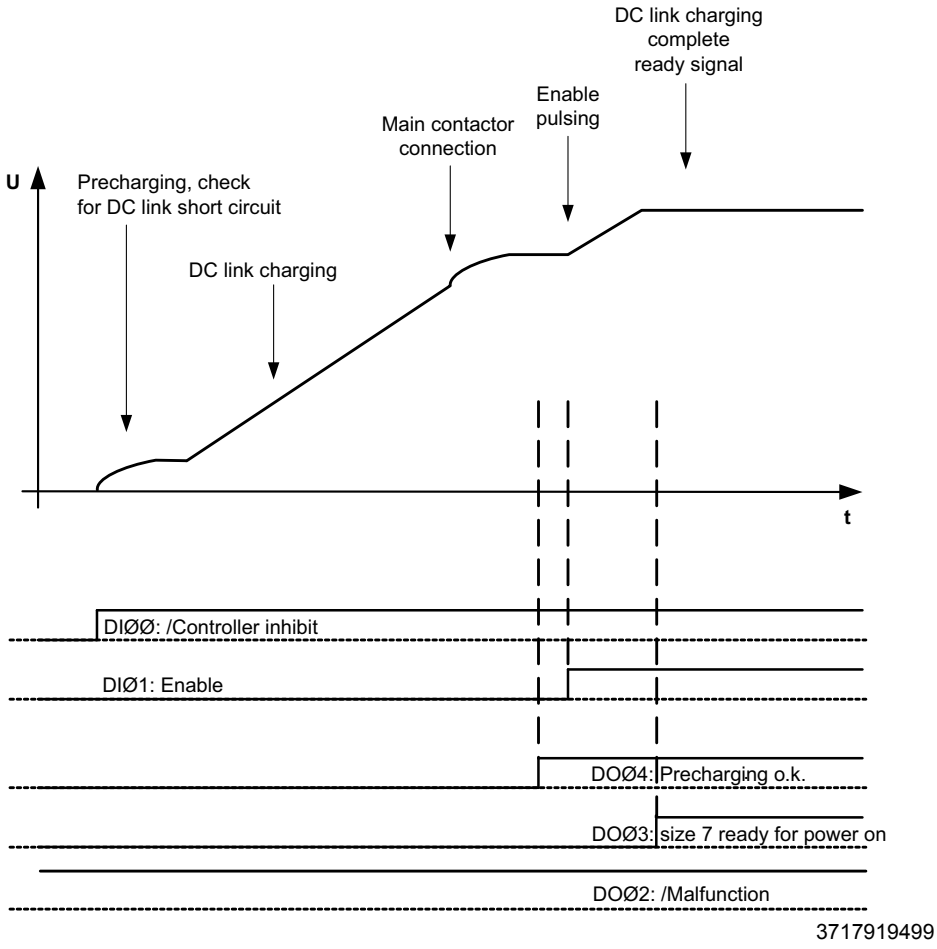
3. Select the unit you want to startup.
4. Open the context menu and select the command [Startup] / [Startup].

   The Startup wizard opens.
5. Follow the instructions of the startup wizard and then load the startup data onto your unit.

5.5 MOVIDRIVE® MDR61B DC link upload process

The MOVIDRIVE® MDR61B is equipped with an automatic DC link management. Charging and discharging processes are controlled automatically by the basic unit.

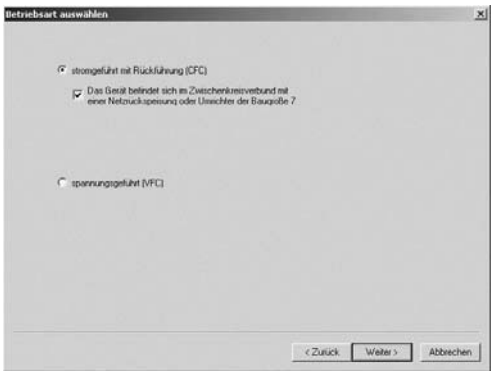
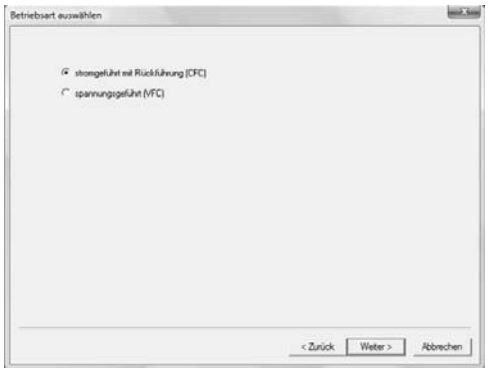
The following diagram illustrates the upload process:



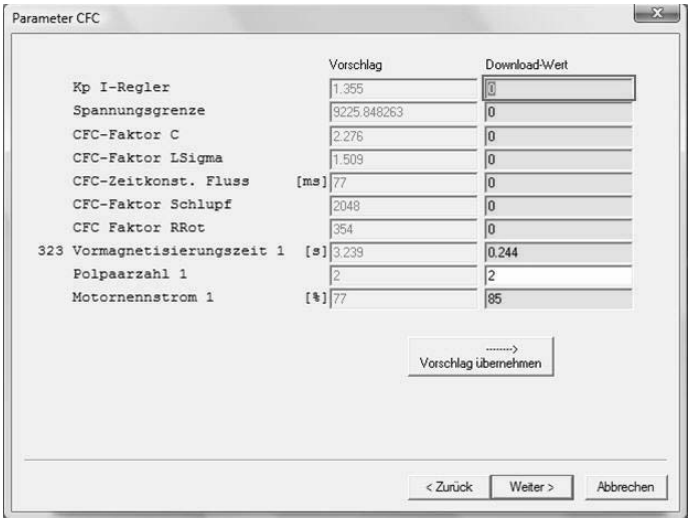
5.6 Setting for CFC/servo mode

If you use CFC mode, you have to make the corresponding selection during startup. The following section illustrates the selection and the further procedure depending on the MOVITOOLS® MotionStudio version.

- Select operating mode CFC "current-controlled with feedback".

MOVITOOLS® MotionStudio	
Example A: Version 5.7 with ServicePack 1 (In preparation)	**Example B: Version 5.7 without service pack (latest version)**
	

- **Example A (version 5.7 with ServicePack 1):** Activate the checkbox "Unit is in DC link connection...".
- **Example B (version 5.7 without ServicePack 1)** you additionally have to halve the gain of the current controller (Kp I controller).
  - Press <Shift> + Next> to confirm your selection.
  - Change the setting Kp I controller setting to 50% of the suggested value.



INFORMATION

The following unit combinations do not allow the operation of synchronous servomotors with MOVIDRIVE®:

- MOVIDRIVE® MDR61B regenerative power supply unit size 7 in DC link connection with MOVIDRIVE® MDX61B inverters size 0 – 6
- MOVIDRIVE® MDX61B inverters size 7 in connection type A or B with MOVIDRIVE® MDX61B inverters size 0 – 6

6 MDR61B1600/2500 – Parameters

6.1 Overview of parameters

The following table lists all parameters together with their factory settings (underlined): Numerical values are displayed with the complete setting range.

P00x Process values	
P002 Frequency	
P004 Output current	
P005 Active current	
P008 DC link voltage	
P009 Output current	
P01x Status displays	
P010 Inverter status	
P011 Operating state	
P012 Fault status	
P014 Heat sink temperature	
P015 Operating hours	
P016 Enable hours	
P017 Work	
P03x Binary inputs of basic unit	
P030 – P032 Binary inputs DI00 – DI02	
P039 Binary inputs DI00 – DI07	
P05x Binary outputs of basic unit	
P051 – P055 Binary outputs DO01 – DO05	
P059 Binary outputs DO01 – DO05	
P07x Unit data	
P070 Unit type	
P071 nominal output current	
P072 Option/encoder slot	
P076 Basic unit firmware	
P08x Error memory	
P080 – P084 Errors t-0 – t-4	
P09x Bus diagnostics	
P094 – P096 PO1 – PO3 setpoint	
P097 – P099 PI1 – PI3 actual value	
P1xx Setpoints/ramp generators	
P10x Setpoint preselection	
P101 Control signal source	TERMINALS
P2xx Controller parameters	
P29x Regenerative power supply	
P290 Minimum voltage	
P291 P gain voltage controller	
P292 Integral time voltage controller	
P293 P gain current control	
P294 Integral time current controller	
P295 Mains off tolerance time	
P296 Uz reduced	
P297 Regenerated energy	
P298 Effective power display	

P299 Line voltage	
P4xx Reference signals	
P43x Current reference signal	
P430 Current reference value	0 - 100 - 200 % I_N
P431 Hysteresis	0 - 5 - 30 % I_N
P432 Delay time	0 - 1 - 9 s
P433 Signal = "1" if:	$I < I_{ref}$ / $I > I_{ref}$
P6xx Terminal assignment	
P60x Binary inputs of basic unit	
P600 Binary input DIØ1	ENABLE
P601 Binary input DIØ2	RESET
P62x Binary outputs of basic unit	
P620 – P623 binary output DOØ1 – DOØ4	
P8xx Unit functions	
P80x Setup	
P802 Factory setting	NO
P803 Parameter lock	OFF
P804 Reset statistics data	NO
P81x Serial communication	
P810 RS485 address	0 - 99
P811 RS485 group address	100 - 199
P812 RS485 timeout interval	0 - 650 s
P83x Fault responses	
P833 Response to RS485 TIMEOUT	DISPLAY ONLY
P836 Response SBus TIMEOUT 1	DISPLAY ONLY
P84x Reset behavior	
P840 Manual reset	NO
P841 Auto reset	OFF
P842 Restart time	1 - 3 - 30 s
P87x Process data description	
P870 / P871 / P872 Setpoint description PO1 / PO2 / PO3	
P873 / P874 / P875 Actual value description PI1 / PI2 / PI3	
P876 PO data enable	ON
P88x Serial communication SBus 1/2	
P881 Address SBus 1	0 - 63
P883 Timeout delay SBus 1	0 - 650 s
P884 Baud rate SBus 1	125 / 250 / 500/1000 kBaud

6.2 Explanation of the parameters

The parameters are explained below. The parameters are divided into 10 groups. The parameter names correspond to their representation in the parameter tree. The factory setting is underlined.

6.2.1 Symbols

The following symbols explain the parameters:

These parameters can only be changed with INHIBITED inverter status (= output stage at high resistance).

The startup function automatically changes this parameter.

6.2.2 P0xx display values

This parameter group contains the following information:

- Process values and states of the basic unit
- Process values and states of the installed options
- Error memory
- Fieldbus parameters

P00x Process values

P002 Frequency — Frequency of the line inverter in Hz.

P004 Output current — Apparent current in the range 0 – 200% of the rated unit current.

P005 Active current — Active current in the range 0 – 200 % I_N. The display value is positive when power is supplied to the drive. The display value is negative when power is fed back into the supply system.

P008 DC link voltage — The displayed value is the voltage measured in the DC link circuit.

P009 Output current — Apparent current of the line inverter, displayed in AC A.

P01x Status displays

P010 Inverter status — Status of the unit output stage (INHIBITED, ENABLED).

P011 Operating state — The following operating states are possible (7 segment display):

- 0: 24 V OPERATION (inverter not ready for operation)
- 1: CONTROLLER INHIBIT
- 2: NO ENABLE
- 3: DC LINK IS CHARGED
- 4: ENABLE
- 8: DELIVERY STATUS

- d: PRECHARGE
- F: ERROR
- t: WAITING FOR DATA
- U: STO → X17 signal jumpers not installed

P012 Fault status — Error number and error in plain text. The error number also appears on the 7-segment display of the regenerative power supply.

P014 Heat sink temperature — Heat sink temperature of the regenerative power supply in the range −40 – +125 °C.

P015 Operating hours — Total number of hours for which the regenerative power supply unit has been connected to the supply system or an external DC 24 V supply. Storage cycle every 1 min.

P016 Enable hours — Total number of hours for which the regenerative power supply was in ENABLE operating state; storage cycle every 1 min.

P017 Work — Total of the active electrical energy the regenerative power supply has consumed; storage cycle every 1 min.

P03x Binary inputs of basic unit

P030 – P032 Binary inputs DI00 – DI02 — Displays the current status of input terminals DI00 – DI02 and the current function assignment.

Binary input DI00 is always assigned with controller inhibit.

Menu selection see *P60x Binary inputs of basic unit*.

P039 Binary inputs DI00 – DI07 — Displays the standard binary inputs DI00 to DI07 in this sequence.

P05x Binary outputs of basic unit

P051 – P055 Binary outputs DO01 – DO05 — Displays the current state of the binary output on the basic unit with the current function assignment.

Menu selection see *P62x Binary outputs of basic unit*.

P059 Binary outputs DO01 – DO05 — Displays the binary outputs DO01 – DO05 in this sequence.

P07x Unit data

P070 Unit type — Displays the complete designation of the unit, e.g. MDR61B2500-503.

P071 nominal output current — Displays the r.m.s. value of the nominal inverter current.

P072 Option/ encoder slot — The display shows "MDR" for the line voltage measurement pcb that is currently plugged into the encoder slot.

P076 Basic unit firmware — Displays the program version of the firmware used in the basic unit.

P08x Error memory

P080 – P084 Errors t-0 – t-4

There are 5 error memories (t-0 – t-4). The errors are stored in a chronological sequence with the most recent error event being stored in error memory t-0. If there are more than 5 errors, the error event of longest standing stored in t-4 is deleted.

Programmable error responses: see table *P83x Fault responses*.

The following information is stored at the time of the error and can be displayed in the event of a error:

- Status ("0" or "1") of the binary inputs/outputs
- Operating status of the regenerative power supply
- Unit status
- Heat sink temperature
- Output current
- Active current
- Unit utilization
- DC link voltage
- Operating hours
- Enable hours
- RMS value of line voltage

P09x Bus diagnostics

P094 – P096 PO1 – PO3 setpoint

Displays the value currently transferred on the process data word in hexadecimal form.

PO setpoint	Description
P094 PO1 setpoint	*P870 Setpoint description PO1*
P095 PO2 setpoint	*P871 Setpoint description PO2*
P096 PO3 setpoint	*P872 Setpoint description PO3*

P097 – P099 PI1 – PI3 actual value

Displays the value currently transferred on the process data word in hexadecimal form.

PI setpoint	Description
P097 PI1 actual value	*P873 Actual value description PI1*
P098 PI2 actual value	*P874 Actual value description PI2*
P099 PI3 actual value	*P875 Actual value description PI3*

6.2.3 P1xx Setpoints/ramp generators

P10x Setpoint preselection

P100 can also be used for selecting a communication interface as control signal source. However, the interfaces are not automatically deactivated with these parameters because the inverter must remain ready to receive data via all interfaces at any time.

If the drive inverter is in "t = Waiting for data" status, please check the timeout intervals of parameter *P812 RS485 timeout interval* and, if necessary, switch off timeout monitoring by entering 0 s or 650 s.

P101 Control signal source

This parameter is used to set the source of the control signals for the inverter (CONTROLLER INHIBIT, ENABLE, etc.).

- TERMINALS: Control is performed via the binary inputs.
- RS485: Control is performed via the RS485 interface and the binary inputs.

- SBus: Control is performed via the system bus and the binary inputs.

6.2.4 P2xx Controller parameters

P29x Regenerative power supply

The DC link voltage of the supply and regenerative unit is adjusted via voltage control with lower-level current control.

P290 Minimum voltage

Setting range: 620 V – 780 V

In the supply and regenerative unit, the level of the controlled DC link voltage depends on the line voltage level. The DC link voltage is carried along with the line voltage automatically. The minimum voltage for the DC link is 620 V.

For low line voltages, the minimum voltage can be increased

Automatic assignment (no parameter setting required):

Line voltage	Controlled DC link voltage
AC 380 V	DC 644 V
AC 400 V	DC 670 V
AC 440 V	DC 722 V
AC 460 V	DC 748 V
AC 480 V	DC 774 V
AC 500 V	DC 780 V

Recommendation: Do not change the factory setting.

P291 P gain voltage controller

Setting range: 0.000 – 1.775 – 100.000 A/V

The DC link voltage of the supply and regenerative unit is adjusted via voltage control with lower-level current control.

Recommended settings when connecting:

- Only units of sizes 0 to 6 (number of units is not relevant): 0.7
- One unit of size 7 (and smaller sizes in addition, if required): 1.775
- two units of size 7 (and smaller sizes in addition, if required): 2.9

P292 Integral time voltage controller

Setting range: 0.00 – 30.00 – 10000.00 ms

Recommendation: Do not change the factory setting.

P293 P gain current control

Setting range for MDR61B2500: 0.000 – 0.925 – 100.000 V/A

Setting range for MDR61B1600: 0.000 – 1.450 – 100.000 V/A

The current controller is adapted to the choke inductances integrated in the regenerative power supply.

Recommendation: Do not change the factory setting.

It might be necessary to adjust the current controller to poor supply system conditions with high impedance.

INFORMATION

When transferring a parameter set, check if the parameter is correct and correct it if required.

P294 Integral time current controller

Setting range: 0.00 – 7.50 – 10000.00 ms

Recommendation: Do not change the factory setting.

It might be necessary to adjust the current controller to poor supply system conditions with high impedance. To do so, increase the integral time.

P295 Mains off tolerance time

Setting range: 0.000 – 5.000 ms

The supply and regenerative unit monitors the supply system and the DC link. In case of faulty supply systems and brief power failures, you can set a delay time in the "Mains off tolerance" parameter before the supply system monitor trips. A prerequisite for this is that the DC link voltage does not fall below 435 V. If the voltage falls below this value, the monitor trips without delay.

P296 U_z reduced

Setting range: Yes/No

If you connect SEW units in sizes 0 to 6 to the supply and regenerative unit with line voltages ≥ 440 V, you have to set parameter U_z reduced to "Yes". This avoids an excessive voltage load of the connected consumers. This function generates additional inductive reactive power.

Automatic assignment:

Line voltage	Controlled DC link voltage
AC 380 V	DC 644 V
AC 400 V	DC 670 V
AC 440 V	DC 700 V
AC 460 V	DC 700 V
AC 480 V	DC 700 V
AC 500 V	DC 710 V

P297 Regenerated energy

…kWh

Total of the active electrical energy that the regenerative power supply unit has fed back into the supply system; storage cycle every 1 min.

P298 Effective power display

…kW

Amount of power that is currently consumed or regenerated by the line inverter. Signed.

P299 Line voltage

…V

RMS value of line voltage

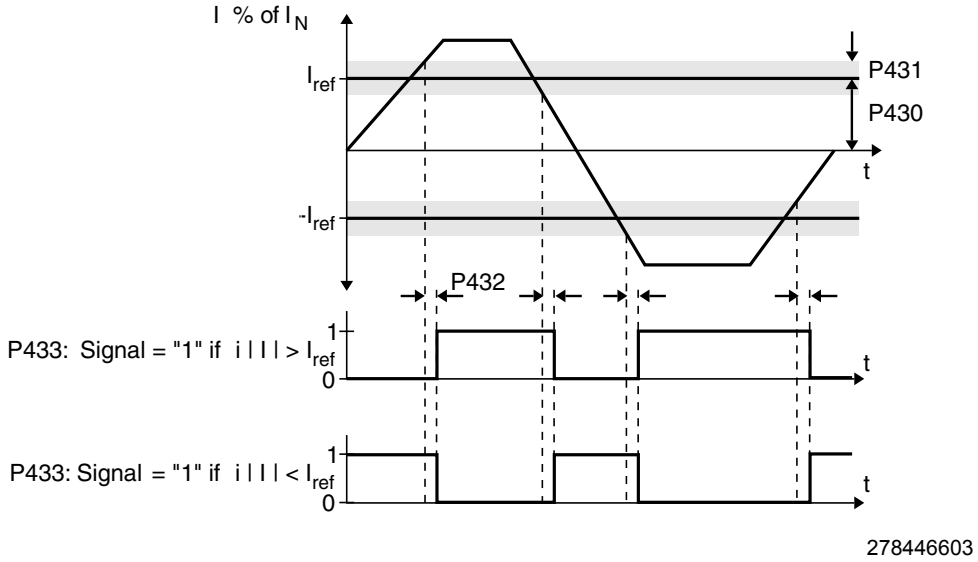
6.2.5 P4xx Reference signals

The following reference values are used for recording and reporting certain operating states. All signals of parameter group P4xx can be read via binary outputs (*P62x Binary outputs of basic unit*).

Important: The signals are only valid if the inverter has signaled "ready" after switch-on and there is no error display.

P43x Current reference signal

Signal if the line current is greater than or less than the reference value.



P430 Current reference value

Setting range: 0 – <u>100</u> – 150 % I_N

P431 Hysteresis

Setting range: 0 – <u>5</u> – 30% I_N

P432 Delay time

Setting range: 0 – <u>1</u> – 9 s

P433 Signal = "1" if:

<u>I < I_{ref}</u> / I > I_{ref}

6.2.6 P6xx Terminal assignment

P60x Binary inputs of basic unit

The binary inputs are not programmable.

Binary input DIØØ with fixed assignment "/CONTROLLER INHIBIT".

P600 Binary input DIØ1

- P600 Binary input DIØ1 "ENABLE"

P601 Binary input DIØ2

- P601 Binary input DIØ2 "RESET"
- DIØ3 – DIØ7 no function

P62x Binary outputs of basic unit

INFORMATION

The binary signals are only valid if the unit has signaled "ready" after switch-on and there is no error display. Binary signals have "0" status while MOVIDRIVE® is being initialized.

Several terminals can be assigned the same function.

P620 – P623 binary output DOØ1 – DOØ4

The following functions can be assigned to the freely programmable binary outputs:

- /FAULT
- READY FOR OPERATION
- OUTPUT STAGE ON
- CURRENT REFERENCE SIGNAL
- SIZE 7 READY FOR POWER ON

6.2.7 P8xx Unit functions

P80x Setup

P802 Factory setting

Setting range: <u>NO</u> / DELIVERY STATUS

The "delivery state" setting also resets the data listed above.

An "8" appears on the 7-segment display during reset. The previous operating state of the inverter appears on the display after the factory settings have been restored. *P802* automatically reverts to "NO".

INFORMATION

Save the set parameter values with SHELL or the DBG60B keypad before you start resetting the parameters. After resetting, it is necessary to adapt the altered parameter values and terminal assignments to meet the requirements.

P803 Parameter lock

Setting range: ON / <u>OFF</u>

Setting *P803* to "ON" makes it possible to prevent any change to the parameters (except for *P840 Manual reset* and the parameter lock itself). This makes sense, for example, after the regenerative power supply unit has been optimized. *P803* must be set to "OFF" to enable changes to parameters again.

The parameter lock does not have any effect on the following parameters:

- *P803 Parameter lock*
- *P840 Manual reset*

P804 Reset statistics data

Setting range: <u>NO</u> / FAULT MEMORY / kWh COUNTER / OPERATING HOURS

P804 permits reset of the statistics data stored in the EEPROM, namely the fault memory, kilowatt-hour meter and operating hours counter.

P81x Serial communication

P810 RS485 address

Setting range: <u>0</u> – 99

P810 sets the address by means of which communication can take place with the regenerative power supply unit via the serial interfaces. A maximum of 32 stations can be interconnected.

INFORMATION

The regenerative power supply unit is always delivered with the address set to 0. To avoid problems during data exchange in serial communication with several inverters, we recommend that you do not use address 0.

P811 RS485 group address

Setting range: <u>100</u> – 199

P811 makes it possible to group together several MOVIDRIVE® B units for communication via the serial interface. In this way, all MOVIDRIVE® B units with the same RS485

group address can be addressed via this address using a multicast telegram. The data received via group address are not acknowledged by MOVIDRIVE® B. Group address 100 means that no group is assigned to the inverter.

P812 RS485 time-out interval

Setting range: 0 – 650 s

P812 sets the monitoring time for data transmission via the serial interface. MOVIDRIVE® B performs the error response set in if there is no cyclical process data exchange via the serial interface for the period set in parameter 812. Serial data transmission is not monitored when *P812* is set to 0. Monitoring is activated with the first cyclical data exchange.

P83x Fault responses

The following responses can be programmed:

Response	Description
NO RESPONSE	Neither an error is displayed nor an error response is performed. The signaled error is ignored.
DISPLAY ONLY	The error is displayed (in 7-segment display and SHELL), the fault output is set (if programmed). The unit performs no other error responses. The error can be reset (terminal, RS485, fieldbus, auto-reset).
OUTPUT STAGE INHIBIT	The inverter switches off immediately and an error is signaled. The line inverter is inhibited. The ready signal is revoked and the error output is set, if programmed. Restart is only possible after the error has been reset. The line contactor remains on.
DE-ENERGIZE LINE CONTACTOR	The inverter switches off immediately and an error is signaled. The output stage is inhibited. The error is signaled via the terminal, if programmed. The line contactor opens.
DISPLAY ONLY WITH AUTO-RESET	A re-established fieldbus connection resets the display.
INHIBIT OUTPUT STAGE WITH AUTO-RESET	A re-established fieldbus connection enables the line inverter.

P833 Response to RS485 TIMEOUT

Factory setting: DISPLAY ONLY

P833 programs the error response that is triggered by the RS485 timeout monitoring. The response time of the monitoring process can be set with *P812 RS485 timeout interval*.

P836 Response SBus TIMEOUT 1

Factory setting: DISPLAY ONLY

P836 programs the error response that is triggered by system bus timeout monitoring. The response time of the monitoring process can be set with *P883 Timeout delay SBus 1*.

P84x Reset behavior

P840 Manual reset

Setting range: YES / NO

- YES: The error in the regenerative power supply unit is reset. In case of an error, you can press the [← / Del] key on the DBG60B to access *P840* directly. *P840* is also available in the "Parameters" main menu in SHELL. *P840* automatically reverts to NO after the reset. Activating the manual reset does not have any effect if there is no error present.
- NO: No reset.

P841 Auto reset

Setting range: ON / OFF

- ON: The auto reset function is activated. In case of an error, this function automatically resets the unit after *P842 Restart time*. A maximum of five auto resets is possi-

ble during an auto reset phase. If 5 errors occur that are reset by an auto-reset, no more auto-resets are possible until:

– a manual reset is performed using the input terminal,
– a manual reset is performed using the serial interface (SHELL, DBGT60B, master controller),
– there is a transition to 24 V backup mode, or the inverter is switched off.

Five automatic resets are then possible again.

⚠ WARNING

Risk of crushing if the motor starts up automatically after an auto reset.

Severe or fatal injuries.

- Do not use auto reset with drives where an automatic restart represents a danger to people or units.
- Perform a manual reset.

- OFF: No auto reset.

P842 Restart time

Setting range: 1 – 3 – 30 s

P842 is used to set the time to be waited between the time an error occurs and the execution of an automatic reset.

P87x Process data description

P870 / P871 / P872 Setpoint description PO1 / PO2 / PO3

P870/*P871*/*P872* is used to define the content of the process output data words PO1/PO2/PO3. This is necessary so MOVIDRIVE® B can allocate the appropriate setpoints.

Setpoint description	Factory setting
P870 Setpoint description PO1	CONTROL WORD 1
P871 Setpoint description PO2	NO FUNCTION
P872 Setpoint description PO3	NO FUNCTION

P873 / P874 / P875 Actual value description PI1 / PI2 / PI3

P873/*P874*/*P875* define the content of the process input data words PI1/PI2/PI3. This is necessary so MOVIDRIVE® B can allocate the appropriate actual values.

Actual value description	Factory setting
P873 Actual value description PI1	STATUS WORD 1
P874 Actual value description PI2	OUTPUT CURRENT (LINE CURRENT OF THE REGENERATIVE POWER SUPPLY UNIT)
P875 Actual value description PI3	NO FUNCTION

The following PI assignments are available:

Assignment	Description
NO FUNCTION	The content of the process input data word is 0000_{hex}.
OUTPUT CURRENT	Present output current of the system in % of I_N.
ACTIVE CURRENT	Present active current of the system in % of I_N: • Positive sign = motor current • Negative sign = regenerative current
STATUS WORD 1	Status information of the inverter

See the "Fieldbus unit profile with parameter list" manual for a detailed explanation.

P876 PO data enable

Setting range: ON / OFF

- ON: The process output data that was last sent from the fieldbus controller becomes effective.
- OFF: The last valid process output data remain in effect.

INFORMATION

If the process data assignment is changed, *P876* is automatically set to "OFF".

P88x Serial communication SBus 1/2

P881 Address SBus 1

Setting range: 0 – 63

Use *P881* to set the system bus address of MOVIDRIVE® B. MOVIDRIVE® B can communicate with other MOVIDRIVE® B units via the system bus (SC11) by means of the address set here.

P883 Timeout delay SBus 1

Setting range: 0 – 650 s

P883 is used to set the monitoring time for data transmission via system bus. If there is no data traffic via the system bus during the time period set in *P883*, MOVIDRIVE® will execute the error response set in *P836 Response SBus TIMEOUT 1*. No monitoring of data transmission via the system bus takes place when *P883* is set to the value 0.

P884 Baud rate SBus 1

Setting range: 125 / 250 / 500/1000 kBaud

P884 sets the transmission speed of the system bus.

7 Operation (MDR60A0150/0370/0750 and MDR61B1600/2500)

⚠ WARNING

Electric shock due to charged capacitors

Severe or fatal injuries.

- Observe a minimum switch-off time of 10 minutes after disconnecting the power supply.
- Regardless of the LED display, make sure that the unit is deenergized before you touch any power elements.

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 Inhibit inverter of regenerative power supply unit

To keep the power supply disturbances to a minimum, you can inhibit the inverter of the regenerative power supply unit using a DC 24 V signal at terminal X3:3 (inhibit). For the MOVIDRIVE® MDR60A0150/0370/0750 regenerative power supply unit (size 2 – 4), the minimum inhibit time is 1.5 s. If the DC 24 V signal is active for < 1.5 s, the regenerative power supply unit remains inhibited for 1.5 s. Then, once the inhibit signal is removed, the regenerative power supply is immediately enabled.

MOVIDRIVE® MDR60A0150/0370/0750 (size 2 – 4) displays the "Ready" even when inhibited. Take this fact into account in your system's sequence control.

7.2 Operating displays

7.2.1 MOVIDRIVE® MDR60A0150/0370/0750 operating displays

Ready signal

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

The ready signal is revoked when a thermal overload occurs in the regenerative power unit or in case of 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 be able to bring the drives to a controlled stop in case of an interruption in the power supply or power failure. This resistor is only energized during braking when there is a power supply interruption.

Unit status/ supply system status	Response	Ready signal	Ready signal indicator
Supply system failure **or** Unit fault → MDR60A not ready	Power failure is detected under load within one supply system half-wave. Immediate inhibit of the regenerative power supply Input rectifier remains switched on.	Not ready	Red
Supply system OK again **and** no unit fault → MDR60A ready	Supply system O.K. is detected within one supply system half-wave. After 200 ms delay[1], the regenerative power supply is started automatically.	Ready after 200 ms	Yellow

1) ensures safe operation in the event of contactor chatter

7.2.2 MOVIDRIVE® MDR61B1600/2500 operating displays

7-segment display

The 7-segment display shows the operating condition of the MOVIDRIVE® MDR 1600/2500 regenerative power supply unit and, in the event of an error, an error or warning code.

7-segment display	Unit status (high byte in status word 1)	Meaning
0	**0**	24 V operation (inverter not ready)
1	**1**	Controller inhibit active
2	**2**	No enable
3	**3**	DC link is loaded
4	**4**	Enable
8	**8**	Delivery state
d	**13**	Precharge
F	**Error number**	Error indicator (flashing)
t	**16**	Inverter is waiting for data
U	**17**	X17 signal jumpers not installed
⊣2 ...⊣4	-	RAM defective

DBG60B keypad

Basic displays:

50.0Hz 0.000Amp CONTROLLER INHIBIT	Display when X13:1 (DIØØ "/CONTROL.INHIBIT") = "0".
50.0Hz 0.000Amp NO ENABLE	Display when X13:1 (DIØØ "/CONTROL.INHIBIT") = "1" and inverter is not enabled ("ENABLE/STOP" = "0").
50.0Hz 0.990Amp ENABLE	Display for enabled inverter.
NOTE 6: VALUE TOO HIGH	Information message
(DEL)=Quit ERROR 9 STARTUP	Error display

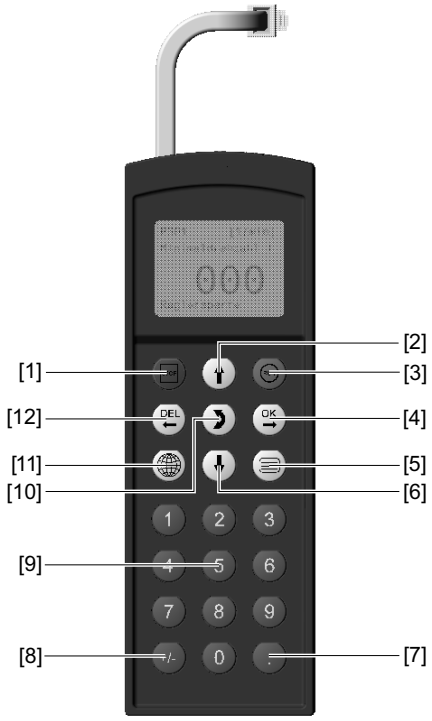
DC link voltage display of size 7

MOVIDRIVE® B, size 7 has an additional display LED under the lower front cover. The lit display LED indicates a DC link voltage. Do not touch power connections. Check that there is no voltage present before touching power connections even if the LED display indicates that there is no voltage.

INFORMATION

The DC link voltage display goes out about 20 seconds after the power off.

7.3 Key assignment for DBG60B



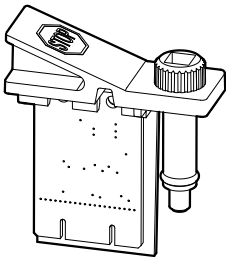
1810609803

[1]	Key	STOP	Stop
[2]	Key	↑	Up arrow, moves up to the next menu item
[3]	Key	RUN	Start
[4]	Key	OK	OK, confirms the entry
[5]	Key	☰	Activate the context menu
[6]	Key	↓	Down arrow, moves down to the next menu item
[7]	Key	·	Decimal point
[8]	Key	+/-	Sign reversal
[9]	Key	0 – 9	Digits 0... 9
[10]	Key		Change menu
[11]	Key		Select language
[12]	Key	DEL	Delete previous entry

7.4 Memory card

The pluggable memory card is installed in the basic unit. The basic data is stored on the memory card and is always up-to-date. If a unit has to be replaced, the plant can be started up again quickly without PC and data backup by simply re-plugging the memory card.

The following figure shows the memory card.



1810728715

- Only plug in the memory card when the MOVIDRIVE® MDR61B unit is switched off.

8 Service (MDR60A0150/0370/0750 and MDR61B1600/2500)

⚠ WARNING

Electric shock due to charged capacitors

Severe or fatal injuries.

- Observe a minimum switch-off time of 10 minutes after disconnecting the power supply.
- Regardless of the LED display, make sure that the unit is deenergized before you touch any power elements.

8.1 Fault information

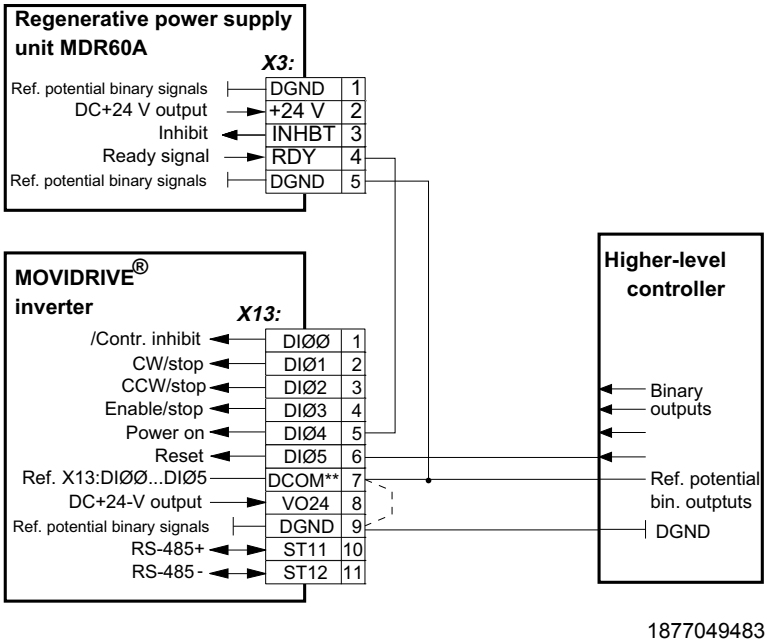
8.1.1 MOVIDRIVE® MDR60A0150/0370/0750 error information

Regenerative power supply reset

After a switch-off the regenerative power supply is reset automatically (→ chapter "Operating behavior").

Inverter

The power off response does not produce an error message in the inverter (no reset required). Other errors, such as "U_Z overvoltage" must be reset. Program a binary input on the inverter to "RESET" for that purpose. The reset is activated by a positive edge ("0" → "1" signal). A reset can also be achieved by switching the supply voltage off and on again.



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** If the binary inputs are connected to the DC 24 V voltage supply X13:8 "VO24", install a jumper between X13:7 and X13:9 (DCOM - DGND) on the MOVIDRIVE® inverter.

8.1.2 MOVIDRIVE® MDR61B1600/2500 error information

Error memory

The error memory (P080) stores the last five error messages (errors t-0 ... t-4). The oldest error message is deleted whenever more than 5 error messages have occurred. The following information is stored when a malfunction occurs:

Error that has occurred · Status of binary inputs/outputs · Operating status of the inverter · Inverter status · Heat sink temperature · Output current · Active current · Unit utilization · DC link voltage · ON hours · Enable hours.

Switch-off responses

There are 3 switch-off responses depending on the error; the inverter remains blocked during the error status:

Immediate disconnection

The unit can no longer brake the drive; the output stage goes to high resistance in the event of an error and the brake is applied immediately (DBØØ "/Brake" = "0").

Reset

An error message can be acknowledged by:

- DC 24 V power supply switch-off

  Recommendation: Observe a minimum switch-off time of 10 s for the line contactor K11.
- Reset via input terminals DIØ2, i.e. via binary input
- Manual reset in SHELL (P840 = “YES” or [Parameter] / [Manual reset]).
- Manual reset using the DBG60B.
- Auto reset performs up to 5 unit resets with an adjustable restart time.

⚠ WARNING

Risk of crushing if the motor starts up automatically after an auto reset.

Severe or fatal injuries.

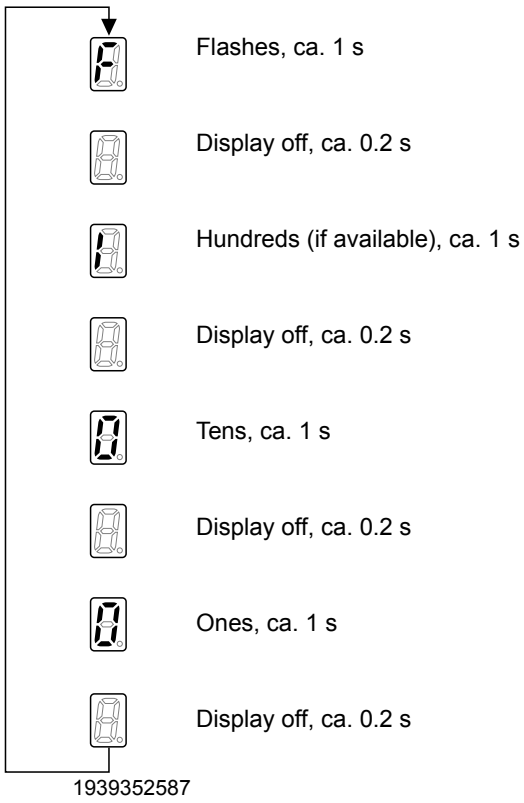
- Do not use auto reset with drives where an automatic restart represents a danger to people or units.
- Perform a manual reset.

8.2 Error messages and list of errors

8.2.1 Error messages and error list for MOVIDRIVE® MDR61B1600/2500

Error message via 7-segment display

The error code is shown in a 7-segment display. The following display sequence is used (e.g. error code 100):



Following a reset or if the error code resumes the value "0", the display switches to the operating display.

Suberror code – display

The suberror code is displayed in MOVITOOLS® MotionStudio (as of version 4.50) or in the DBG60B keypad.

Error list

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
00	No error					
01	Overcurrent	Immediate disconnection	1	VCE monitoring or undervoltage monitoring of the unit driver	• Short circuit at the power input • regenerative power rating too high • Defective output stage • Power supply Current converter • Defective phase module • Supply voltage 24 V or 24 V generated from it is instable • Interruption or short circuit on the signal lines from the phase modules	• Rectify the short circuit • Limit regenerative power rating; e.g. extend ramp times of the motor inverter • Contact SEW Service for advice if the output stage is defective.
			6	UCE monitoring or undervoltage monitoring of gate driver or overcurrent of current converter ..Phase U		
			7	..Phase V		
			8	..Phase W		
			9	..Phases U and V		
			10	..Phases U and W		
			11	..Phases V and W		
			12	..Phases U and V and W		
			13	Voltage supply Current converter in mains operation		
			14	MFE signal lines defective	Defective output stage	
03	Ground fault	Immediate disconnection	0	Ground fault	Ground fault • in the supply cable • in the regenerative power supply	• Eliminate ground fault • Consult SEW Service
			1	Ground fault or current converter error	• Ground fault – in the supply cable – in the regenerative power supply • defective current converter • Defective cable between phase module and current converter	• Eliminate ground fault • Consult SEW Service
06	Line phase failure	Immediate disconnection (+ open line contactor)	0	DC link voltage periodically too low	• Phase failure • Inadequate line voltage quality	• Check the line cable • Check configuration of the supply system. • Check supply (fuses, contactor)
			3	Mains voltage failure		
			4	Line frequency fault		
07	DC link	Immediate disconnection	0	DC link voltage too high	DC link voltage too high	• Extend deceleration ramps of the motor inverter • Check braking resistor supply cable (if available) • Check technical data of braking resistor (if available) • Check configuration of the supply system. • For supply voltages > 480 V, set the "Enable" and "Controller inhibit" signals simultaneously
		Immediate disconnection (+ open line contactor)	5	DC link undervoltage	DC link voltage too low	
		Immediate disconnection	6	DC link voltage too high.. Phase U	DC link voltage too high	
			7	.. Phase V		
			8	.. Phase W		
		Immediate disconnection (+ open line contactor)	9	DC link voltage (Software detection)		
09	Startup	Immediate disconnection (+ open line contactor)	0	Startup missing	The regenerative power supply has not been started up in the hardware configuration yet.	Restore the factory settings in the setup or load matching data set.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
11	Overtemperature	Immediate disconnection	0	heat sink temperature limit exceeded	• Thermal overload of the regenerative power supply • Temperature sensor of a phase module faulty. (size 7) • Line chokes overloaded	• Reduce load and/or ensure adequate cooling. • Check fan (Phase modules or line chokes) • If F-11 is issued even though the temperatures is obviously not too high, this indicates a faulty temperature sensor of the phase module. Replace the phase module (Size 7)
			3	Overtemperature switched-mode power supply		
			6	Heat sink temperature too high or defective temperature sensor.. ..Phase U		
			7	..Phase V		
			8	..Phase W		
			9	Heat sink temperature of rectifier or line choke too high during regeneration		
17	System malfunction	Immediate disconnection (+ open line contactor)	48	Computer internal; exception error	Inverter electronics disrupted, possibly due to effect of EMC.	• Check grounding and shielding and improve, if necessary. • Consult SEW Service if the error reoccurs.
18	System malfunction	No response, (display only)	101	Invalid error code requested		
		Immediate disconnection (+ open line contactor)	300	Internal error Software-Modul MoviLink Lib		
			301	Internal error Software-Modul ParameterData		
			302	Internal error Software-Modul ASMOS		
			303	Internal error Software-Modul Utilities		
		No response, (display only)	304	Internal error Software-Modul A/D conversion		
25	Non-volatile parameter memory	Immediate disconnection	2	NV memory runtime error (Memory Device)	Access to the NV memory card has failed	• Activate factory settings, perform reset and reset parameters. • Contact SEW service if the error occurs again. • Replace memory card.
			3	NV memory import error		
			4	NV memory setup error		
			5	NV memory data error		
			7	NV memory initialization error		
			15	Used NV memory cannot be operated with the firmware.		
			17	NV memory runtime error (NV memory)		
			18	NV memory initialization error (Memory Device)		
36	Option missing	Immediate disconnection (+ open line contactor)	2	Encoder slot error.	• "MDR" mdata logging option card defective	Consult SEW Service.
37	System watchdog	Immediate disconnection (+ open line contactor)	0	"System watchdog overflow" error	Error while executing system software	Consult SEW Service.
43	RS485 timeout	No response, (display only)(P)	0	Communication timeout at RS485 interface.	Error during communication via interface RS485	Check RS485 connection (e.g. inverter - PC, inverter - DBG60B). If necessary, contact SEW Service.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
44	Unit utilization	Immediate disconnection	0	Unit utilization error	• Unit utilization (IxT value) > 125%	• Decrease power output • Extend ramps of the motor inverter • If suggested actions not possible, use larger regenerative power supply unit. • Reduce load
45	Initialization	Immediate disconnection (+ open line contactor)	1	Offsets of the current measurement outside the permitted range	• No parameters set for EEPROM in power section, or parameters set incorrectly. • Option card not in contact with backplane bus. • Current measurement is defective • Error in the processor periphery	• Restore factory settings Consult SEW Service if the error still cannot be reset. • Insert the option card correctly.
47	System bus 1 timeout	No response, (display only)(P)	0	Timeout system bus CAN1	Error during communication via system bus 1.	Check system bus connection.
80	RAM test	Immediate disconnection	0	"RAM test" error	Internal unit fault, RAM defective.	Consult SEW Service.
94	Unit configuration data	Immediate disconnection	1	CRC checksum error	Inverter electronics disrupted, possibly due to effect of EMC or a defect.	Send unit in for repair.
			11	Power section data CRC checksum error		
97	Copy error	Immediate disconnection	1	Download of parameter set to unit cancelled.	• Memory card cannot be written or read. • Error during data transmission	• Repeat copying process • Restore default setting (P802) and repeat copying process
98	CRC error	Immediate disconnection (+ open line contactor)	0	"CRC via internal flash" error	Internal unit error, flash memory defective.	Send unit in for repair.
107	Line components	Immediate disconnection (+ open line contactor)	1	Line contactor feedback contact error	• Defective main contactor • Supply cable missing • Output stage defective • Control cables defective	• Check main contactor • Check control cables and line connection • Check line filter connection
			4	Internal line cables are swapped		
			5	Missing line cable or faulty branch of the output stage		
			6	Unable to perform self-test due to controller inhibit.		
124	Ambient condition	Immediate disconnection	1	Permitted ambient temperature exceeded	Ambient temperature > 60 °C	Improve ventilation and cooling conditions, improve air supply in the control cabinet, check filter mats.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
196	Power section	Immediate disconnection (+ open line contactor)	1	Discharge resistor	Discharge resistor overload	Observe waiting time for power on/off
			2	Hardware ID precharge/discharge control	Incorrect precharge/discharge control variant	• Consult SEW Service • Replace precharge/discharge control
		Immediate disconnection	3	Inverter coupling PLD Live	Defective inverter coupling	• Consult SEW Service • Replace inverter coupling
			4	Inverter coupling reference voltage	Defective inverter coupling	• Consult SEW Service • Replace inverter coupling
			5	Power section configuration	Different phase modules installed in the unit	• Inform SEW service. • Check and replace phase modules
		Immediate disconnection (+ open line contactor)	6	Control unit configuration	Control unit line inverter or motor inverter incorrect	Replace or correctly assign the control unit of line and motor inverter.
		Immediate disconnection	7	Communication power section control unit	No communication	Check control unit installation.
		Immediate disconnection (+ open line contactor)	8	Communication precharge/discharge control inverter coupling	No communication	• Check wiring • Consult SEW Service
			10	Communication power section control unit	The inverter coupling does not support protocol	Replace inverter coupling
			11	Communication power section control unit	Faulty communication with inverter coupling at power-up (CRC error).	Replace inverter coupling
			12	Communication power section control unit	Inverter coupling uses protocol that does not match control unit	Replace inverter coupling
		Immediate disconnection	13	Communication power section control unit	Faulty communication with inverter coupling during operation: More than once per second a CRC error.	Replace inverter coupling
		Immediate disconnection (+ open line contactor)	14	Control unit configuration	Missing PLD functionality for EEPROM data set size 7.	Replace control unit
		Immediate disconnection	15	Inverter coupling error	Inverter coupling processor has signaled internal error.	• Consult SEW service if the error reoccurs • Replace inverter coupling
196	Power section	Immediate disconnection (+ open line contactor)	16	Inverter coupling error: PLD version incompatible		Replace inverter coupling
			17	Precharge/discharge control error	Precharge/discharge control processor has signaled internal error	• Consult SEW service if the error reoccurs • Replace precharge/discharge control
		Immediate disconnection	18	Defective DC link fan	The DC link fan is faulty.	• Consult SEW Service • Check whether DC link choke fan is connected or faulty
			19	Communication power section control unit	Faulty communication with inverter coupling during operation: More than once per second an internal error.	• Consult SEW Service if the error reoccurs. • Replace inverter coupling
			20	Communication power section control unit	The control unit has not sent any messages to the inverter coupling for a while.	• Consult SEW Service if the error reoccurs. • Replace inverter coupling
			21	U_z measurement implausible phase R	Defective phase module	Consult SEW service if the error reoccurs
			22	U_z measurement implausible phase S		
			23	U_z measurement implausible phase T		

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
197	Power failure	Immediate disconnection (+ open line contactor)	0	Power failure	Inadequate line voltage quality.	• Check supply (fuses, contactor) • Check configuration of the supply system
			1	Supply system overvoltage		
			2	Supply system undervoltage		
		No response, (display only)	3	Supply system quality, frequency error		
199	DC link charging	Immediate disconnection (+ open line contactor)	1	Precharging was aborted (timeout)	Unable to charge DC link.	• Precontrol overload • Connected DC link capacity too high • Short circuit in the DC link; check DC link connection in case of several units.
		Immediate disconnection	3	Charging to voltage setpoint was aborted (timeout)		
		Immediate disconnection (+ open line contactor)	4	Precharging was aborted		

8.3 SEW Electronics Service

8.3.1 Send in for repair

Consult the **SEW-EURODRIVE electronics service if an error cannot be rectified** (→ "Customer and spare parts service").

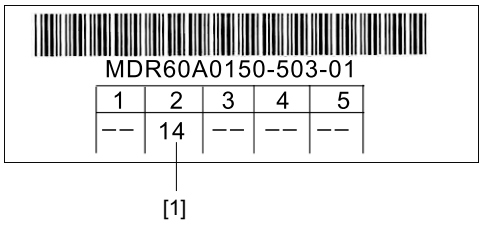
When contacting SEW electronics service, always quote the digits on the status label so that our service personnel can assist you more effectively.

Provide the following information when sending the unit in for repair:

- Serial number (→ nameplate)
- Type designation
- Digits on the status label
- Short description of application (drive application, control via terminals or serial)
- Connected components (inverter, etc.)
- Nature of the fault
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

8.3.2 Status label

MOVIDRIVE® MDR60A regenerative power supply units have a service label attached to them; the label is located at the side of the unit.



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[1] = Hardware status

MOVIDRIVE® MDR61B regenerative power supply units have a service label attached to them; the label is located on the upper front cover.

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9 Introduction (MDR60A1320-503-00)

INFORMATION

The following sections include information on the MOVIDRIVE® MDR60A1320-503-00 regenerative power supply unit only.

9.1 About these operating instructions

- This operating instructions is a guideline for the safe operation of and with the MOVIDRIVE® MDR60A1320-503-00 regenerative power supply unit. It contains safety notes to be observed and information that is necessary for fault-free operation making use of all advantages offered by the unit.
- All persons operating the MOVIDRIVE® MDR60A1320-503-00 regenerative power supply units must have a copy of these operating instructions at their disposal and pay attention to the important data and notes.
- The operating instructions must always be complete and legible.

9.2 Terminology

- **Regenerative power supply**

  The MOVIDRIVE® MDR60A1320-503-00 regenerative power supply unit will be referred to as "regenerative power supply unit".

- **Drive controller**

  The frequency inverter used in connection with the regenerative power supply unit will be referred to as "Drive controller".

- **Drive system**

  Drive systems with regenerative power supply units, drive controllers and other drive components will be referred to as "Drive system".

9.3 Legal provisions

9.3.1 Labeling

- **Nameplate**

  MOVIDRIVE® MDR60A1320-503-00 regenerative power supply units are clearly identified as such by the nameplate.

- **CE marking**

  Meeting the EC guideline "Low voltage".

- **Manufacturers**

  SEW-EURODRIVE GmbH & Co KG, Ernst-Blickle-Straße 42, 76646 Bruchsal, Germany

9.3.2 Designated use

- **Operate MOVIDRIVE® MDR60A1320-503-00 regenerative power supply units only at those operating conditions listed in these operating instructions.**
- MOVIDRIVE® MDR60A1320-503-00 regenerative power supply units are components
  - for feeding and regeneration of electrical energy
  - for installation into a machine
  - for assembly with other components to form a machine
- MOVIDRIVE® MDR60A1320-503-00 regenerative power supply units
  - are electrical equipment for installation in control cabinets or other closed operating spaces
  - meet the safety requirements of the EC guideline "Machines"
  - are no household appliances but are intended for commercial use only.
- Drive systems with MOVIDRIVE® MDR60A1320-503-00 regenerative power supply unit meet the EC guideline "Electromagnetic compatibility" if they are installed according to the guidelines of the CE typical drive system. They can be operated
  - in public and private power supply systems
  - in industrial environments as well as residential and business environments
- The customer is responsible for maintaining the EC guidelines in the machine operation.

9.3.3 Disclaimer

- The information, data and notes in these operating instructions were the most recent at the time of publishing. We do not accept claims for changes to regenerative power supply units that were delivered previously based on the information, illustrations and descriptions contained in these instructions.
- The process engineering notes and wiring sections represented in these operating instructions are recommendations that need to be checked for the respective application. SEW-EURODRIVE GmbH & Co KG is not liable for suitability of the indicated processes and circuit suggestions.
- We are not liable for any damages or problems resulting from:
  - disregarding the operating instructions
  - Unauthorized modifications to the regenerative power supply unit
  - operation errors
  - Inappropriate operation of and with the regenerative power supply unit

9.3.4 Warranty

- Conditions for limited warranty: see Terms and Conditions for Sale issued by SEW-EURODRIVE GmbH & Co KG.
- File any limited warranty claims immediately after registering the defect or error.
- Limited warranty expires in all cases in which you cannot file liability claims.

9.3.5 Disposal

Material	Recycling	Disposal
Metal	X	–
Plastics	X	–
Printed-circuit boards	–	X

10 Safety Notes (MDR60A1320-503-00)

10.1 General information

This information is provided for installers and operators of a system and includes notes regarding the special characteristics and regulations for the MOVIDRIVE® MDR60A1320-503-00 regenerative power supply unit. We do not claim that these safety notes are complete.

10.1.1 Special features in comparison to the brake chopper

The regenerative power supply unit does not represent a constant drain, like a braking resistor, but depends on the current conditions within the power supply system. Commutation notches or voltage fluctuations in the supply system affect the reverse current of the unit. The reverse current has to increase in case of a short-term system voltage drop to still regenerate the required power. Drop of the supply voltage for an extended period of time reduces the maximum power available for feedback. If only one phase fails, the unit can still operate but the current in the remaining phases increases by a factor of 1.5.

10.1.2 Length of the DC connection

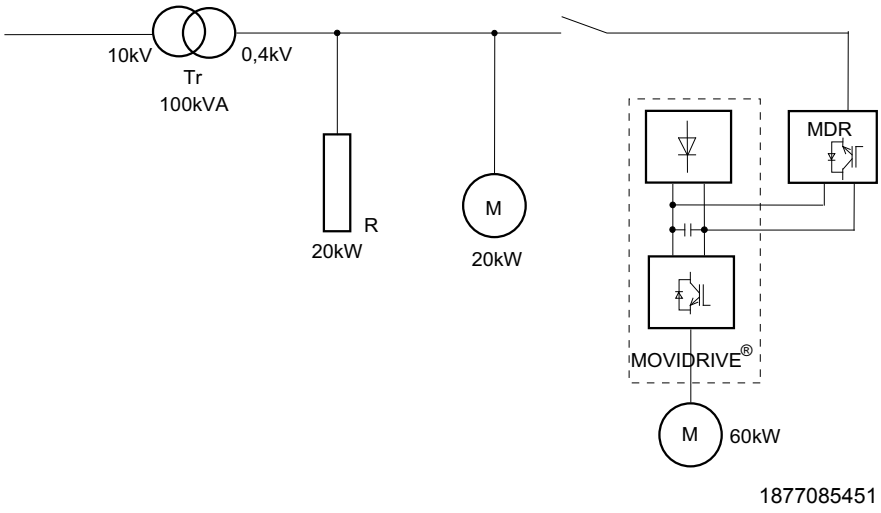
- Install the frequency inverter and the regenerative power supply unit as close as possible to each other.
- The permitted cable length between frequency inverter and regenerative power supply unit must not exceed 5 m.
- Route the cables very close to each other.

10.1.3 Operation with a transformer

If only a few consumers operate in a power supply section besides the regenerative power unit, the transformer must be able to transmit the power not used in this section to the next voltage level without the voltage becoming excessively high in the section. This means the rated (apparent) power of the transformer must be at least 1.5 times greater than the (effective) power regenerated from this section to also transmit the harmonics and reactive components of the currents.

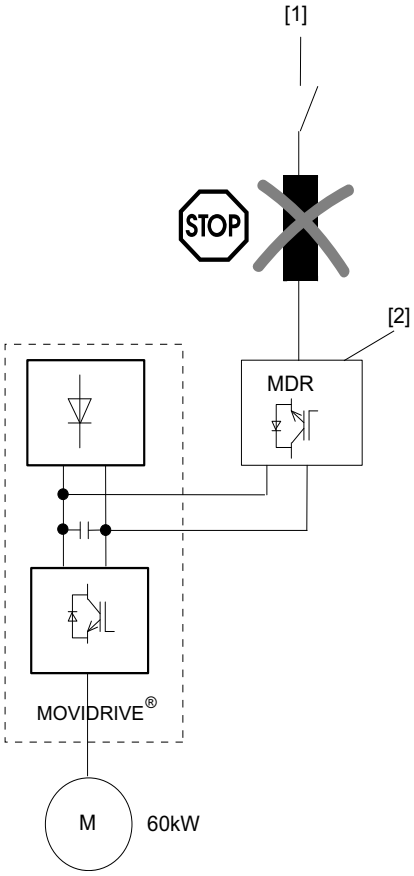
These conditions are met in the power supply section shown in following figure when all other consumers are turned off. If the regenerated power is close to the rated power of the transformer, the u_K value of the transformer must be sufficiently small (max. 6 %) to limit the voltage increase in the power supply section.

Operation of MOVIDRIVE®-MDR60A1320-503-00 units in connection with variable transformers with a large u_K of 10 - 20 % (e.g. in a design as stalled slipring motor) is permitted only if the ratio regenerative power/rated power is considerably smaller.



10.1.4 Position of the commutation inductance

The commutation inductance required for the drive controllers [2] is integrated in the regenerative power supply units. It is not permitted to connect an additional commutation inductance in the incoming circuit. Regenerative power supply units are connected directly to the power supply system [1] (→ following figure).



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If you do not follow this method of connection, the inductance will prevent synchronization with the power supply system and there may be a voltage increase at the choke when turning off the unit while current is still flowing. This may damage the regenerative power supply unit.

NOTICE

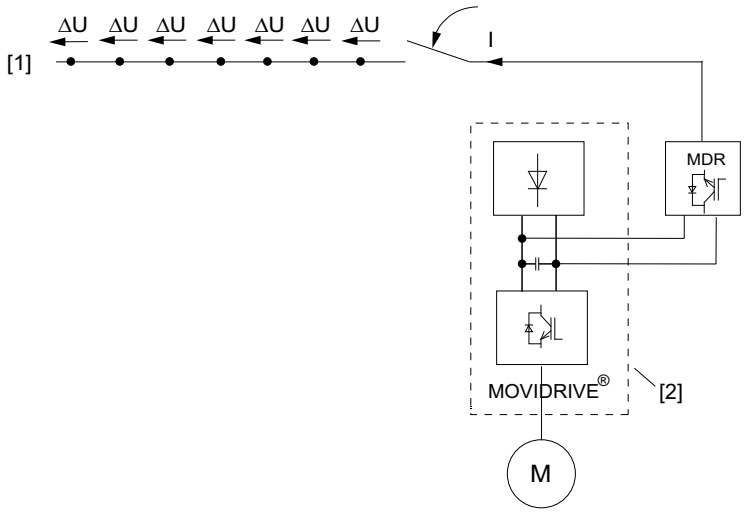
- **The same holds true when installing additional chokes in the incoming circuit, which is also prohibited.**
- **Overvoltages can cause irreparable damage to the connected drive controller and/or the regenerative power supply unit as well as the other loads.**

10.1.5 Cable and transfer resistors

The data on current carrying capacity of cables usually refers to copper conductors. Use larger cross sections for aluminum conductors due to the higher specific resistance.

For both kinds of conductor material you will have to ensure that the connection points of the conductors are low-resistance and that their number is kept as low as possible.

As shown in the following illustration, too many or too high-resistance terminal connections (D U) can result in an excessive voltage drop during driving operation and an excessive voltage peak in regenerative operation.



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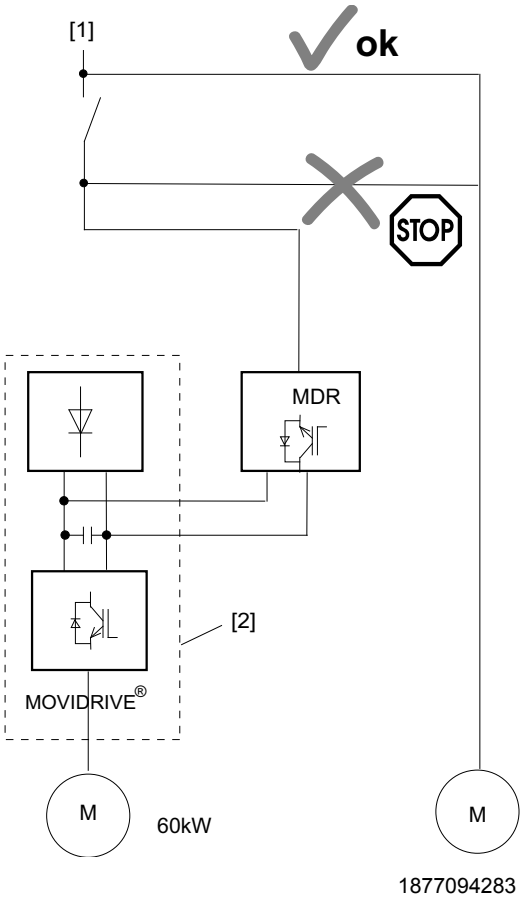
Based on a stable power supply [1] with 400 V rated voltage and a regenerative current of 80 A, there will be a voltage loss of 8 V at a poorly designed terminal connection of 100 mΩ. A well designed terminal connection has a transfer resistance of ca. 1 mΩ. There will be a voltage of 456 V in regenerative operation at the power switch with 7 terminal connections.

NOTICE

Overvoltages can cause irreparable damage to the connected drive controller [2] and/or the regenerative power supply unit as well as the other loads.

10.1.6 Connection of additional consumers

It is **not permitted** to connect additional consumers (e. g. control cabinet fans or air-conditioning units) parallel to the drive controller [2]/regenerative power supply unit in front of a common power switch (→ following figure) . When triggering the switch, there is no connection to the power supply system [1] that represents the power drain and the synchronizing element for the incoming and regenerative unit. The IGBTs will now route the DC link voltage directly to the consumers. The resulting and almost rectangular "power supply" voltage supplies a current to the consumers whose strength and shape depends on their impedance. If the power consumption of the consumers is too low, the DC link voltage will increase in regenerative operation as well as the output voltage of the regenerative power supply units. This high voltage can damage all connected units.

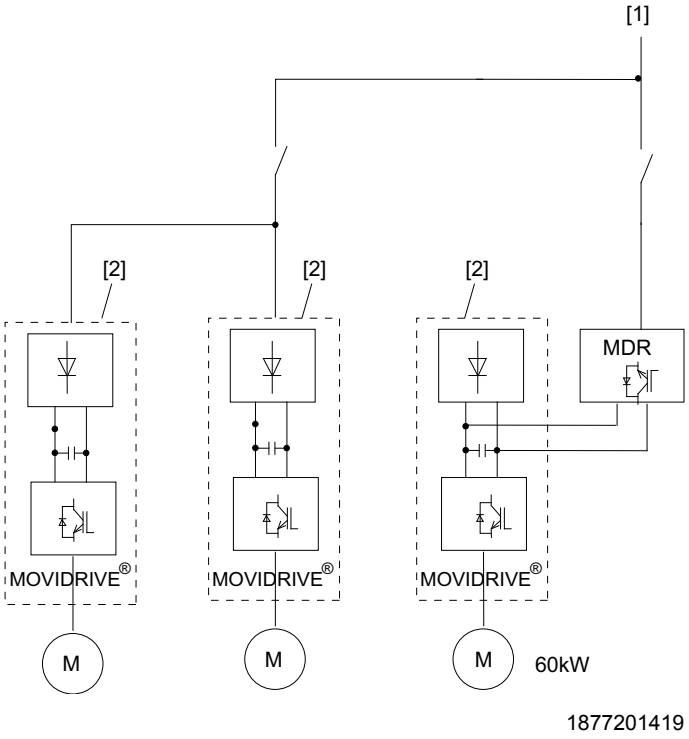


NOTICE

Overvoltages can cause irreparable damage to the connected drive controller [2] and/or the regenerative power supply unit as well as the other loads.

INFORMATION

The same holds true for the design shown in the following figure. Such a system requires that at least each regenerative current path is equipped with a separate switch!



[1] Supply system

[2] Drive controller

11 Technical Data (MDR60A1320-503-00)

11.1 Characteristics

- Very compact size
- Supply of drive controllers
- Braking power from drive controllers is fed back into power supply system
- Rated power 160 kW
- Continuous power 200 kW
- Peak power 240 kW (motor) / 210 kW (regenerative) for 60 s
- DC link connection of several drive controllers possible
- Power section with high efficiency and operational safety
- Self synchronizing
- Overload protection in regenerative operation
- Monitoring of supply voltage, rotating field orientation and temperature
- Implementation of highly dynamic braking actions
- User-friendly startup without programming or setting

11.2 General technical data

MOVIDRIVE® MDR60A1320-503-00	
Interference immunity	Meets EN 61000-6-1 and EN 61000-6-2
Interference emission with EMC-compliant installation	Meets EN 61000-6-4 with NF300-503
Ambient temperature ϑ_U **Ambient temperature derating**	0 °C ... +40 °C I_N reduction: 3% I_N per K to max. 55 °C
Climate class	EN 60721-3-3, class 3K3
Storage temperature[1] ϑ_L	–25 °C...+55 °C (according to EN 60721-3-3, class 3K3)
Cooling type (DIN 51751)	Forced cooling (temperature-controlled fan, response threshold 45 °C)
Degree of protection	IP20
Operating mode	Continuous duty (EN 60149-1-1 and 1-3)
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Installation altitude	h ≤ 1000 m: No limitation From 1000 m to max. 4000 m: I_N reduction: 0.5% per 100 m

1) In case of long-term storage, the unit must be connected to the mains voltage for at least 5 minutes every two years, otherwise the unit's service life may be reduced.

11.3 Rated data

MOVIDRIVE® MDR60A1320-503-00	
Nominal range of the linked supply voltage U_N	380 V ≤ U_N ≤ 500 V
Tolerance of the linked supply voltage U_N	342 V ≤ U_N ≤ 550 V
Mains frequency f_N	40 Hz ... 60 Hz ±10 %
Overload capacity	→ Chapter "Current carrying capacity"
Efficiency η	Approximately 98 % (2 % thermal losses)
Power factor G	≈ 0.7 - 0.95
Cooling air consumption	700 m^3/h
Power reduction ϑ_U	40 °C ... 55 °C → 3 %/K 1000 m above sea level < h ≤ 4000 m above sea level → 5 %/1000 m

11.4 Current carrying capacity

Unit type	Driving operation Free-wheeling diode $I_{eff\ Phase}$		Braking operation IGBT modules $I_{eff\ Phase}$	
	100 %	1 min in 10 min	100 %	1 min in 10 min
MDR60A 1320-503-00	260 A	360 A	260 A	330 A

INFORMATION

- Just like the input of a drive controller, the incoming side of the MOVIDRIVE® MDR60A1320-503-00 is not overload protected. Make sure during dimensioning that the maximum DC input current of the driver controller (including overload factor) does not exceed the input current of the regenerative power supply unit. If that should still be the case, the programmable motor current limit of the drive controller should be identical to that of the regenerative power supply unit. You will have to take the overload factor of the drive controller into consideration in this instance as well.
- Keep in mind when determining the regenerative power that the actual current regenerative power always depends on the actually existing supply voltage.

11.5 Fuses and cable cross sections

The power supply connection of the regenerative power supply unit takes place via terminals L1, L2 and L3 at the commutation choke and PE on the heat sink. Match the input fuse according to the current carrying capacity of the permitted connection cable. The listed manufacturers are recommendations only; you can certainly use comparable types from other manufacturers (e.g. Jean Müller, Ferraz, Bussmann).

11.5.1 Fuses to connect to incoming cable

You can connect the semiconductor fuses listed in the following table to the incoming cable of the regenerative power supply unit.

Unit type	Max. fuse	Connection/max. line cross section of supply cable
MOVIDRIVE® MDR60A1320-503-00	Siba 20 713 32.500 AC 500 A / AC 1100 V / 110 mm NH01	Terminal stud M10 / 185 mm^2

11.5.2 Fuses used in unit

The semiconductor fuses listed in the following table are installed in the regenerative power supply unit.

Unit type	DC fuses (high-speed semiconductor fuses)	Connection/max. line cross section of supply cable
MOVIDRIVE® MDR60A1320-503-00	Siba 20 713 32.630 AC 630 A / AC 1100 V / 110 mm NH01	Terminal stud M10 / 185 mm^2

NOTICE

Contact SEW-EURODRIVE in case the fuses are activated; other protection measures may have been triggered in the unit. Replace internal fuses with original equipment only.

⚠ WARNING

Electric shock from live components.

Severe or fatal injuries.

- **Replace fuses in deenergized state only!**

11.5.3 Radio interference suppression filter

Install a radio interference suppression filter of category A in the MOVIDRIVE® MDR60A 1320-503-00 to meet EMC regulations.

Unit type	Order number for radio interference suppression filter
MOVIDRIVE® MDR60A1320-503-00	NF300-503

12 Installation (MDR60A1320-503-00)

12.1 Mechanical installation

12.1.1 Important notes

- Only use the regenerative power supply units as built-in devices.
- Note installation clearances:
  - You can install several regenerative power supply units in one control cabinet next to each other without clearance.
  - The lateral clearance between components/control cabinet walls may not be less than 70 mm.
  - Keep a minimum clearance of 150 mm at the top and bottom.
  - Install the regenerative power supply units close to each other to keep the cables short.
- Provide free flow of cooling air and exhaust.
- In case of unclean cooling air (dust, lint, grease, aggressive gases) that might impair the function of the regenerative power supply units:
  - Implement sufficient countermeasures, such as separate air ducts, installation of filters, regular cleaning, etc.
- Do not exceed permitted range of ambient temperatures.

12.1.2 Specified mounting position

The MOVIDRIVE® MDR60A1320-503-00 regenerative power supply unit is intended for vertical wall mounting (±15°). Installation site may be even surface only without use of spacers or similar devices. In case of installation into control cabinets make sure that the units are mounted directly and without spacers or similar to the mounting platform and that the waste heat is dissipated appropriately in the control cabinet. This type of installation is necessary to ensure cooling air flow. You will have a power loss of ca. 2 % of the maximum rated power of the unit. Do not exceed an air temperature of 40 °C in the immediate vicinity of the unit. The air inlet and outlet openings on the top and bottom of the unit may not be obstructed by installation material such as cable ducts and other units.

12.2 Notes on electrical installation

12.2.1 Operator protection

⚠ WARNING

Electric shock from live components.

Severe or fatal injuries.

- A dangerously high voltage may be present for several minutes at the DC link terminals of the MOVIDRIVE® MDR60A 1320-503-00 regenerative power unit. The particular time period that is necessary for the voltage to drop to a harmless level is determined by the drive controller in operation and has to definitely expire. The specific times are given by the manufacturer for the drive controller in use.
- Replace any defective fuses in de-energized state only with a fuse of the specified type!

12.2.2 Protection of the regenerative power supply

NOTICE

The MOVIDRIVE® MDR60A1320-503-00 regenerative power supply units contain components that can be damaged by electrostatic energy (ESDS).

Personnel working on the connections has to observe the measures set forth in international standard IEC747-1. That includes discharge of any electrostatic charges prior to starting the job.

Discharge by touching the PE retaining screw or another grounded metal area in the control cabinet.

12.2.3 System configuration/system conditions

Note the limitations for each system configuration! Contact SEW-EURODRIVE if you are planning to operate regenerative power supply units in systems not listed in the following table.

VDE compliant system configuration	Regenerative power supply unit operation
With grounded star point	No limitations
With isolated star point	Prohibited
With grounded phase	Prohibited

12.2.4 Specifications of the used cables

- The cables have to meet the specifications required for the operation site.
- Observe the regulations concerning minimum cross sections of PE conductors.
- The effectiveness of a shielded conductor is determined by
  - a good shielding connection.
  - a low impedance.
- Use shields made of tin-plated or nickel-plated copper braiding only.
  - The overlap factor of the braiding must be at least 70 % to 80 % with an overlap angle of 90°.
- Use the prescribed line protection fuses to protect the incoming cables of the regenerative power supply units.

12.3 Electrical connection

You will have access to the MOVIDRIVE® MDR60A1320-503-00 wiring space after removal of the lateral knurled screw and housing cover. The incoming cables are guided through the metal cable glands installed in the flange.

NOTICE

Make sure not to damage or tear off the cables leading to the display board when removing the cover!

12.3.1 Power connection

Fusing:

- Consider the voltage drop in case of load when selecting the cable cross section.
- Protection of cables and regenerative power supply units on AC side (L1, L2, L3):
  - Commercial semiconductor fuses
  - Fuses and fuse holders/disconnector switches in UL-compliant systems must have UL approval.
  - Rated voltage of fuses must be configured according to the supply voltage on site.
- Protection of regenerative power supply units on the DC side (+UG, –UG):
  - Fuses are installed in unit.

Connection:

- Make all connections as short and as low in inductance as possible.
- Use shielded cables to meet EMC directives (according to existing standards such as VDE 0160 and EN 61800-5-1).
- Connect the supply cables to terminals L1, L2 and L3 of the regenerative power supply unit. Connection always has to be three phase.
- A certain phase sequence has to be observed for the power supply connections of the power section (clockwise phase sequence). The unit comes equipped with a phase monitoring option. If the phase monitoring detects an incorrect phase sequence, the unit will indicate the following error message with its LEDs "Incorrect rotating field" or "Phase fault" (→ chapter "Operation and Service" (page 121)). 2 supply system phases of the power supply connection will have to be replaced.
- Connect the cables for the DC link of drive controller and regenerative power supply unit to terminals +UG / -UG. Ensure correct polarity when making the connection!
- Observe the specified torques and use a 2. wrench to absorb the torque.
- Connect the equipment grounding conductor of the supply cable to the earthing screw at the bottom of the unit.

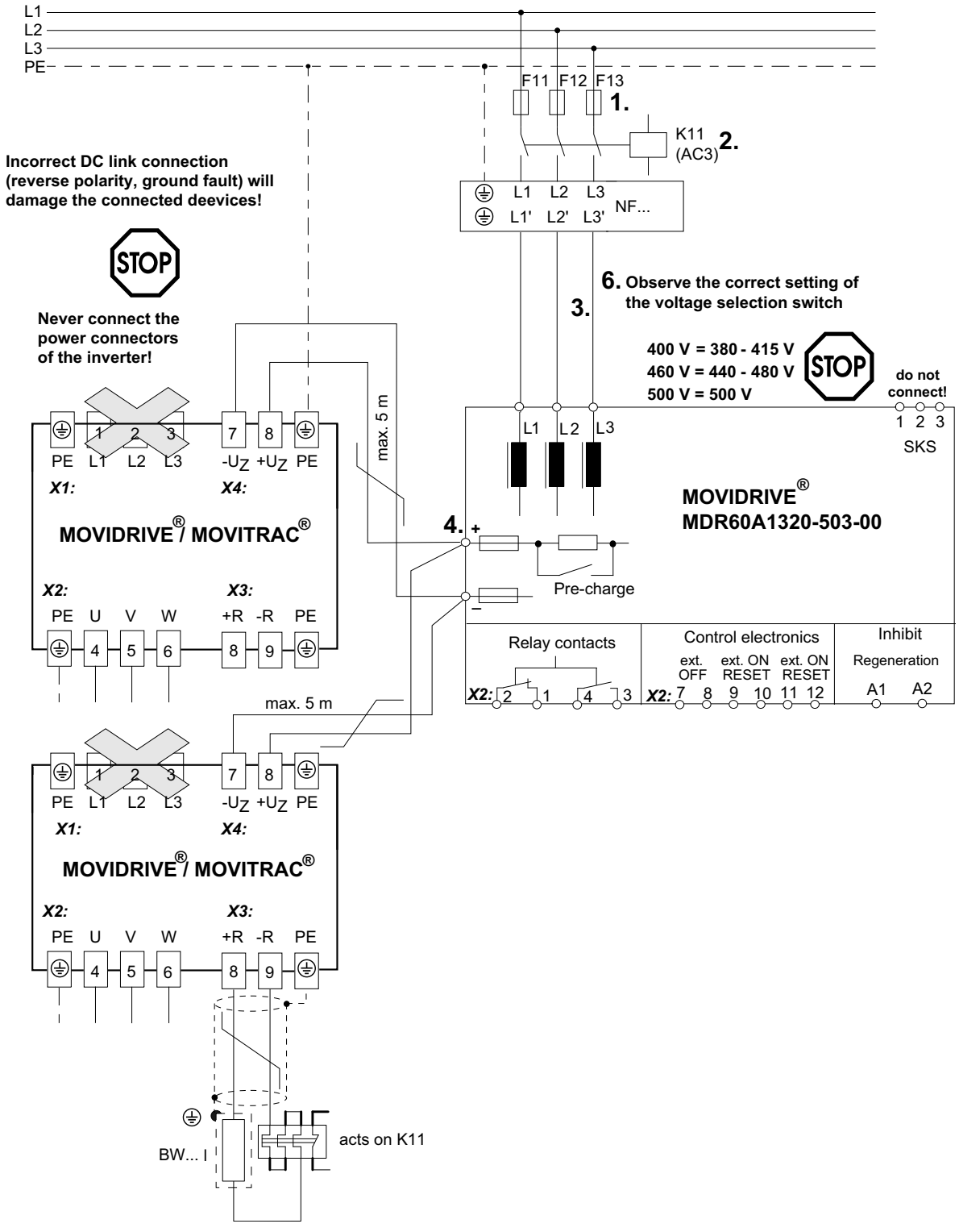
NOTICE

Reversal or incorrect connection of + (plus) or – (minus) poles can destroy the drive controller and the regenerative power supply unit!

Wiring diagram

The following circuit diagram is a circuit recommendation. Special requirements for the application, such as the integration of a PLC, may require changes to the connection of contacts X2:1 ... X2:12.

1. ... 6. → Section "Notes on wiring diagram"



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Notes on wiring diagram

1. Install fuses according to these operating instructions.
2. Do not connect any additional consumers besides the regenerative power supply unit behind the input contactor connected in the incoming cable.

NOTICE

Non-compliance may result in a dangerous voltage increase during regeneration when you disconnect the power supply; the presence of such a dangerous voltage may cause irreparable damage to any additional consumers, drive controllers as well as the regenerative power supply unit in the disconnected section!

3. Cable cross section according to applicable VDE regulations.
4. You can connect one or more drive controllers at this site (even with different power ratings). Keep the DC connection cables **as short as possible** even when connecting several drive controllers! Route the cables as closely as possible.
5. The option of an external "ON" or "RESET" takes place via terminal pairs X2:9 and X2:10 as well as X2:11 and X2:12 (→ section "Terminal assignment control terminal strip X2"):
   - X2:9 and X2:10: Isolated contact (short-term contacting)
   - X2:11 and X2:12: Positive impulse (DC 12 - 24 V); can be implemented through PLC control (terminal 11 +, terminal 12 –)
6. Select the size of the connected voltage supply using the voltage selection switch **prior to turning on the supply voltage**. (→ following table).

Position of the voltage selection switch	Size of connected supply voltage
400 V	AC 380 V - AC 415 V ± 10 %
460 V	AC 440 V - AC 480 V ± 10 %
500 V	500V AC ± 10 %

NOTICE

- Make sure that the switch setting of the voltage selection switch corresponds to the supply voltage prior to turning on the supply voltage. The unit will be destroyed if the value is incorrect!
- The voltage selection switch is located in the device and can be set with the front panel removed. The factory setting is AC 500 V. Deenergize the device before you open it.
- The voltage selection switch may not be operated under voltage.

There is also the risk of a defect in case of improper operation. The tolerance limit for improper operation is set to a time of < 1 min (for cold units).

12.3.2 Control cables

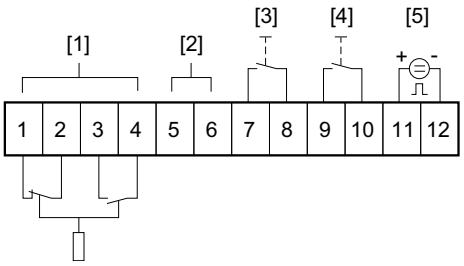
- Connect the control cables to the control terminal strip X2 (→ section "Terminal assignment control terminal strip X2").
- Do not route the control cables parallel to the problem-prone motor cables.
- Apply the shielding of the control cables over a wide area of the metal cable glands on the flange.

12.3.3 Control connections

The control terminal strip X2 is located at the bottom of the device. The terminal block is modular and can be easily wired.

Use the terminal control strip X2 to connect via relay certain messages such as ready for operation or a group fault outside the unit. You can also perform an external RESET or switching function via the control terminal strip X2 and link it with the frequency inverter.

12.3.4 Terminal assignment control terminal strip X2



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[1] X2:1 ... X2:4 Group fault relay

[2] X2:5, X2:6 Internal assignment for temperature monitoring. Do not connect any cables!

[3] X2:7, X2:8 External OFF

[4] X2:9, X2:10 not assigned

[5] X2:11, X2:12 = ON / RESET

INFORMATION

SEW-EURODRIVE recommends preferably using the reset connections X2:11 and X2:12.

NOTICE

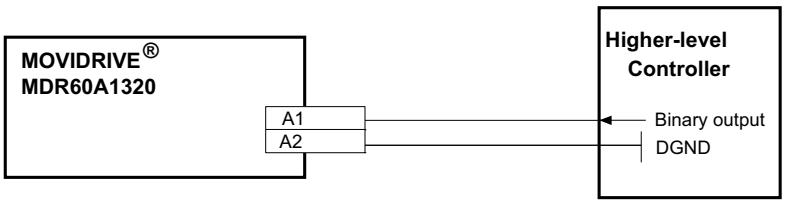
Do not connect any external voltage to terminals X2:5 and X2:10 because otherwise the unit may be damaged!

terminal	Function	Description
X2:1 Normally closed contact	Isolated relay contacts[1) 2)]	Collective fault signal switching capability of the relay contacts: • 30 V DC3A • 230 V AC5A
X2:2 Normally closed contact		
X2:3 Normally open contact		
X2:4 Normally open contact		
X2:5	Internally assigned to temperature monitoring	
X2:6		
X2:7	OFF switch	To switch off the regenerative power supply
X2:8		
X2:9	ON switch / reset[3)]	
X2:10		
X2:11 (+24 V)	External voltage input	To switch on the regenerative supply or confirm errors
X2:12 (0 V)		

1. The relay picks up
   – when the supply voltage is present;
   – when the precharging of the DC link capacitors is complete
   – when there is no group fault;
2. The relay drops out
   • in case of an OFF command via terminals 7 and 8;
   • in the event of an error message
3. Autostart does not require activation of the ON switch Observe chapter "Configuration" (page 117).

12.3.5 Terminal assignment inhibit input A1/A2

terminal	Function	Description
A1	Inhibit input 24 V	Control voltage to inhibit the regenerative power supply path
A2	DGND	



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12.4 Installation in a CE typical drive system

12.4.1 General information

- The customer is responsible for maintaining the EC guidelines in the machine operation.
  - If you observe the following measures you can assume that there will be no EMC problems caused by the regenerative power supply unit when operating the machine and that the EC directive and the EMC law have been met.
  - If you operate any devices in the vicinity of the regenerative power supply unit that do not meet the CE requirements regarding interference immunity according to EN500082-2, these devices may be electromagnetically impaired by the regenerative power supply units.

12.4.2 Structure

- Establish a connection over a large area on the grounded mounting platforms for the regenerative power supply unit and radio interference suppression filter:
  - Mounting platforms with conductive surface (galvanized or stainless steel) make for a permanent contact.
  - Coated platforms are not suitable for an EMC compliant installation.
- If you use several mounting platforms:
  - Connect the mounting platforms to each other over a large area (e.g. with copper bands).
- Install the power and signal cables separately.
- Route the cables as close as possible to the reference potential. Any free floating cables act like antennas.

12.4.3 Filtering

- Use only those radio interference suppression filters assigned to the regenerative power supply units. Radio interference suppression filters reduce excessive high-frequency disturbances to a permitted level.

12.4.4 Shielding

- Metal cable glands ensure a connection of shield and housing over a large area.
- In case of contactors and terminals in shielded cables,
  - connect the shields of all cables and connect these over a large area with the mounting platform.
- In case of supply system cables between radio interference suppression filter and drive controller in excess of 300 mm (11.8"):
  - Shield supply system cable.
  - Apply the shield of the supply system cable directly at the drive controller / on the regenerative power supply unit and the radio interference suppression filter and connect it over a large area to the mounting plate.
- Shielding the control cables:
  - Connect the shields with the shield connections by the shortest possible route.

12.4.5 Grounding

- Ground all conductive metal components (regenerative power supply unit, drive controller, radio interference suppression filter) by using the appropriate cables from a central grounding point (PE busbar).
- Comply with the minimum cross sections defined in the safety regulations:
  - For EMC purposes, it is not the cable cross section but the surface of the cable and the connection over a wide area that are important.

12.4.6 Additional notes

Regenerative power supply units are electrical apparatus for operation in industrial and commercial systems. These devices are not subject to a specific identification according to EMC Directive 2004/108/EC because according to EMC Directive and EMC law, they are devices intended for further installation by competent machine and system manufacturers and cannot be operated on their own. The verification of maintaining the protection targets required by the EMC Directive must be provided by the installer / operator of a machine / system.

When using the radio interference suppression filters provided by SEW-EURODRIVE and adhering to the notes on EMC compliant installation, the appropriate requirements for CE-marking of the entire machine/system in which they are installed are met on the basis of the EMC Directive 2004/108/EC.

The MOVIDRIVE® MDR60A1320-503-00 regenerative power supply units in combination with the associated radio interference suppression filters are intended for operation in environments of class A limit.

Definition according to generic standard:

- EN 61000-6-4 for interference emission
- EN 61000-6-2 for interference immunity

13 Startup (MDR60A1320-503-00)

NOTICE

- Check for completeness, false polarity, short circuits and ground fault prior to taking the unit into operation.
- Incorrect connection could result in problems with the drive controller.

13.1 Initial operation

1. Set the correct position on the voltage selection switch; otherwise the regenerative power supply unit will be destroyed.

Position of the voltage selection switch	Size of connected supply voltage
400 V	AC 380 V - AC 415 V
460 V	AC 440 V - AC 480 V
500 V	AC 500 V

   The voltage selection switch is preset to AC 500 V. Proceed as follows to change the setting of the voltage selection switch:

   – Deenergize the unit

   – Remove the front panel by removing the 8 retaining screws.

   – Change the setting of the voltage selection switch and reinstall the front panel.

   If you have to set jumpers on the control board, proceed in the same order.

2. Turn on the power supply. The unit is ready for operation after about 1 s.
3. Check to make sure that the regenerative power supply unit is ready for operation:

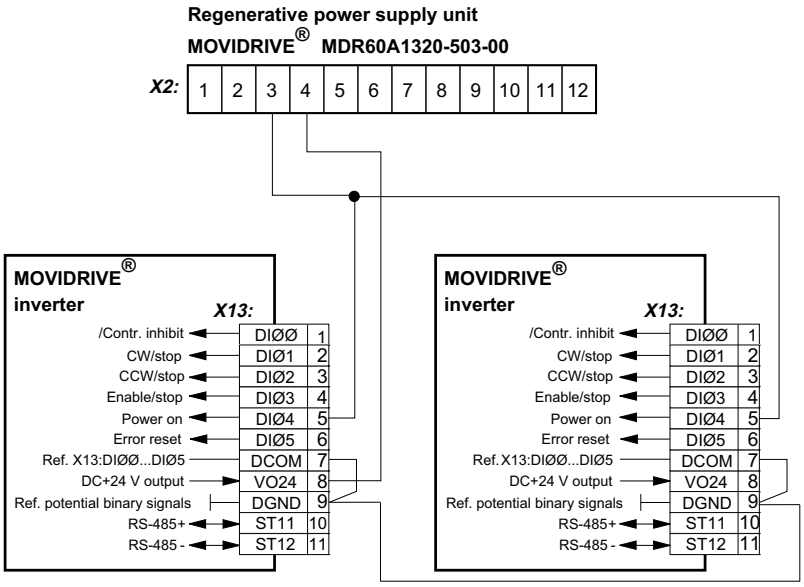
   – The unit is ready for operation if only the green LED of the regenerative power supply unit is on.

   – A problem exists if other LEDs besides the green LED are on. Remedy any errors before you proceed with startup. Observe chapter "Operation and service" (page 121).

4. Check to see if the drive controller is ready for operation in accordance with the corresponding operating instructions.

13.2 Ready signal

The following figure shows how the ready signal (ready) from the regenerative power supply unit must be connected to the "Power supply system on" binary input of the inverter.



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14 Configuration (MDR60A1320-503-00)

The coding of jumpers (jumpers J3, J5, J6, J7, J8) on the control card offers different control options and different internal functions for certain error messages.

The different terms that result from certain coding options are explained below.

14.1 Important notes on configuration

14.1.1 Autostart

"Autostart" means that the unit starts up automatically with a delay of 1 s once the supply voltage has been applied. The "Autostart" function is coded with jumper J1 on the control card and may not be altered.

14.1.2 Switch-off – switch-on

"Switch-off" means that control of the power semiconductors and regeneration is interrupted and braking operation of the drive controllers is no longer possible.

"Switch-on" means control of the power semiconductors is being activated.

14.1.3 Save

The unit comes equipped with an error memory that can be assigned certain errors. Saved error messages must be confirmed via reset or interruption of the supply voltage of the control component power supply. "Save" always results in a simultaneous "switch-off" and dropping out of the centralized alarm relay.

14.1.4 Confirmation

Once an error has been remedied, the error memory will have to be confirmed with the ON confirmation key or disconnection of the three-phase power supply.

NOTICE

- Confirmation of an excessive DC link voltage, i.e. during braking operation, is not permitted and may destroy the unit!

14.1.5 Phase failure

Phase fault monitoring monitors power supply of all three phases. The unit will remain fully functional as far as internal power supply is concerned even with failure of one phase (e.g. error memory).

The unit can respond to a phase failure in two ways. One is "two-phase operation", the other is that the unit stops operation and indicates the error via the centralized alarm relay.

Phase failure monitoring is coded via jumpers J3, J5, J6 and J7 to the control board (→ following table).

Jumper				Phase failure monitoring
J3	J5	J6	J7	
1	0	0	1	Sensitive, error memory "ON"
1	1	1	1	insensitive, error memory "ON"
0	X	X	1	Deactivated, error memory "ON"
0	X	X	0	Deactivated, error memory "OFF"

1 = Jumper closed 0 = Jumper open X = Jumper optional

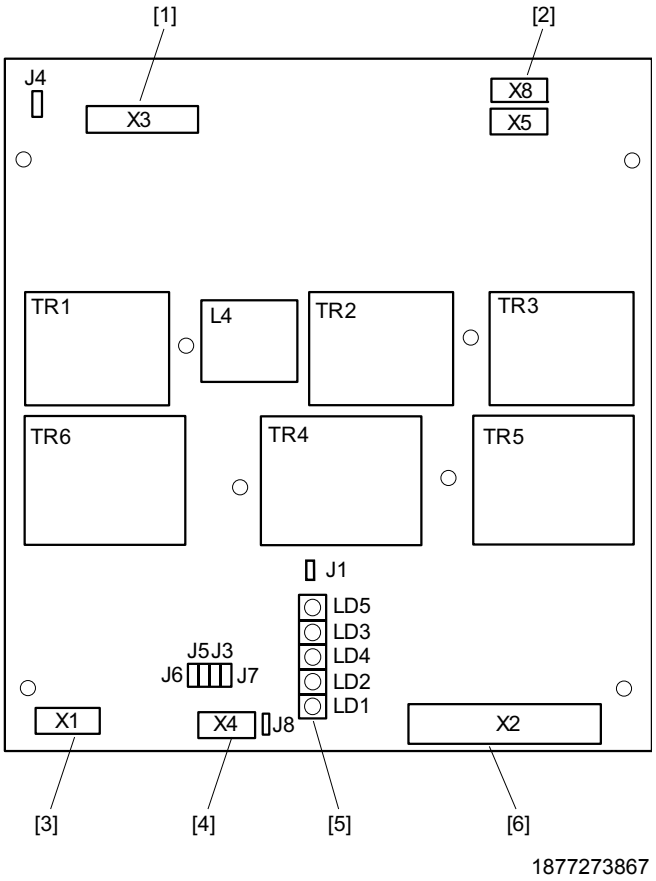
NOTICE

- Remove and install jumper J3 in de-energized state only!

Error memory "ON" means that the error display "Phase failure" via LED remains active until it is confirmed.

Error memory "OFF" means that the error "Phase failure" is indicated via the LED only while it is actually present.

14.1.6 Arrangement of connections and components on the control card



[1] X3: Connection to driver board
[2] X5, X8
[3] X1: System synchronization
[4] X4: Connection to display board
[5] LEDs (display of operating status)
[6] X2: Control terminal strip

14.1.7 Overvoltage monitoring

The overvoltage monitoring for the supply voltage will turn off the regenerative power supply unit when the voltage exceeds the rated unit voltage 1.15 times.

Error code 3 (→ chapter "Operation and Service") will be issued as error message. To differentiate between error signals "Phase fault" and "Overvoltage", you have the option to deactivate phase failure monitoring by removing jumper 3 on the control card. If the result is a disconnection with the red and yellow LED lighting up (error code 3, → chapter "Operation and Service", the reason for the disconnection is an overvoltage. Phase failure monitoring is coded via jumpers J3, J5, J6, J7 and J8 on the control card (→ following table).

Jumper					LED display			Evaluation through overvoltage
J3	J5	J6	J7	J8	Operation	Phase failure	Group fault	
1	X	X	1	1	Green	Red	Yellow	Overvoltage/phase failure commutation notch
1	X	X	0	1	Green	-	Yellow	Overvoltage
0	X	X	1	1	Green	Red	Yellow	Overvoltage/phase failure commutation notch
0	X	X	0	1	Green	-	Yellow	Overvoltage
0	X	X	0	1	Green	Red	Yellow	Permanent phase failure

1 = Jumper closed 0 = Jumper open X = Jumper optional

14.1.8 Default

The standard setting of the MOVIDRIVE® MDR60A1320-503-00 jumpers is as follows:

Jumper						
J1	J3	J4	J5	J6	J7	J8
1[1)]	0	0[1)]	1	1	0	1

1) Do not alter the setting!

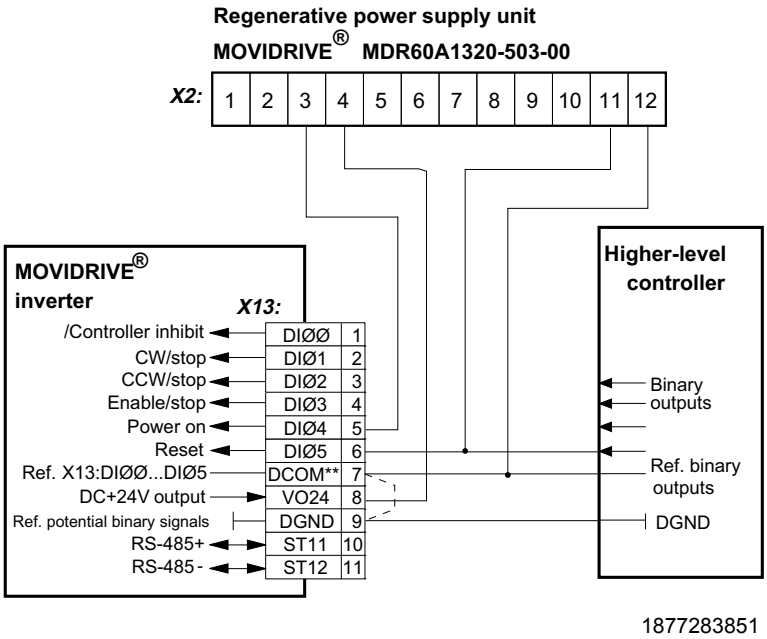
1 = Jumper closed 0 = Jumper open

15 Operation and Service (MDR60A1320-503-00)

15.1 Reset

15.1.1 Regenerative power supply

Any time the MOVIDRIVE® MDR60A1320-503-00 regenerative power supply unit is turned off, there will be an automatic reset. You can trigger a manual reset by using the reset button on the front panel (→ chapter "Operation displays") of the MDR60A1320-503-00.



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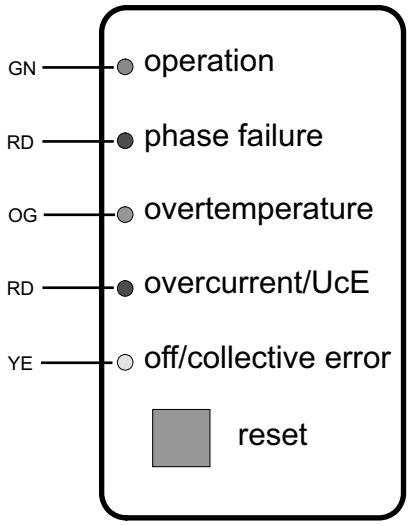
** If the binary inputs are connected to the DC 24 V voltage supply X13:8 "VO24", then install a jumper between X13:7 and X13:9 on the MOVIDRIVE® inverter.

15.2 Operating displays

The 5 LEDs in the cover of the regenerative power supply unit show the respective operating state. Refer to chapter "LED signals" (page 123). The same LEDs are also located on the internal control card for easier control during maintenance. There is, however, a separate orange LED on the board; its function is assigned to the two-color (green/orange) LED in the cover.



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If an error message is generated during the braking process, leading to the disconnection of the regenerative power supply unit, the regenerative power supply unit may not be confirmed until the braking process is complete and the DC link voltage has dropped to the standard value.

We recommend that you block the pulse enable of the drive controller via the centralized alarm relay to prevent any possible problems.

15.2.1 U_{CE} disconnection

The regenerative power supply unit switches off via the U_{CE} protective device if the maximum current specified for the respective unit is exceeded. The operating principle of this protective device does, however, cause an overload of the IGBTs for less than a millisecond far in excess of its rating for standard operation. This does usually not represent a problem for the unit. However, if this overcurrent disconnection occurs often or regularly, the result will be an accelerated aging of the power semiconductors and ultimately premature failure of the component.

Frequent U_{CE} disconnections due to overcurrents can be triggered by:

- Overload
- Undervoltage in the supply system
- Defective or oscillating controller, such as in the drive controller
- An oscillating control value of the controller
- Incorrect dimensioning of the system

15.2.2 LED signals

Error code	LED displays					Meaning	
	Operation (Green)	Phase failure (Red)	Overcurrent / UCE (Red)	Overtemperature (Orange)	Group fault (Yellow)	During initial startup	During operation
1	X	-		-	-	The unit is ready for operation after about 1 s.	Unit in operation
2	X	-	-	-	-	Unit ready for operation but no regeneration → check DC fuses	
3	X	-	-	X	X	-	Overtemperature of the heat sink. → Error message cannot be confirmed while temperature is excessive.
4	X	-	-	-	X	-	Just like error code 3. → Heat sink temperature has dropped and error can be confirmed.
5	X	-	-	-	X	Unit has been turned off (external OFF). → Enable signal required	
6	X	-	-	-	X	Triggering the overvoltage monitoring. Enable signal is required if the supply voltage has dropped to nominal value	
7	X	X	-	-	X	Incorrect rotating field or phase	Phase failure has been detected → Confirmation necessary.
8	X	-	X	-	X	-	Overcurrent (three-phase side) has been detected. → Confirmation necessary.
9	X	X	X	-	X	Error codes 7 and 8	Overcurrent has been detected with simultaneous phase failure detection due to commutation notch.
10	X	X	X	X	X	Several errors occurring at the same time.	
11	-	-	-	-	-	Unit not operating, at least two phases without voltage.	
13	X	X	-	-	-	-	Massive commutation notch has been detected, no disconnection because jumpers 3 and 7 are open. → Operation can be resumed, recommendation for improved supply system.

15.3 Maintenance

The MOVIDRIVE® MDR60A1320-503-00 regenerative power supply unit is maintenance-free if you observe the specified operating conditions. Observe chapter "Technical data" (page 101).

15.3.1 Check cooling air vents

The cooling air vents can clog up in case of unclean ambient air. Check the regenerative power supply units on a regular basis, depending on the degree of pollution about every four weeks. Use a vacuum to clean any clogged cooling air vents.

NOTICE

Do not use any sharp or pointed objects, such as knives or screw drivers, to clean the cooling air vents.

16 Technical Data – Basic Unit

16.1 CE marking, UL approval and C-Tick

16.1.1 CE-marking

- Low Voltage Directive

  MOVIDRIVE® MDX60B/61B inverters and MOVIDRIVE® MDR60A/61B regenerative power supply units comply with the regulations of the Low Voltage Directive 2006/95/EC.

- Electromagnetic compatibility (EMC)

  The designated use of MOVIDRIVE® inverters and regenerative power supply units is as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives". Provided that you comply with the installation instructions for the SEW components, the CE marking requirements for the machine/system in which they are installed are satisfied on the basis of the EMC directive 2004/108/EC.

- Compliance with limit classes C2 or C3 has been tested in a CE-typical drive system. SEW-EURODRIVE can provide detailed information on request.

CE

The CE-mark on the nameplate indicates conformity with the low voltage directive 2006/95/EC.

16.1.2 UL / cUL / GOST-R

c UL us LISTED

UL, cUL approval (USA) and the GOST-R certificate (Russia) have been granted for the entire MOVIDRIVE® unit series. Only MOVIDRIVE® MDR60A1320-503-00 is not UL- or cUL-approved. cUL is equivalent to CSA.

16.1.3 C-Tick

C-Tick approval has been granted for the entire MOVIDRIVE® range of units. C-Tick certifies conformity with ACMA (Australian Communications and Media Authority) standards.

16.2 General technical data

16.2.1 MOVIDRIVE® MDR60A regenerative power supply unit

MOVIDRIVE® MDR60A	0150-503-00 (size 2) 0370-503-00 (size 3) 0750-503-00 (size 4)	1320-503-00 (size 6)
Interference immunity	Meets EN 61800-3	Meets EN 61000-6-1 and EN 61000-6-2
Interference emission with EMC-compliant installation	Meets EN 61800-3: • with NF035-503 line filter (MDR60A0150-503-00) • with NF048-503 line filter (MDR60A0150-503-00) • with NF085-503 line filter (MDR60A0370-503-00) • with NF150-503 line filter (MDR60A0750-503-00)	Meets EN 61000-6-4 with NF300503 line filter
Ambient temperature ϑ_U **Ambient temperature derating**	0 °C – +40 °C I_N reduction: 3% I_N per K to max. 60 °C	0 °C – +40 °C I_N reduction: 3% I_N per K to max. 55 °C
Climate class	EN 60721-3-3, class 3K3	
Storage temperature[1] **ϑ_L**	–25 °C – +70 °C (EN 60721-3-3, class 3K3)	–25 °C – +55 °C (EN 60721-3-3, class 3K3)
Cooling type (DIN 51751)	Forced cooling (temperature-controlled fan, response threshold 50 °C)	Forced cooling (temperature-controlled fan, response threshold 45 °C)
Degree of protection size 2 **EN 60529 size 3** **(NEMA1) size 4**	IP20 IP20 IP00 (power connections) IP10 (power connections) • With fitted plexiglass cover supplied as standard • With fitted shrink tubing (not included in scope of delivery) IP20 • with mounted DLB11B touch guard	IP20
Operating mode	Continuous duty (EN 60149-1-1 and 1-3)	
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)	
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)	
Installation altitude	At h ≤ 1000 m without restrictions. The following restrictions apply to heights ≥ 1000: • From 1000 m to max. 4000 m: – I_N reduction by 1% per 100 m • from 2000 m (6562 ft) to max. 4000 m (13120 ft): – The safe disconnection of power and electronics connections can no longer be assured above 2000 m. This requires external measures (IEC 60664-1/ EN 61800-5-1). – You have to connect an overvoltage protection device in order to reduce the overvoltages from category III to category II.	h ≤ 1000 m: No limitation From 1000 m to max. 4000 m: I_N reduction: 0.5% per 100 m

1) In case of long-term storage, connect the unit to the power supply for at least 5 minutes every two years, otherwise the unit's service life may be reduced.

16.2.2 MOVIDRIVE® MDR61B regenerative power supply unit

MOVIDRIVE® MDR61B	1600-503-00/L (size 7) 2500-503-00/L (size 7)
Interference immunity	Meets EN 61800-3
Interference emission with EMC-compliant installation	Meets EN 61800-3: • with NF600-503 line filter
Ambient temperature ϑ_U **Ambient temperature derating**	0 °C – +50 °C with I_D = 100 % I_{ZK} 0 °C – +40 °C with I_D = 125 % I_{ZK} 2.5 % I_{ZK} per K between 40 °C – +50 °C 3 % I_{ZK} per K between 50 °C – +60 °C
Climate class	EN 60721-3-3, class 3K3
Storage temperature[1] ϑ_L	–25 °C – +70 °C (EN 60721-3-3, class 3K3)
Cooling type (DIN 51751)	Forced cooling (temperature-controlled fan, response threshold 50 °C)
Degree of protection EN 60529 (NEMA1)	IP00 IP10 (power connections) • with mounted DLB31B touch guard
Operating mode	Continuous duty (EN 60149-1-1 and 1-3)
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Installation altitude	At h ≤ 1000 m without restrictions. The following restrictions apply to heights ≥ 1000: • From 1000 m to max. 4000 m: – I_N reduction by 1% per 100 m • from 2000 m (6562 ft) to max. 4000 m (13120 ft): – The safe disconnection of power and electronics connections can no longer be assured above 2000 m. This requires external measures (IEC 60664-1/EN 61800-5-1). – You have to connect an overvoltage protection device in order to reduce the overvoltages from category III to category II.

1) In case of long-term storage, connect the unit to the power supply for at least 5 minutes every two years, otherwise the unit's service life may be reduced.

16.3 MOVIDRIVE® MDR60A/61B unit series, sizes 2 to 7

The following figure shows MOVIDRIVE® MDX61B regenerative power supply units, sizes 2 to 7

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16.4 Smallest wire bending space (EN 61800-5-1)

As stipulated in EN 61800-5-1, the distance between a power connection terminal and an obstruction toward which the wire is directed on leaving the terminal must correspond with the minimum values given in the table below.

Cable cross section in mm²	Smallest wire bending space in mm Wires per connection terminal		
	1	2	3
10 ... 16	40	-	-
25	50	-	-
35	65	-	-
50	125	125	180
70	150	150	190
95	180	180	205
120	205	205	230
150	255	255	280
185	305	305	330
240	305	305	380

16.5 MOVIDRIVE® MDR60A0150/0370 size 2 and size 3

MOVIDRIVE® MDR60A Standard variant Variant with coated printed circuit boards	Size 2 0150-503-00 0150-503-00/L	Size 3 0370-503-00 0370-503-00/L
Part number	1825 271 0 1825 272 9	826 658 1 829 672 3
INPUT		
Nominal line voltage U_{line} (according to EN 50160)	3 × AC 380 V - 500 V	
Line frequency f_{line}	50 Hz - 60 Hz ±5 %	
Rated connected load P_N	15 kW	37 kW
Rated supply current I_{supply} (at V_{line} = 3 × AC 400 V)	AC 29 A	AC 66 A
ELECTRONICS TERMINALS		
Binary inputs **Internal resistance**	PLC compatible (EN 61131), sampling time 1 ms $R_i \approx 3.0$ kΩ, $I_i \approx 10$ mA	
Signal level	+13 V – +30 V = "1" = contact closed -3 V – +5 V = "0" = contact open	
Binary outputs	PLC compatible (EN 61131-2), resp. time 1 ms, short-circuit proof, I_{max} = 50 mA	
Signal level	"0"=0 V, "1"=+24 V, **Important: Do not apply external voltage.**	
DC LINK		
Apparent output power S_A (at V_{supply} = 3 × AC 380 – 500 V)	25 kVA	50 kVA
DC link V_{DC} (at nominal supply current I_{supply})	DC 560 V - 780 V	
Nominal DC link current I_{ZK} (at nominal supply current I_{supply})	DC 35 A	DC 70 A
Max. DC link current I_{DCL_max}	DC 53 A	DC 105 A
GENERAL INFORMATION		
Power loss at P_N P_{Vmax}	120 W	950 W
Cooling air consumption	100 m^3/h	180 m^3/h
Connection for power terminals X1, X2 **Permitted tightening torque** **Permitted cable cross section**	Separable terminal strip DIN 46228 conductor end sleeve 1.8 Nm (16 in-lb) 6 mm^2 (AWG9) PE: M4 with 1.5 Nm (13 n-lb)	M6 screw and washer assembly 3.5 Nm (31 in-lb) 25 mm^2 (AWG4)
Electronics terminals connection X3	Permitted cable cross-section: • One core per terminal: 0.20 – 2.5 mm^2 (AWG 24 – 13) • Two cores per terminal: 0.20 – 1 mm^2 (AWG 23 – 17)	
Mass	4 kg (8.8 lb)	16 kg (35 lb)
Dimensions W × H × D	118 mm × 320 mm × 127 mm (4.65 in × 12.6 in × 5.0 in)	200 mm × 465 mm × 221 mm (7.87 in × 18.3 in × 8.7 in)
Line choke (always required)	ND045-013, L_N = 0.1 mH Part number 826 013 3	ND085-013 L_N = 0.1 mH Part number 826 014 1
Line filter (optional)	NF035-503 up to 15 kW Part number 827 128 3 NF048-503 up to 22 kW (15 kW × 125%) Part number 827 117 8	NF085-503, Part number 827 415 0
For MOVIDRIVE® MDX60B/61B...-5_3	0005 – 0150	0005 – 0370
Recommended line fuse	63 A	100 A

16.6 MOVIDRIVE® MDR60A0750/1320 size 4 and size 6

MOVIDRIVE® MDR60A **Standard variant** **Variant with coated printed circuit boards**	**Size 4** **0750-503-00** **0750-503-00/L**	**Size 6** **1320-503-00**[1)] **–**
Part number	826 556 9 829 673 1	827 952 7
INPUT		
Nominal line voltage U_{line} **(according to EN 50160)**	3 × AC 380 V - 500 V	
Line frequency f_{line}	50 Hz - 60 Hz ±5 %	40 Hz - 60 Hz ±10 %
Rated connected load P_N	75 kW	160 kW
Rated supply current I_{supply} **(at V_{line} = 3 × AC 400 V)**	AC 117 A	AC 260 A
ELECTRONICS TERMINALS		
Binary inputs **Internal resistance**	Isolated (optocoupler), PLC compatible (EN 61131), sampling interval 1 ms $R_i \approx 3.0$ kΩ, $I_I \approx 10$ mA	–
Signal level	+13 V – +30 V = "1" = Contact closed -3 V – +5 V = "0" = Contact open	
Binary outputs	PLC compatible (EN 61131-2), response time 1 ms, short-circuit proof, I_{max} = 50 mA	
Signal level	"0"=0 V, "1"=+24 V, **Important: Do not apply external voltage.**	
DC LINK		
Apparent output power S_A **(at V_{supply} = 3 × AC 380 – 500 V)**	90 kVA	175 kVA
DC link V_{DC}	DC 560 V - 780 V	
Nominal DC link current I_{ZK} **(at nominal supply current I_{supply})**	DC 141 A	DC 324 A
Max. DC link current I_{DCL_max} **(at nominal supply current I_{supply})**	DC 212 A	motor: • DC 486 A Regenerative: • DC 410 A
GENERAL INFORMATION		
Power loss at P_N P_{Vmax}	1700 W	2400 W
Cooling air consumption	360 m^3/h	880 m^3/h
Connection for power terminals X1, X2 **(L1, L2, L3 for size 6)** **Permitted tightening torque** **Permitted cable cross section**	M10 terminal studs 14 Nm (120 in-lb) 70 mm^2 (AWG2/0)	M10 terminal studs 25 – 30 Nm (220 – 265 in-lb)[2)] 185 mm^2 (AWG6/0)
Connection of power terminals SKS 1 – 3	–	Do not connect terminals
Electronics terminals connection X3 **(X2 for size 6)**	Permitted cable cross-section: • One core per terminal: 0.20 – 2.5 mm^2 (AWG 24 – 13) • Two cores per terminal: 0.20 – 1 mm^2 (AWG 23 – 17)	Permitted cable cross-section: • 0.75 – 2.5 mm^2 (AWG18 – 14) Terminals A1 / A2: • 0.75 – 4 mm^2 (AWG18 – 12)
Mass	24 kg (53 lb)	100 kg (220 lb)
Dimensions W × H × D	280 mm × 522 mm × 205 mm (11 in × 20.6 in × 8.07 in)	378 mm × 942 mm × 389.5 mm (14.9 in × 37.1 in × 15.3 in)
Line choke (always required)	ND200-0033 L_N = 0.03 mH Part number 826 579 8	installed in the basic unit

MOVIDRIVE® MDR60A Standard variant Variant with coated printed circuit boards	Size 4 0750-503-00 0750-503-00/L	Size 6 1320-503-00[1)] –
Line filter (optional)	NF150-503, Part number 827 417 7	NF300-503, Part number 827 419 3
For MOVIDRIVE® MDX60B/61B...-5_3	0005 – 0750	0005 – 1600
Recommended line fuse	175 A	500 A

1) The listed technical data applies to units with series no. DCV200xxx. For units of the previous series with no. DCV185xxx, refer to the provided documentation and the data on the nameplate.

2) Note: Do not apply tightening torque directly at terminals L1, L2, L3 and ±UG; use a second wrench.

16.7 MOVIDRIVE® MDR61B1600/2500 size 7

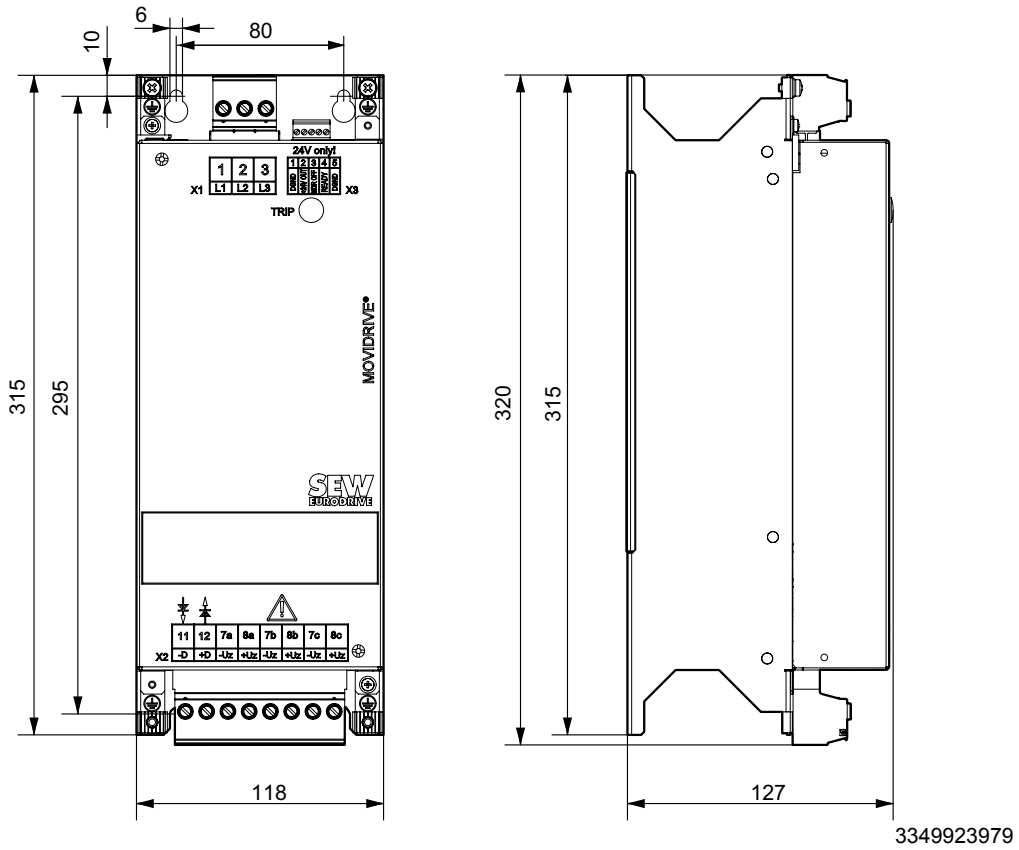
MOVIDRIVE® MDR61B	Size 7	
	1600-503-00/L	2500-503-00/L
Part number	1825 095 5	1825 096 3
INPUT		
Nominal line voltage U_{line} (according to EN 50160)	3 × AC 380 V - 500 V	
Line frequency f_{line}	50 Hz - 60 Hz ±5 %	
Rated connected load P_N	160 kW	250 kW
Rated supply current I_{supply} (at V_{line} = 3 × AC 400 V)	AC 250 A	AC 400 A
ELECTRONICS TERMINALS		
Binary inputs Internal resistance	Isolated (optocoupler), PLC compatible (EN 61131), sampling interval 1 ms $R_i \approx 3.0$ kΩ, $I_i \approx 10$ mA	
Signal level	+13 V – +30 V = "1" = contact closed -3 V – +5 V = "0" = contact open	
2 binary outputs	PLC compatible (EN 61131-2), resp. time 1 ms, short-circuit proof, I_{max} = 50 mA	
Signal level	"0"=0 V, "1"=+24 V, **Important: Do not apply external voltage.**	
DC LINK		
Apparent output power S_A (at V_{supply} = 3 × AC 380 – 500 V)	173 kVA	271 kVA
DC link V_{DC}	DC 620 V - 780 V	
Nominal DC link current I_{ZK} (at nominal supply current I_{supply})	DC 255 A	DC 407 A
Max. DC link current I_{DCL_max} (at nominal supply current I_{supply})	DC 382 A	DC 610 A
Max. continuous DC link current I_{ZK_Dmax} (at nominal supply current I_{supply})	DC 318 A	DC 508 A
GENERAL INFORMATION		
Power loss at P_N P_{Vmax}	5000 W	6600 W
Cooling air consumption	1400 m^3/h	
Connection for power terminals L1, L2, L3	Connection rail with bore for M12 Max. 2 × 240 mm^2 Press cable lug DIN 46235	
Tightening torque	70 Nm (620 lb in)	
DC link coupling option	• DLZ11B / 100 mm (part number: 1 823 193 4) • DLZ11B / 200 mm (part number: 1 823 566 2) • DLZ11B / 300 mm (part number: 1 823 567 0)	
Electronics terminals connection X2	Permitted cable cross-section: • One core per terminal: 0.20 – 2.5 mm^2 (AWG 24 – 12) • Two cores per terminal: 0.20 – 1 mm^2 (AWG 22 – 17)	Permitted cable cross-section: • One core per terminal: 0.20 – 2.5 mm^2 (AWG 24 – 12) • Two cores per terminal: 0.20 – 1 mm^2 (AWG 22 – 17)
External voltage supply	Connect 24 V backup voltage via the DC power supply unit. No connection at the control unit.	
Mass	385 kg (849 lb)	475 kg (1047 lb)
Dimensions W × H × D	899 mm × 1490 mm × 473 mm (35.4 in × 58.7 in × 18.2 in)	
Line choke	installed in the basic unit	
Line filter (optional)	NF600-503 Part number 1 796 338 9	
For MOVIDRIVE® MDX60B/61B...-5_3	0005 – 2500	
Recommended line fuse	315 A (gRL/gL) 500 A (gRL/gL)	

16.8 Dimension drawings

16.8.1 MOVIDRIVE® MDR60A0150 size 2

Observe the following minimum clearance for control cabinet installation:

- Above and below 100 mm (3.9 in)
- No clearance required on the side

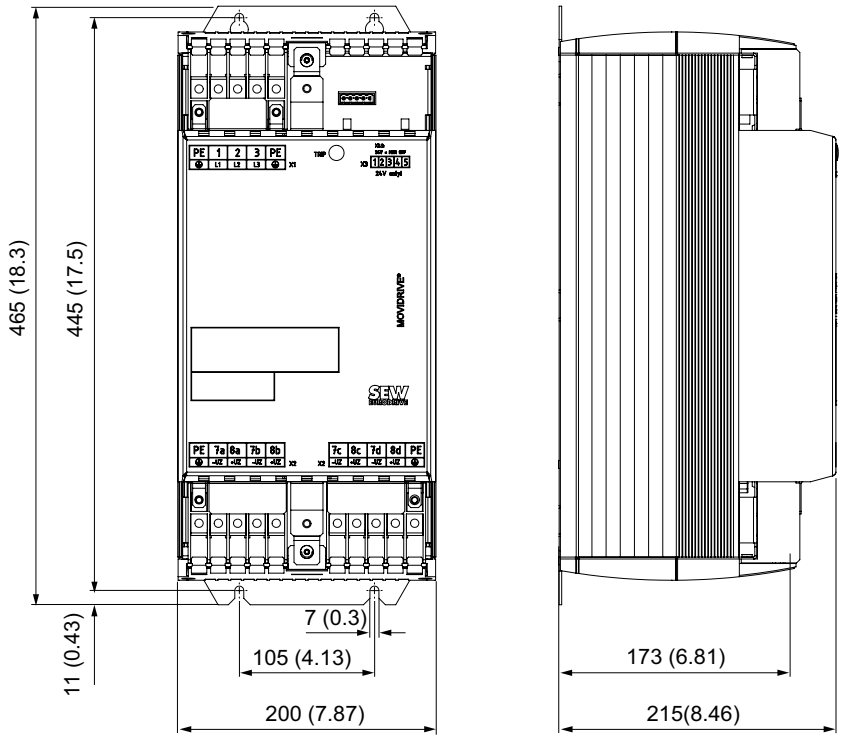


All dimensions in mm (in)

16.8.2 MOVIDRIVE® MDR60A0370 size 3

Observe the following minimum clearance for control cabinet installation:

- Above and below 100 mm (3.9 in)
- No clearance required on the side

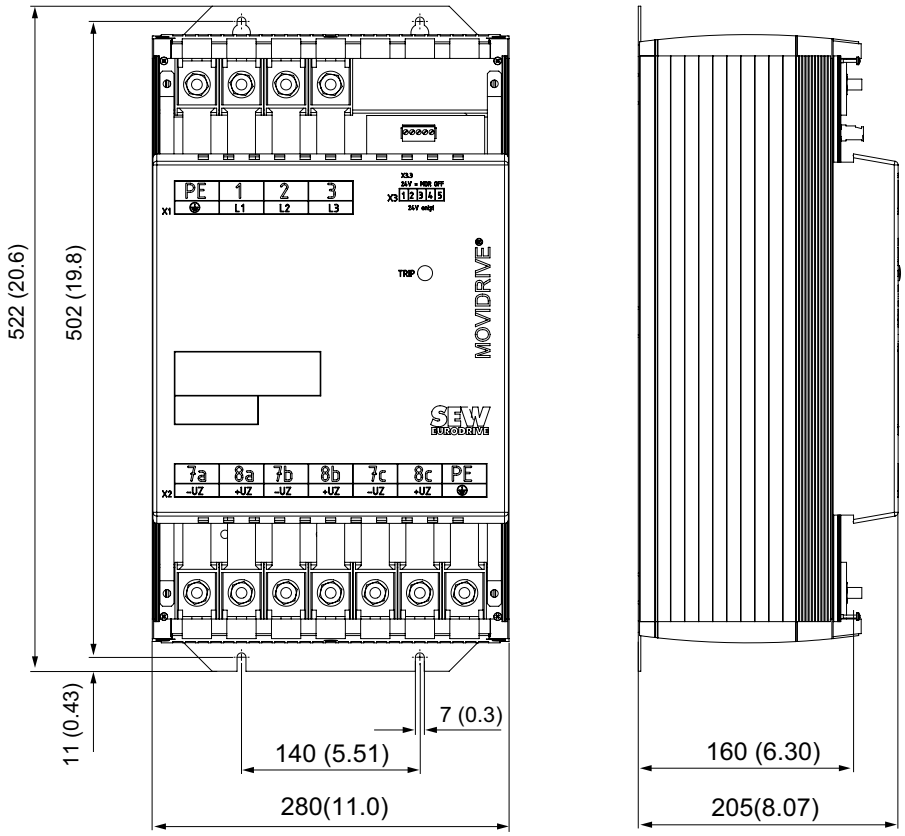


All dimensions in mm (in)

16.8.3 MOVIDRIVE® MDR60A0750 size 4

Observe the following minimum clearance for control cabinet installation:

- Above and below 100 mm (3.9 in)
- Do not install any components that are sensitive to high temperatures within 300 mm (11.8 in) above the unit, for example contactors or fuses.
- No clearance required on the side



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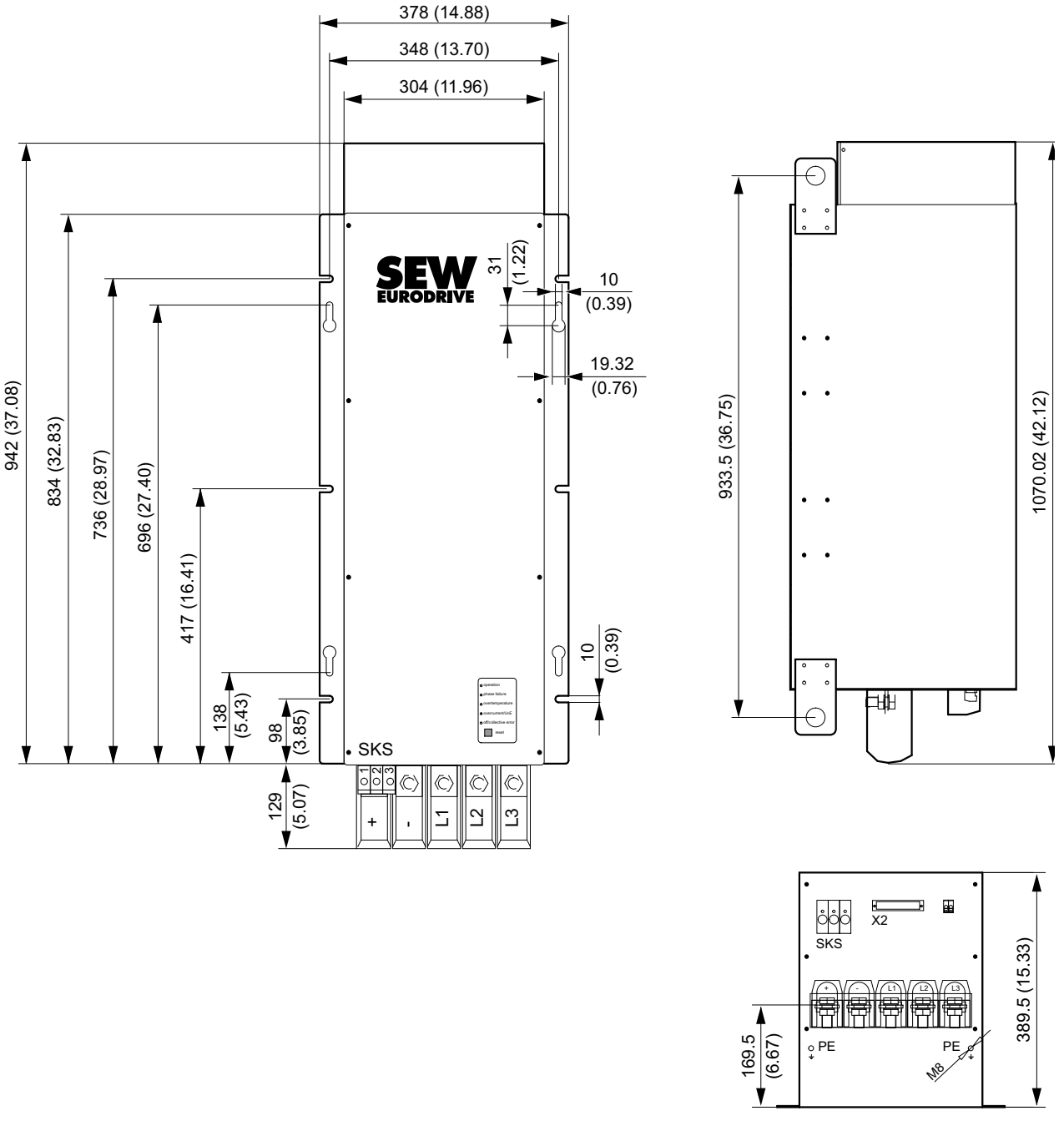
All dimensions in mm (in)

16.8.4 MOVIDRIVE® MDR60A1320 size 6

Observe the following minimum clearance for control cabinet installation:

- Above 100 mm (3.9 in)
- Do not install any components that are sensitive to high temperatures within 300 mm (11.8 in) above the unit, for example contactors or fuses.
- No clearance required below
- 70 mm (2.8 in) on the side

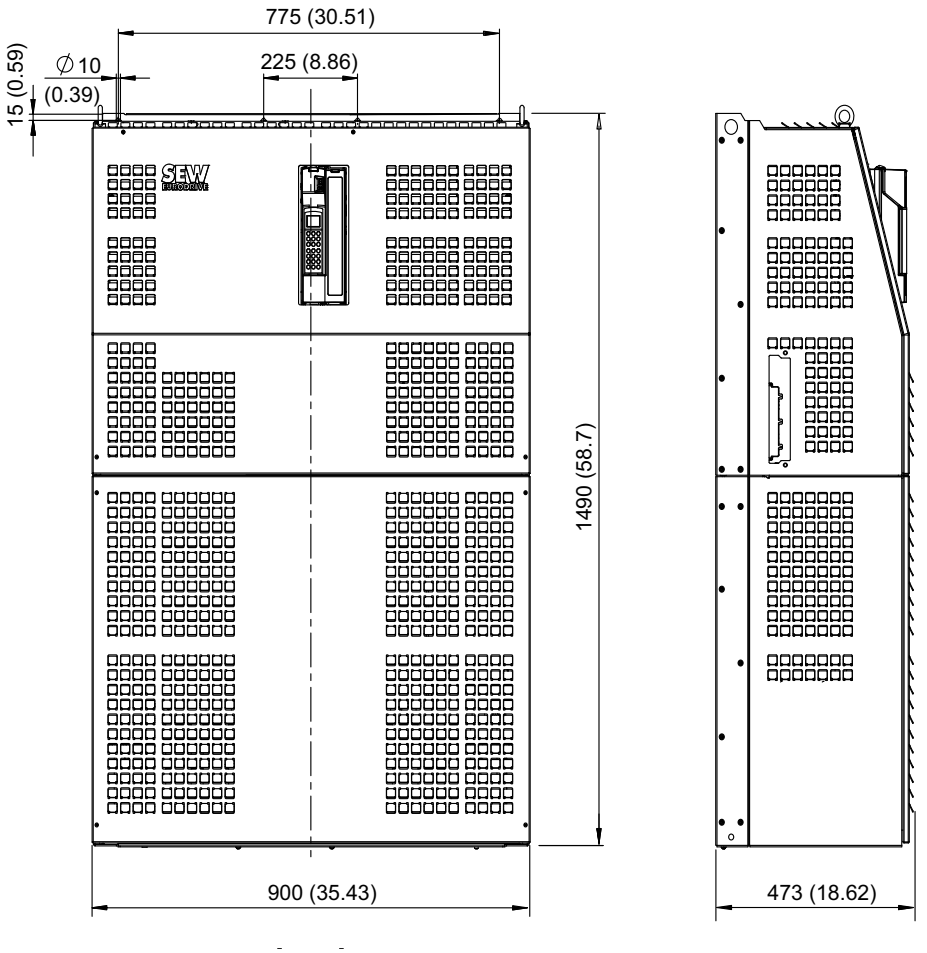


All dimensions in mm (in)

16.8.5 MOVIDRIVE® MDR61B1600/2500 size 7

Observe the following minimum clearance for control cabinet installation:

- Above 100 mm (3.9 in)
- Do not install any components that are sensitive to high temperatures within 300 mm (11.8 in) above the unit, for example contactors or fuses.
- No clearance required below
- No clearance required on the side



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17 Declarations of Conformity

17.1 MOVIDRIVE® MDR60A/61B

EC Declaration of Conformity

SEW EURODRIVE

900920110

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

regenerative power supply units of the series	**MOVIDRIVE® MDR60A** **MOVIDRIVE® MDR61B**	
are in conformity with		
Low Voltage Directive	**2006/95/EC**	
EMC Directive	**2004/108/EC**	**4)**
Applied harmonized standards	**EN 61800-5-1:2007** **EN 61800-3:2007**	

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.

Bruchsal	16.05.11	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

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