



SEW
EURODRIVE

Operating Instructions



Frequency Inverters
MOVITRAC® LTE-B



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1 General information

1.1 About this documentation

This documentation is an integral part of the product. The documentation is intended for all employees who perform assembly, installation, startup, and service work on the product.

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

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

Signal word	Meaning	Consequences if disregarded
▲ DANGER	Imminent hazard	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 handling of the drive system.	

1.2.2 Structure of section-related safety notes

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

This is the formal structure of a safety note for a specific section:



SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

1.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

- **▲ SIGNAL WORD** Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

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 product.

1.4 Exclusion of liability

You must comply with the information contained in this documentation to ensure safe operation and to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Copyright notice

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Unauthorized reproduction, modification, distribution or any other use of the whole or any part of this documentation is strictly prohibited.

1.6 Product names and trademarks

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

2 Safety notes

2.1 Preliminary information

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The user must ensure that the basic safety notes are read and observed. 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.

Please also observe the supplementary safety notes in the individual chapters of this documentation.

2.2 General information



▲ WARNING

Depending on its enclosure, the unit may have live, uninsulated as well as moving or rotating parts and hot surfaces during operation.

Severe or fatal injuries.

- All work related to transportation, storage, installation, setup/assembly, connection, startup, maintenance and repair may only be carried out by specialists, in strict observance of
 - The relevant detailed documentation
 - The warning and safety signs on the unit
 - All other relevant project planning documents, startup instructions and wiring diagrams
 - The specific regulations and requirements for the system
 - The national/regional regulations governing safety and the prevention of accidents.
- Never install damaged products.
- Submit a complaint to the shipping company immediately in the event of damage.

Unauthorized removal of required covers, improper use, or incorrect installation and operation may result in severe injury to persons, or damage to machinery.

Refer to the following chapters for more information.

2.3 Target group

Mechanical work of any kind may be carried out only by trained specialists. Specialists in the context of this documentation are persons who are familiar with the design, mechanical installation, troubleshooting and maintenance of the product and have the following qualifications:

- Training in mechanical engineering (for example, as a machinist or mechatronics technician) and the successful completion of final examinations.
- Knowledge of this documentation.

Electrical work of any kind may be carried out only by skilled persons. In the context of this documentation, skilled persons are persons who are familiar with the electrical installation, startup, troubleshooting and maintenance of the product and who have the following qualifications:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- Knowledge of this documentation.

In addition to that, they must be familiar with the relevant safety regulations and laws, especially with the requirements of the performance levels according to DIN EN ISO 13849-1 and all other standards, directives and laws specified in this documentation. The above-mentioned persons must have the express authorization of the company to operate, program, parameterize, identify and ground units, systems and circuits in accordance with safety technology standards.

All work in the areas of transportation, storage, operation and waste disposal must be performed by suitably trained personnel.

2.4 Designated use

Frequency inverters are components for controlling asynchronous AC motors. Frequency inverters are intended for installation in electrical systems or machines. Never connect capacitive loads. Operation with capacitive loads results in overvoltages and may destroy the unit.

The following standards apply if the frequency inverters are marketed in the EU/EFTA:

- In case of installation in machines, startup of the inverters (meaning the start of proper use) is prohibited until it is determined that the machine meets the requirements stipulated in Directive 2006/42/EC (machine directive); observe EN 60204.
- Startup (i.e. the start of designated use) is only permitted under observance of EMC Directive 2004/108/EC.
- The frequency inverters comply with the requirements of 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 frequency inverters.

Observe the technical data and the connection requirements specified on the nameplate and the operating instructions.

2.5 Transportation

Inspect the shipment for transport damage as soon as you receive the delivery. Inform the shipping company immediately of any damage. If necessary, put startup on hold.

Note the following points regarding transport:

- Before transportation, cover the connections with the supplied protection caps.
- Place the unit only on the cooling fins or on a side without connectors during transportation.
- Ensure that the unit is not subjected to mechanical impact during transportation.

If necessary, use suitable, sufficiently rated handling equipment. Prior to startup, remove the transport protection.

Observe the information on climatic conditions as stated in chapter "Technical Data".

2.6 Installation/assembly

Ensure that the unit is installed and cooled according to the regulations in the related documentation.

Protect the unit from excessive strain. Especially during transportation and handling, do not allow the components to be deformed or insulation spaces altered. Electrical components must not be mechanically impaired or irreparably damaged.

The following applications are prohibited unless explicitly permitted:

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

Observe the notes in the "Mechanical Installation" chapter.

2.7 Electrical connection

Observe the applicable national accident prevention regulations when working on a live drive controller.

Perform electrical installation according to the pertinent regulations (e.g. cable cross sections, fusing, protective earth connection). The documentation contains additional notes.

Preventive measures and protection devices must meet the applicable regulations (e.g. EN 60204-1 or EN 61800-5-1).

Required preventive measures:

Type of energy transfer	Protective measure
Direct power supply	<ul style="list-style-type: none"> • Ground connection

2.8 Protective separation

The unit meets all requirements for protective separation of power and electronics connections in accordance with EN 61800-5-1. All connected circuits must also comply with the requirements for protective separation so as to guarantee reliable isolation.

2.9 Startup/operation



▲ CAUTION

The surfaces of the unit and any connected components, e.g. braking resistors, can reach high temperatures during operation.

Danger of burns.

- Let the unit and external options cool down before you start working on them.

Do not deactivate the monitoring and protection devices, even during the test run.

When in doubt, switch off the unit whenever changes occur compared with normal operation (e.g. increased temperatures, noise, oscillation). Determine the cause of the fault and, if necessary, contact SEW-EURODRIVE.

Where required, systems in which such units are installed must be equipped with additional monitoring and protection devices in accordance with the respective applicable safety regulations, e.g. the law governing technical equipment, accident prevention regulations, etc.

Additional preventive measures may be necessary for applications with increased hazard potential. You must check the functionality of protection devices each time you change the configuration.

Connections that are not being used must be covered with the supplied protection caps during operation.

Do not touch live components or power connections immediately after disconnecting the unit from the voltage supply because some capacitors may still be charged. Adhere to a minimum switch-off time of 10 minutes. Observe the corresponding labels on the unit.

When the unit is switched on, dangerous voltages are present at all power connections as well as at connected cables and motor terminals. This applies even when the unit is not running and the motor is at standstill.

The fact that the operation LED and other display elements are no longer illuminated does not indicate that the unit has been disconnected from the supply system.

Mechanical blocking or internal safety functions within the unit can cause the motor to stop. Eliminating the cause of the problem or performing a reset may help to restart the drive automatically. If, for safety reasons, this is not permitted for the drive-controlled machine, disconnect the unit from the supply system before you start troubleshooting.

2.10 Inspection/maintenance



▲ WARNING

Danger of electric shock due to exposed, live parts in the unit.

Severe or fatal injuries

- Never open the unit.
- Only SEW-EURODRIVE is authorized to carry out repairs.

3 General specifications

Input voltage ranges

3 General specifications

3.1 Input voltage ranges

Depending on the model and the nominal power, the frequency inverters are designed for direct connection to the following voltage sources:

MOVITRAC® LTE-B			
Nominal voltage	Size	Connection type	Nominal frequency
100 – 115 V ± 10%	1, 2	1-phase	50 – 60 Hz ± 5%
200 – 240 V ± 10 %	1, 2 and 3	1-phase / 3-phase	50 – 60 Hz ± 5%
380 – 480 V ± 10 %	1, 2 and 3 s	3-phase	50 – 60 Hz ± 5 %

Units that are connected to a 3-phase supply system are designed for a maximum power grid imbalance of 3% between the phases. For supply systems with a power grid imbalance of more than 3% (for example, in India and parts of the Asia-Pacific region including China), SEW-EURODRIVE recommends that you use input chokes.

INFORMATION



* Single-phase frequency inverters can also be connected to two phases of a three-phase power supply system of 200 to 240 V.

3.2 Nameplate

The following figure shows a nameplate:



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3.3 Type designation

Example: MCLTE-1-B 0015-201-1-00		
Product name	MCLTE	MOVITRAC® LTE-B
Version	B	Version status of the unit series
Motor	1	Only single-phase motors
Recommended motor power	0015	0015 = 1.5 kW
Connection voltage	2	<ul style="list-style-type: none"> • 1 = 115 V • 2 = 200 – 240 V • 5 = 380 – 480 V
Interference suppression on the input	0	<ul style="list-style-type: none"> • 0 = Class 0 • A = Class A • B = Class B
Connection type	1	<ul style="list-style-type: none"> • 1 = 1-phase • 3 = 3-phase
Quadrants	1	1 = single-quadrant operation without brake chopper 4 = 4-quadrant operation with brake chopper
Design	00	<ul style="list-style-type: none"> • 00 = Standard IP20 housing • 10 = IP55/NEMA 12K housing without switch • 20 = IP55/NEMA 12K housing with switch • 30 = IP66/NEMA 4X housing without switch • 40 = IP66/NEMA 4X housing with switch
Country-specific variant	(60 Hz)	60 Hz = 60 Hz variant

3.4 Speed setting range

MOVITRAC® LTE-B frequency inverters have a speed setting range of 1:5.

3.5 Overload capacity

All MOVITRAC® LTE-B products have the following overload capacity:

- 150% for 60 seconds
- 175% for 2 seconds

With an output frequency of < 10 Hz, the overload capacity is reduced to 150% for 7.5 seconds.

3.6 Protection functions

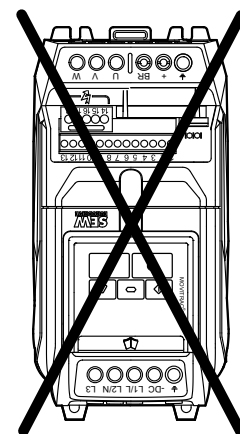
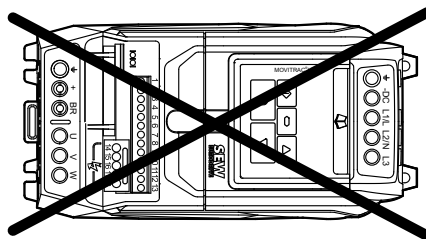
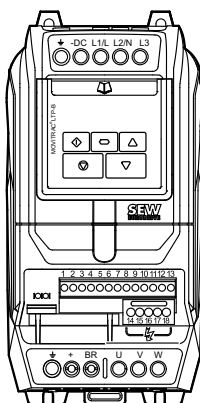
- Short circuit output, phase-phase, phase-ground
- Output overcurrent
- Overload protection
- Overvoltage shutdown
- Undervoltage shutdown
- Shutdown caused by overtemperature
- Shutdown caused by undertemperature

4 Installation

The next chapter describes the installation.

4.1 General information

- Before installation, carefully check the frequency inverter for damage.
- Store the frequency inverter in its packaging until you need it. The storage location must be clean and dry with an ambient temperature between -40°C and $+60^{\circ}\text{C}$.
- Install the frequency inverter in a suitable housing on a level, vertical, non-flammable, and vibration-free surface. If a certain IP degree of protection is required, observe EN 60529.
- Keep flammable materials away from the frequency inverter.
- Prevent the ingress of conductive or flammable foreign objects.
- The relative humidity must be kept below 95% (condensation is not permitted).
- Protect the IP55 frequency inverter from direct sunlight. Use a cover when using the frequency inverter outdoors.
- The frequency inverters can be installed side by side. Doing so ensures sufficient ventilation space between the individual units. If the frequency inverter is installed above another frequency inverter or another device that dissipates heat, there must be a vertical minimum clearance of 150 mm. To facilitate self-cooling, the control cabinet must be cooled through forced ventilation or sized accordingly. See chapter "IP20 housing: Installation and installation space" (\rightarrow 22).
- The maximum permitted ambient temperature during operation is $+50^{\circ}\text{C}$ for IP20 frequency inverters, and $+40^{\circ}\text{C}$ for IP55/IP66 frequency inverters. The minimum permitted ambient temperature during operation is -10°C .
Note the special degrees of protection specified in the section "Information on ambient conditions" (\rightarrow 81).
- A facility for installation on DIN mounting rails is provided solely for sizes 1 and 2.
- Install the frequency inverter only as depicted in the following figure:



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4.2 Mechanical installation

4.2.1 Housing variants and dimensions

Housing variants

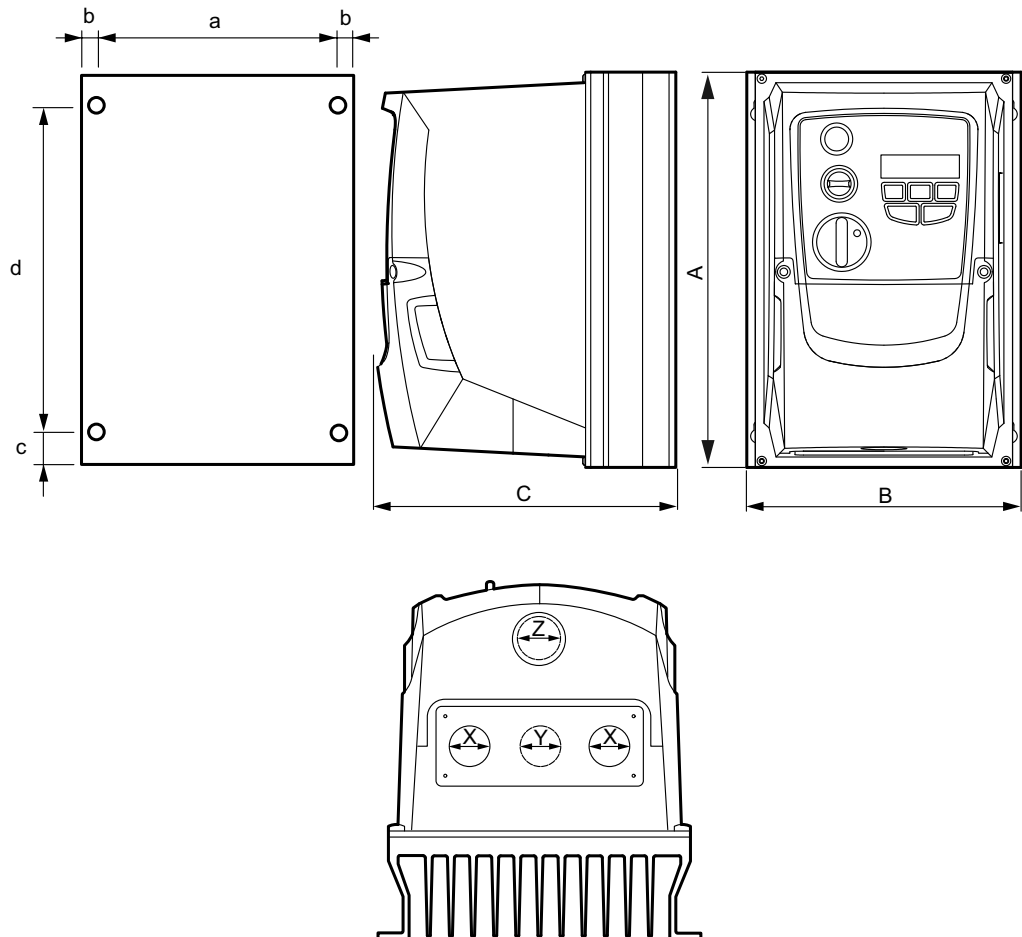
MOVITRAC® LTE-B is available with three housing designs:

- IP66/NEMA 4X
- IP55/NEMA 12K
- IP20 housing for installation in control cabinets

IP55/NEMA 12K and IP66/NEMA 4X housings are protected against humidity and dust. These frequency inverters can be operated indoors in a dusty or damp environment. IP55 and IP66 frequency inverters feature the same electronics as the IP20 design. They only differ in their housing dimensions and mass.

In degrees of protection IP55 and IP66, the frequency inverters are also available with switch options, such as main switch, direction of rotation switch, and potentiometer.

Dimensions of IP66/NEMA 4X housings (LTE xxx -30 and -40)



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Dimensions		Size 1	Size 2	Size 3
Height (A)	mm	232	257	310
	in	9.13	10.12	12.20
Width (B)	mm	161	188	210.5
	in	6.34	7.4	8.29
Depth (C)	mm	179	186.5	228.7
	in	7.05	7.34	9
Mass	kg	2.8	4.6	7.4
	lb	6.2	10.1	16.3
a	mm	148.5	176	197.5
	in	5.85	6.93	7.78
b	mm	6.25	6	6.5
	in	0.25	0.24	0.26
c	mm	25	28.5	33.4
	in	0.98	1.12	1.31
d	mm	189	200	251.5
	in	7.44	7.87	9.9
Tightening torque for power terminals	Nm	1	1	1
	lb _r -in	8.85	8.85	8.85
Tightening torque for control terminals	Nm	0.5	0.5	0.5
	lb _r -in	4.43	4.43	4.43
Recommended screw size		4 × M4	4 × M4	4 × M4

IP66 cable openings

Use suitable cable glands to achieve the corresponding IP/NEMA classification.

The pre-punched cable bushings can be opened using a suitable tool.

Dimensions		Size 1	Size 2	Size 3
X	mm	22	28.2	28.2
	in	0.87	1.11	1.11
	PG / M ¹⁾	PG13.5 / M20	PG21 / M25	PG21 / M25
Y ²⁾	mm	22	22	22
	in	0.87	0.87	0.87
	PG / M ¹⁾	PG13.5 / M20	PG13.5 / M20	PG13.5 / M20
Z ²⁾	mm	22	22	22
	in	0.87	0.87	0.87
	PG / M ¹⁾	PG13.5 / M20	PG13.5 / M20	PG13.5 / M20

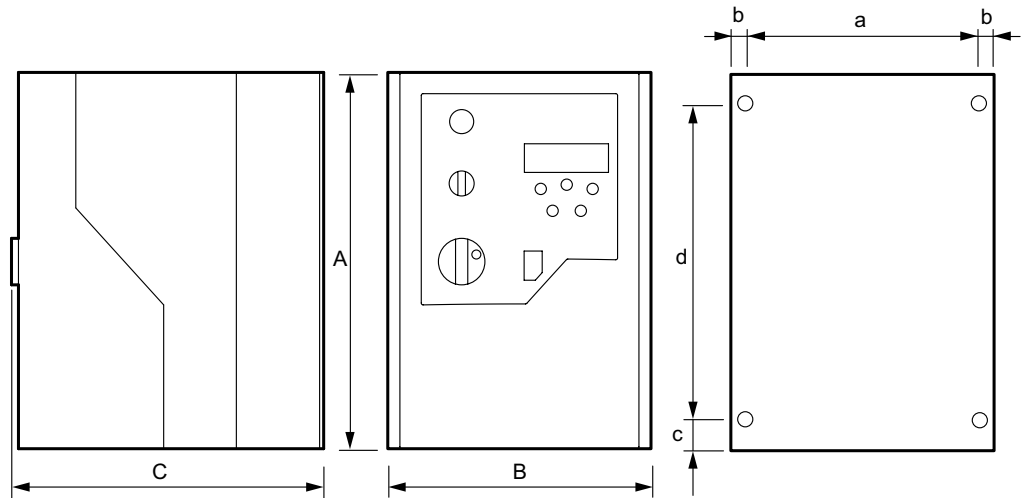
1) The data specified above refers to plastic screws

2) Cable bushings Y and Z are pre-punched

4 Installation

Mechanical installation

Dimensions of IP55/NEMA 12K housings (LTE xxx -10 and -20)



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Dimension		Size 1	Size 2	Size 3
Height (A)	mm	200	310	310
	in	7.9	12.2	12.2
Width (B)	mm	140	165	211
	in	5.5	6.5	8.31
Depth (C)	mm	165	176	240
	in	6.5	6.9	9.45
Mass	kg	2.3	4.5	7.4
	lb	5.1	9.9	12.4
a	mm	128	153	196
	in	5	6	7.72
b	mm	6	6	7
	in	0.23	0.23	0.28
c	mm	25	25	25
	in	0.98	0.98	0.98
d	mm	142	252	251
	in	5.6	9.9	9.88
Tightening torques for power terminals	Nm	1	1	1
	lb _f -in	8.85	8.85	8.85
Tightening torques for control terminals	Nm	0.5	0.5	0.5
	lb _f -in	4.43	4.43	4.43
Recommended screw size		2 × M4	4 × M4	4 × M4

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IP55 cable openings

Use suitable cable glands to achieve the corresponding IP/NEMA classification.
The pre-punched cable bushings can be opened using a suitable tool.

Dimensions		Size 1	Size 2	Size 3
X	mm	22.3	28.2	28.2
	in	0.87	1.11	1.11
	PG ¹⁾	PG13.5 / M20	PG21 / M25	PG21 / M25
Y ²⁾	mm	22	22	22
	in	0.87	0.87	0.87
	PG	PG13.5 / M20	PG13.5 / M20	PG13.5 / M20
Z ²⁾	mm	17	17	-
	in	0.67	0.67	-
	PG	PG9 / M16	PG9 / M16	-

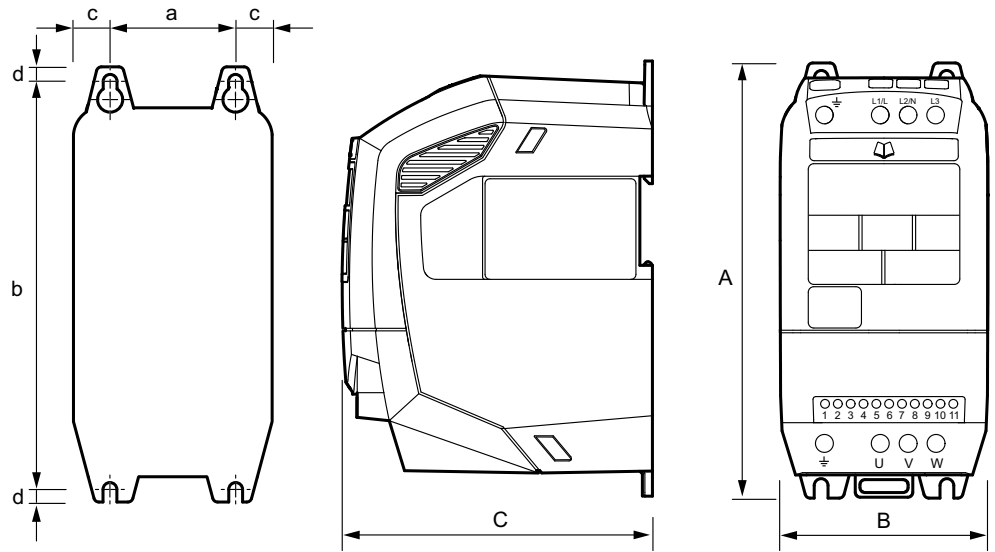
1) The data specified above refers to plastic screws

2) Cable bushings Y and Z are pre-punched

4 Installation

Mechanical installation

Dimensions of the IP20 housing



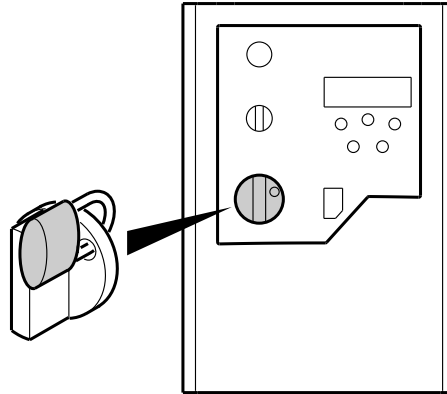
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Dimensions	Unit	Size 1	Size 2	Size 3
Height (A)	mm	174	220	261
	in	6.85	8.66	10.28
Width (B)	mm	82	109	131
	in	3.11	4.10	4.96
Depth (C)	mm	122.6	150	178
	in	4.83	5.90	7.01
Mass	kg	1.1	2	4.5
	lb	2.43	4.40	10.0
a	mm	50	63	80
	in	1.97	2.48	3.15
b	mm	162	209.0	247
	in	6.38	8.23	9.72
c	mm	16	23	25.5
	in	0.63	0.91	1.02
d	mm	5	5.25	7.25
	in	0.2	0.21	0.29
Tightening torques for power terminals	Nm	1	1	1
	lb _f -in	8.85	8.85	8.85
Tightening torques for control terminals	Nm	0.5	0.5	0.5
	lb _f -in	4.43	4.43	4.43
Recommended screws		4 × M4	4 × M4	4 × M4

4.2.2 Locking of IP55/IP66 units with switching function

The main disconnect switch can be locked in "OFF" position using a standard 20 mm padlock. The padlock is not included in the delivery.

To apply the lock, you must press on the center of the switch.



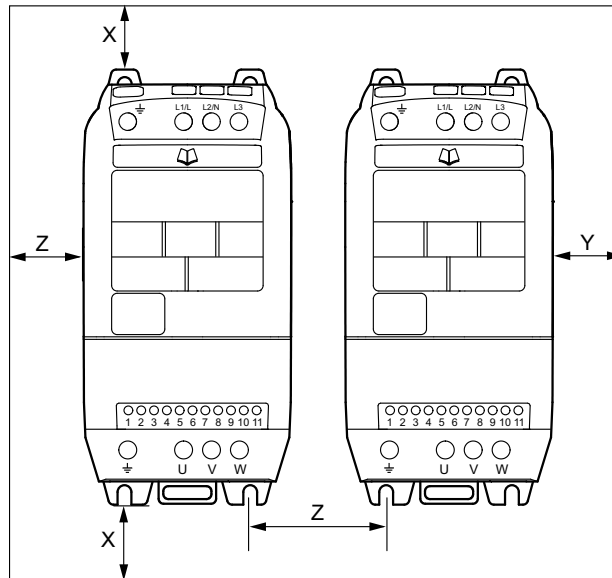
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4.2.3 IP20 housing: assembly and installation space

For applications that require a higher IP degree of protection than IP20, the frequency inverter must be installed in a control cabinet. Observe the following requirements:

- The control cabinet must be made of a heat conductive material unless it has forced air cooling.
- When using a control cabinet with ventilation openings, the openings must be provided above and below the frequency inverter to allow for unobstructed circulation of air. The air must be supplied below the frequency inverter and dissipated above it.
- If the frequency inverter is operated in external environments with particles of dirt (such as dust), ventilation openings either have to be equipped with a suitable particle filter or forced air cooling has to be used. The filter has to be serviced and cleaned.
- In environments with a high level of humidity, salt or chemicals, a suitable enclosed control cabinet (without ventilation openings) must be used.
- The IP20 frequency inverter can be assembled directly next to one another without clearance.

Minimum clearance during installation



11938462859

Size	X		Y		Z		Air flow rate m ³ /h
	mm	in	mm	in	mm	in	
1	50	1.97	50	1.97	33	1.3	11
2	75	2.95	50	1.97	47	1.81	11
3	100	3.94	50	1.97	52	2.05	26

4.3 Electrical installation

Adhere to the safety notes in chapter 2 during installation.



▲ WARNING

Electric shock due to charged capacitors. Dangerous voltage levels may still be present inside the unit and at the terminals up to ten minutes after disconnection from the power supply.

Severe or fatal injuries.

- Wait ten minutes after disconnecting the frequency inverter from the power supply as well as disconnecting the line voltage and the DC 24 V voltage. Then, establish that the unit has been de-energized. Only then, start to work on the unit.
- The frequency inverter may only be installed by electrical specialists in compliance with the relevant directives and regulations.
- The grounding cable must be designed for the maximum fault current of the voltage source that is usually limited by fuses or motor protection switches.
- The frequency inverter has protection class IP20. If higher protection classes are required, use a suitable housing or the IP55/NEMA 12K or IP66/NEMA 4X version.
- Ensure that the frequency inverters are properly grounded. Refer to the wiring diagram in the section "Connecting inverter and motor" (→ 31).
- The frequency inverters are suitable for lifting applications, whereby the following warning instructions must be observed.

4.3.1 Before installation

- Make sure that the supply voltage, frequency, and number of phases (single-phase or three-phase) correspond to the nominal values of the frequency inverter on delivery.
- A disconnecting switch or similar disconnecting element must be installed between the voltage supply and the frequency inverter.
- Never connect the mains supply to output terminals U, V or W of the frequency inverter.
- Do not install automatic contactors between the frequency inverter and the motor. Adhere to a minimum clearance of 100 mm at points where control cables and electric power lines are installed close to one another, and an angle of 90° for crossing cables.
- The cables are only protected by slow-blow high-power fuses or a motor protection switch. You find more information in section "Permitted voltage supply systems" (→ 27).
- Make sure that shieldings and sheaths of power cables are designed according to the wiring diagram in section "Connecting inverter and motor" (→ 31).
- Make sure that all terminals have been tightened with the proper tightening torques.
 - Control terminals: 0.5 Nm
 - Power terminals: 1 Nm

Line contactors

Use only line contactors in utilization category AC-3 (EN 60947-4-1).

Make sure to observe a minimum time interval of 120 seconds between two cycles.

Line fuses

Fuse types:

- Line protection types in utilization categories gL, gG:
 - Nominal fuse voltage \geq nominal line voltage
 - The nominal fuse current must be designed for 100% of the nominal frequency inverter current, depending on the use of the frequency inverter.
- Miniature circuit breaker with characteristic B:
 - Nominal circuit breaker voltage \geq nominal line voltage
 - The nominal currents of the miniature circuit breakers must be 10% higher than the nominal frequency inverter current.

Residual current device



▲ WARNING

No protection against electric shock if an incorrect type of residual current device is used.

Severe or fatal injuries.

- Use only universal current sensitive residual current devices of type B for 3-phase frequency inverters.
- A 3-phase frequency inverter creates a DC component in the leakage current and may greatly reduce the sensitivity of a type-A residual current device. A type-A residual current device is therefore not permitted as a protection device.
Use only a type-B residual current device.
- If the use of a residual current device is not stipulated in the standards, SEW-EURODRIVE recommends not using a residual current device.

Operation on IT system

Only IP20 units can be used on IT systems. The connection of the components for the overvoltage suppression and filters must be separated. Remove the EMC and VAR screw on the side of the unit.

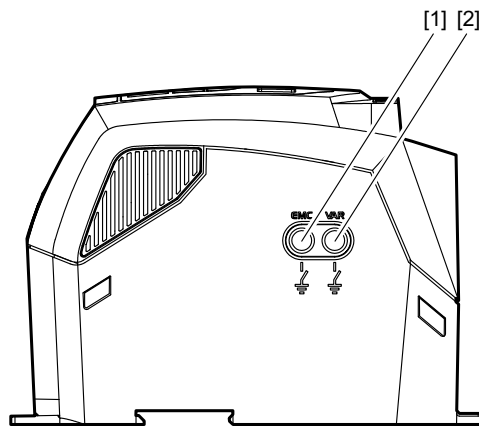
▲ WARNING



Danger of electric shock. Dangerous voltage levels may still be present inside the unit and at the terminals up to 10 minutes after disconnection from the supply system.

Severe or fatal injuries.

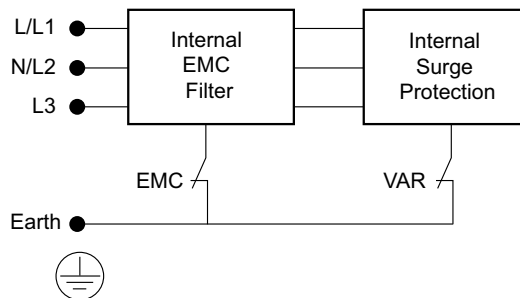
- De-energize the frequency inverter at least 10 minutes before removing the EMC screw.



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[1] EMC screw

[2] VAR screw



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SEW-EURODRIVE recommends using insulation monitors with pulse-code measurement in voltage supply systems with a non-earthed star point (IT systems). Use of such devices prevents the insulation monitor from false tripping due to the earth capacitance of the frequency inverter.

Operation on TN system with residual current device (IP20)

IP20 frequency inverters with integrated EMC filter (e.g., MOVITRAC® LT xxxx xAx-x-00 or MOVITRAC® LT xxxx xBx-x-00) have a higher leakage current than units without an EMC filter. The EMC filter can trigger faults when operated with residual current devices. Deactivate the EMC filter to reduce the leakage current. To do so, remove the EMC screw on the side of the unit. See figure in chapter "Operation on IT systems".

4.3.2 Installation


Connect the frequency inverter as shown in the wiring diagrams below. Ensure proper wiring in the motor terminal box. A distinction is made between the following two basic connections: star connection and delta connection. Make sure that the motor is connected with the voltage source in such a way that it is supplied with the correct operating voltage.

More information is provided in the figure in section "Connection in the motor terminal box" (→  30).

It is recommended that you use a 4-core PVC-insulated and shielded cable as the power cable. Route this cable in accordance with the relevant national regulations of the industry sector as well as the rules and standards. Conductor end sleeves are required in order to connect the power cables to the frequency inverter.

The power connectors of size 3 frequency inverters must feature crimped ring cable lugs to ensure a secure contact.

The grounding terminal of each frequency inverter must be connected individually and **directly** to the ground busbar (mass) of the installation site (via a filter, if available).

See section "Connecting inverter and motor" (→  31).

Do not loop the ground connections of the MOVITRAC® LT inverter from one inverter to the other. Furthermore, do not route the ground connections to the inverters from other inverters.

The impedance of the ground circuit must comply with the local safety regulations of the industry sector.


To comply with UL regulations, all earth connections must be designed with UL-listed crimping ring cable lugs.

Permitted voltage supply systems

- **Voltage supply systems with grounded star point**

The frequency inverter is intended for operation on TN and TT systems with a directly grounded star point.

- **Voltage supply systems with non-grounded star point**

Operation on voltage supply systems with a non-grounded star point (for example, IT systems) is only permitted for frequency inverters with degree of protection IP20. For more information, refer to the chapter "Operation on IT system" (→  25).

- **Voltage supply systems with grounded outer conductor**

On voltage supply systems, the frequency inverters must only be operated with a maximum phase-to-ground AC voltage of 300 V.

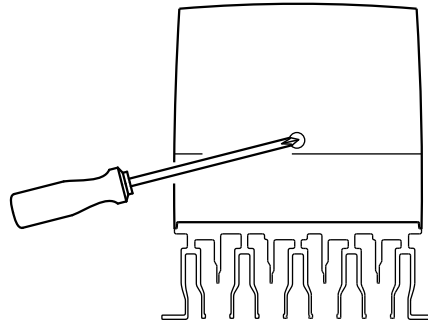
4 Installation

Electrical installation

Opening the front cover

IP55 sizes 1 and 2

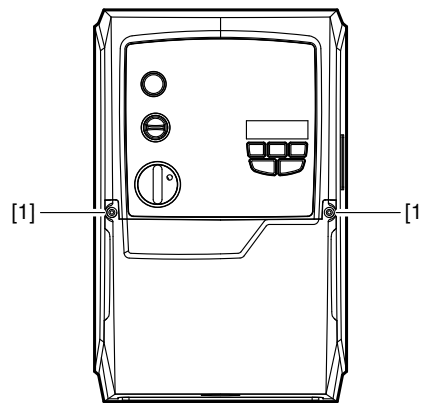
To release the front cover, position the screwdriver in the opening as shown in the following figure.



2933381515

IP55 size 3, and IP66 all sizes

Remove the two screws on the front of the inverter to open the front cover.



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[1] Screws on the front cover

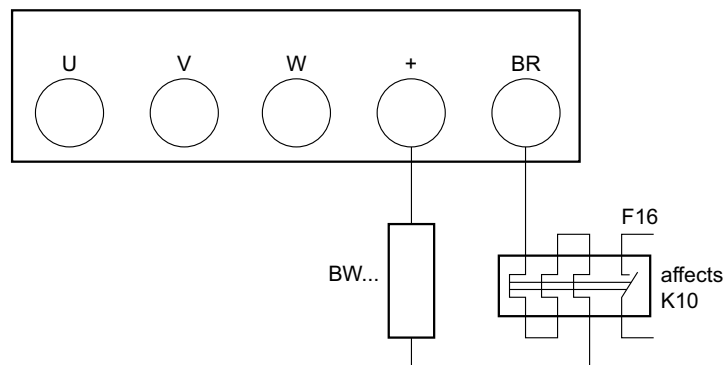
Connecting a braking resistor

- Shorten the cables to the required length.
- Use 2 tightly twisted leads or a 2-core shielded power cable. The cross section corresponds to the rated power of the inverter.
- Protect the bimetallic relay against overload with trip characteristics of trip class 10 or 10A in accordance with EN 60947-4-1. Set the tripping current to the value I_F . Do not use electronic or electromagnetic fuses since these can be triggered even in case of short-term excess currents that are still within the tolerance range.
- For braking resistors of the BW...-...T series, you can connect the integrated temperature sensor using a 2-core, shielded cable as an alternative to a bimetallic relay.
- Flatpack resistors feature internal thermal overload protection (non-replaceable fuse). Install the flatpack braking resistors using appropriate touch guards.
- **▲ WARNING Danger of electric shock. Dangerous voltage levels can still be present inside the unit and at the terminals up to 10 minutes after disconnection from the supply system.**

Severe or fatal injuries.

- Disconnect and isolate the frequency inverter from the current supply at least 10 minutes before you begin removing the braking resistor.
- Remove the factory-fitted touch guard.

The following figure shows the wiring diagram for the braking resistor.

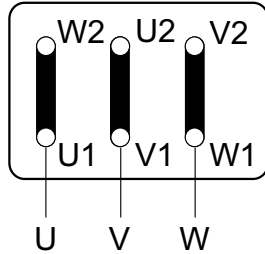


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Connection in the motor terminal box

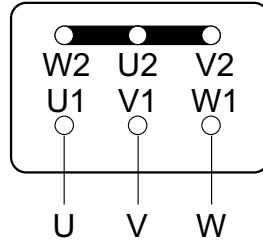
Connection types for motors: star, delta, double star, or star according to NEMA. The nameplate of the motor indicates the nominal voltage for the connection type that has to match the operating voltage of the frequency inverter.

R13



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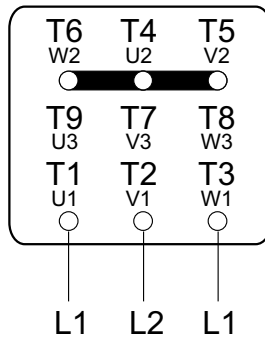
Low voltage Δ



2933393675

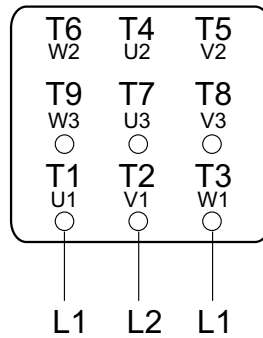
High voltage Δ

R76



2933395339

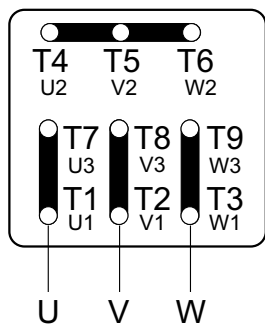
Low voltage Δ



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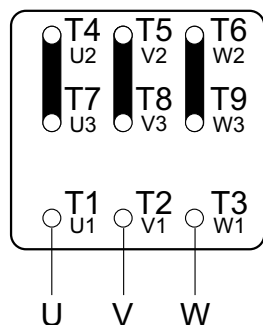
High voltage Δ

DR/DT/DV



2933398667

Low voltage Δ



2933400331

High voltage Δ

Connecting frequency inverter and motor



⚠ WARNING

Danger of electric shock. Incorrect wiring can lead to danger due to high voltages.
Severe or fatal injuries.

- Adhere to the connection sequence shown below.

In the following applications, always cut-off the brake in the AC and DC circuits:

- All lifting applications
- Applications that require a quick brake reaction time

INFORMATION



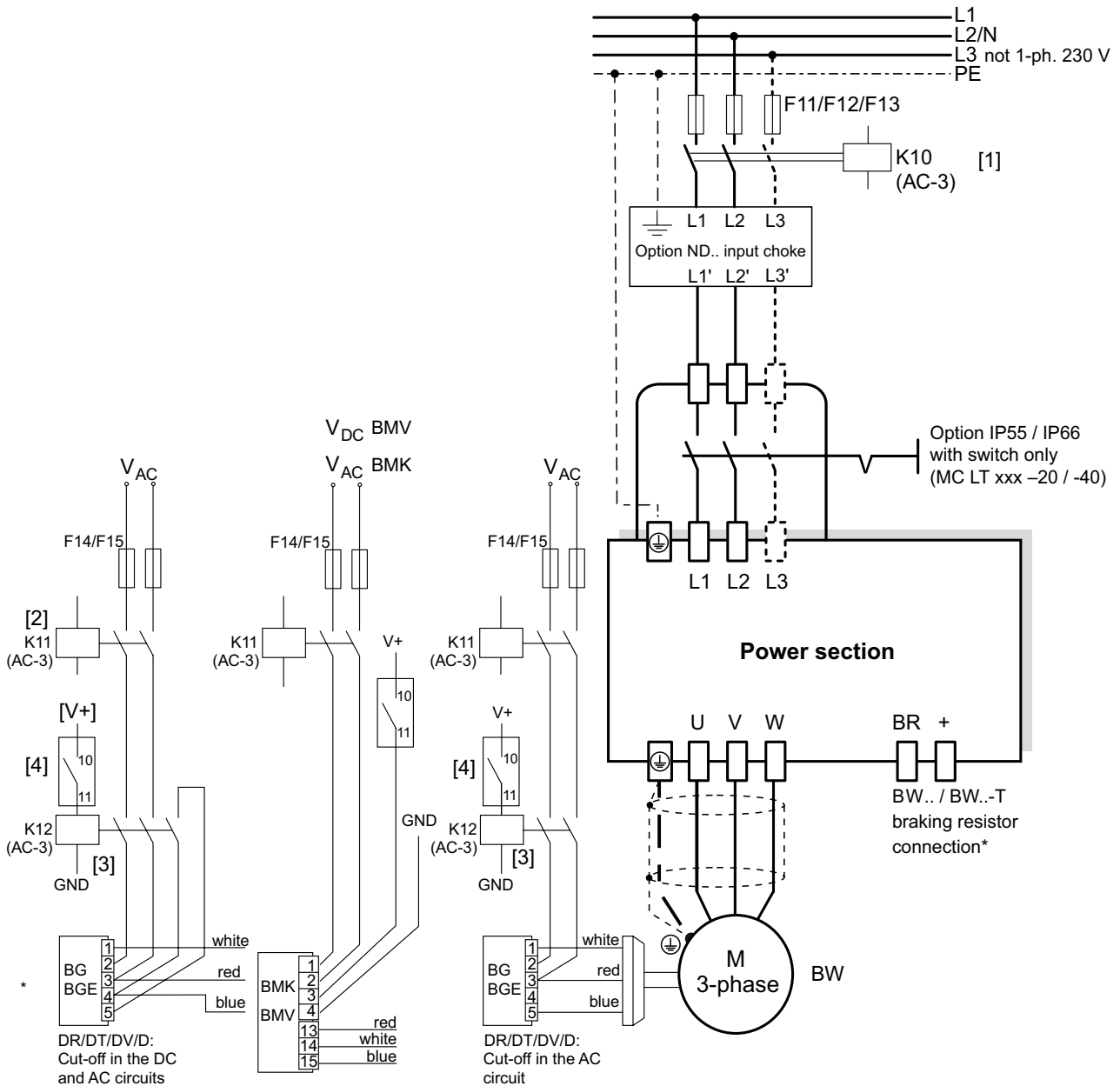
On a new unit, the terminals DC-, DC+, and BR are equipped with removable covers, which must be broken off when required.

Connect the brake rectifier using a separate supply system lead.

Supply via the motor voltage is not permitted.

4 Installation

Electrical installation



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* Only sizes 2 and 3

[1] Supply contactor on frequency inverter

[2] Supply system on brake rectifier, connected via K10

[3] Control contactor/relay for the current supply of the brake rectifier. Control via relay contact [4] in the frequency inverter.

[4] Floating relay contacts in the frequency inverter. Controls the contactor for the motor holding brake. Parameter *P-18* must be set to "1".

V+ External current supply AC 250 V/DC 30 V at max. 5 A

V_{DC} BMV DC voltage supply BMV

V_{AC} BMK AC voltage supply BMK

20265743/EN – 01/2015

Motor temperature protection (TF/TH)

Motors with an internal temperature sensor (TF, TH or similar) can be connected directly to the frequency inverter.

If the thermal protection trips, the frequency inverter indicates the error "E-triP".

The sensor is connected to terminal 1 (+24 V) and digital input 3, see section "Overview of signal terminals" (→ 33). Parameter *P-15* must be set to the external error input to receive the overtemperature shutdown. The shutdown level is set to 2.5 kΩ.

Multi-motor drive/group drive

The total of the motor currents must not exceed the nominal current of the frequency inverter. The maximum permitted cable length for the group is limited to the values of the single connection. See chapter "Technical data" (→ 81).

The motor group is limited to five motors and they must not differ by more than three sizes.

Multi-motor operation is only possible with AC asynchronous motors, not with synchronous motors.

For groups comprising more than three motors, SEW-EURODRIVE recommends using an output choke "HD LT xxx", unshielded cables, and a maximum permitted output frequency of 4 kHz.

4.3.3 Overview of signal terminals

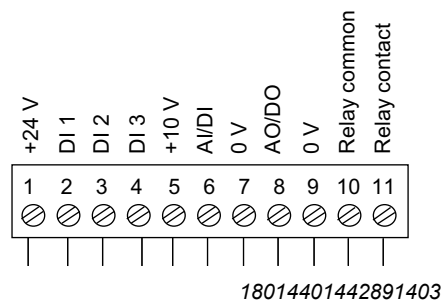
⚠ CAUTION



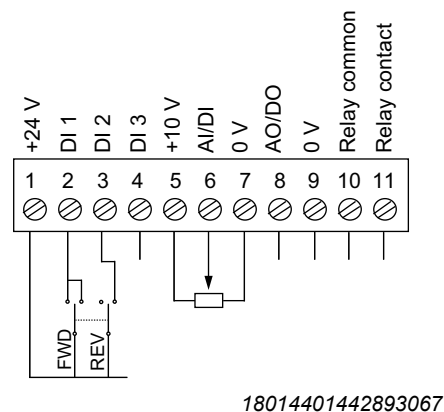
Applying voltages of more than 30 V to the signal terminals can damage the controller.

Possible damage to property.

- The voltage applied to the signal terminals must not exceed 30 V.



IP20 and IP55



IP55 and IP66 with switch option

The signal terminal block is equipped with the following signal terminals:

Terminal no.	Signal	Connection	Description
1	+24 V ref out	Output +24 V: Reference voltage	Reference voltage for activating DI1 – DI3 (max. 100 mA)
2	DI 1	Digital input 1	Positive logic "Logic 1" input voltage range: DC 8 – 30 V "Logic 0" input voltage range: DC 0 – 2 V Compatible with PLC requirement if 0 V is connected to terminal 7 or 9.
3	DI 2	Digital input 2	
4	DI 3	Digital input 3 / thermistor contact	
5	+10 V	Output +10 V: Reference voltage	10 V reference voltage for analog input (Pot. supply +, max. 10 mA, min. 1 kΩ)
6	AI/DI	Analog input (12 bit) Digital input 4	0 – 10 V, 0 – 20 mA, 4 – 20 mA "Logic 1" input voltage range: DC 8 – 30 V
7	0 V	0 V: Reference potential	0 V: Reference potential for analog input (potential supply -)
8	AO/DO	Analog output (10 bit) Digital output	0 – 10 V, max. 20 mA analog 0/24 V, max. 20 mA digital
9	0 V	0 V: Reference potential	0 V: Reference potential for analog output
10	Relay switching voltage	Input for relay switching voltage	NO contact (AC 250 V/DC 30 V at 5 A)
11	Relay contact	Relay contact	

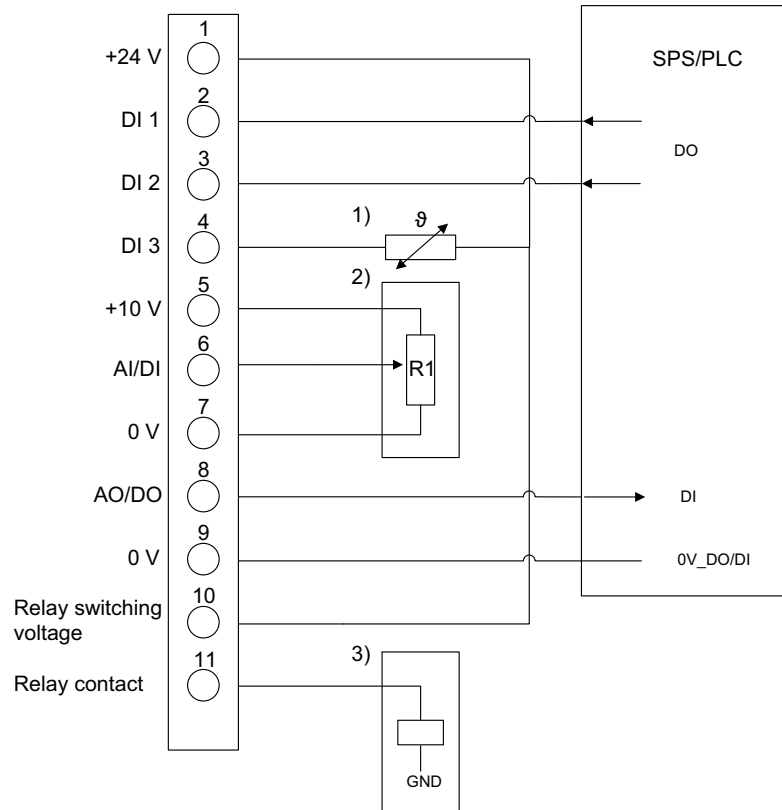
All digital inputs are enabled with an input voltage in the range of 8 to 30 V and are +24 V compatible.

INFORMATION



Terminals 7 and 9 can be used as GND reference potential if the frequency inverter is controlled via PLC.

4.3.4 Signal terminal connection example

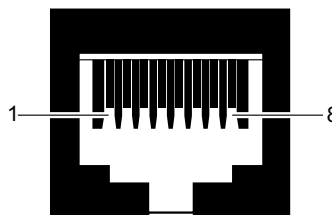


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- 1) Motor temperature sensor TF/TH
- 2) Analog speed specification/potentiometer
- 3) Control contactor/relay for supplying the brake rectifier with current

4.3.5 Communication socket RJ45

Socket at unit



13515899787

- [1] SBus- (*P1-12* must be set to SBus communication)
- [2] SBus+ (*P1-12* must be set to SBus communication)
- [3] 0 V
- [4] RS485- (engineering)
- [5] RS485+ (engineering)
- [6] +24 V (output voltage)
- [7] RS485- (Modbus RTU)
- [8] RS485+ (Modbus RTU)

4.3.6 UL-compliant installation

Note the following points for UL-compliant installation:

Ambient temperatures

The frequency inverters can be operated at the following ambient temperatures:

IP degree of protection	Ambient temperature
IP66/NEMA 4X	-10°C – 40°C
IP55/NEMA 12K	-10°C – 40°C
IP20	-10°C – 50°C

Use only copper connection cables suited for ambient temperatures up to 75°C.

Tightening torques for power terminals

The following permitted tightening torques apply to the power terminals of the frequency inverter:

Size	Tightening torque
1	1 Nm / 9 lb _f -in
2	1 Nm / 9 lb _f -in
3	1 Nm / 9 lb _f -in

Tightening torques for control terminals

The permitted tightening torque for control terminals is 0.5 Nm (4.5 lb_f-in).

External DC 24 V supply

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

Voltage supply systems and fusing

The frequency inverters are suitable for operation in voltage supply systems with an earthed star point (TN and TT systems) that supply a maximum line current and a maximum line voltage in accordance with the tables below. The fuses listed in the tables below are the maximum permitted back-up fuse for each frequency inverter. Use fuses only.

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

200 – 240 V units

1×200 – 240 V	Fuses	Nominal short-circuit current I_{KN}	Max. line voltage V_N
0004	AC 6 A / 250 V	AC 5000 A	AC 240 V
0008	AC 10 A / 250 V		
0015	AC 20 A / 250 V		
0022, 0040	AC 32 A / 250 V		

380 – 480 V units

1×380 – 480 V	Fuses	Nominal short-circuit current I_{KN}	Max. line voltage V_N
0008, 0015	AC 15 A / 600 V	AC 5000 A	AC 480 V
0022, 0040	AC 20 A / 600 V		
0055, 0075	AC 60 A / 600 V		
0110	AC 110 A / 600 V		

4.3.7 Electromagnetic compatibility (EMC)

Frequency inverters with an EMC filter are designed for use in machines and drive systems. They meet the EMC product standard EN 61800-3 for drives with variable speed. For an EMC-compliant installation of the drive system, observe the specifications of Directive 2004/108/EC (EMC) of the European Council.

Interference immunity

With regard to interference immunity, the frequency inverter with an EMC filter meets the limit values defined in the standard EN 61800-3 and can therefore be used for both industrial and domestic (light industrial) applications.

Interference emission

With regard to the interference emission, the frequency inverter with an EMC filter meets the limit values defined in the standards EN 61800-3 and EN 55014. The frequency inverters can be used for both industrial and domestic (light industrial) applications.

To ensure the best possible electromagnetic compatibility, install the frequency inverters as described in chapter "Installation" (→ 15). Ensure good ground connections for the frequency inverters. To comply with interference emissions, use shielded motor cables.

The conditions for use in drive applications are defined in the following tables.

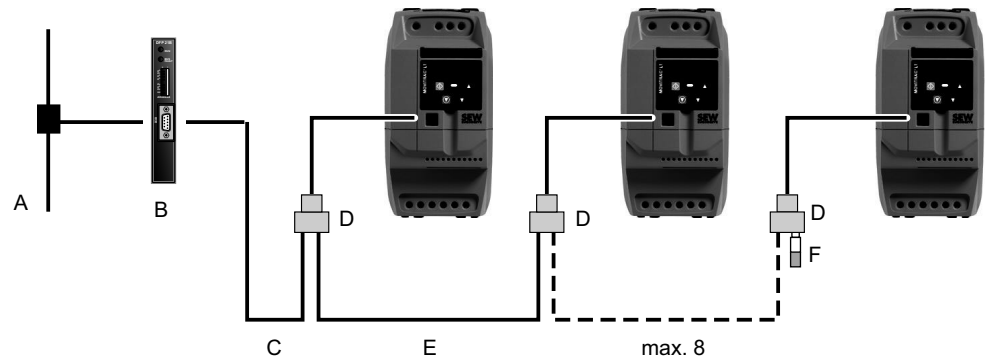
Inverter type with filter	Cat. C1 (class B)	Cat. C2 (class A)	Cat. C3
230 V, 1-phase LTE-B xxxx 2B1-x-xx	No additional filtering required. Use a shielded motor cable.		
230 V / 400 V, 3-phase LTE-B xxxx 2A3-x-xx LTE-B xxxx 5A3-x-xx	Use an external filter of the type NF LT 5B3 0xx.	No additional filtering required.	
	Use a shielded motor cable.		

To meet the specifications for frequency inverters without an internal filter, use an external filter and a shielded motor cable.

Inverter type without filter	Cat. C1 (class B)	Cat. C2 (class A)	Cat. C3
230 V, 1-phase LTE-B xxxx 201-x-xx	Use an external filter of the type NF LT 2B1 0xx. Use a shielded motor cable.		
230 V, 3-phase LTE-B xxxx 203-x-xx 400 V, 3-phase LTE-B xxxx 503-x-xx	Use an external filter of the type NF LT 5B3 0xx. Use a shielded motor cable.		

4.3.8 Fieldbus configuration

The topology shown here applies both to the installation of the frequency inverters on an SBus gateway and on a Modbus RTU master.



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- | | |
|---|---|
| [A] Bus connection | [D] Splitter |
| [B] SBus gateway (e.g., DFx/UOH) or Modbus RTU master | [E] Connection cable |
| [C] Connection cable | [F] Y connector with terminating resistor |

5 Startup

5.1 Brief instructions

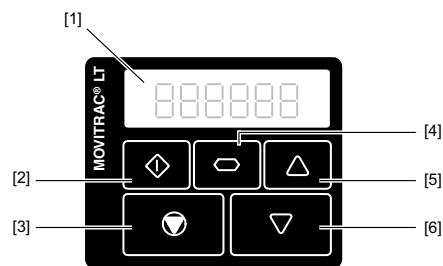
Brief startup instructions are contained in the IP20 housing in a separate tray above the display. In IP55/IP66 housings, the brief startup instructions are attached inside the front cover.

A wiring diagram for the signal terminals is contained in the brief instructions.

5.2 User interface

5.2.1 Operator terminal

Each MOVITRAC® LT inverter is equipped with an operator terminal as standard, which allows for operating and setting up the frequency inverter without the use of any further devices.



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- | | |
|-------------------------------|------------------|
| [1] 6-digit 7-segment display | [4] Navigate key |
| [2] Start key | [5] Up key |
| [3] Stop/reset key | [6] Down key |

The operator terminal has five keys with the following functions:

- | | | |
|-----|--------------|---|
| Key | Navigate [4] | <ul style="list-style-type: none"> • Toggle between menus • Save parameter values • Display realtime information |
| Key | Up [5] | <ul style="list-style-type: none"> • Increase speed • Increase parameter values |
| Key | Down [6] | <ul style="list-style-type: none"> • Decrease speed • Decrease parameter values |
| Key | Stop [3] | <ul style="list-style-type: none"> • Stop drive • Acknowledge error |
| Key | Start [2] | <ul style="list-style-type: none"> • Enable drive • Change direction of rotation |

If the parameters are set to the factory setting, the <Start> and <Stop> keys of the operator terminal are disabled. To release the <Start>/<Stop> keys on the operator terminal for use, set parameter *P-12* for LTE-B or *P1-12* for LTP-B to "1" or "2".

The parameter edit menu can only be accessed by pressing the <Navigate> key [4].

- To toggle between the menu for changing parameters and the realtime display (operating speed/operating current), keep the key pressed for longer than one second.
- To toggle between the operating speed and the operating current of the running frequency inverter, press the key briefly (for less than one second).


5.2.2 Parameterization

Proceed as follows to change the parameter values:


1. Check the connection of the frequency inverter.
See chapter "Electrical installation" (→ 23).
2. Make sure that the motor cannot start,
e.g., by separating the connection between terminal 1 and terminal 2.
3. Switch on the line voltage.

After the initialization, "StoP" appears in the display. NOTE: To be able to change parameters, you must deactivate the frequency inverter enable signal, e.g., by separating the connection between terminal 1 and terminal 2.

StoP


4. Use the  key to activate the parameter mode.

P 1 - 0 1

(Press the  key for more than 1 s)

5. Use the  key and the  key to select the desired parameter.


P 1 - 0 3

6. Use the  key to activate the setting mode.


5.0

7. Use the  key and the  key to set the required parameter value.

2.0

8. Use the  key to quit the setting mode.

P 1 - 0 3

9. Use the  key to quit the parameter mode.

StoP





(Press the  key for more than 1 s)

The operator terminal shows "StoP", "H", "A", or "P".

Parameter descriptions are provided in the chapter "Parameters" (→ 62).

5.2.3 Resetting parameters to default settings

To reset the parameters to their default value, proceed as follows:



1. The frequency inverter must not be enabled and "Inhibit" must be shown on the display.
2. Press the 3 keys , , and  simultaneously for at least 2 s.
"P-deF" is shown on the display.
3. Press the  key to acknowledge the "P-deF" message.

5.3 Simple startup

1. Connect the motor to the frequency inverter. Note the nominal voltage of the motor when establishing the connection.
2. Enter the nominal values specified on the motor nameplate:
 - Use *P-01* and *P-02* to set the limit values for the minimum and maximum speed.
 - Use *P-03* and *P-04* to set the acceleration and deceleration times.
 - Use *P-07* to set the nominal motor voltage.
 - Use *P-08* to set the nominal motor current.
 - Use *P-09* to set the rated motor frequency.

5.3.1 Terminal mode (factory setting)

To activate operation in terminal mode (factory setting), proceed as follows:

- Ensure that *P-12* is set to "0" (factory setting).
- Install a switch between terminals 1 and 2 of the user terminal block. See chapter "Overview of signal terminals" (→  33).
- Connect a potentiometer between terminals 5, 6, and 7 (1 k – 10 k), with the slider connected to terminal 6. See chapter "Overview of signal terminals" (→  33).
- **▲ WARNING!** Automatic start of motor during startup.
Sever or fatal injury.
 - Ensure that an automatic restart of the machine presents no danger to people or equipment.
 - Set the potentiometer to 0.
- Close the switch to enable the frequency inverter.
- Set the speed using the potentiometer.

5.3.2 Keypad mode

In keypad mode, the drive can be controlled via the integrated operator terminal.

To activate operation in keypad mode, proceed as follows:

- Change parameter *P-12* to "1" (unidirectional) or "2" (bidirectional).
- Connect terminals 1 and 2 on the user terminal block with wire or a switch in order to enable the frequency inverter.
- Press the <Start> key. The frequency inverter is activated as 0 Hz.

- To increase the speed, press the <Up> key.
- Press the <Stop> key to stop the frequency inverter.
- If you now press the <Start> key, the frequency inverter returns to its original speed.

When bidirectional mode is activated ($P-12 = 2$), pressing the <Start> key changes the direction of rotation.

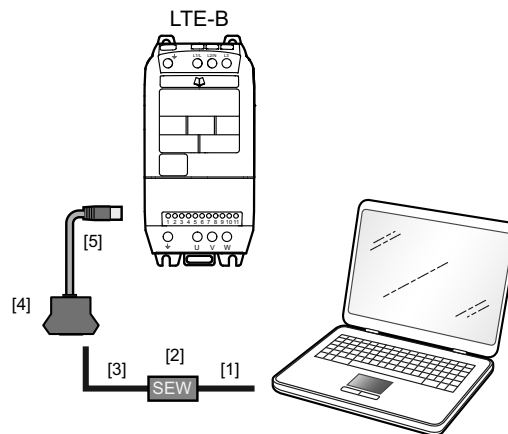
- **▲ CAUTION!** If you set the desired speed via the keypad during operation and subsequently press the <Stop/Reset> key, the frequency inverter resumes the previously set speed if you press the <Start> key again.

5.4 Startup with PC

5.4.1 PC connection

The diagnostic interface can be connected to a conventional PC/laptop with the following accessories:

- USB11A interface adapter
- PC engineering set (cable set C) for the frequency inverter.



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- [1] USB A-B cable
- [2] USB11A
- [3] RJ10 to RJ10 cable
- [4] RJ adapter (2 x RJ45, 1 x RJ10)
- [5] RJ45 to RJ45 cable

Type	Part number	Scope of delivery
USB11A	0 824 831 1	<ul style="list-style-type: none"> • USB11A interface adapter • USB cable • Cable with RJ10 – RJ10 plug connectors
PC engineering set	1 824 368 1	<ul style="list-style-type: none"> • OP LT 003 C adapter with DC 24 V → DC 5 V voltage transformer • Cable with RJ45 – RJ45 plug connectors

5.4.2 Parameterization with LT Shell software

User interface for parameterization

ID	Description	Value	Range	Default
P-01	Maximum Frequency / Speed Limit	50.0 Hz	0.0 ... 250.0 Hz	50.0 Hz
P-02	Minimum Frequency / Speed Limit	0.0 Hz	0.0 ... 50.0 Hz	0.0 Hz
P-03	Acceleration Ramp Time	5.0 s	0.00 ... 600 s	5.0 s
P-04	Deceleration Ramp Time	5.0 s	0.00 ... 600 s	5.0 s
P-05	Stop Mode Select	0: Ramp to Stop (Mains Loss Ride-Through)		0: Ramp to Stop (Mains Loss Ride-Through)
P-06	Energy Optimiser	0: Disable		0: Disable
P-07	Motor Rated Voltage	230 V	0, 20 ... 250 V	230 V
P-08	Motor Rated Current	0.6 A	0.5 ... 2.3 A	2.0 A
P-09	Motor Rated Frequency	50 Hz	25 ... 500 Hz	50 Hz
P-10	Motor Rated Speed	0 rpm	0, 300 ... 3000 rpm	0 rpm
P-11	Voltage Boost	3.0 %	0.0 ... 20.0 %	3.0 %
P-12	Drive Control Mode	0: Terminal Mode		0: Terminal Mode
P-13	Trip Log	2:18:33 Over load trip (I-t-trip) 2:17:58 Over load trip (I-t-trip) 2:14:40 Over load trip (I-t-trip) 2:14:11 Over load trip (I-t-trip)	1113 ... 2	0
P-14	Extended Menu Access Code	101	0 ... 9999	0

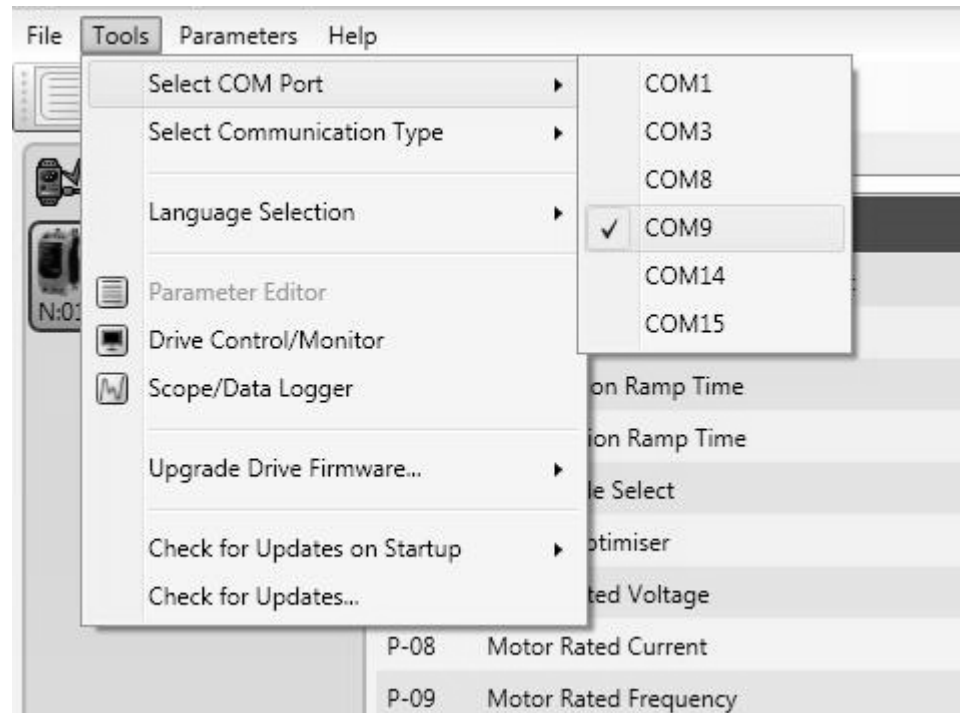
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- [1] Tool selection menu:
- Parameter editor
 - Drive monitor
 - Scope tool
- [2] Shows the units in the network.
 [3] Open and save parameter file.
 [4] Reset unit to factory settings.
 [5] Transfer parameter set from selected drive.
 [6] Transfer parameter set to selected drive.
- [7] Transfer parameter set from parameter module.
 [8] Transfer parameter set to parameter module.
 [9] Parameter display
- [10] Offline mode
 [11] Searches the network for drives.
 [12] Starts real-time edit mode.
 [13] Defines the number of drives to be scanned.

Proceed as follows to change the parameter values on the PC:

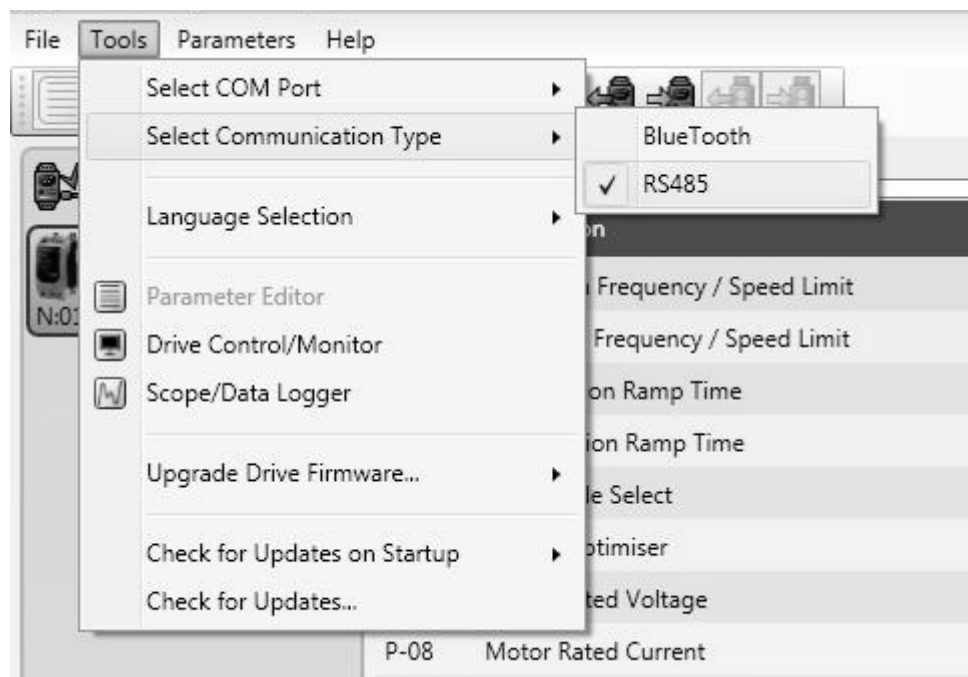
1. Check the connection of the frequency inverter. See chapter "Electrical installation" (→ 23).
2. Connect the PC/laptop to the frequency inverter. See chapter "PC connection" (→ 42).
3. Start the software LT-Shell V4.0.exe.
4. The parameter editor is displayed.

5. Select the COM port on the PC/laptop to which the frequency inverter is connected.



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6. Choose the communication type RS485.



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7. Scan the network for existing drives.
8. Read the parameter set using button [5] of the frequency inverter. After reading the parameter set, the parameters are displayed in the parameter editor.
9. Double-click the parameter whose value you wish to change.

10. Enter the new parameter value in the edit box.
11. Transfer the parameter set from the PC to the frequency inverter using button [6].

5.4.3 Real-time edit mode

In real-time edit mode, the parameter changes immediately take effect in the frequency inverter.



▲ WARNING

Risk of crushing if the drive starts up unintentionally and risk of impact due to sudden changes in velocity. When the drive is enabled, a parameter change affects the drive system immediately.

Severe or fatal injuries.

- Make sure that the drive is **inhibited** before you activate the real-time edit mode.
- Take additional safety precautions depending on the application to avoid injury to people and damage to machinery.

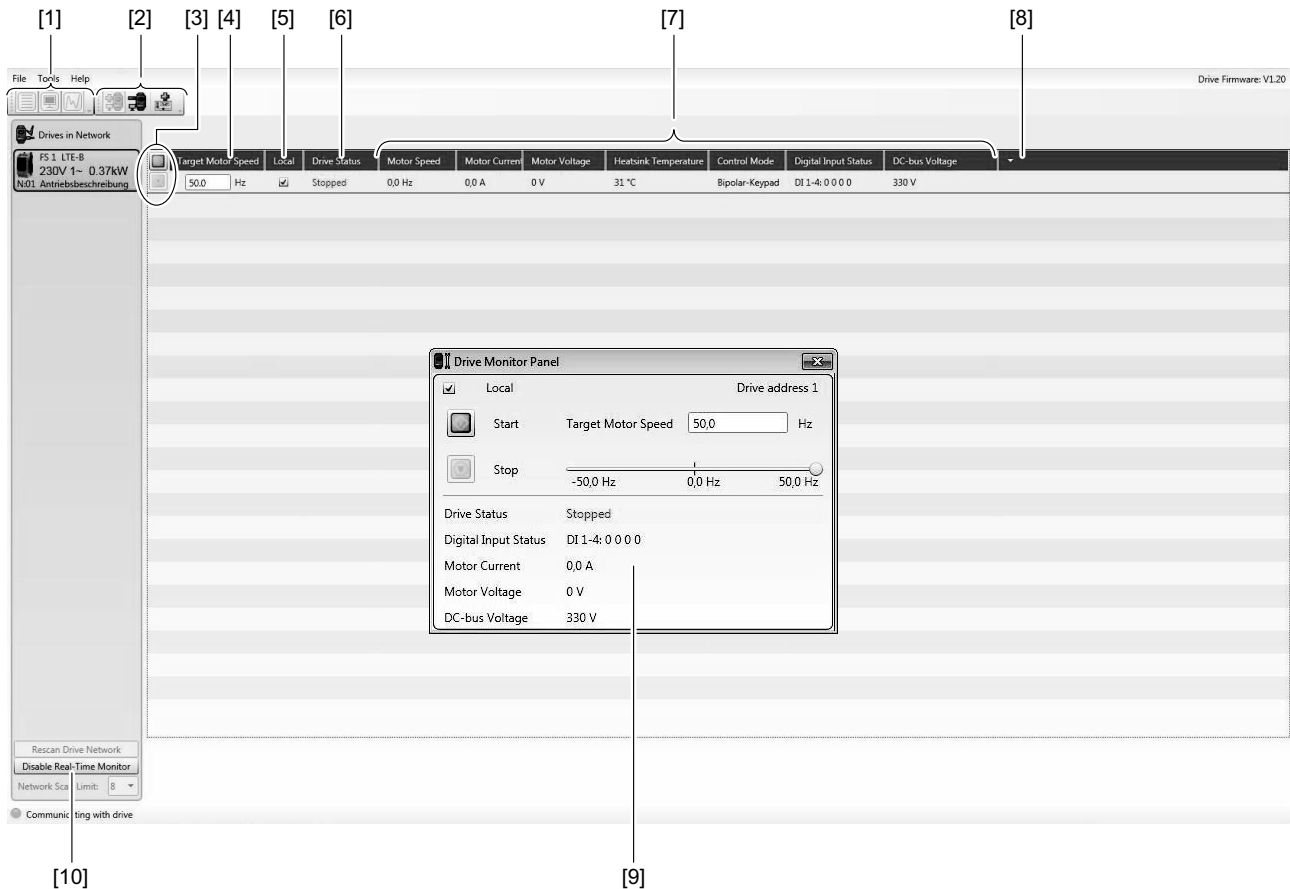
Proceed as follows to change the parameter values in real-time edit mode:

1. If the frequency inverter has not yet been set up in the LT Shell software, carry out the steps 1 to 7 of the chapter "Parameterization with LT Shell software" (→ 43).
2. Activate real-time edit mode by pressing button [12].
3. Select the required parameter group.
4. Double-click the desired parameter.
5. Enter the new parameter value in the edit box.
6. Exit real-time edit mode by clicking button [10].

5.4.4 Drive control in drive monitor

The drive monitor tool allows you to control the drive via the PC software. It is also possible to operate multiple drives in a single network.

Drive monitor user interface



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- | | |
|---|--|
| <p>[1] Tool selection menu:</p> <ul style="list-style-type: none"> • Parameter editor • Drive monitor • Scope tool <p>[2] Control keys for:</p> <ul style="list-style-type: none"> • Activating monitor for all drives • Deactivating monitor for all drives • Opening drive monitor panel <p>[3] Control keys for "Start" and "Stop/Reset"</p> | <p>[4] Speed with edit box</p> <p>[5] Activate/deactivate local control</p> <p>[6] Drive status/diagnostics</p> <p>[7] Status displays</p> <p>[8] Variable status displays. Add the variable to be displayed via the drop-down list.</p> <p>[9] Drive monitor panel for simplified drive operation</p> <p>[10] Activate/deactivate drive monitor</p> |
|---|--|

Operation

You can either control the selected drive using the complete *drive control bar* or using the simplified operation of the *drive monitor panel*.

You open the control panel by pressing the [Drive monitor panel] button in the menu bar [1].

Activating the drive monitor

1. If the frequency inverter has not yet been set up in the LT Shell software, follow steps 1 to 7 of the chapter "Parameterization with LT Shell software" (→ 43).
2. Switch to the drive monitor tool by pressing the [Drive monitor] button the menu bar [1].

Controlling drives



▲ WARNING

Risk of crushing if the drive starts up unintentionally and risk of impact due to sudden changes in velocity. When the drive is enabled, a parameter change affects the drive system immediately.

Severe or fatal injuries.

- Make sure that the drive is **inhibited** before you activate drive monitor mode.
- Take additional safety precautions in line with the application to avoid injury to people and damage to machinery.

Controlling a single drive

1. If a network contains multiple frequency inverters, you can select the relevant drive by clicking the corresponding unit.
2. You then activate the drive monitor tool for the selected drive by clicking button [10].
3. Activate the "Local" check box in the drive control bar [5] or in the drive monitor panel [9].
4. To be able to control the drive via the drive monitor, the hardware must be enabled. See chapter "Simple startup" (→ 41).

Controlling multiple drives

1. If a network contains multiple frequency inverters, you can select the relevant drive by clicking the corresponding unit.
2. Activate the "Local" check box for all frequency inverters you wish to control in the drive control bar [5] or the drive monitor panel [9].
3. To be able to control the relevant drive via the drive monitor, the hardware must be enabled. See chapter "Simple startup" (→ 41).

Deactivating drive control

To stop controlling the relevant drive, deactivate the "Local" check box in the drive control bar [5] or in the drive monitor panel [9].

Exiting the drive monitor

1. You can stop operation of all activated drives by clicking button [3].
2. Deactivate the hardware activation for all drives by removing the enable signal at the relevant digital input.
3. Then deactivate the drive monitor using button [10] or, in the case of multiple drives in the network, using the button in the menu bar [2].

5.4.5 Oscilloscope function

User interface



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- | | |
|--|--|
| [1] Tool selection menu: | [7] Selection of measured channel variable |
| • Parameter editor | [8] Oscilloscope control: |
| • Drive monitor | • Start/stop data recording |
| • Scope tool | • Change settings |
| [2] Open and save oscilloscope recording | [9] Zoom cursor |
| [3] Show and hide measuring points | [10] Overview of recorded curve |
| [4] Open and save oscilloscope settings | [11] Work window |
| [5] Time cursor with measured value | [12] Units in network |
| [6] Expand and collapse the channel settings | |

Display

The recorded measurements are displayed in two window areas.

Overview window [10]

- Display of measurement over entire period.
- You can define a specific area using the zoom cursors [9]. It then appears in the work window [11].

Work window [11]

The defined area is displayed using the zoom function in the overview window [10]. You can measure a specific time period using the time cursors [5]. You can display the measured values by clicking the relevant time cursor in the display of the individual channels.

Oscilloscope activation

1. If the frequency inverter has not yet been set up in the LT Shell software, follow steps 1 to 7 of the chapter "Parameterization with LT Shell software" (→ 43).
2. Switch to the oscilloscope function by pressing the relevant button [Scope tool] in the menu bar [1].

Oscilloscope recording in real-time mode**Starting the recording**

Before starting the recording, you can make the settings [6], [7] for the measuring channels, the time axis, and the position of the curves to be recorded. You can start the recording by clicking on the [Start] button in area [8]. Clicking on the [Stop] button stops the measurement.

Data logging function


When the data logging function is activated, the recorded measuring points are written to a separate CSV file at the same time as the oscilloscope display.



To activate the data logging function, proceed as follows:

1. Activate the field "Record to file" in area [8].
2. Enter the storage location and file name in the corresponding field.
3. In the "Logging interval" choice box, you can set the rate at which the data is written to the file. (Default value: 1 s)
4. Press [Start] to start the recording.

5.5 Startup via fieldbus

5.5.1 SBus startup

Set up the SBus network as shown in the figure in chapter "Fieldbus configuration" (→  38).

- Start up the inverter as described in the section "Simple startup" (→  41).
- Set parameter *P-12* to "3" or "4" to control the frequency inverter via SBus.
 - 3 = control word and speed setpoint via SBus, ramp times as specified in *P-03/P-04*.
 - 4 = control word, speed setpoint, and ramp time via SBus.
- Set *P-14* to "101" to provide access to the advanced menu.
- Set the values in *P-36* as follows:
 - For a unique SBus address, enter a setting between "1" and "63".
 - The SBus baud rate is set to "500 kBaud" by default (factory setting). To set a different baud rate, select it in *P-36*. Note that the baud rates of the SBus gateway and the frequency inverter must always be identical.
 - Define the behavior of the frequency inverter in the case of a timeout when communication is interrupted:
 - 0: Continue with the last data used (factory setting).
 - *t_xxx*: Error after delay of xxx milliseconds. The error must be reset.
 - *r_xxx*: Frequency inverter is brought to a standstill along a ramp once a time of xxx milliseconds has passed. An automatic restart takes place when new data is received.
- Connect the frequency inverter to the DFX/UOH gateway via SBus, as described in the section "RJ45 communication socket" (→  35).
- Set the "AS" DIP switch on the DFX/UOH gateway from "OFF" to "ON" to perform the automatic setup of the fieldbus gateway. The "H1" LED on the gateway lights up repeatedly and then goes off completely. If the "H1" LED is lit, the gateway or one of the frequency inverters is not properly connected to the SBus or was not started correctly.
- Refer to the relevant DFX manual for information on how to configure the fieldbus communication between the DFX/UOH gateway and bus master.

Permitted cable lengths

The permitted total cable length depends on the baud rate setting of the SBus:

- 125 kBaud: 500 m (1640 ft)
- 250 kBaud: 250 m (820 ft)
- 500 kBaud: 100 m (328 ft) (factory setting)
- 1000 kBaud: 25 m (82 ft)

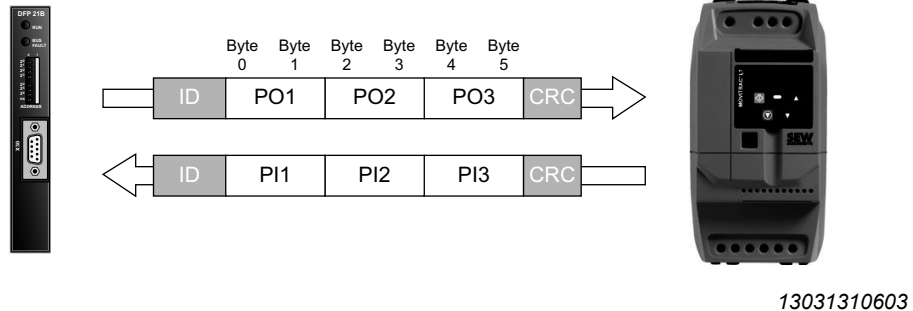
Use only shielded cables.

Monitoring sent data

The data transmitted via the gateway can be monitored by one of the following methods:

- Using MOVITOOLS® MotionStudio via the X24 engineering interface of the gateway or optionally via Ethernet
- Via the website of the gateway (e.g. on DFE3x Ethernet gateways)

Structure of SBus telegram



5.5.2 Startup of Modbus RTU

Protocol	Modbus RTU (Remote Terminal Unit)
Error checking	CRC
Baud rate	9600 bps, 19,200 bps, 38,400 bps, 57,600 bps, 76,800 bps, 115,200 bps (standard)
Data format	1 start bit, 8 data bits, 1 stop bit, no priority
Physical format	RS485 (2-core)
User interface	RJ45

Electrical installation

Set up the Modbus network as shown in the figure in the chapter "Fieldbus configuration" (→ 38). The maximum number of bus nodes is 32. The permitted cable length depends on the baud rate. With a baud rate of 115,200 bps and a 0.5 mm² cable, the maximum cable length is 1200 m. For the connection assignment of the RJ45 communication socket, refer to the chapter "RJ45 communication socket" (→ 35).

- Start up the frequency inverter as described in the section "Simple startup" (→ 41).
- Set parameter *P-12* to "5" or "6" to control the frequency inverter via Modbus RTU.
 - 5 = control word and speed setpoint via Modbus RTU, ramp times as specified in *P-03/P-04*.
 - 6 = control word, speed setpoint, and ramp time via Modbus RTU.
- Set *P-14* to "101" to provide access to the advanced menu.
- Set the values in *P-36* as follows:
 - For a unique Modbus address, enter a setting between "1" and "64".
 - The Modbus baud rate is set to "115.2 kBaud" by default (factory setting). To set a different baud rate, select it in *P-36*. Note that the baud rates of the Modbus master and the frequency inverter must always be identical.
 - Define the behavior of the frequency inverter in the case of a timeout when communication is interrupted.

- 0: Continue with the last data used (factory setting).
 - t_{xxx}: Error after delay of xxx milliseconds; error must be reset.
 - r_{xxx}: Frequency inverter is brought to a standstill along a ramp once a time of xxx milliseconds has passed. An automatic restart takes place when new data is received.
- Connect the frequency inverter to a suitable Modbus master, as described in the section "RJ45 communication socket" (→ 35). With regard to the startup of the Modbus master, please refer to the relevant chapter in the manufacturer's operating instructions.

Register allocation of the process data words

The most important registers for a simple controller are specified in the following table. The structure of the process data words PI and PO is described in the chapter "Description of transferred process data (PD)" (→ 56).

Register	Process data	Command	Type
1	PO1 control word (fixed; assignment of data bytes, see Process data words (16 bit) from gateway to inverter (PA) (→ 56))	03, 06	Read/write
2	PO2 setpoint speed (assignment of data bytes, see Process data words (16 bit) from gateway to inverter (PA) (→ 56))	03, 06	Read/write
3	PO3 ramp (if P-12 =6; assignment of data bytes, see Process data words (16 bit) from gateway to inverter (PA) (→ 56))	03, 06	Read/write
4	Reserved	03, 06	Read/write
5	Reserved	0, 3	Read
6	PI1 status word (fixed; assignment of data bytes, see Process data words (16 bit) from inverter to gateway (PI) (→ 56))	0, 3	Read
7	PI2 actual speed (assignment of data bytes, see Process data words (16 bit) from inverter to gateway (PI) (→ 56))	0, 3	Read
8	PI3 actual current (assignment of data bytes, see Process data words (16 bit) from inverter to gateway (PI) (→ 56))	0, 3	Read

The complete parameter/register assignment and data scaling is provided in the memory allocation plan in the chapter "Modbus register table" (→ 55).

INFORMATION



Please note: Many bus masters address the first register as register 0. Therefore, it may be necessary to deduct the value "1" from the register number given below to obtain the correct register address.

Structure of Modbus telegram

Structure of process data

For a read request

Request master → slave

Address	Function	Data				CRC check
		Start address		Number of registers		
addr	03 _H	High byte	Low byte	High byte	Low byte	crc16

Response slave → master

Address	Function	Data		CRC check
		Number of data bytes	Information	
addr	03 _H	n (8 bit)	n/2 register	crc16

For a write command

Request master → slave

Address	Function	Data				CRC check
		Register number		Process data		
addr	06 _H	High byte	Low byte	High byte	Low byte	crc16

Response slave → master

Address	Function	Data				CRC check
		Register number		Process data		
addr	06 _H	High byte	Low byte	High byte	Low byte	crc16

Communication example

Sending of setpoints

- Enable
- Motor speed = 100%
- Ramp = 5 s

As a response, the slave sends confirmation of the sent information in a corresponding telegram.

Enable

Data direction	Address	Function	Data	CRC check
-Tx	01	06 _H	00010006	09C8
-Rx	01	06 _H	00010006	09C8

Motor speed

Data direction	Address	Function	Data	CRC check
-Tx	01	06 _H	00024009	29CC
-Rx	01	06 _H	00024009	29CC

Acceleration ramp

Data direction	Address	Function	Data	CRC check
-Tx	01	06 _H	00031388	255C
-Rx	01	06 _H	00031388	255C

Tx – Send from perspective of the bus master

Rx – Receive from perspective of the bus master

Explanation of write command using example of enable

Address	01 _H – unit address
Function	06 _H – write
Data	00010006 _H – write to register 01, value 06 _H = enable
CRC check	CRC_high, CRC_low

Modbus register table

Register	Parameter	Description	Comment	
1	-	Control word	Description, see chapter "Description of transferred process data (PD)" (→ 56).	
2	-	Setpoint speed		
3	-	Ramp time		
6	-	Status word		
7	-	Actual speed		
8	-	Actual current		
11	P00-04	Digital input status		Bit 0 = DI1, bit 1 = DI2
12	P00-20	Frequency inverter ID		Inverter ID
13	P00-20	Frequency inverter power class	To 2 decimal positions (kW or HP)	
14	P00-20	Voltage class	e.g. "1230" (1-phase, 230 V)	
15	P00-18	IO software version	"120" = v1.20	
16	P00-18	Motor ctrl software version	"120" = v1.20	
17	P00-20	Inverter type	Fixed value: 0x0002 = LTE-B	
18 – 19	-	Reserved		
20	P00-01	Value of analog input 1	Display 0 – 100%; 100% = max. input voltage; 4096 = 100%	
21	P00-02	Value of analog input 1	P00-01 (min) – P00-01 (max); -4096 – 4096	
22	P00-03	Setpoint speed	Speed display; 3000 = 50 Hz	
23	P00-08	DC link voltage	DC 0 – 1000 V; 800 = 800 V	
24	P00-09	Heat sink temperature	25 = 25°C	
25	P00-10	Operating hours counter (h)	0 – 65,535 h	
26	P00-10	Operating hours counter (min + s)	3599 s = 59 min 59 s	
27	P00-13	Operating time since last deactivation (h)	0 – 65,535 h	
28	P00-13	Operating time since last deactivation (min + s)	3599 s = 59 min 59 s	
101	P-01	Maximum speed	3000 = 50 Hz	
102	P-02	Minimum speed	3000 = 50 Hz	
103	P-03	Acceleration ramp time	100 = 1.00 s	
....	
136	P-36	Address, baud rate, timeout	0xABCD A = timeout setting (selection no. 0 – 8) B = baud rate (selection no. 0 – 5) CD = address range (0 – 32)	
...			
140	P-40	Actual speed value scaling factor	0 – 6000 (6000 = 6 (factor))	

5.5.3 Description of transferred process data (PD)

Structure of process data words

This chapter describes the structure of the process data words for the fieldbus communication with SBus and Modbus RTU.

Process data words (16 bit) from gateway to inverter (PA)

Description		Bit		Settings
PO1	Control word	0	Controller inhibit	0: Start 1: Stop
		1	Rapid stop along second deceleration ramp (P-24)	0: Rapid stop 1: Start
		2	Stop along process ramp P-03/P-04 or PO3	0: Stop 1: Start
		3 – 5	Reserved	0
		6	Error reset	Edge 0 set to 1 = error reset
		7 – 15	Reserved	0
PO2	Setpoint speed	Signed percentage value/0.0061% Example: -80%/0.0061% = -13115 = CCC5 (hex)		
PO3	Ramp time (if P-12 = 4 or 6)	Scaling: Acceleration and deceleration in ms for rated speed n = 50 Hz.		
	No function (of P-12 = 3 or 6)	Ramp times as set in P-03 and P-04.		

Process data words (16 bit) from inverter to gateway (PI)

Description		Bit		Settings	Byte
PI1	Status word	0	Output stage enable	0: Locked 1: Enabled	Low byte
		1	Inverter ready	0: Not ready 1: Ready	
		2	PO data enabled	1 if P-12 = 3 or 4	
		3 – 4	Reserved		
		5	Error/warning	0: No error 1: Error	
		6 – 7	Reserved		
		8 – 15	Status of inverter if bit 5 = 0 0x01 = output stage inhibited 0x02 = not enabled/not running 0x04 = enabled/running 0x05 = factory setting activated	High byte	
8 – 15	Status of inverter if bit 5 = 1 0x01 = output stage inhibited 0x04 = not enabled/not running 0x06 = phase asymmetry error at input/input phase failure 0x07 = overvoltage at DC bus 0x08 = motor overload 0x09 = parameter set to factory setting 0x0B = shutdown due to excess temperature 0x1A = external error 0x2F = error, failure of communication connection (SBus) 0x71 = analog input error, current under 2.5 mA 0x75 = shutdown due to insufficient temperature 0xC6 = undervoltage at DC bus 0xC8 = general error/output stage error				
PI2	Actual speed	Scaling corresponds to PO2			
PI3	Actual current	Scaling: 0x4000 = 100% of maximum speed, set as in P-08			

Example

The information in the following table is transferred to the inverter when the following conditions are met:

- To enable the inverter, the digital inputs must be correctly configured and connected.
- To operate the inverter via SBus, parameter *P-12* must be set to 3 or 5.

Description		Value	Description
PO1	Control word	0	Rapid stop along second deceleration ramp (<i>P-24</i>).
		1	Coast
		2	Stop along the process ramp <i>P-04</i> .
		3 – 5	Reserved
		6	Start up along a ramp (<i>P-03</i>) and rotate at setpoint speed (PO2).
PO2	Speed setpoint	0x4000	= 16,384 = maximum speed, e.g. 50 Hz (<i>P-01</i>) CW rotation
		0x2000	= 8192 = 50% of maximum speed, e.g. 25 Hz CW rotation
		0xC000	= -16,384 = maximum speed, e.g. 50 Hz (<i>P-01</i>) CCW rotation
		0x0000	= 0 = minimum speed, set in <i>P-02</i>

During operation, the data transferred by the inverter is as follows:

Description		Value	Description
PI1	Status word	0x0407	Status = running Output stage enabled Inverter ready PO data enable
PI2	Actual speed	Corresponds to PO2 (speed setpoint)	
PI3	Actual current	Depends on speed and load	

5.6 Startup with 87 Hz characteristic curve

The following parameters have to be set:

- P-01: 87 Hz
- P-07: 400 V
- P-08: Motor current for Δ operation (see nameplate)
- P-09: 87 Hz

6 Operation

6.1 Status of the inverter

6.1.1 Display for disabled inverter

The following table shows the messages relating to the inverter status that are displayed when the motor is at standstill.

Message	Description
StoP	Power section of inverter disabled. This message is displayed when the motor is at standstill and no error is present. The inverter is ready for normal operation.
P-deF	Parameter factory settings have been loaded. This message appears when the user issues the command for loading the parameter factory settings. To take the inverter into operation again, press the <Reset> key.
Standby	Inverter is in standby mode. This message is displayed when the inverter reports a speed of 0 for 30 seconds and the speed setpoint is also 0.

6.1.2 Display for enabled inverter

The following table shows the messages relating to the frequency inverter status that are displayed when the motor is running.

You can toggle between output frequency, output current, and speed by briefly pressing the <Navigate> key on the keypad.

Message	Description
H xxx	The output frequency of the frequency inverter is displayed in Hz. This display appears when the frequency inverter is enabled.
A xxx	The output current of the frequency inverter is displayed in amperes. This display appears when the frequency inverter is enabled.
xxxx	The output speed of the frequency inverter is displayed in rpm if a value > 0 was entered in parameter <i>P-10</i> .
C xxx	This is the scaled speed (<i>P-40</i>).
. (flashing dots)	The output current of the frequency inverter exceeds the current value entered in <i>P-08</i> . The frequency inverter monitors the extent and duration of the overload. Depending on the overload, the frequency inverter triggers the error message "I.t-trP".

6.1.3 Error reset

You can reset an error in the event of an error response (see section "Error codes") by pressing the <Stop> key or by enabling or disabling digital input 1.

7 Service and error codes

7.1 Error memory

In parameter mode, parameter *P-13* contains a data set with the last four events that have occurred. The corresponding messages are displayed in abbreviated form, with the most recent message shown first (*when calling P-13*) and earlier events appearing further down.

Once a new message is issued, the oldest message is deleted from the error log.

- **NOTE**

If the last shutdown was caused, for example, by undervoltage, no further undervoltage errors will be entered in the error log. The purpose is to avoid that the error log is flooded with undervoltage errors, which occur every time the inverter is switched off.

7.2 Error codes

Error	Meaning	Measure
"P-dEF"	The factory-set parameters were loaded.	Press the <Stop> key. The inverter can now be configured for the required application.
"O-I"	Overcurrent at inverter output to the motor. Motor overload. Overtemperature at the heat sink of the inverter.	Error during constant speed: • Check for overload or error. Error during drive enable: • Check the motor for stalling or blocking. • Check for star-delta motor connection error. • Check whether the length of the cable meets the requirements. Error during operation: • Check for sudden overload or malfunction. • Check cable connection between inverter and motor. • The acceleration/deceleration time might be too short and requires too much power. If you cannot increase <i>P-03</i> or <i>P-04</i> , use a larger inverter.
"I.t-trP"	Overload error. This error occurs when the inverter has delivered more than 100% of the rated current for a certain time (defined in <i>P-08</i>). The display flashes to indicate overload.	• Increase the acceleration ramp <i>P-03</i> or reduce the motor load. • Check whether the length of the cable meets the requirements. • Mechanically check the load to make sure it can be moved freely and no blockage or other mechanical problems are present.
"OI-b"	Brake channel overcurrent. Overcurrent in the braking resistor circuit.	• Check supply cable to the braking resistor. • Check the braking resistor circuit value. • Observe the minimum resistance values given in the respective tables.
"OL-br"	Braking resistor overload	• Increase deceleration time, reduce load moment of inertia or switch further braking resistors in parallel. • Observe the minimum resistance values given in the respective tables.
"PS-trP"	Internal output stage error	Error during drive enable: • Check for incorrect wiring or short circuit. • Check for phase short circuits or ground faults. Error during operation: • Check for sudden overload or overtemperature. • Provide additional room or cooling, if necessary.
"O.Uolt"	DC link overvoltage	• Check whether the supply voltage is too high or too low. • If the error occurs during deceleration, increase the deceleration time in <i>P-04</i> . • Connect a braking resistor, if required. • If a braking resistor is already installed, make sure that <i>P-34</i> is set to 1 or 2.
"U.Uolt"	DC link undervoltage	Occurs routinely when switching off the inverter. Check line voltage if this occurs while the motor is running.

Error	Meaning	Measure
"O-hEat"	Ambient temperature is too high	<ul style="list-style-type: none"> • Check inverter cooling and housing dimensions. • Provide additional room or cooling, if necessary. • Check internal fan function.¹⁾
"O-t"	Overtemperature at heat sink	<ul style="list-style-type: none"> • Check inverter cooling and housing dimensions. • Provide additional room or cooling, if necessary. • Check internal fan function¹⁾. • Decrease the switching frequency. • Reduce the motor load.
"U-t"	Undertemperature	<ul style="list-style-type: none"> • Occurs at an ambient temperature below -10°C. • Increase the temperature to above -10°C to start the inverter.
"th-Flt"	Defective thermistor at heat sink	Contact SEW-EURODRIVE service if you have any questions.
"E-triP"	External error (in conjunction with binary input 3).	<ul style="list-style-type: none"> • External error at digital input 3. NC contact was opened. • Check motor thermistor (if connected).
"SC-trP"	Communication failure error	<ul style="list-style-type: none"> • Check communication connection between inverter and external devices. • Make sure each inverter in the network is assigned a unique address.
"P-LOSS"	Input phase failure error	An input phase failed in an inverter designed for operation on a three-phase system.
"SPIn-F"	Spin start failed	Spin start function unable to detect motor speed.
"dAtA-F"	Internal memory error	<ul style="list-style-type: none"> • Parameter not saved, factor settings restored. • Try again. If this problem re-occurs, contact SEW-EURODRIVE service.
"EE-F"	EEPROM error parameter not saved, factor settings restored.	EEPROM error parameter not saved, factor settings restored. If this error re-occurs, contact SEW-EURODRIVE service.
"4-20 F"	Current at analog input not within defined range.	<ul style="list-style-type: none"> • Make sure the input current is within the range defined in P-16. • Check the connection cable.
"SC-Flt"	Internal inverter fault	Please contact SEW-EURODRIVE service if you have any questions.
"FAULtY"		
"Prog_ _"		

1) To perform a function test for frequency inverters from 0.75 kW, press all keys of the integrated operator terminal at the same time.

7.3 SEW-EURODRIVE Electronics Service

If you are unable to rectify a fault, contact SEW-EURODRIVE Electronics Service.

Please provide the following information when sending the device in for repair:

- Serial number (→ nameplate)
- Type designation
- Short description of the application (application, control via terminals or serial)
- Connected components (motor, and so on)
- Type of error
- Circumstances
- Your own assumptions as to what has happened
- Any unusual events preceding the problem, and so on

7.4 Extended storage

If the unit is stored for a long time, connect it to the power supply for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

Procedure when maintenance has been neglected:

Electrolytic capacitors are used in the frequency inverters. They are subject to aging effects when de-energized. This effect can damage the capacitors if the unit is connected directly to the nominal voltage after an extended storage period.

If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the line voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview.

The following stages are recommended:

AC 230 V units:

- Stage 1: AC 170 V for 15 minutes
- Stage 2: AC 200 V for 15 minutes
- Stage 3: AC 240 V for 1 hour

AC 400 V units:

- Stage 1: AC 0 V to AC 350 V within a few seconds
- Stage 2: AC 350 V for 15 minutes
- Stage 3: AC 420 V for 15 minutes
- Stage 4: AC 480 V for 1 hour

After you have completed the regeneration process, the unit can be used immediately or stored again for an extended period with maintenance.

7.5 Waste disposal

Please observe current regulations. Dispose of the following materials in accordance with the regulations in force:

- Electronics scrap (printed circuit boards)
- Plastic (housing)
- Sheet metal
- Copper
- Aluminum

8 Parameters

8.1 Overview of parameters

8.1.1 Standard parameters

Parameter	Description	Range of values	Factory setting	Brief description
Speed limits				
P-01	Maximum speed	P-02 to 5 × P-09 but max. 500 Hz (default, P-10 = 0) Or P-02 to 5×P-10, but max. 30,000 rpm (P-10>0)	50 Hz ¹⁾	This is the upper speed limit in Hz or rpm, see <i>P-10</i> .
P-02	Minimum speed	0 – P-01	0 Hz	This is the upper speed limit in Hz or rpm, see <i>P-10</i> .
Ramps				
P-03	Acceleration ramp	0 – 600 s	5 s	Acceleration ramp time in seconds. The ramp time is based on a setpoint step change of 0 – 50 Hz (1500 rpm).
P-04	Deceleration ramp	0 – 600 s	5 s	Deceleration ramp time in seconds. The ramp time is based on a setpoint step change of 50 Hz (1500 rpm) – 0 Hz.
P-05	Stop mode selection	0 – 3 See "Advanced parameter description" (→ 65).	0	Defines the deceleration behavior of the drive for normal operation and power failure.
P-06	Energy saving function	0: off 1: on	0	When active, this function automatically reduces the applied motor voltage in the case of light loads. In this case, the smallest possible motor voltage is 50% of the nominal voltage.
Nominal motor data				
P-07	Nominal motor voltage	0 – 250 V ²⁾ 0 – 500 V (for 400 V units)	230 V ²⁾ 400 V ³⁾	Nominal voltage according to motor nameplate. With <i>P-07</i> = "0", voltage compensation is deactivated. See "Advanced parameter description" (→ 65).
P-08	Nominal motor current	25 – 100% of frequency inverter output current	DR.. motor specification	Rated motor current of motor according to nameplate.
P-09	Rated motor frequency	25 – 500 Hz	50 Hz	Nominal frequency of motor according to nameplate.
P-10	Nominal motor speed	0 – 30,000 rpm	0	0 = slip compensation deactivated + display of all parameters in Hz 1 = slip compensation active + display of all parameters in rpm See "Advanced parameter description" (→ 65).
P-11	Additional voltage/boost	0 – 20% of max. output voltage (resolution 0.1%) • Size 1: max. 20% • Size 2: max. 15% • Size 3: max. 10%	Depending on frequency inverter power rating	Raises the output voltage of the frequency inverter by a scalable value at low speeds to enable higher torque development of the motor in this speed range. See "Advanced parameter description" (→ 66).
P-12	Control signal source	0 – 6	0 (terminal control)	See "Advanced parameter description" (→ 66).
P-13	Error log	The 4 most recent errors are logged.	No error	The last 4 errors are saved in chronological order. The most recent error is displayed first. You can view the saved errors by pressing the <Up/Down> key. See section "Error codes" (→ 59).
P-14	Advanced menu access code	0 – 9999	0	101: (standard) for advanced menu access. Change the code in <i>P-37</i> to prevent unauthorized access to the advanced parameter set.

1) 60 Hz (American variant only)

2) For 230 V and 115 V units

3) 460 V (American variant only)

8.1.2 Advanced parameters

Parameter	Description	Range of values	Factory setting	Brief description
P-15	Digital input function setting	0 – 12	0	Specifies the functions of the digital inputs. See section "P-15 Functions of the binary inputs" (→ 76).
P-16	Analog input V/mA	0 – 10 V, b 0 – 10 V, 0 – 20 mA t 4 – 20 mA, r 4 – 20 mA t 20 – 4 mA, r 20 – 4 mA	0 – 10 V	Configures the format of the analog input. See "Advanced parameter description" (→ 67).
P-17	Pulse-width-modulated switching frequency (PWM)	2 – 16 kHz, depending on nominal inverter power	Depending on nominal inverter power	See "Advanced parameter description" (→ 68).
User relay				
P-18	Selection of user relay output	0 – 7	1 (inverter OK)	Selects the function of the user relay output. See "Advanced parameter description" (→ 68).
P-19	Relay threshold level	0 – 200% of maximum speed <i>P-01</i> or nominal motor current <i>P-08</i>	100%	Specifies the limit value for <i>P-18</i> and <i>P-25</i> .
Setpoint speeds				
P-20	Fixed setpoint speed 1	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Internal setpoint for speed 1 if <i>P-10</i> > 0 Entry in rpm
P-21	Fixed setpoint speed 2	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Internal setpoint for speed 2 if <i>P-10</i> > 0 Entry in rpm
P-22	Fixed setpoint speed 3	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Internal setpoint for speed 3 if <i>P-10</i> > 0 Entry in rpm
P-23	Fixed setpoint speed 4	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Internal setpoint for speed 4 if <i>P-10</i> > 0 Entry in rpm
P-24	Deceleration ramp 2	0 – 25 s	0 s	Via digital input or in the event of power failure according to <i>P-05</i> .
AO/DO				
P-25	Function selection analog output	0 – 9	8	Selects the function of the analog output. See "Advanced parameter description" (→ 69).
Speed skip function				
P-26	Speed skip function, frequency band	0 – <i>P-01</i>	0 Hz	Size of frequency band to be skipped. See "Advanced parameter description" (→ 69).
P-27	Skip center	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Skip center See "Advanced parameter description" (→ 69).
Adjustment of V/f characteristic curves				
P-28	Adjustment of V/f characteristic curves (voltage value)	0 – <i>P-07</i>	0 V	V/f characteristic curve adjustment – voltage value of new operating point. See "Advanced parameter description" (→ 70).
P-29	Adjustment of V/f characteristic curves (frequency value)	0 – <i>P-09</i>	0 Hz	V/f characteristic curve adjustment – frequency value of new operating point. See "Advanced parameter description" (→ 70).
Inverter behavior in case of enable/restart				
P-30	Terminal mode restart function	Edge-R Auto-0 Auto-1 – Auto-5	Auto-0	Defines the inverter behavior with regard to the enable digital input and configures the automatic restart function. See "Advanced parameter description" (→ 71).
P-31	Operator terminal mode restart function	0 – 3	1	Defines the enable behavior of the inverter when controlled via the integrated operator terminal. See "Advanced parameter description" (→ 71).
HVAC functions				
P-32	DC hold function	0 – 25 s	0 s	Presents restarting of the rotor due to airflow for the period specified in <i>P-32</i> . See "Advanced parameter description" (→ 72).
P-33	Flying start function	0: off 1: on	0	Flying start function. See "Advanced parameter description" (→ 73).

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Parameter	Description	Range of values	Factory setting	Brief description
P-34	Activation of brake chopper	0: off 1: activated, with SW protection for BWLT 100 002 only 2: activated, for other BWxxxx with external protection	0	Activates the internal brake chopper. If SW protection is activated, an error message is issued when the max. permissible current is exceeded.
P-35	Scaling factor analog input	0 – 500%	100%	Scaling factor of analog input See "Advanced parameter description" (→ 73).
Fieldbus settings				
P-36	Fieldbus settings for SBus, Modbus RTU	Address, 1 – 63 SBus baud rate: 125 k – 1 Mbd Modbus baud rate: 9.6 – 115.2 kbd Timeout: 0 – 3000 ms	1, 500 kbd (SBus), 115.2 kbd (Modbus), 0	See "Advanced parameter description" (→ 74).
Parameter lock functions				
P-37	Access code definition	0 – 9999	101	Defines access code for <i>advanced parameter set in P-14</i> .
P-38	Block parameter access	0 = read and write access, automatic protection in case of power failure 1 = read access only	0	Controls user access to the parameters.
P-39	Analog input offset	-500 – 500%	0%	Analog input offset See "Advanced parameter description" (→ 75).
P-40	Actual speed value scaling factor	0 – 6	0	Actual speed = setpoint speed x <i>P-40</i> See "Advanced parameter description" (→ 75).
P-41	Thermal motor protection according to UL 508C	0: deactivated 1: activated	0	See "Advanced parameter description" (→ 75).

8.2 Advanced parameter description

8.2.1 P-05 stop mode selection

Defines the deceleration behavior of the drive for normal operation and power failure.

Range of values:

0 – 2

In the event of power failure:

- 0: Operation continues
- 1: Motor coasts to a halt
- 2: Rapid stop along *P-24*

Normal stop:

- 0: Stop along ramp *P-04*
- 1: Motor coasts to a halt
- 2: Stop along ramp *P-04*

If *P-05* = 0, the frequency inverter attempts to continue operation in the case of a power failure by reducing the motor speed and using the load as a generator.

8.2.2 P-07 nominal motor voltage

Range of values:

- 0 – 230 – 250 V
- 0 – 400 (460 → American variant only) – 500 V

Nominal voltage of motor according to nameplate. For low-voltage drives, this value is limited to 250 V.

Voltage compensation

P-07 > 0 V: activated

If this function is activated, the pulse-width-modulated output voltage of the frequency inverter is kept constant through variable adjustment of the pulses. This allows negative effects, such as a drop in the line-side input voltage, to be compensated and the motor can maintain its nominal torque. In addition, thermal losses of the motor resulting from regenerative energy produced during braking operation are alleviated.

P-07 = 0 V: deactivated

If voltage compensation is deactivated, higher thermal losses are produced in the motor during braking and the motor torque can be influenced by external influences, such as a drop in the line voltage. This setting reduces the load on the DC link of the frequency inverter.

8.2.3 P-10 nominal motor speed

Range of values:

0 – 30,000 rpm

- 0: Slip compensation deactivated, display of all parameters in Hz
- 1: Slip compensation activated, display of all parameters in rpm

With active slip compensation, the frequency inverter compensates the load-dependent drop in speed by raising the output frequency f_o by the calculated load-dependent share Δf in the relevant operating point.

8.2.4 P-11 additional voltage/boost

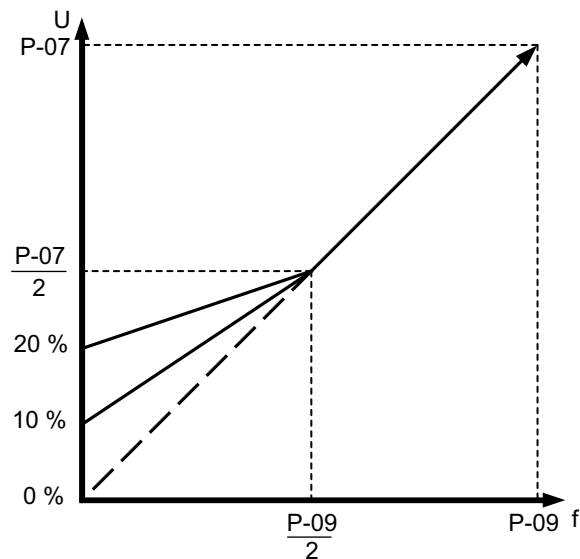
Range of values:

0 – 20% of the max. output voltage. Resolution 0.1%

- Size 1: max. 20%
- Size 2: max. 15%
- Size 3: max. 10%

Factory setting: dependent on rated frequency inverter power

Raises the output voltage of the frequency inverter by a scalable value at low speeds to enable higher torque development of the motor in this speed range.



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A motor with forced cooling fan must be used for continuous duty at low speeds.

8.2.5 P-12 control signal source

Range of values:

0 – 6

0	Terminal control
1	Control with operator terminal (forwards only)
2	Control with operator terminal (press <Start> key to toggle between forwards/backwards)
3	SBus network control with internal acceleration/deceleration ramps
4	SBus network control with adjustment of acceleration/deceleration ramp via bus
5	Modbus RTU – network control with internal acceleration/deceleration ramps
6	Modbus RTU – network control with adjustment of acceleration/deceleration ramps via bus

8.2.6 P-16 analog input

Range of values:

Display	Range of values	Explanation
U	0 – 10	0 – 10 V
b	0 – 10	-10 – 10 V
A	0 – 20	0 – 20 mA
t	4 – 20	4 – 20 mA
r	4 – 20	4 – 20 mA
t	20 – 4	4 – 20 mA (inv.)
r	20 – 4	4 – 20 mA (inv.)

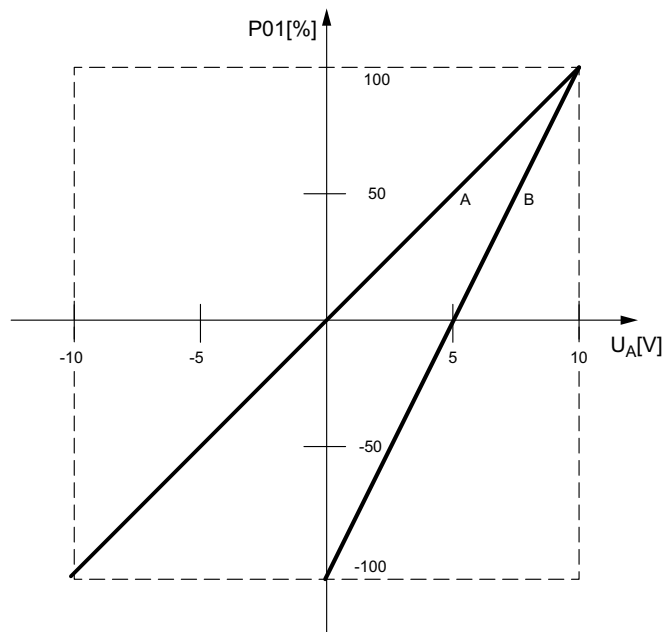
b = Bipolar mode

t = The frequency inverter switches off if the signal is revoked when the inverter is enabled.

r = Indicates that the frequency inverter moves along a ramp to the speed set in *P-20*.

Bipolar mode

This function enables infinite speed adjustment across the entire *P-01* speed range from -100% to +100% without switching the digital input. Alternatively, a characteristic curve similar to [B] is possible.



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A characteristic curve

When using an analog input signal with a voltage range of -10 V to +10 V (bipolar mode)

P-16 = 0 – 10b

B characteristic curve

With this characteristic curve, operation can be implemented with the following frequency inverter settings:

P-16 = 0 – 10 V (factory setting)

P-35 = 50%

P-39 = 200%

8.2.7 P-17 PWM switching frequency

Setting of the pulse-width-modulated switching frequency. A higher switching frequency means less motor noise, but also higher losses in the output stage. The following table shows the performance-class-dependent values for the PWM switching frequency.

Input voltage V	Performance class kW	PWM factory setting kHz	min. PWM kHz	max. PWM kHz
1×110	0.37 – 1.1	8	2	16
1×230 3×230	0.37 – 2.2	8	2	16
1×230 3×230	4	4	2	12
3×400	0.75 – 4	4	2	16
3×400	5.5 – 7.5	4	2	12
3×400	11	4	2	8

8.2.8 P-18 selection of user relay output

Range of values:

0 – 1 – 7

0	Frequency inverter is enabled. Select this function to control the electromechanical holding brake of the motor. The installation of the brake control is covered in the chapter "Installation" (→ 27).
1	Frequency inverter is ready for operation
2	Motor at setpoint speed
3	Frequency inverter in error state
4	Motor speed \geq limit value <i>P-19</i>
5	Motor current \geq limit value <i>P-19</i>
6	Motor speed $<$ limit value <i>P-19</i>
7	Motor current $<$ limit value <i>P-19</i>

The switching point of the limit value is defined in *P-19*.

The relay contact is designed as a NO contact.

8.2.9 P-25 analog output function selection

Range of values:

0 – 8 – 9

0	Frequency inverter is enabled (digital)
1	Frequency inverter is ready for operation (digital)
2	Motor at setpoint speed (digital)
3	Frequency inverter in error state (digital)
4	Motor speed \geq limit value <i>P-19</i> (digital)
5	Motor current \geq limit value <i>P-19</i> (digital)
6	Motor speed $<$ limit value <i>P-19</i> (digital)
7	Motor current $<$ limit value <i>P-19</i> (digital)
8	Motor speed (analog)
9	Motor current (analog)

Setting as digital output

Deactivated: 0 V

Activated: +24 V (20 mA limit value)

Setting as analog output

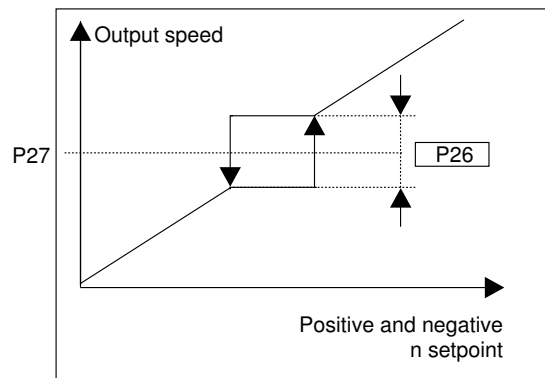
- Selection 8: Motor speed signal range
0 – 10 V = 0 – 100% of *P-01*
- Selection 9: Motor current signal range
0 – 10 V = 0 – 200% of *P-08*

8.2.10 P-26, P-27 speed skip function

Range of values:

0 – *P-01*

In some applications, specific speed ranges can cause mechanical resonance vibrations, which have a negative impact on machine behavior. The "speed skip" function can be used to hide the interfering speed range. The input speed is subject to the hysteresis shown in the figure with the ramps from *P-03* and *P-04*.



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$P-26$ describes the size of the frequency band.

$P-27$ describes the center of the frequency band.

Example:

Hiding of the speed range 27 Hz – 37 Hz

Start frequency = 27 Hz; end frequency = 37 Hz

$P-26 = 37 \text{ Hz} - 27 \text{ Hz} = 10 \text{ Hz}$

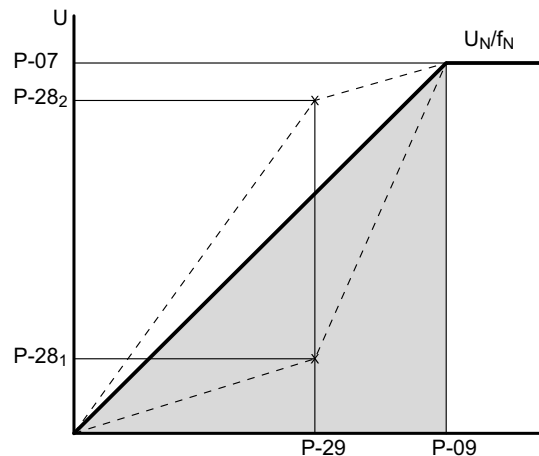
$P-27 = \text{start frequency} + P-26/2 = 27 \text{ Hz} + 5 \text{ Hz} = 32 \text{ Hz}$

If the setpoint speed lies within the frequency band to be hidden, the input speed remains at the upper or lower limit of the frequency band, depending on the acceleration direction.

8.2.11 P-28, P-29 V/f characteristic curve adjustment

With this function, you can generate an additional operating point for the V/f characteristic curve of the frequency inverter.

- If this operating point is below the standard line (operating point 1), the motor uses less energy at all speeds below its reference point. However, the motor produces less torque. This setting is suitable for pump and fan applications, among others.
- If the operating point is above the standard line (operating point 2), the motor develops greater torque at all speeds below the reference point. However, this also results in a higher motor temperature. This setting is suitable when motor instability is observed at specific frequencies. If this is the case, increase or reduce the voltage ($P-28$) at the unstable speed ($P-29$).



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$P-07$ = nominal motor voltage

$P-09$ = rated motor frequency

$P-28$ = voltage value of V/f characteristic curve adjustment

$P-29$ = frequency value of V/f characteristic curve adjustment

Example:

Operating point 1 = $P-28_1 / P-29$

Operating point 2 = $P-28_2 / P-29$

8.2.12 P-30 terminal mode restart function

Defines the frequency inverter behavior with regard to the enable digital input and configures the automatic restart function.

Range of values:

Edge-R, **Auto-0**, Auto-1 – Auto-5

- **Edge-R:**

After activation or resetting of an error, the frequency inverter does not start automatically, even if an enable signal is still present at the relevant digital input. To start the frequency inverter after activation or resetting, the signal must first be deleted (open switch) and then reset (close switch).

- **Auto-0:**

After activation or resetting, the frequency inverter starts automatically if an enable signal is still present at the relevant digital input.

- **Auto-1 – Auto-5:**

Following an error shutdown (trip), the frequency inverter makes up to 5 attempts to restart at intervals of 20 seconds. To reset the counter, the frequency inverter must be de-energized. The number of attempted restarts is counted. If the frequency inverter is unable to start the drive with the final attempt, a permanent error shutdown occurs, which can only be reset by pressing the "Reset" key.

8.2.13 P-31 operator terminal mode restart function

Defines the enable behavior of the frequency inverter when controlled via the integrated operator terminal.

Range of values:

0 – 1 – 3

Mode	Designation	Explanation
0	Minimum speed	Press <Start> key to start.
1	Most recently used speed	Press <Start> key to start.
2	Minimum speed (auto run)	Enable hardware via digital inputs to start.
3	Most recent speed (auto run)	Enable hardware via digital inputs to start.

If the frequency inverter is controlled via Modbus or SBus and function 7 is active in *P-15*, the enable behavior described in the following tables applies in the case of a restart:

Reaction in case of restart if P-15 = 7 in Modbus operation			
Setting DI2	Mode P-31	Designation	Explanation
0	0, 1	Control via Modbus RTU master	P-31 has no impact on functionality.
0	2, 3	Control via Modbus RTU master	Enable via Modbus is ignored. Enable solely via DI1.
1	0, 2	Control via operator terminal Minimum speed	Enable via DI1 to start.
1	1, 3	Control via operator terminal Most recently used speed	Enable via DI1 to start.

Reaction in case of restart if P-15 = 7 in SBus operation			
Setting DI2	Mode P-31	Designation	Explanation
0	X	Control via SBus	P-31 has no impact on functionality.
1	0, 2	Minimum speed	Enable hardware to start.
1	1, 3	Most recently used speed	Enable hardware to start.

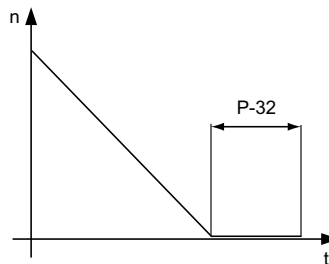
8.2.14 P-32 DC hold function

Range of values:

0 – 25 s

The DC hold function is active whenever the motor comes to a standstill after deceleration.

By applying a direct current to the motor winding, a homogeneous magnetic field is generated during the time specified in P-32. When a torque is exerted on the rotor by an external force, the magnetic field generates a braking torque. The function is used, for example, to prevent a fan restarting as a result of applied airflow. The size of the applied direct current is determined on the basis of the percentage voltage value entered in P-11.



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8.2.15 P-33 flying start function

Range of values:

- 0 = off
- 1 = on

Flying start function only available for sizes 2 and 3. Size 1 works with DC hold function *P-32*.

Reaction of frequency inverter when P-33 = 1:

Size 1:

The DC hold function *P-32* is activated when the inverter is enabled. With this setting, the rotor is stopped completely before it is started again. Duration and holding torque are defined with *P-32* and *P-11*.

Size > 1:

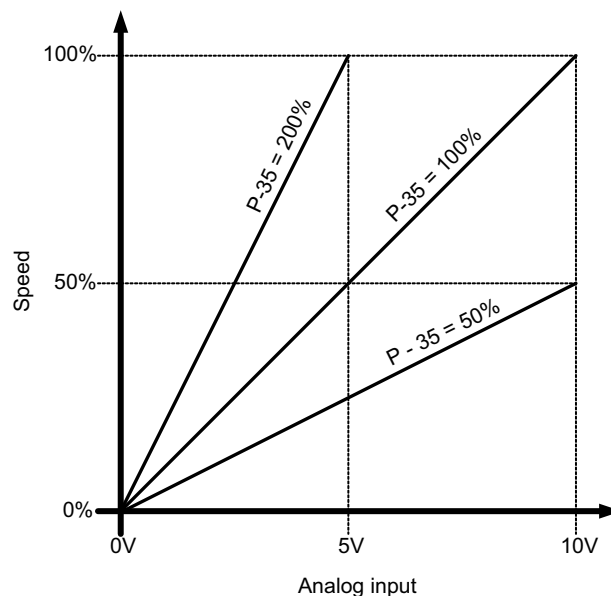
The frequency inverter starts from the entered rotor speed. In this case, the inverter starts with a brief delay.

8.2.16 P-35 scaling factor of analog input

Range of values:

0 – 100 – 500%

Analog input scaling resolution 0.1%.



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8.2.17 P-36 fieldbus settings

P-36 is divided into levels in the operator terminal of the frequency inverter. Pressing the <Navigate> key in any given level takes you to the next level.

The frequency inverter display shows program numbers in level 2 of *P-36*. Depending on the setting made in *P-12*, different values apply for these numbers. The following table shows the program numbers and corresponding values on the basis of *P-12*.

Level	Program no.	Value	
		SBus (<i>P-12</i> = 3, 4)	Modbus RTU (<i>P-12</i> = 5, 6)
1 – Slave address		1 – 63	1 – 63
2 – Baud rate	0	–	9.6 kb/s
	1	–	115.2 kb/s
	2	125 kb/s	19.2 kb/s
	3	250 kb/s	38.4 kb/s
	4	500 kb/s	57.6 kb/s
	5	1 Mb/s	76.8 kb/s
3 – Timeout response in ms	0	0 (no error)	
	1	t 30	
	2	t 100	
	3	t 1000	
	4	t 3000	
	5	r 30	
	6	r 100	
	7	r 1000	
	8	r 3000	

The setting "0" deactivates the communication shutdown.

t_x: The frequency inverter turns off immediately when the time **x** [ms] is exceeded.

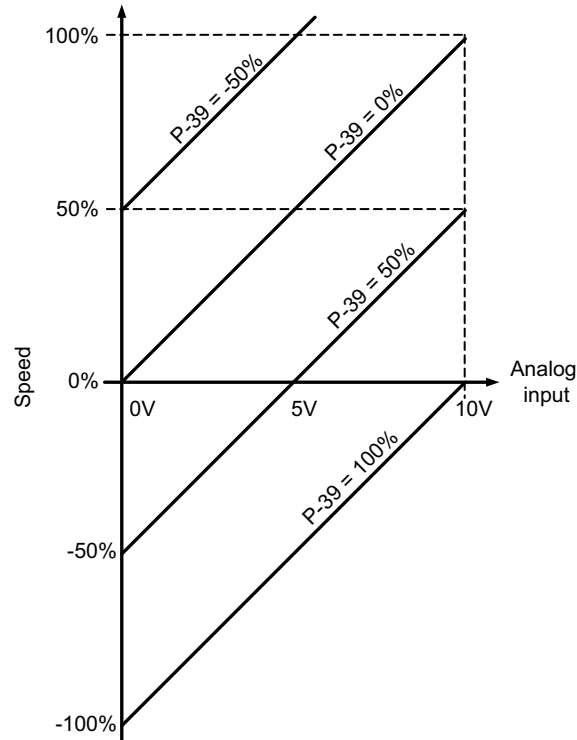
r_x: The motor is brought to a standstill along a ramp when the time **x** [ms] is exceeded.

8.2.18 P-39 analog input offset

Range of values:

-500 – 0 – 500%

Analog input offset, resolution 0.1%.



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8.2.19 P-40 actual speed value scaling factor

Range of values:

0 – 6

When $P-10 = 0$: speed in Hz scaled by this factor.

When $P-10 > 0$: speed is scaled in rpm.

Appears on the operating state display in real time (cXXX).

8.2.20 P-41 thermal motor protection according to UL508C

- 0 / deactivated
- 1 / activated

The frequency inverters feature a thermal motor protection function according to NEC (National Electrical Code) to protect the motor from overload. The motor current accumulates in an internal memory over time.

The frequency inverter goes to error state as soon as the thermal limit is exceeded (l.t.trP).

Once the output current of the frequency inverter is less than the set nominal motor current, the internal memory is decremented depending on the output current.

When $P-41$ is disabled, the thermal overload memory is reset when switching power off and on again.

When *P41* is enabled, the memory is maintained even after switching power off and on again.

8.3 P-15 Digital input function selection

The functions of the digital inputs on the frequency inverter can be programmed. You can select the necessary functions for your application.

The following tables show the functions of the digital inputs depending on the value of parameter *P-12* (control via terminals/operator terminal/SBus and Modbus RTU) and *P-15* (digital input function selection).

8.3.1 Terminal mode



If parameter *P-12* = 0 (terminal mode), the following table applies:

P-15 Selection	Digital input 1	Digital input 2	Digital input 3	Analog input	Comments	
0	0: Stop/Controller inhibit 1: Enable/Start	0: Clockwise rotation 1: Counterclockwise rotation	0: Analog speed value reference 1: Preset speed 1	Speed reference	–	
1	0: Stop/Controller inhibit 1: Enable/Start	0: Analog speed value reference 1: Preset speed 1 or 2	0: Preset speed 1 1: Preset speed 2	Speed reference	–	
2	0: Stop/Controller inhibit 1: Enable/Start	0: Open 1: Closed	0: Open 1: Closed	0: Preset speed 1 – 4 1: Max. speed (<i>P-01</i>)	Preset speed 1	
		0: Open 1: Closed	0: Open 1: Closed		Preset speed 2	
		0: Open 1: Closed	0: Open 1: Closed		Preset speed 3	
		0: Open 1: Closed	0: Open 1: Closed		Preset speed 4	
3	0: Stop/Controller inhibit 1: Enable/Start	0: Analog speed value reference 1: Preset speed 1	0: Disconnection TF/TH 1: Motor temperature OK	Speed reference	Connect external temperature sensor to digital input 3.	
4	0: Stop/Controller inhibit 1: Enable/Start	0: Clockwise rotation 1: Counterclockwise rotation	0: Analog speed value reference 1: Preset speed 1	Speed reference	–	
5	0: Stop clockwise rotation 1: Clockwise rotation	0: Stop counterclockwise rotation 1: Counterclockwise rotation	0: Analog speed value reference 1: Preset speed 1	Speed reference	Integrated rapid stop function via digital inputs 1 and 2	
						To stop the motor with the rapid stop ramp, connect digital inputs 1 and 2.
6	0: Stop/Controller inhibit 1: Enable/Start	0: Clockwise rotation 1: Counterclockwise rotation	0: Disconnection TF/TH 1: Motor temperature OK	Speed reference	Connect external temperature sensor to digital input 3.	
7	0: Stop clockwise rotation 1: Clockwise rotation	0: Stop counterclockwise rotation 1: Counterclockwise rotation	0: Disconnection TF/TH 1: Motor temperature OK	Speed reference	Integrated rapid stop function via digital inputs 1 and 2. Connect external temperature sensor to digital input 3.	
						To stop the motor with the rapid stop ramp, connect digital inputs 1 and 2.
8	0: Stop/Controller inhibit 1: Enable/Start	0: Clockwise rotation 1: Counterclockwise rotation	0: Open 1: Closed	0: Open 1: Closed	Preset speed 1	
			0: Open 1: Closed		0: Open 1: Closed	Preset speed 2
			0: Open 1: Closed		0: Open 1: Closed	Preset speed 3
			0: Open 1: Closed		0: Open 1: Closed	Preset speed 4
9	0: Stop clockwise rotation 1: Clockwise rotation	0: Stop counterclockwise rotation 1: Counterclockwise rotation	0: Open 1: Closed	0: Open 1: Closed	Preset speed 1	
			0: Open 1: Closed		0: Open 1: Closed	Preset speed 2
			0: Open 1: Closed		0: Open 1: Closed	Preset speed 3
			0: Open 1: Closed		0: Open 1: Closed	Preset speed 4
10	Pushbutton function, NO contact Positive edge: Enable	Pushbutton function, NC contact Negative edge: Stop	0: Analog speed value reference 1: Preset speed 1	Speed reference	Function for operation via pushbuttons (pulse control)	

P-15 Selection	Digital input 1	Digital input 2	Digital input 3	Function	Analog input	Comments
11	0	1	1	Counterclockwise rotation	Speed reference	Function for operation via pushbuttons (pulse control)
	0	0	1	Backward stop		
	1	1	0	Clockwise rotation		
	1	0	0	Stop clockwise rotation		
	1	0	1	Rapid stop along P-24		
P-15 Selection	Digital input 1	Digital input 2	Function	Digital input 3	Analog input	Comments
12	0	0	Stop/Controller inhibit	0: Analog speed value reference 1: Preset speed 1	Speed reference	–
	1	0	Stop with ramp 1 (P-04)			
	0	1	Stop with ramp 2 (P-24)			
	1	1	Enable/Start			

8.3.2 Keypad mode

If parameter P-12 = 1 or 2 (keypad mode), the following table applies.

P-15	Digital input 1	Digital input 2	Digital input 3	Analog input	Comments	Key 5 	Key 6 
0, 1, 5, 8–12	0: Stop/Controller inhibit 1: Enable/Start	0: no function 1: Speed up	0: no function 1: Speed down	0 (0 V): Clockwise rotation 1 (10 – 24 V): Counterclockwise rotation	–	Increase speed	Reduce speed
2	0: Stop/Controller inhibit 1: Enable/Start	0: no function 1: Speed up	0: no function 1: Speed down	0 (0 V): Clockwise rotation 1 (10 – 24 V): Counterclockwise rotation	–	Increase speed	Reduce speed
3	0: Stop/Controller inhibit 1: Enable/Start	0: no function 1: Speed up	0: Disconnection TF/TH 1: Motor temperature OK	0 (0 V): Clockwise rotation 1 (10 – 24 V): Counterclockwise rotation	Connect external temperature sensor to digital input 3.	Increase speed	Reduce speed
4	0: Stop/Controller inhibit 1: Enable/Start	0: no function 1: Speed up	0: Speed reference operator terminal 1: Analog input speed reference	Speed reference	–	Increase speed	Reduce speed
6	0: Stop/Controller inhibit 1: Enable/Start	0: Clockwise rotation 1: Counterclockwise rotation	0: Disconnection TF/TH 1: Motor temperature OK	0 (0 V): Speed reference operator terminal 1 (10 – 24 V): Fixed setpoint speed 1	Connect external temperature sensor to digital input 3.	Increase speed	Reduce speed
7	0: Stop/Controller inhibit 1: Enable/Start To stop the motor with the rapid stop ramp, connect digital inputs 1 and 2.	0: Stop 1: Clockwise rotation	0: Disconnection TF/TH 1: Motor temperature OK	0 (0 V): Speed reference operator terminal 1 (10 – 24 V): Fixed setpoint speed 1	Integrated rapid stop function via digital inputs 1 and 2. Connect external temperature sensor to digital input 3.	Increase speed	Reduce speed

8.3.3 SBus control mode

If parameter $P-12 = 3$ or 4 (SBus control mode), the following table applies:

P-15	Digital input 1	Digital input 2	Digital input 3	Analog input	Comments
0 – 2, 4, 5, 8 – 12	0: Controller inhibit 1: Enable	No effect	No effect	No effect	Enable via DI1 and gateway.
3	0: Controller inhibit 1: Enable	0: Master speed reference 1: Preset speed 1	0: Disconnection TF/TH 1: Motor temperature OK	No effect	Connect external temperature sensor to digital input 3.
6	0: Controller inhibit 1: Enable	0: Master speed reference 1: Analog input speed reference	0: Disconnection TF/TH 1: Motor temperature OK	Speed reference	Digital input 1 must be closed for enable. Start and stop command issued via the gateway.
7	0: Controller inhibit 1: Enable	0: Master speed reference 1: Operator terminal speed reference	0: Disconnection TF/TH 1: Motor temperature OK	No effect	Enable behavior also depends on settings in $P-31$. Connect external temperature sensor to digital input 3. → ¹⁾

1) See description of P-31 in section "Advanced parameter description".

8.3.4 Modbus RTU control mode

If parameter $P-12 = 5$ or 6 (Modbus RTU control mode), the following table applies:

P-15	Digital input 1	Digital input 2	Digital input 3	Analog input	Comments
0 – 2, 4, 5, 8 – 12	0: Controller inhibit 1: Enable	No effect	No effect	No effect	Enable via DI1 and gateway.
3	0: Controller inhibit 1: Enable	0: Master speed reference 1: Preset speed 1	0: Disconnection TH/TF 1: Motor temperature OK	No effect	Connect external temperature sensor to digital input 3.
6	0: Controller inhibit 1: Enable	0: Master speed reference 1: Analog input speed reference	0: Disconnection TH/TF 1: Motor temperature OK	Speed reference	If DI2 = 0, enable via DI1 and gateway. If DI2 = 1, enable solely via DI1.
7	0: Controller inhibit 1: Enable	0: Master speed reference 1: Operator terminal speed reference	0: Disconnection TH/TF 1: Motor temperature OK	No effect	Enable behavior also depends on settings in $P-31$. Connect external temperature sensor to digital input 3. → ¹⁾

1) See description of P-31 in section "Advanced parameter description".

8.4 Parameters for monitoring operating data in real time (read only)

You can monitor the internal operating data of the inverter using parameter group $P00$. These parameters cannot be changed.

8.4.1 Access to parameter group 0

Access to parameter group 0	<p>When $P-14 = P-37$ (factory set to 101), all parameters are visible.</p> <p>You can switch to $P-00$ by pressing the <Navigate> key. "P00-z" is displayed, where "z" represents the second number in $P-00$ (i.e., 1 – 14). You can then switch to the required parameter $P-00$.</p> <p>Pressing the <Navigate> key again then displays the value of this specific parameter group "0".</p> <p>The various values of parameters with several values (such as software ID), can be displayed by pressing the <Up>/<Down> keys.</p> <p>To go to the next higher level, quickly press the <Navigate> key. By pressing the <Navigate> key quickly again (without pressing the <Up>/<Down> keys), the display shows the next higher level (main level of the parameters, that is $P-00$).</p> <p>If you are on a lower level (e.g., $P00-05$) and press the <Up>/<Down> key to change the directory $P-00$, the corresponding parameter value is briefly displayed by pressing the <Navigate> key.</p>
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8.4.2 Description of parameter group 0

P00 (1) value of analog input 1	<p>Display range:</p> <p>0 – 100%</p> <p>100% = max. input voltage</p>
P00 (2) reserved	
P00 (3) speed set-point input	<p>Display range:</p> <p>$P1-01$ (min.) – $P1-01$ (max.)</p> <p>Speed display in Hz when $P-10 = 0$, else in rpm.</p>
P00 (4) status of digital inputs	<p>Display range:</p> <p>Binary value</p> <p>Status of digital inputs of inverter.</p>
P00 (5) internal temperature	<p>Display range:</p> <p>-25°C – 125°C</p> <p>Internal temperature of frequency inverter.</p>
P00 (6) DC link voltage ripple	<p>Display range:</p> <p>0 – 1000 V</p> <p>DC link voltage ripple.</p>
P00 (7) applied motor voltage	<p>Display range:</p> <p>AC 0 – 600 V</p> <p>R.m.s value of voltage applied to motor.</p>
P00 (8) current DC link voltage	<p>Display range:</p> <p>DC 0 – 1000 V</p>
P00 (9) heat sink temperature	<p>Display range:</p> <p>-20 – 100°C</p> <p>Heat sink temperature in °C</p>
P00 (10) operating hours counter	<p>Display range:</p> <p>0 – 99,999 hours</p> <p>Display remains even if parameters are reset to factory settings.</p>

P00 (11) operating time since last error 1	<p>Display range: 99,999 hours</p> <p>Shows the operating time that has passed since the last error (TRIP) or last shutdown (power off). If the conditions are met, the timer is reset to zero with the next drive enable.</p>
P00 (12) operating time since last error 2	<p>Display range: 99,999 hours</p> <p>Shows the operating time that has passed since the last error (TRIP). If the conditions are met, the timer is reset to zero with the next drive enable.</p>
P00 (13) operating time since last de-activation	<p>Display range: 99,999 hours</p> <p>Shows operating time of an enable interval. Is reset to zero upon every enable.</p>
P00 (14) current PWM switching frequency	<p>Display range: 2 – 16 kHz</p> <p>Effective actual output switching frequency of inverter. This value can be smaller than the frequency selected in <i>P-17</i> if the inverter is too hot. The inverter will automatically reduce the switching frequency to prevent overtemperature shutdown and maintain operation.</p>
P00 (15) DC link voltage log	<p>Display range: 0 – 1000 V</p> <p>The last 8 values prior to the error shutdown.</p>
P00 (16) heat sink temperature log	<p>Display range: -20 – +120°C</p> <p>The last 8 values prior to the error shutdown.</p>
P00 (17) motor current log	<p>Display range: 0 – 2 × nominal current</p> <p>The last 8 values prior to the error shutdown.</p>
P00 (18) software ID, I/O, and motor control	<p>Display range: e.g., "1.00", "47AE"</p> <p>Version number and checksum.</p> <p>"1" on left side shows I/O processor while "2" shows motor control.</p>
P00 (19) serial number of inverter	<p>Display range: 000 000 – 999 999 00-000 – 99-999</p> <p>Unique serial number of inverter: e.g., 540 102 / 32 / 005.</p>
P00 (20) inverter identification number	<p>Display range: Nominal value of the inverter/software version</p> <p>Nominal value, inverter type, and codes of software version: e.g., 0.37, 1 230, 3 P-aus.</p>

9 Technical data

The next chapter contains the technical data.

9.1 Conformity

All products meet the following international standards:

- CE marking according to the low voltage directive
- IEC 664-1 Insulation coordination for electrical equipment within low-voltage systems
- UL 508C Power conversion equipment
- EN 61800-3 Variable-speed electrical drives – part 3
- EN 61000-6 / -2, -3, -4 Interference immunity/Interference emission (EMC)
- Housing protection classes according to NEMA 250, EN 55011:2007
- Classification of flammability according to UL 94
- C-Tick
- cUL
- EAC

9.2 Information on ambient conditions

	Permitted conditions
Ambient temperature during operation	-10 – +50°C for PWM frequency of 2 kHz (IP20) -10 – +40°C for PWM frequency of 2 kHz (IP66 NEMA 4X/IP55 NEMA 12K)
Maximum derating depending on the ambient temperature	4% / 1°C – 55°C for IP20 frequency inverters 4% / 1°C – 45°C for IP66/IP55 frequency inverters
Ambient temperature during storage	-40°C – +60°C
Maximum installation altitude for nominal operation	1000 m
Derating above 1000 m	1%/100 m to max. 2000 m
Relative humidity	< 95% (condensation not permitted)
Degree of protection of control cabinet inverter	IP20 NEMA 1
Frequency inverter with high degree of protection	IP66 NEMA 4X / IP55 NEMA 12K

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9.3 Output power and current carrying capacity without EMC filter

Whether the MOVITRAC® LTE-B frequency inverters are used with or without filters depends on the regulations applicable in the various countries where the product is used.

- **Without filter: permitted in America, Asia, and Africa.**
- With filter: suited for use worldwide.

The specification "horsepower" (HP) is defined as follows.

- 200 – 240 V units: NEC2002, table 430-150, 230 V
- 380 – 480 V units: NEC2002, table 430-150, 460 V

9.3.1 1-phase system AC 115 V for 3-phase AC 230 V motors (voltage doubler)

MOVITRAC® LTE-B – EMC filter class 0					
IP20	Type	MC LTE B...	0004-101-1-00	0008-101-1-00	0011-101-4-00
	Part number		08296839	08296847	08296855
IP55/NEMA 12K housing without switch	Type	MC LTE B...	0004-101-1-10	0008-101-1-10	0011-101-4-10
	Part number		08297754	08297762	08297770
IP55/NEMA 12K housing with switch	Type	MC LTE B...	0004-101-1-20	0008-101-1-20	0011-101-4-20
	Part number		08297290	08297304	08297312
IP66/NEMA 4X housing without switch	Type	MC LTE B...	0004-101-1-30	0008-101-1-30	0011-101-4-30
	Part number		18254640	18254659	18254667
IP66/NEMA 4X housing with switch	Type	MC LTE B...	0004-101-1-40	0008-101-1-40	0011-101-4-40
	Part number		18252540	18252559	18252567
INPUT					
Line voltage V_{line}	V		1 × AC 110 – 115 ± 10%		
Line frequency f_{line}	Hz		50 / 60 ± 5%		
Input fuse	A		10	16 (15) ¹⁾	20
Rated input current	A		6.7	12.5	16.8
OUTPUT					
Recommended motor power	kW		0.37	0.75	1.1
	HP		0.5	1.0	1.5
Output voltage V_{motor}	V		3 × 0 – 250		
Output current	A		2.3	4.3	5.8
Maximum output frequency	Hz		500		
Cross section of motor cable Cu 75C	mm ²		1.5		
	AWG		16		
Max. motor cable length	Shielded	m	50		100
	Unshielded		75		150
GENERAL INFORMATION					
Size	Size		1	2	
Heat loss at nominal output power	W		11	22	33
Minimum braking resistance value	Ω		–		47

1) Recommended values for UL compliance

9.3.2 1-phase system AC 230 V for 3-phase AC 230 V motors

MOVITRAC® LTE-B – EMC filter class 0								
IP20 ¹⁾	Type	MC LTE B...	0004-201-1-00	0008-201-1-00	0015-201-1-00	0015-201-4-00	0022-201-4-00	0040-201-4-00
	Part number		08296863	08296871	08296898	08296901	08296928	18250394
IP55/NEMA 12K housing without switch ¹⁾	Type	MC LTE B...	0004-201-1-10	0008-201-1-10	0015-201-1-10	0015-201-4-10	0022-201-4-10	0040-201-4-10
	Part number		08297789	08297797	08297800	08297819	08297827	18250408
IP55/NEMA 12K housing with switch ¹⁾	Type	MC LTE B...	0004-201-1-20	0008-201-1-20	0015-201-1-20	0015-201-4-20	0022-201-4-20	0040-201-4-20
	Part number		08297320	08297339	08297347	08297355	08297363	18250416
INPUT								
Line voltage V_{line}	V	1 × AC 200 – 240 ± 10%						
Line frequency f_{line}	Hz	50 / 60 ± 5%						
Input fuse	A	10	16	20		32 (35) ²⁾	40	
Rated input current	A	6.7	12.5	14.8		22.2	31.7	
OUTPUT								
Recommended motor power	kW	0.37	0.75	1.5		2.2	4	
	HP	0.5	1	2		3	5	
Output voltage V_{motor}	V	0 – V_{line}						
Output current	A	2.3	4.3	7		10.5	16	
Maximum output frequency	Hz	500						
Cross section of motor cable Cu 75C	mm ²	1.5					2.5	
	AWG	16					18	
Max. motor cable length	Shielded	m		50		100		
	Unshielded			75		150		
GENERAL INFORMATION								
Size	Size	1			2		3	
Heat loss at nominal output power	W	11	22	45		66	120	
Minimum braking resistance value	Ω	-			47			

1) Device for America, Asia, and Africa

2) Recommended values for UL compliance

9.3.3 3-phase system AC 230 V for 3-phase AC 230 V motors

MOVITRAC® LTE-B – EMC filter class 0								
IP20 ¹⁾	Type	MC LTE B...	0004-203-1-00	0008-203-1-00	0015-203-1-00	0015-203-4-00	0022-203-4-00	0040-203-4-00
	Part number		08296936	08296944	08296952	08296960	08296979	08296987
IP55/NEMA 12K housing without switch ¹⁾	Type	MC LTE B...	0004-203-1-10	0008-203-1-10	0015-203-1-10	0015-203-4-10	0022-203-4-10	0040-203-4-10
	Part number		08297835	08297843	08297851	08297878	08297886	08297894
IP55/NEMA 12K housing with switch ¹⁾	Type	MC LTE B...	0004-203-1-20	0008-203-1-20	0015-203-1-20	0015-203-4-20	0022-203-4-20	0040-203-4-20
	Part number		08297371	08297398	08297401	08297428	08297436	08297444
INPUT								
Line voltage V_{line}	V	3 × AC 200 – 240 ± 10%						
Line frequency f_{line}	Hz	50 / 60 ± 5%						
Input fuse	A	6	10	16 (15) ²⁾			20	32 (35) ²⁾
Rated input current	A	3	5.8	9.2			13.7	20.7
OUTPUT								
Recommended motor power	kW	0.37	0.75	1.5			2.2	4
	HP	0.5	1	2			3	5
Output voltage V_{motor}	V	0 – V_{line}						
Output current	A	2.3	4.3	7			10.5	18
Maximum output frequency	Hz	500						
Cross section of motor cable Cu 75C	mm ²	1.5						2.5
	AWG	16						12
Max. motor cable length	Shielded	m	50			100		
	Unshielded		75			150		
GENERAL INFORMATION								
Size	Size	1			2		3	
Heat loss at nominal output power	W	11	22	45			66	120
Minimum braking resistance value	Ω	-			47			

1) Device for America, Asia, and Africa

2) Recommended values for UL compliance

9.3.4 3-phase system AC 400 V for 3-phase AC 400 V motors

Sizes 1 and 2

MOVITRAC® LTE-B – EMC filter class 0							
IP20 ¹⁾	Type	MC LTE B...	0008-503-1-00	0015-503-1-00	0015-503-4-00	0022-503-4-00	0040-503-4-00
	Part number		08296995	08297002	08297010	08297029	08297037
IP55/NEMA 12K housing without switch	Type	MC LTE B...	0008-503-1-10	0015-503-1-10	0015-503-4-10	0022-503-4-10	0040-503-4-10
	Part number		08297908	08297916	08297924	08297932	08297940
IP55/NEMA 12K housing with switch	Type	MC LTE B...	0008-503-1-20	0015-503-1-20	0015-503-4-20	0022-503-4-20	0040-503-4-20
	Part number		08297452	08297460	08297479	08297487	08297495
INPUT							
Line voltage V_{line}	V	3 × AC 380 – 480 ± 10%					
Line frequency f_{line}	Hz	50 / 60 ± 5%					
Input fuse	A	5	10			16 (15) ²⁾	
Rated input current	A	2.9	5.4	7.6	12.4		
OUTPUT							
Recommended motor power	kW	0.75	1.5	2.2	4		
	HP	1	2	3	5		
Output voltage V_{motor}	V	0 – V_{line}					
Output current	A	2.2	4.1	5.8	9.5		
Maximum output frequency	Hz	500					
Cross section of motor cable Cu 75C	mm ²	1.5					
	AWG	16					
Max. motor cable length	Shielded	m	50	100			
	Unshielded	m	75	150			
GENERAL INFORMATION							
Size	Size	1			2		
Heat loss at nominal output power	W	22	45	66	120		
Minimum braking resistance value	Ω	-			100		

- 1) Device for America, Asia, and Africa
- 2) Recommended values for UL compliance

Size 3

MOVITRAC® LTE-B – EMC filter class 0					
IP20 ¹⁾	Type	MC LTE B...	0055-503-4-00	0075-503-4-00	0110-503-4-00
	Part number		08297045	08297053	08299218
IP55/NEMA 12K housing without switch ¹⁾	Type	MC LTE B...	0055-503-4-10	0075-503-4-10	-
	Part number		08297959	08297967	-
IP55/NEMA 12K housing with switch ¹⁾	Type	MC LTE B...	0055-503-4-20	0075-503-4-20	-
	Part number		08297509	08297517	-
INPUT					
Line voltage V_{line}	V		3 × AC 380 – 480 ± 10%		
Line frequency f_{line}	Hz		50 / 60 ± 5%		
Input fuse	A		20	25	32 (35) ²⁾
Rated input current	A		16.1	20.7	27.1
OUTPUT					
Recommended motor power	kW		5.5	7.5	11
	HP		7.5	10	15
Output voltage V_{motor}	V		0 – V_{line}		
Output current	A		14	18	24
Maximum output frequency	Hz		500		
Cross section of motor cable Cu 75C	mm ²		2.5		4
	AWG		12		10
Max. motor cable length	Shielded	m	100		
	Unshielded		150		
GENERAL INFORMATION					
Size	Size		3		
Heat loss at nominal output power	W		165	225	330
Minimum braking resistance value	Ω		47		

1) Device for America, Asia, and Africa

2) Recommended values for UL compliance

9.4 Output power and current carrying capacity with EMC filter

Whether the MOVITRAC® LTE-B frequency inverters are used with or without filters depends on the regulations applicable in the various countries where the product is used.

- **With filter: suited for use worldwide.**
- Without filter: permitted in America, Asia, and Africa.

The specification "horsepower" (HP) is defined as follows.

- 200 – 240 V units: NEC2002, table 430-150, 230 V
- 380 – 480 V units: NEC2002, table 430-150, 460 V

9.4.1 1-phase system AC 230 V for 3-phase AC 230 V motors

MOVITRAC® LTE-B – EMC filter class B									
IP20 ¹⁾	Type	MC LTE B...	0004-2B1-1-00	0008-2B1-1-00	0015-2B1-1-00	0015-2B1-4-00	0022-2B1-4-00	0040-2B1-4-00	
	Part number		08297061	08297088	08297096	08297118	08297126	18250424	
IP55/NEMA 12K housing without switch	Type	MC LTE B...	0004-2B1-1-10	0008-2B1-1-10	0015-2B1-1-10	0015-2B1-4-10	0022-2B1-4-10	0040-2B1-4-10	
	Part number		08297975	08297983	08297991	08298009	08298017	18250432	
IP55/NEMA 12K housing with switch	Type	MC LTE B...	0004-2B1-1-20	0008-2B1-1-20	0015-2B1-1-20	0015-2B1-4-20	0022-2B1-4-20	0040-2B1-4-20	
	Part number		08297525	08297533	08297541	08297568	08297576	18250440	
IP66/NEMA 4X housing without switch	Type	MC LTE B...	0004-2B1-1-30	0008-2B1-1-30	0015-2B1-1-30	0015-2B1-4-30	0022-2B1-4-30	0040-2B1-4-30	
	Part number		18254675	18254683	18254691	18254705	18254713	18254721	
IP66/NEMA 4X housing with switch	Type	MC LTE B...	0004-2B1-1-40	0008-2B1-1-40	0015-2B1-1-40	0015-2B1-4-40	0022-2B1-4-40	0040-2B1-4-40	
	Part number		18251013	18251021	18251048	18251056	18251064	18251072	
INPUT									
Line voltage V_{line}	V	1 × AC 200 – 240 ± 10%							
Line frequency f_{line}	Hz	50 / 60 ± 5%							
Input fuse	A	10	16	20	32 (35) ²⁾	40			
Rated input current	A	6.7	12.5	14.8	22.2	31.7			
OUTPUT									
Recommended motor power	kW	0.37	0.75	1.5	2.2	4			
	HP	0.5	1	2	3	5			
Output voltage V_{motor}	V	0 – V_{line}							
Output current	A	2.3	4.3	7	10.5	16			
Maximum output frequency	Hz	500							
Cross section of motor cable Cu 75C	mm ²	1.5					2.5		
	AWG	16					18		
Max. motor cable length	Shielded	50			100				
	Unshielded	75			150				
GENERAL INFORMATION									
Size	Size	1			2		3		
Heat loss at nominal output power	W	11	22	45	66	120			
Minimum braking resistance value	Ω	-			47				

1) Device for Europe, Australia, and New Zealand

2) Recommended values for UL compliance

9.4.2 3-phase system AC 230 V for 3-phase AC 230 V motors

MOVITRAC® LTE-B – EMC filter class A					
IP20 ¹⁾	Type	MC LTE B...	0015-2A3-4-00	0022-2A3-4-00	0040-2A3-4-00
	Part number		08297134	08297142	08297150
IP55/NEMA 12K housing without switch	Type	MC LTE B...	0015-2A3-4-10	0022-2A3-4-10	0040-2A3-4-10
	Part number		08298025	08298033	08298041
IP55/NEMA 12K housing with switch	Type	MC LTE B...	0015-2A3-4-20	0022-2A3-4-20	0040-2A3-4-20
	Part number		08297584	08297592	08297606
IP66/NEMA 4X housing without switch	Type	MC LTE B...	0015-2A3-4-30	0022-2A3-4-30	0040-2A3-4-30
	Part number		18254748	18254756	18254764
IP66/NEMA 4X housing with switch	Type	MC LTE B...	0015-2A3-4-40	0022-2A3-4-40	0040-2A3-4-40
	Part number		18251110	18251129	18251137
INPUT					
Line voltage V_{line}	V		3 × AC 200 – 240 ± 10%		
Line frequency f_{line}	Hz		50 / 60 ± 5%		
Input fuse	A		16 (15) ²⁾	20	32 (35)
Rated input current	A		9.2	13.7	20.7
OUTPUT					
Recommended motor power	kW		1.5	2.2	4.0
	HP		2	3	5
Output voltage V_{motor}	V		0 – V_{line}		
Output current	A		7	10.5	18
Maximum output frequency	Hz		500		
Cross section of motor cable Cu 75C	mm ²		1.5		2.5
	AWG		16		12
Max. motor cable length	Shielded	m	100		
	Unshielded		150		
GENERAL INFORMATION					
Size	Size		2		3
Heat loss at nominal output power	W		45	66	120
Minimum braking resistance value	Ω		47		

1) Device for Europe, Australia, and New Zealand

2) Recommended values for UL compliance

9.4.3 3-phase system AC 400 V for 3-phase AC 400 V motors

Sizes 1 and 2

MOVITRAC® LTE-B – EMC filter class A							
IP20 ¹⁾	Type	MC LTE B...	0008-5A3-1-00	0015-5A3-1-00	0015-5A3-4-00	0022-5A3-4-00	0040-5A3-4-00
	Part number		08297169	08297177	08297185	08297193	08297207
IP55/NEMA 12K housing without switch	Type	MC LTE B...	0008-5A3-1-10	0015-5A3-1-10	0015-5A3-4-10	0022-5A3-4-10	0040-5A3-4-10
	Part number		08298068	08298076	08298084	08298092	08298106
IP55/NEMA 12K housing with switch	Type	MC LTE B...	0008-5A3-1-20	0015-5A3-1-20	0015-5A3-4-20	0022-5A3-4-20	0040-5A3-4-20
	Part number		08297614	08297622	08297630	08297649	08297657
IP66/NEMA 4X housing without switch	Type	MC LTE B...	0008-5A3-1-30	0015-5A3-1-30	0015-5A3-4-30	0022-5A3-4-30	0040-5A3-4-30
	Part number		18254772	18254780	18254799	18254802	18254810
IP66/NEMA 4X housing with switch	Type	MC LTE B...	0008-5A3-1-40	0015-5A3-1-40	0015-5A3-4-40	0022-5A3-4-40	0040-5A3-4-40
	Part number		18251145	18251153	18251161	18251188	18251196
INPUT							
Line voltage V_{line}	V	3 × AC 380 – 480 ± 10%					
Line frequency f_{line}	Hz	50 / 60 ± 5%					
Input fuse	A	5	10			16 (15) ²⁾	
Rated input current	A	2.9	5.4	7.6	12.4		
OUTPUT							
Recommended motor power	kW	0.75	1.5	2.2	4		
	HP	1	2	3	5		
Output voltage V_{motor}	V	0 – V_{line}					
Output current	A	2.2	4.1	5.8	9.5		
Maximum output frequency	Hz	500					
Cross section of motor cable Cu 75C	mm ²	1.5					
	AWG	16					
Max. motor cable length	Shielded	m	50	100			
	Unshielded		75	150			
GENERAL INFORMATION							
Size	Size	1			2		
Heat loss at nominal output power	W	22	45	66	120		
Minimum braking resistance value	Ω	-			100		

1) Device for Europe, Australia, and New Zealand

2) Recommended values for UL compliance

Size 3

MOVITRAC® LTE-B – EMC filter class A					
IP20 ¹⁾	Type	MC LTE B...	0055-5A3-4-00	0075-5A3-4-00	0110-5A3-4-00
	Part number		08297215	08297223	08299196
IP55/NEMA 12K housing without switch	Type	MC LTE B...	0055-5A3-4-10	0075-5A3-4-10	-
	Part number		08298114	08298122	-
IP55/NEMA 12K housing with switch	Type	MC LTE B...	0055-5A3-4-20	0075-5A3-4-20	-
	Part number		08297665	08297673	-
IP66/NEMA 4X housing without switch	Type	MC LTE B...	0055-5A3-4-30	0075-5A3-4-30	-
	Part number		18254829	18254837	-
IP66/NEMA 4X housing with switch	Type	MC LTE B...	0055-5A3-4-40	0075-5A3-4-40	-
	Part number		18251218	18251226	-
INPUT					
Line voltage V_{line}	V		3 × AC 380 – 480 ± 10%		
Line frequency f_{line}	Hz		50 / 60 ± 5%		
Input fuse	A		20	25	32 (35) ²⁾
Rated input current	A		16.1	20.1	27.1
OUTPUT					
Recommended motor power	kW		5.5	7.5	11
	HP		7.5	10	15
Output voltage V_{motor}	V		0 – V_{line}		
Output current	A		14	18	24
Maximum output frequency	Hz		500		
Cross section of motor cable Cu 75C	mm ²		2.5		4
	AWG		12		10
Max. motor cable length	Shielded	m	100		
	Unshielded		150		
GENERAL INFORMATION					
Size	Size		3		
Heat loss at nominal output power	W		165	225	330
Minimum braking resistance value	Ω		47		

1) Device for Europe, Australia, and New Zealand

2) Recommended values for UL compliance

10 Declaration of Conformity

EC Declaration of Conformity

SEW
EURODRIVE

900720010

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

declares under sole responsibility that the

frequency inverters of the series **MOVITRAC® LTE B**

are in conformity with

Low Voltage Directive **2006/95/EC**EMC Directive **2004/108/EC** 4)applied harmonized standards **EN 61800-5-1:2003**
EN 60204-1:2006
EN 61800-3:2004
EN 55011:2007

- 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 11.01.10

Place Date  Johann Soder
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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	Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 sianhwa@sby.centrin.net.id http://www.cvmultimas.com
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	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
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Vietnam

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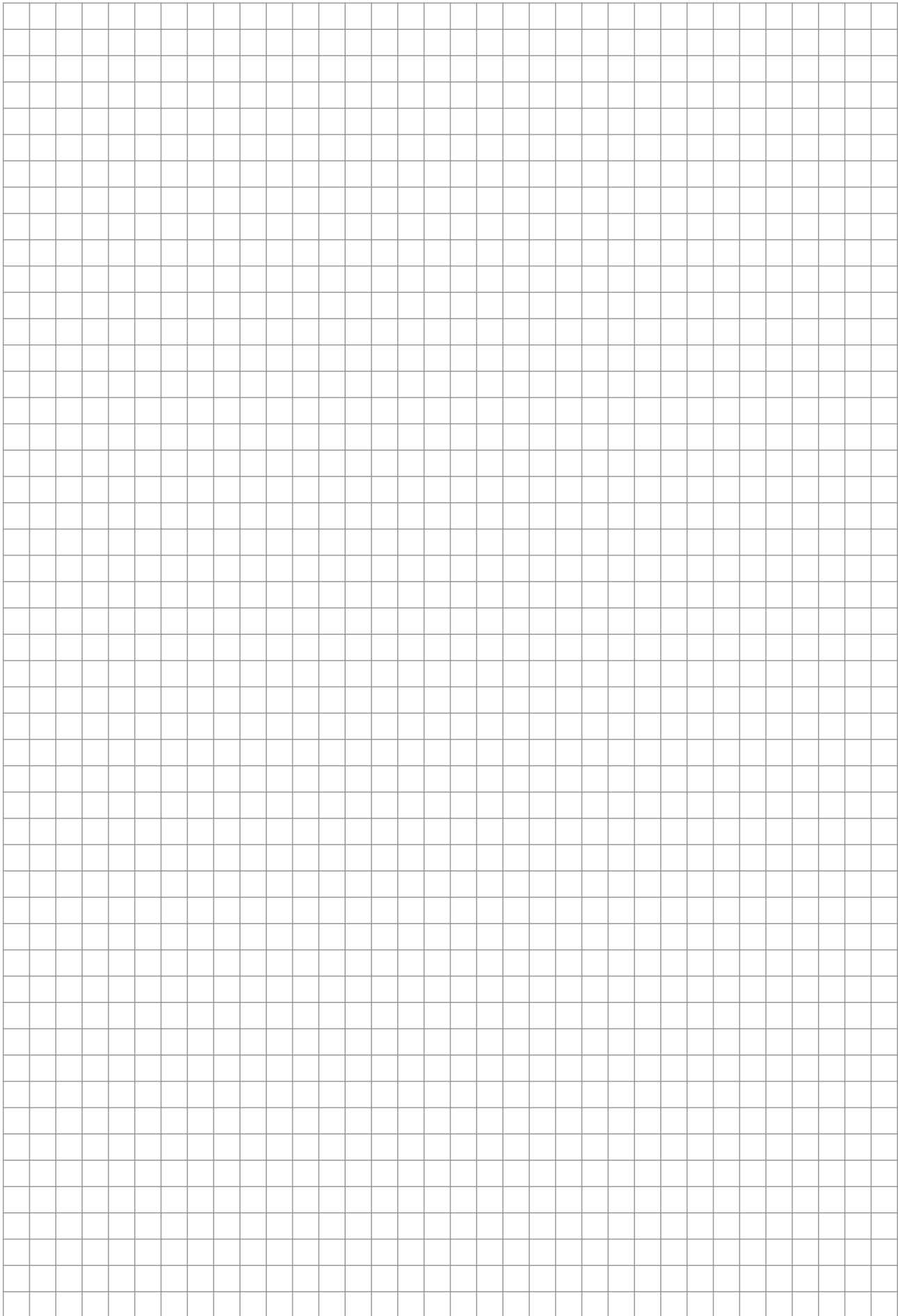
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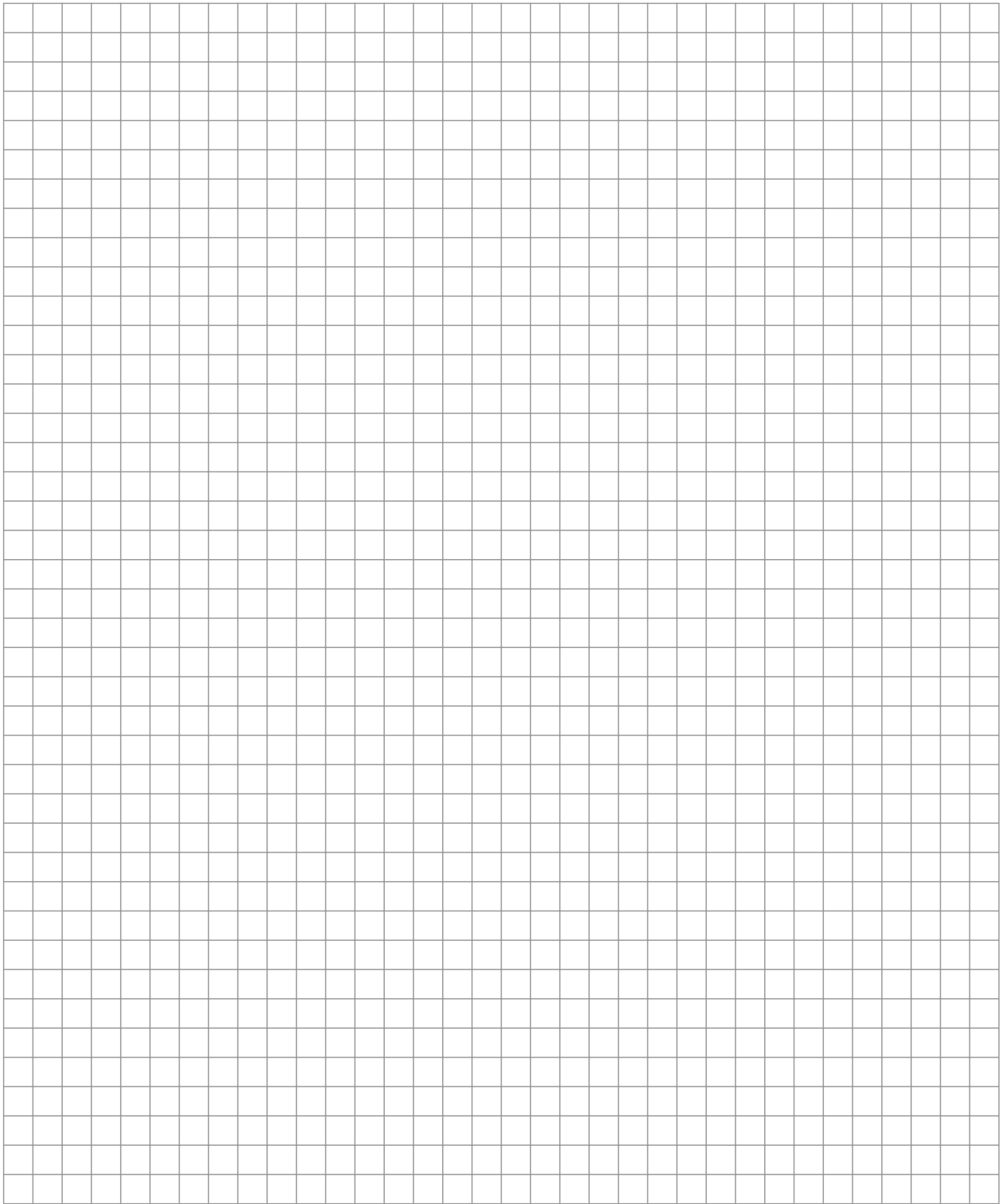
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