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ACOPOSinverter P84

User's manual

Version: **2.10 (October 2017)**
Model no.: **MAACPIP84-ENG**

Translation of the original documentation

1 Installation guide

1.1 Important information

Note:

Read these instructions carefully and make yourself familiar with the device before you install, commission or service it.

The aim of the warnings below in these instructions or indicated on the device is to protect you from possible hazards or to refer you to information that explains or simplifies operations.

Danger!

DANGER indicates a directly hazardous situation, which if not avoided, could result in death, serious bodily injury and/or material damage.

Warning!

WARNING indicates a potentially hazardous situation, which if not avoided, could result in death, serious bodily injury and/or material damage.

Caution!

CAUTION indicates a potentially hazardous situation, which if not avoided, could result in bodily injury and/or material damage.

Information:

Only qualified personnel are entitled to perform maintenance work on electrical devices. No responsibility is assumed by B&R for any consequences arising out of the use of this device. This document is not intended as a manual for untrained operators.

1.2 Before you begin

Read and understand these instructions before performing any procedure on this frequency inverter.

Danger!

HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH

- **Read and understand this manual before installing and operating the ACOPOSinverter P84. Installation, adjustment, repair and maintenance must be performed by qualified personnel.**
- **The user is responsible for complying with all relevant international and national electrical engineering requirements regarding the protective grounding of all equipment.**
- **Numerous components of the frequency inverter, including the circuit boards, are supplied via the mains voltage. DO NOT TOUCH! Use only electrically insulated tools.**
- **DO NOT TOUCH shielded components or bolted connections on terminal blocks while connected to the power supply.**
- **DO NOT short across terminals PA/+ and PC/– or the DC bus capacitors.**
- **Before servicing the frequency inverter:**
  - **Disconnect any power supply.**
  - **Place a "DO NOT TURN ON" label on the power or disconnection switch.**
  - **Lock the power or disconnection switch in the open position.**
  - **WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then perform the procedure for measuring the DC bus voltage, see "Position of the LED status indicator of the capacitor charge" on page 69, to check whether the DC voltage is below 42 V. The LEDs on the inverter can no longer display whether there is no DC bus voltage.**
  - **If the DC bus capacitors do not discharge completely, contact your local B&R representative. The frequency inverter is not permitted to be repaired or put into operation in this case.**
- **Install all covers and close them before turning the power on or before the starting and stopping the frequency inverter.**

Failure to follow these instructions can result in death or injury.

Danger!

ACCIDENTAL OPERATION OF DEVICE

- **Read and understand this manual before installing and operating the ACOPOSinverter P84.**
- **Any changes made to the parameter settings must be performed by qualified personnel.**

Failure to follow these instructions can result in death or injury.

Warning!

EQUIPMENT DAMAGE

Do not operate or install any frequency inverter or accessory that appears damaged.

Failure to follow these instructions can result in death, serious injury or material damages.

Warning!

CONTROL FAILURE

- **The designer of any wiring scheme must consider the potential failure modes of control channels and, for certain critical functions, provide a means to achieve a safe state during and after a channel failure. Examples of critical control functions: Emergency stop and stopping in the case of an overrun traverse that is too long.**
- **Separate or redundant control channels must be provided for critical control functions.**
- **System control channels may include communication links. The effects of unexpected transmission delays or failures must be taken into account.** [1)]

Failure to follow these instructions can result in death, serious injury or material damages.

1) For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety guidelines for the application, installation and maintenance of solid state control" and to NEMA ICS 7.1 (latest edition), "Safety standards for construction and guide for selection, installation and operation of adjustable-speed drive systems."

Caution!

INCOMPATIBLE MAINS VOLTAGE

Before switching on and configuring the frequency inverter, ensure that the mains voltage is compatible with the supply voltage shown on the frequency inverter nameplate. The frequency inverter may be damaged if the mains voltage is not compatible.

Failure to follow these instructions can result in injury or equipment damage.

Caution!

IMPROPER OPERATION OF THE INVERTER

- **If the inverter has not been turned on over a longer period of time, the performance of the electrolytic capacitors is reduced.**
- **If the inverter remains out of operation for a longer period, switch it on every 2 years for at least 5 hours to reestablish the performance of the capacitors. Then check the operation of the inverter. It is recommended not to connect the inverter directly to the mains voltage, but rather to increase the voltage gradually with the aid of an adjustable AC voltage source.**

Failure to follow these instructions can result in injury and/or equipment damage.

[1)] For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Sys-

1.3 Low power

Low Power

0.37 kW to 45 kW / 200 to 240 V

0.75 kW to 75 kW / 380 to 480 V

1.3.1 Steps for setting up

INSTALLATION

1. Receipt and testing of the inverter control

- Check that the catalog number printed on the nameplate is the same as that on your purchase order.
- Remove the ACOPOSinverter from its packaging and check that it has not been damaged in transit.

Steps 1 to 4 must be carried out in a **voltage-free state**.

2. Line voltage compatibility check

- Check that the supply voltage is compatible with the voltage range of the inverter (see "Technical data" on page 29).

3. Installing the frequency inverter

- Install the inverter in accordance with the instructions in this document.
- If required, install the internal and external options.

4. Wiring the frequency inverter

- Connect the motor and make sure that the motor connection corresponds to the mains voltage.
- After making sure that the power is off, connect the line supply.
- Connect the control part.
- Connect the frequency reference line.

1.3.2 Preliminary recommendations

1.3.2.1 Handling and storage

To ensure the protection of the frequency inverter before assembly, the device should be moved and stored in its packaged condition. Ensure that the ambient conditions are permissible.

Warning!

PACKAGING DAMAGE

If the packaging is damaged, opening it or any further handling could be hazardous.

In this case, take the appropriate precautions.

Failure to follow these instructions can result in death, serious injury or material damages.

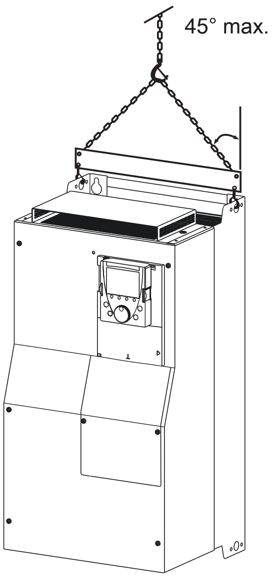
Warning!

DAMAGED EQUIPMENT

Do not operate or install the inverter, if it is damaged.

Failure to follow this instruction can result in death, serious injury or material damages.

1.3.2.2 Handling during installation



Up to the models 8I84T201500.01P-1 and 8I84T401850.01P-1, the ACOPOSinverter P84 can be unpacked and installed without a transport fixture.

The use of a hoist is required for larger inverter models. To this end, all these inverters are equipped with lifting eyes. Refer to the recommendations on the next page.

1.3.2.3 Before you begin

Read the instructions in the "Programming guide" carefully.

Caution!

INCOMPATIBLE MAINS VOLTAGE

Before switching on and configuring the frequency inverter, ensure that the mains voltage is compatible with the supply voltage shown on the frequency inverter nameplate. The frequency inverter may be damaged if the mains voltage is not compatible.

Failure to follow these instructions can result in injury and/or equipment damage.

Danger!

ACCIDENTAL OPERATION OF DEVICE

- **Before turning on and configuring the ACOPOSinverter P84, to avoid an unintended operation ensure that the PWR input (POWER REMOVAL) is deactivated (state 0).**
- **Before you turn on the inverter or when you exit the configuration menu make sure that the inputs assigned to the operating commands are deactivated (state 0), since these could result in the immediate starting of the motor.**

Failure to follow these instructions can result in death or injury.

Information:

If unwanted or unintended operation must be excluded for the safety of the operating personnel, the function "Power Removal" electronically locks the ACOPOSinverter P84.

This function requires the use of a connection diagram that corresponds to the standards IEC/EN 61508 Safety Integrity Level SIL 2 and ISO 13849 PL d.

The power-removal function (PWR) has priority before every operating command.

Note:

The ACOPOSinverter P84 is supported starting with AS V3.0.80.25.

1.3.3 Order data

1.3.3.1 8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 200-240V	
8I84T200037.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 0.37 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T200075.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 0.75 kW and 1x 200 to 240 V, 0.37 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T200150.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 1.5 kW and 1x 200 to 240 V, 0.75 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT004.000-1	Mains choke 3-phase 4 A, for ACOPOSinverter P74 3x 380 to 500 V, 0.37 to 1.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 1.5 kW	
8I0CT010.000-1	Mains choke 3-phase 10 A, for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 2.2 to 4 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR060.000-1	Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P74/P84 - Mains chokes	
8I0CS045.000-1	Mains choke 1-phase 45 A, for ACOPOSinverter P84 1x 200 to 240 V, 4 to 5.5 kW	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT012.300-1	EMC filter 3-phase 12 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
	ACOPOSinverter P84 - DC bus choke	
8I0DC002.300-1	DC bus choke 2 A, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 kW and 3x 380 to 480 V, 0.75 kW	
8I0DC008.300-1	DC bus choke 8 A, for ACOPOSinverter P84 3x 200 to 240 V, 0.75 kW and 3x 380 to 480 V, 2.2 to 3 kW	
8I0DC014.300-1	DC bus choke 14 A, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 kW and 3x 380 to 480 V, 5.5 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.020-1	Fan for ACOPOSinverter 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF001.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	

Table 1: 8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1 - Order data

Model number	Short description	Figure
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 1: 8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1 - Order data

1.3.3.2 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 200-240V	
8I84T200220.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 2.2 kW and 1x 200 to 240 V, 1.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T200300.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 3 kW and 1x 200 to 240 V, 2.2 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T200400.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 4 kW and 1x 200 to 240 V, 3 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT010.000-1	Mains choke 3-phase 10 A, for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 2.2 to 4 kW	
8I0CT016.000-1	Mains choke, 3-phase 17 A, for ACOPOSinverter P74 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0CT030.000-1	Mains choke 3-phase 30 A, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5.5 kW and 3x 380 to 480 V, 11 to 15 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR028.000-1	Braking resistor 28 Ω continuous braking power 0.2 kW, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 to 4 kW and 3x 380 to 480 V, 11 to 15 kW	
8I0BR060.000-1	Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P74/P84 - Mains chokes	
8I0CS025.000-1	Mains choke 1-phase 25 A, for ACOPOSinverter P84 1x 200 to 240 V, 3 kW	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT026.300-1	EMC filter 3-phase 26 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
	ACOPOSinverter P84 - DC bus choke	
8I0DC019.300-1	DC bus choke 19 A, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 kW and 3x 380 to 480 V, 7.5 kW	
8I0DC027.300-1	DC bus choke 27 A, for ACOPOSinverter P84 3x 200 to 240 V, 3 kW and 3x 380 to 480 V, 11 kW	
8I0DC044.300-1	DC bus choke 44 A, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5 kW and 3x 380 to 480 V, 15 to 18.5 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.030-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF002.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	

Table 2: 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1 - Order data

Model number	Short description	Figure
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 2: 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1 - Order data

1.3.3.3 8I84T200550.01P-1, 8I84T200750.01P-1, 8I84T201100.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 200-240V	
8I84T200550.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 5.5 kW and 1x 200 to 240 V, 4 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T200750.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 7.5 kW and 1x 200 to 240 V, 5.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T201100.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 11 kW, integrated brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT030.000-1	Mains choke 3-phase 30 A, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5.5 kW and 3x 380 to 480 V, 11 to 15 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR010.000-1	Braking resistor 10 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 11 kW and 3x 380 to 480 V, 37 kW	
8I0BR015.000-1	Braking resistor 15 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 to 7.5 kW and 3x 380 to 480 V, 18.5 to 30 kW	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P74/P84 - Mains chokes	
8I0CT060.000-1	Mains choke 3-phase 60 A, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 to 11 kW and 3x 380 to 480 V, 18.5 to 22 kW	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT035.300-1	EMC filter 3-phase 35 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0FT046.300-1	EMC filter 3-phase 46 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
8I0FT072.300-1	EMC filter 3-phase 72 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
	ACOPOSinverter P84 - DC bus choke	
8I0DC036.300-1	DC bus choke 36 A, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW	
8I0DC044.300-1	DC bus choke 44 A, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0DC084.300-1	DC bus choke 84 A, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 22 to 37 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.040-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0XF084.050-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
8I0XF084.055-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF003.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0MF004.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
8I0MF005.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	

Table 3: 8I84T200550.01P-1, 8I84T200750.01P-1, 8I84T201100.01P-1 - Order data

Model number	Short description	Figure
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 3: 8I84T200550.01P-1, 8I84T200750.01P-1, 8I84T201100.01P-1 - Order data

1.3.3.4 8I84T201500.01P-1, 8I84T201850.01P-1, 8I84T202200.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 200-240V	
8I84T201500.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 15 kW, integrated brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T201850.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 18.5 kW, integrated brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T202200.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 22 kW, integrated brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR005.000-1	Braking resistor 5 ohms, continuous braking power 1.3 kW, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 45 to 75 kW	
8I0BR008.000-1	Braking resistor 8 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 15 kW	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/ P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/ P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/ P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/ P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P74/P84 - Mains chokes	
8I0CT100.000-1	Mains choke 3-phase 100 A, for ACOPOSinverter P84 3x 200 to 240 V, 15 kW and 3x 380 to 480 V, 30 to 55 kW	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT072.300-1	EMC filter 3-phase 72 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0FT090.300-1	EMC filter 3-phase 90 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	
	ACOPOSinverter P84 - Control card fan kits	
8I0XF004.300-1	Control card fan kit, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW, for operation at ambient temperature of 50 to 60°C	
	ACOPOSinverter P84 - DC bus choke	
8I0DC084.300-1	DC bus choke 84 A, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 22 to 37 kW	
8I0DC171.300-1	DC bus choke 171 A, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 45 to 75 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.055-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0XF084.060-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF005.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0MF006.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 4: 8I84T201500.01P-1, 8I84T201850.01P-1, 8I84T202200.01P-1 - Order data

1.3.3.5 8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 200-240V	
8I84T203000.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 30 kW, integrated brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T203700.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 37 kW, integrated brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T204500.01P-1	ACOPOSinverter P84, 3x 200 to 240 V, 45 kW, integrated brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT180.300-1	EMC filter 3-phase 180 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW and 3x 380 to 480 V, 45 to 75 kW	
	ACOPOSinverter P84 - Control card fan kits	
8I0XF006.300-1	Control card fan kit, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW, for operation at ambient temperature of 50 to 60°C	
	ACOPOSinverter P84 - DC bus choke	
8I0DC195.300-1	DC bus choke 195 A, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.075-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF008.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 5: 8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1 - Order data

1.3.3.6 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1, 8I84T400300.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 380-480V	
8I84T400075.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 0.75 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T400150.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 1.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T400220.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 2.2 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T400300.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 3 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT004.000-1	Mains choke 3-phase 4 A, for ACOPOSinverter P74 3x 380 to 500 V, 0.37 to 1.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 1.5 kW	
8I0CT010.000-1	Mains choke 3-phase 10 A, for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 2.2 to 4 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P74/P84 - Mains chokes	
8I0CS045.000-1	Mains choke 1-phase 45 A, for ACOPOSinverter P84 1x 200 to 240 V, 4 to 5.5 kW	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT012.300-1	EMC filter 3-phase 12 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
8I0FT026.300-1	EMC filter 3-phase 26 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
	ACOPOSinverter P84 - DC bus choke	
8I0DC002.300-1	DC bus choke 2 A, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 kW and 3x 380 to 480 V, 0.75 kW	
8I0DC004.300-1	DC bus choke 4 A, for ACOPOSinverter P84 3x 380 to 480 V, 1.5 kW	
8I0DC008.300-1	DC bus choke 8 A, for ACOPOSinverter P84 3x 200 to 240 V, 0.75 kW and 3x 380 to 480 V, 2.2 to 3 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.020-1	Fan for ACOPOSinverter 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
8I0XF084.030-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF001.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
8I0MF002.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	

Table 6: 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1, 8I84T400300.01P-1 - Order data

Model number	Short description	Figure
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 6: 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1, 8I84T400300.01P-1 - Order data

1.3.3.7 8I84T400400.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1, 8I84T401100.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 380-480V	
8I84T400400.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 4 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T400550.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 5.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T400750.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 7.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T401100.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 11 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT010.000-1	Mains choke 3-phase 10 A, for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 2.2 to 4 kW	
8I0CT016.000-1	Mains choke, 3-phase 17 A, for ACOPOSinverter P74 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0CT030.000-1	Mains choke 3-phase 30 A, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5.5 kW and 3x 380 to 480 V, 11 to 15 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR028.000-1	Braking resistor 28 Ω continuous braking power 0.2 kW, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 to 4 kW and 3x 380 to 480 V, 11 to 15 kW	
8I0BR060.000-1	Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT026.300-1	EMC filter 3-phase 26 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
8I0FT035.300-1	EMC filter 3-phase 35 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0FT046.300-1	EMC filter 3-phase 46 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
	ACOPOSinverter P84 - DC bus choke	
8I0DC010.300-1	DC bus choke 10 A, for ACOPOSinverter P84 3x 380 to 480 V, 4 kW	
8I0DC014.300-1	DC bus choke 14 A, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 kW and 3x 380 to 480 V, 5.5 kW	
8I0DC019.300-1	DC bus choke 19 A, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 kW and 3x 380 to 480 V, 7.5 kW	
8I0DC027.300-1	DC bus choke 27 A, for ACOPOSinverter P84 3x 200 to 240 V, 3 kW and 3x 380 to 480 V, 11 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.030-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
8I0XF084.040-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	

Table 7: 8I84T400400.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1, 8I84T401100.01P-1 - Order data

Model number	Short description	Figure
8I0XF084.050-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF002.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
8I0MF003.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0MF004.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 7: 8I84T400400.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1, 8I84T401100.01P-1 - Order data

1.3.3.8 8I84T401500.01P-1, 8I84T401850.01P-1, 8I84T402200.01P-1, 8I84T403000.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 380-480V	
8I84T401500.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 15 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T401850.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 18.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T402200.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 22 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T403000.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 30 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT030.000-1	Mains choke 3-phase 30 A, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5.5 kW and 3x 380 to 480 V, 11 to 15 kW	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR015.000-1	Braking resistor 15 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 to 7.5 kW and 3x 380 to 480 V, 18.5 to 30 kW	
8I0BR028.000-1	Braking resistor 28 Ω continuous braking power 0.2 kW, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 to 4 kW and 3x 380 to 480 V, 11 to 15 kW	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P74/P84 - Mains chokes	
8I0CT060.000-1	Mains choke 3-phase 60 A, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 to 11 kW and 3x 380 to 480 V, 18.5 to 22 kW	
8I0CT100.000-1	Mains choke 3-phase 100 A, for ACOPOSinverter P84 3x 200 to 240 V, 15 kW and 3x 380 to 480 V, 30 to 55 kW	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT072.300-1	EMC filter 3-phase 72 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0FT090.300-1	EMC filter 3-phase 90 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	
	ACOPOSinverter P84 - Control card fan kits	
8I0XF004.300-1	Control card fan kit, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW, for operation at ambient temperature of 50 to 60°C	
8I0XF005.300-1	Control card fan kit, for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW, for operation at ambient temperature of 50 to 60°C	
	ACOPOSinverter P84 - DC bus choke	
8I0DC044.300-1	DC bus choke 44 A, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0DC084.300-1	DC bus choke 84 A, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 22 to 37 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.055-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0XF084.060-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	
8I0XF084.070-1	Fan for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF005.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0MF006.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	

Table 8: 8I84T401500.01P-1, 8I84T401850.01P-1, 8I84T402200.01P-1, 8I84T403000.01P-1 - Order data

Model number	Short description	Figure
8I0MF007.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 8: 8I84T401500.01P-1, 8I84T401850.01P-1, 8I84T402200.01P-1, 8I84T403000.01P-1 - Order data

1.3.3.9 8I84T403700.01P-1, 8I84T404500.01P-1, 8I84T405500.01P-1, 8I84T407500.01P-1

Model number	Short description	Figure
	ACOPOSinverter P84 3-phase 380-480V	
8I84T403700.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 37 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T404500.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 45 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T405500.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 55 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
8I84T407500.01P-1	ACOPOSinverter P84, 3x 380 to 480 V, 75 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface	
	Optional accessories	
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR003.000-1	Braking resistor 2.5 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 37 to 45 kW	
8I0BR005.000-1	Braking resistor 5 ohms, continuous braking power 1.3 kW, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 45 to 75 kW	
8I0BR010.000-1	Braking resistor 10 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 11 kW and 3x 380 to 480 V, 37 kW	
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	
	ACOPOSinverter P74/P84 - Mains chokes	
8I0CT100.000-1	Mains choke 3-phase 100 A, for ACOPOSinverter P84 3x 200 to 240 V, 15 kW and 3x 380 to 480 V, 30 to 55 kW	
8I0CT184.000-1	Mains choke 3-phase 184 A, for ACOPOSinverter P84 3x 380 to 480 V, 75 to 90 kW	
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT092.300-1	EMC filter 3-phase 92 A, bottom or side installation for ACOPOSinverter P84/P76 3x 380 to 480 V, 37 kW	
8I0FT180.300-1	EMC filter 3-phase 180 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW and 3x 380 to 480 V, 45 to 75 kW	
	ACOPOSinverter P84 - Control card fan kits	
8I0XF005.300-1	Control card fan kit, for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW, for operation at ambient temperature of 50 to 60°C	
8I0XF007.300-1	Control card fan kit, for ACOPOSinverter P84 3x 380 to 480 V, 45 to 75 kW, for operation at ambient temperature of 50 to 60°C	
	ACOPOSinverter P84 - DC bus choke	
8I0DC084.300-1	DC bus choke 84 A, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 22 to 37 kW	
8I0DC171.300-1	DC bus choke 171 A, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 45 to 75 kW	
	ACOPOSinverter P84 - Fan	
8I0XF084.070-1	Fan for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW	
8I0XF084.080-1	Fan for ACOPOSinverter P84 3x 380 to 480 V, 45 to 75 kW	
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF007.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW	
8I0MF009.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 380 to 480 V, 45 to 75 kW	
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	

Table 9: 8I84T403700.01P-1, 8I84T404500.01P-1, 8I84T405500.01P-1, 8I84T407500.01P-1 - Order data

Model number	Short description	Figure
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 9: 8I84T403700.01P-1, 8I84T404500.01P-1, 8I84T405500.01P-1, 8I84T407500.01P-1 - Order data

1.3.4 Technical data

1.3.4.1 Electrical data

1.3.4.1.1 8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1

Model number	8I84T200037.01P-1	8I84T200075.01P-1	8I84T200150.01P-1
General information			
Certifications			
CE	Yes		
KC	Yes		
UL	cULus E225616 Power conversion equipment		
Motor power			
Listed on nameplate, 1-phase	-	0.37 kW 0.5 PS	0.75 kW 1 PS
Listed on nameplate, 3-phase	0.37 kW 0.5 PS	0.75 kW 1 PS	1.5 kW 2 PS
Mains connection			
Mains input voltage, 1-phase	-	1x 200 VAC -15% to 240 VAC +10%	
Mains input voltage, 3-phase	3x 200 VAC -15% to 240 VAC +10%		
Frequency	50 to 60 Hz ±5%		
Apparent power (at 240 VAC)	1.3 kVA	-	
Apparent power (at 240 VAC), 1-phase	-	1.4 kVA	2.4 kVA
Apparent power (at 240 VAC), 3-phase	-	2.2 kVA	4 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	5 kA		
Max. mains current with optional mains choke			
At 230 VAC	1.6 A	3.0 A	5.8 A
Mains current			
At 200 VAC	3.5 A	-	
At 200 VAC, 1-phase	-	6.9 A	12 A
At 200 VAC, 3-phase	-	6.1 A	11.3 A
At 240 VAC	3.1 A	-	
At 240 VAC, 1-phase	-	5.8 A	9.9 A
At 240 VAC, 3-phase	-	5.3 A	9.6 A
Power dissipation at nominal load and nominal clock frequency	46 W	66 W	101 W
Integrated EMC filter	Yes [1]		
Line-conducted and radiated emissions			
With integrated filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-		
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤10 m / ≤5 m [2]		
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤10 m / ≤5 m [2]		
With add-on filter	8I0FT012.300-1		
With add-on filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤50 m / ≤20 m [3]		
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤100 m / ≤50 m [4]		
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤100 m / ≤50 m [4]		
Motor connection			
Derating of continuous output current depending on ambient temperature			
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)		
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).		
Derating of continuous output current depending on installation elevation			
Starting at 1000 m above sea level	1%, per 100 m		
Max. continuous output current (In)			
At 230 VAC, 1-phase	-	3 A [5]	4.8 A [5]
At 230 VAC, 3-phase	3 A [5]	4.8 A [5]	8 A [5]
Max. transient current for 60 s, 1-phase	-	4.5 A	7.2 A
Max. transient current for 60 s, 3-phase	4.5 A	7.2 A	12 A
Max. transient current for 2 s, 1-phase	-	4.9 A	7.9 A
Max. transient current for 2 s, 3-phase	4.9 A	7.9 A	13.2 A
Output frequency range	0.5 to 599 Hz		
Nominal clock frequency	4 kHz		

Table 10: 8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1 - Technical data

Model number	8I84T200037.01P-1	8I84T200075.01P-1	8I84T200150.01P-1
Nominal clock frequency			
Min.	1 kHz		
Max.	16 kHz		
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s		
Braking torque			
With braking resistor	Up to 150% of the rated motor torque		
Without braking resistor (typical value)	30% of the rated motor torque		
Max. motor cable length			
Shielded cable	50 m [5]		
Non-shielded cable	100 m [5]		
Closed-loop motor control profiles			
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads		
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, over-current between output phases and ground, overvoltages on the DC bus, interrup-tions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply		
Motor protection	Thermal protection integrated in the inverter through continually cal-culating the I²t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors		
Brake chopper			
Integrated dynamic brake transistors	Yes		
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s		
Min. resistance value (external)	44 Ω [6]		33 Ω [6]
24 VDC supply			
Input voltage	24 VDC (min. 19 V, max. 30 V)		
Power consumption	30 W		
Available internal power supplies			
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)		
Output voltage 24 VDC			
Max. output current at 24 VDC	200 mA		
Output voltage 10.5 VDC	10.5 VDC ±5%		
Output voltage 10.5 VDC			
Max. output current 10.5 VDC	10 mA		
Safe input - Power removal			
Switching threshold			
Low	<5 V		
High	>15 V		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Quantity	1		
Nominal voltage	24 VDC		
Response time	≤100 ms		
Input impedance	1.5 kΩ		
Input circuit	Sink		
Interfaces			
Type	POWERLINK and CANopen		
Digital inputs			
Quantity	6 [7]		
Nominal voltage	24 VDC		
Input circuit	Source or sink		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Sampling time	<2 ms ±0.5 ms		
Input impedance	3.5 kΩ		
Analog inputs			
Quantity	2		
Electrical isolation			
Input - Input	No		
Input - ACOPOSinverter	Yes		
Input			
Voltage	±10 V		
Voltage/Current	0 to 10 V or 0 to 20 mA		

Table 10: 8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1 - Technical data

Model number	8I84T200037.01P-1	8I84T200075.01P-1	8I84T200150.01P-1
Resolution	±11 bits		
Sampling time	<2 ms ±0.5 ms		
Input impedance			
Voltage	30 kΩ		
Current	242 Ω		
Relay outputs			
Quantity	2		
Nominal voltage	30 VDC / 250 VAC		
Switching capacity			
Min.	3 mA for 24 VDC		
Max.			
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC		
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC		
Design			
Relay 1	1 NO contact and 1 NC contact with a common point		
Relay 2	1 NO contact		
Response time (max.)	<7 ms ±0.5 ms		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Analog outputs			
Quantity	1		
Output	0 to 10 V or 0 to 20 mA [8)]		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Max. load impedance			
Voltage	470 Ω		
Current	500 Ω		
Update time	<2 ms ±0.5 ms		
Resolution	10-bit		
Operating conditions			
Installation at elevations above sea level	0 to 1000 m		
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)		
Ambient temperature	-10 to 50°C		
Max. ambient temperature	Up to 60°C		
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water		
Maximum installation elevation	Up to 3000 m [9)]		
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)		
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2		
Operating position	Vertical mounting orientation ±10%		
Environmental conditions			
Temperature			
Storage	-25 to 70°C		
Vibration			
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g		
Shock			
Operation	15 g, 11 ms		
Mechanical characteristics			
Dimensions			
Width	130 mm		
Height	230 mm		
Depth	175 mm		
Weight	3 kg		

Table 10: 8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1 - Technical data

1) Shield plate included in delivery
2) For shielded motor cables
≤10 m → At a clock frequency of 4 kHz
≤5 m → At a clock frequency of 4.1 to 16 kHz
3) For shielded motor cables
≤50 m → At a clock frequency of 4 kHz
≤20 m → At a clock frequency of 4.1 to 16 kHz
4) For shielded motor cables
≤100 m → At a clock frequency of 4 kHz
≤50 m → At a clock frequency of 4.1 to 16 kHz
5) These values are valid for the rated clock frequency.
6) The min. resistance value is specified at a temperature of 20°C.
7) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
8) The analog output is configurable as a logic output.
9) From 1000 to 3000 m, current reduced by 1% per 100 m

1.3.4.1.2 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1

Model number	8I84T200220.01P-1	8I84T200300.01P-1	8I84T200400.01P-1
General information			
Certifications			
CE	Yes		
KC	Yes		
UL	cULus E225616 Power conversion equipment		
Motor power			
Listed on nameplate, 1-phase	1.5 kW 2 PS	2.2 kW 3 PS	3 kW -
Listed on nameplate, 3-phase	2.2 kW 3 PS	3 kW -	4 kW 5 PS
Mains connection			
Mains input voltage, 1-phase	1x 200 VAC -15% to 240 VAC +10%		1x 200 VAC -15% to 240 VAC +10% [1]
Mains input voltage, 3-phase	3x 200 VAC -15% to 240 VAC +10%		
Frequency	50 to 60 Hz ±5%		
Apparent power (at 240 VAC), 1-phase	3.7 kVA	5.3 kVA	
Apparent power (at 240 VAC), 3-phase	5.3 kVA	6.8 kVA	9.5 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	5 kA		
Max. mains current with optional mains choke			
At 230 VAC	8.3 A	11.0 A	14.6 A
Mains current			
At 200 VAC, 1-phase	18.2 A [2]	25.9 A [2]	25.9 A [3]
At 200 VAC, 3-phase	15 A [2]	19.3 A [2]	25.8 A [2]
At 240 VAC, 1-phase	15.7 A [2]	22.1 A [2]	22 A [3]
At 240 VAC, 3-phase	12.8 A [2]	16.4 A [2]	22.9 A [2]
Power dissipation at nominal load and nominal clock frequency	122 W	154 W	191 W
Integrated EMC filter	Yes [4]		
Line-conducted and radiated emissions			
With integrated filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-		
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤10 m / ≤5 m [5]	-	
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤10 m / ≤5 m [5]		
With add-on filter	8I0FT026.300-1		
With add-on filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤50 m / ≤20 m [6]		
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤100 m / ≤50 m [7]		
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤100 m / ≤50 m [7]		
Motor connection			
Derating of continuous output current depending on ambient temperature			
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)		
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).		
Derating of continuous output current depending on installation elevation			
Starting at 1000 m above sea level	1%, per 100 m		
Max. continuous output current (In)			
At 230 VAC, 1-phase	8 A [8]	11 A [8]	13.7 A [8]
At 230 VAC, 3-phase	11 A [8]	13.7 A [8]	17.5 A [8]
Max. transient current for 60 s, 1-phase	12 A	16.5 A	20.6 A
Max. transient current for 60 s, 3-phase	16.5 A	20.6 A	26.3 A
Max. transient current for 2 s, 1-phase	13.2 A	18.1 A	22.6 A
Max. transient current for 2 s, 3-phase	18.1 A	22.6 A	28.8 A
Output frequency range	0.5 to 599 Hz		
Nominal clock frequency	4 kHz		
Nominal clock frequency			
Min.	1 kHz		
Max.	16 kHz		
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s		
Braking torque			
With braking resistor	Up to 150% of the rated motor torque		
Without braking resistor (typical value)	30% of the rated motor torque		

Table 11: 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1 - Technical data

Model number	8I84T200220.01P-1	8I84T200300.01P-1	8I84T200400.01P-1
Max. motor cable length			
Shielded cable	50 m [8)]		
Non-shielded cable	100 m [8)]		
Closed-loop motor control profiles			
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads		
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, over-current between output phases and ground, overvoltages on the DC bus, interrup-tions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply		
Motor protection	Thermal protection integrated in the inverter through continually cal-culating the I²t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors		
Brake chopper			
Integrated dynamic brake transistors	Yes		
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s		
Min. resistance value (external)	22 Ω [9)]		16 Ω [9)]
24 VDC supply			
Input voltage	24 VDC (min. 19 V, max. 30 V)		
Power consumption	30 W		
Available internal power supplies			
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)		
Output voltage 24 VDC			
Max. output current at 24 VDC	200 mA		
Output voltage 10.5 VDC	10.5 VDC ±5%		
Output voltage 10.5 VDC			
Max. output current 10.5 VDC	10 mA		
Safe input - Power removal			
Switching threshold			
Low	<5 V		
High	>15 V		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Quantity	1		
Nominal voltage	24 VDC		
Response time	≤100 ms		
Input impedance	1.5 kΩ		
Input circuit	Sink		
Interfaces			
Type	POWERLINK and CANopen		
Digital inputs			
Quantity	6 [10)]		
Nominal voltage	24 VDC		
Input circuit	Source or sink		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Sampling time	<2 ms ±0.5 ms		
Input impedance	3.5 kΩ		
Analog inputs			
Quantity	2		
Electrical isolation			
Input - Input	No		
Input - ACOPOSinverter	Yes		
Input			
Voltage	±10 V		
Voltage/Current	0 to 10 V or 0 to 20 mA		
Resolution	±11 bits		
Sampling time	<2 ms ±0.5 ms		
Input impedance			
Voltage	30 kΩ		
Current	242 Ω		
Relay outputs			
Quantity	2		
Nominal voltage	30 VDC / 250 VAC		

Table 11: 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1 - Technical data

Model number	8I84T200220.01P-1	8I84T200300.01P-1	8I84T200400.01P-1
Switching capacity			
Min.	3 mA for 24 VDC		
Max.			
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC		
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC		
Design			
Relay 1	1 NO contact and 1 NC contact with a common point		
Relay 2	1 NO contact		
Response time (max.)	<7 ms ±0.5 ms		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Analog outputs			
Quantity	1		
Output	0 to 10 V or 0 to 20 mA 11)		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Max. load impedance			
Voltage	470 Ω		
Current	500 Ω		
Update time	<2 ms ±0.5 ms		
Resolution	10-bit		
Operating conditions			
Installation at elevations above sea level	0 to 1000 m		
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)		
Ambient temperature	-10 to 50°C		
Max. ambient temperature	Up to 60°C		
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water		
Maximum installation elevation	Up to 3000 m 12)		
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)		
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2		
Operating position	Vertical mounting orientation ±10%		
Environmental conditions			
Temperature			
Storage	-25 to 70°C		
Vibration			
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g		
Shock			
Operation	15 g, 11 ms		
Mechanical characteristics			
Dimensions			
Width	155 mm		
Height	260 mm		
Depth	187 mm		
Weight	4 kg		

Table 11: 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1 - Technical data

1) A mains choke must be used.
2) Typical value for the specified motor power and the max. assumed short-circuit current (Isc).
3) Typical value for the specified motor power and the max. assumed short-circuit current (Isc). A mains choke is required for the power mains.
4) Shield plate included in delivery
5) For shielded motor cables
≤10 m → At a clock frequency of 4 kHz
≤5 m → At a clock frequency of 4.1 to 16 kHz
6) For shielded motor cables
≤50 m → At a clock frequency of 4 kHz
≤20 m → At a clock frequency of 4.1 to 16 kHz
7) For shielded motor cables
≤100 m → At a clock frequency of 4 kHz
≤50 m → At a clock frequency of 4.1 to 16 kHz
8) These values are valid for the rated clock frequency.
9) The min. resistance value is specified at a temperature of 20°C.
10) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
11) The analog output is configurable as a logic output.
12) From 1000 to 3000 m, current reduced by 1% per 100 m

1.3.4.1.3 8I84T200550.01P-1, 8I84T200750.01P-1, 8I84T201100.01P-1

Model number	8I84T200550.01P-1	8I84T200750.01P-1	8I84T201100.01P-1
General information			
Certifications			
CE	Yes		
KC	Yes		
UL	cULus E225616 Power conversion equipment		
Motor power			
Listed on nameplate, 1-phase	4 kW 5 PS	5.5 kW 7.5 PS	-
Listed on nameplate, 3-phase	5.5 kW 7.5 PS	7.5 kW 10 PS	11 kW 15 PS
Mains connection			
Mains input voltage, 1-phase	1x 200 VAC -15% to 240 VAC +10% 1)		-
Mains input voltage, 3-phase	3x 200 VAC -15% to 240 VAC +10%		
Frequency	50 to 60 Hz ±5%		
Apparent power (at 240 VAC)	-		19 kVA
Apparent power (at 240 VAC), 1-phase	7 kVA	9.5 kVA	-
Apparent power (at 240 VAC), 3-phase	12.8 kVA	16.4 kVA	-
Max. assumed short circuit current (Isc) (short circuit current at connection point)	-	22 kA	
Max. assumed short circuit current (Isc) (short circuit current at connection point), 1-phase	5 kA	-	
Max. assumed short circuit current (Isc) (short circuit current at connection point), 3-phase	22 kA	-	
Max. mains current with optional mains choke			
At 230 VAC	19.5 A	26.5 A	37.1 A
Mains current			
At 200 VAC	-		53.3 A
At 200 VAC, 1-phase	34.9 A 2)	47.3 A 2)	-
At 200 VAC, 3-phase	35 A 3)	45 A 3)	-
At 240 VAC	-		45.8 A
At 240 VAC, 1-phase	29.9 A 2)	40.1 A 2)	-
At 240 VAC, 3-phase	30.8 A 3)	39.4 A 3)	-
Power dissipation at nominal load and nominal clock frequency	293 W	363 W	566 W
Integrated EMC filter	Yes 4)		No 4)
Line-conducted and radiated emissions			
With integrated filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-		
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	-		
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤10 m / ≤5 m 5)		-
With add-on filter	8I0FT026.300-1	8I0FT046.300-1	8I0FT072.300-1
With add-on filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤50 m / ≤20 m 6)		≤50 m / ≤25 m
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤100 m / ≤50 m 7)		≤100 m / ≤50 m
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤100 m / ≤50 m 7)		≤100 m / ≤50 m
Motor connection			
Derating of continuous output current depending on ambient temperature			
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)		
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).		
Derating of continuous output current depending on installation elevation			
Starting at 1000 m above sea level	1%, per 100 m		
Max. continuous output current (In)			
At 230 VAC, 1-phase	17.5 A 8)	27.5 A 8)	-
At 230 VAC, 3-phase	27.5 A 8)	33 A 8)	54 A
Max. transient current for 60 s, 1-phase	26.3 A	41.3 A	-
Max. transient current for 60 s, 3-phase	41.3 A	49.5 A	81 A
Max. transient current for 2 s, 1-phase	28.8 A	45.3 A	-
Max. transient current for 2 s, 3-phase	45.3 A	54.5 A	89.1 A
Output frequency range	0.5 to 599 Hz		
Nominal clock frequency	4 kHz		

Table 12: 8I84T200550.01P-1, 8I84T200750.01P-1, 8I84T201100.01P-1 - Technical data

Model number	8I84T200550.01P-1	8I84T200750.01P-1	8I84T201100.01P-1
Nominal clock frequency			
Min.	1 kHz		
Max.	16 kHz		
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s		
Braking torque			
With braking resistor	Up to 150% of the rated motor torque		
Without braking resistor (typical value)	30% of the rated motor torque		
Max. motor cable length			
Shielded cable	50 m [8]		100 m [8]
Non-shielded cable	100 m [8]		150 m [8]
Closed-loop motor control profiles			
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads		
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, over-current between output phases and ground, overvoltages on the DC bus, interrup-tions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply		
Motor protection	Thermal protection integrated in the inverter through continually cal-culating the I^2t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors		
Brake chopper			
Integrated dynamic brake transistors	Yes		
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s		
Min. resistance value (external)	11 Ω [9]	8 Ω [9]	3 Ω [9]
24 VDC supply			
Input voltage	24 VDC (min. 19 V, max. 30 V)		
Power consumption	30 W		
Available internal power supplies			
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)		
Output voltage 24 VDC			
Max. output current at 24 VDC	200 mA		
Output voltage 10.5 VDC	10.5 VDC ±5%		
Output voltage 10.5 VDC			
Max. output current 10.5 VDC	10 mA		
Safe input - Power removal			
Switching threshold			
Low	<5 V		
High	>15 V		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Quantity	1		
Nominal voltage	24 VDC		
Response time	≤100 ms		
Input impedance	1.5 kΩ		
Input circuit	Sink		
Interfaces			
Type	POWERLINK and CANopen		
Digital inputs			
Quantity	6 [10]		
Nominal voltage	24 VDC		
Input circuit	Source or sink		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Sampling time	<2 ms ±0.5 ms		
Input impedance	3.5 kΩ		
Analog inputs			
Quantity	2		
Electrical isolation			
Input - Input	No		
Input - ACOPOSinverter	Yes		
Input			
Voltage	±10 V		
Voltage/Current	0 to 10 V or 0 to 20 mA		

Table 12: 8I84T200550.01P-1, 8I84T200750.01P-1, 8I84T201100.01P-1 - Technical data

Model number	8I84T200550.01P-1	8I84T200750.01P-1	8I84T201100.01P-1
Resolution	±11 bits		
Sampling time	<2 ms ±0.5 ms		
Input impedance			
Voltage	30 kΩ		
Current	242 Ω		
Relay outputs			
Quantity	2		
Nominal voltage	30 VDC / 250 VAC		
Switching capacity			
Min.	3 mA for 24 VDC		
Max.			
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC		
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC		
Design			
Relay 1	1 NO contact and 1 NC contact with a common point		
Relay 2	1 NO contact		
Response time (max.)	<7 ms ±0.5 ms		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Analog outputs			
Quantity	1		
Output	0 to 10 V or 0 to 20 mA 11)		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Max. load impedance			
Voltage	470 Ω		
Current	500 Ω		
Update time	<2 ms ±0.5 ms		
Resolution	10-bit		
Operating conditions			
Installation at elevations above sea level	0 to 1000 m		
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)		
Ambient temperature	-10 to 50°C		
Max. ambient temperature	Up to 60°C		
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water		
Maximum installation elevation	Up to 3000 m 12)		
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)		
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2		
Operating position	Vertical mounting orientation ±10%		
Environmental conditions			
Temperature			
Storage	-25 to 70°C		
Vibration			
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g		
Shock			
Operation	15 g, 11 ms		
Mechanical characteristics			
Dimensions			
Width	175 mm	210 mm	230 mm
Height	295 mm		400 mm
Depth	187 mm	213 mm	
Weight	5.5 kg	7 kg	9 kg

Table 12: 8I84T200550.01P-1, 8I84T200750.01P-1, 8I84T201100.01P-1 - Technical data

1) A mains choke must be used.
2) Typical value for the specified motor power and the max. assumed short-circuit current (Isc). A mains choke is required for the power mains.
3) Typical value for the specified motor power and the max. assumed short-circuit current (Isc).
4) Shield plate included in delivery
5) For shielded motor cables
   ≤10 m → At a clock frequency of 4 kHz
   ≤5 m → At a clock frequency of 4.1 to 16 kHz
6) For shielded motor cables
   ≤50 m → At a clock frequency of 4 kHz
   ≤20 m → At a clock frequency of 4.1 to 16 kHz
7) For shielded motor cables
   ≤100 m → At a clock frequency of 4 kHz
   ≤50 m → At a clock frequency of 4.1 to 16 kHz
8) These values are valid for the rated clock frequency.
9) The min. resistance value is specified at a temperature of 20°C.

10) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
11) The analog output is configurable as a logic output.
12) From 1000 to 3000 m, current reduced by 1% per 100 m

1.3.4.1.4 8I84T201500.01P-1, 8I84T201850.01P-1, 8I84T202200.01P-1

Model number	8I84T201500.01P-1	8I84T201850.01P-1	8I84T202200.01P-1
General information			
Certifications			
CE	Yes		
KC	Yes		
UL	cULus E225616 Power conversion equipment		
Motor power			
Listed on nameplate	15 kW 20 PS	18.5 kW 25 PS	22 kW 30 PS
Mains connection			
Mains input voltage	3x 200 VAC -15% to 240 VAC +10%		
Frequency	50 to 60 Hz ±5%		
Apparent power (at 240 VAC)	25.6 kVA	28.7 kVA	33.3 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	22 kA		
Max. mains current with optional mains choke			
At 230 VAC	50.0 A	60.9 A	71.0 A
Mains current			
At 200 VAC	71.7 A	77 A	88 A
At 240 VAC	61.6 A	69 A	80 A
Power dissipation at nominal load and nominal clock frequency	620 W	657 W	766 W
Integrated EMC filter	No [1]		
Line-conducted and radiated emissions			
With add-on filter	8I0FT072.300-1	8I0FT090.300-1	
With add-on filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤50 m / ≤25 m [2]	≤50 m / ≤25 m [3]	
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤100 m / ≤50 m [4]	≤100 m / ≤50 m [5]	
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤100 m / ≤50 m [4]	≤100 m / ≤50 m [5]	
Motor connection			
Derating of continuous output current depending on ambient temperature			
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)		
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).		
Derating of continuous output current depending on installation elevation			
Starting at 1000 m above sea level	1%, per 100 m		
Max. continuous output current (In)			
At 230 VAC	66 A [6]	75 A [6]	88 A [6]
Max. transient current for 60 s	99 A	112 A	132 A
Max. transient current for 2 s	109 A	124 A	145 A
Output frequency range	0.5 to 599 Hz		
Nominal clock frequency	4 kHz	2.5 kHz	
Nominal clock frequency			
Min.	1 kHz		
Max.	16 kHz		
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s		
Braking torque			
With braking resistor	Up to 150% of the rated motor torque		
Without braking resistor (typical value)	30% of the rated motor torque		
Max. motor cable length			
Shielded cable	100 m [6]		
Non-shielded cable	150 m [6]		
Closed-loop motor control profiles			
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads		
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, overcurrent between output phases and ground, overvoltages on the DC bus, interruptions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply		

Table 13: 8I84T201500.01P-1, 8I84T201850.01P-1, 8I84T202200.01P-1 - Technical data

Model number	8I84T201500.01P-1	8I84T201850.01P-1	8I84T202200.01P-1
Motor protection	Thermal protection integrated in the inverter through continually calculating the I^2t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors		
Brake chopper			
Integrated dynamic brake transistors	Yes		
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s		
Min. resistance value (external)	3 Ω [7)]	4 Ω [8)]	3.3 Ω [7)]
24 VDC supply			
Input voltage	24 VDC (min. 19 V, max. 30 V)		
Power consumption	30 W		
Available internal power supplies			
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)		
Output voltage 24 VDC			
Max. output current at 24 VDC	200 mA		
Output voltage 10.5 VDC	10.5 VDC ±5%		
Output voltage 10.5 VDC			
Max. output current 10.5 VDC	10 mA		
Safe input - Power removal			
Switching threshold			
Low	<5 V		
High	>15 V		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Quantity	1		
Nominal voltage	24 VDC		
Response time	≤100 ms		
Input impedance	1.5 kΩ		
Input circuit	Sink		
Interfaces			
Type	POWERLINK and CANopen		
Digital inputs			
Quantity	6 [9)]		
Nominal voltage	24 VDC		
Input circuit	Source or sink		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Sampling time	<2 ms ±0.5 ms		
Input impedance	3.5 kΩ		
Analog inputs			
Quantity	2		
Electrical isolation			
Input - Input	No		
Input - ACOPOSinverter	Yes		
Input			
Voltage	±10 V		
Voltage/Current	0 to 10 V or 0 to 20 mA		
Resolution	±11 bits		
Sampling time	<2 ms ±0.5 ms		
Input impedance			
Voltage	30 kΩ		
Current	242 Ω		
Relay outputs			
Quantity	2		
Nominal voltage	30 VDC / 250 VAC		
Switching capacity			
Min.	3 mA for 24 VDC		
Max.			
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC		
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC		
Design			
Relay 1	1 NO contact and 1 NC contact with a common point		
Relay 2	1 NO contact		
Response time (max.)	<7 ms ±0.5 ms		

Table 13: 8I84T201500.01P-1, 8I84T201850.01P-1, 8I84T202200.01P-1 - Technical data

Model number	8I84T201500.01P-1	8I84T201850.01P-1	8I84T202200.01P-1
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Analog outputs			
Quantity	1		
Output	0 to 10 V or 0 to 20 mA [10]		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Max. load impedance			
Voltage	470 Ω		
Current	500 Ω		
Update time	<2 ms ±0.5 ms		
Resolution	10-bit		
Operating conditions			
Installation at elevations above sea level	0 to 1000 m		
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)		
Ambient temperature	-10 to 50°C		
Max. ambient temperature	Up to 60°C		
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water		
Maximum installation elevation	Up to 3000 m [11]		
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)		
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2		
Operating position	Vertical mounting orientation ±10%		
Environmental conditions			
Temperature			
Storage	-25 to 70°C		
Vibration			
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g		
Shock			
Operation	15 g, 11 ms		
Mechanical characteristics			
Dimensions			
Width	230 mm	240 mm	
Height	400 mm	420 mm	
Depth	213 mm	236 mm	
Weight	9 kg	30 kg	

Table 13: 8I84T201500.01P-1, 8I84T201850.01P-1, 8I84T202200.01P-1 - Technical data

1) Shield plate included in delivery
2) For shielded motor cables
≤50 m → At a clock frequency of 3.5 to 4 kHz
≤25 m → At a clock frequency of 4.1 to 12 kHz
3) For shielded motor cables
≤50 m → At a clock frequency of 2 to 2.5 kHz
≤25 m → At a clock frequency of 2.6 to 12 kHz
4) For shielded motor cables
≤100 m → At a clock frequency of 3.5 to 4 kHz
≤50 m → At a clock frequency of 4.1 to 12 kHz
5) For shielded motor cables
≤100 m → At a clock frequency of 2 to 2.5 kHz
≤50 m → At a clock frequency of 2.6 to 12 kHz
6) These values are valid for the rated clock frequency.
7) The min. resistance value is specified at a temperature of 20°C.
8) The min. resistance value is specified at a temperature of 20°C. In environments with temperatures over 20°C, the min. resistance listed in the table must be used.
9) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
10) The analog output is configurable as a logic output.
11) From 1000 to 3000 m, current reduced by 1% per 100 m

1.3.4.1.5 8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1

Model number	8I84T203000.01P-1	8I84T203700.01P-1	8I84T204500.01P-1
General information			
Certifications			
CE	Yes		
KC	Yes		
UL	cULus E225616 Power conversion equipment		
Motor power			
Listed on nameplate	30 kW 40 PS	37 kW 50 PS	45 kW 60 PS
Mains connection			
Mains input voltage	3x 200 VAC -15% to 240 VAC +10%		
Frequency	50 to 60 Hz ±5%		
Apparent power (at 240 VAC)	45.7 kVA	52.8 kVA	61.1 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	22 kA		
Max. mains current with optional mains choke			
At 230 VAC	95.6 A	116.7 A	140.6 A
Mains current			
At 200 VAC	124 A	141 A	167 A
At 240 VAC	110 A	127 A	147 A
Power dissipation at nominal load and nominal clock frequency	980 W	1154 W	1366 W
Integrated EMC filter	No [1]		
Line-conducted and radiated emissions			
With add-on filter	8I0FT180.300-1		
With add-on filter			
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤50 m / ≤25 m [2]		
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤100 m / ≤50 m [3]		
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤100 m / ≤50 m [3]		
Motor connection			
Derating of continuous output current depending on ambient temperature			
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)		
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).		
Derating of continuous output current depending on installation elevation			
Starting at 1000 m above sea level	1%, per 100 m		
Max. continuous output current (In)			
At 230 VAC	120 A [4]	144 A [4]	176 A [4]
Max. transient current for 60 s	180 A	216 A	264 A
Max. transient current for 2 s	198 A	238 A	290 A
Output frequency range	0.5 to 599 Hz		0.5 to 500 Hz
Nominal clock frequency	2.5 kHz		
Nominal clock frequency			
Min.	1 kHz		
Max.	16 kHz		
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s		
Braking torque			
With braking resistor	Up to 150% of the rated motor torque		
Without braking resistor (typical value)	30% of the rated motor torque		
Max. motor cable length			
Shielded cable	100 m [4]		
Non-shielded cable	150 m [4]		
Closed-loop motor control profiles			
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads		
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, over-current between output phases and ground, overvoltages on the DC bus, interrup-tions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply		

Table 14: 8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1 - Technical data

Model number	**8I84T203000.01P-1**	**8I84T203700.01P-1**	**8I84T204500.01P-1**
Motor protection	Thermal protection integrated in the inverter through continually calculating the I^2t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors		
Brake chopper			
Integrated dynamic brake transistors	Yes		
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s		
Min. resistance value (external)	3.3 Ω [5]	1.7 Ω [5]	
24 VDC supply			
Input voltage	24 VDC (min. 19 V, max. 30 V)		
Power consumption	30 W		
Available internal power supplies			
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)		
Output voltage 24 VDC			
Max. output current at 24 VDC	200 mA		
Output voltage 10.5 VDC	10.5 VDC ±5%		
Output voltage 10.5 VDC			
Max. output current 10.5 VDC	10 mA		
Safe input - Power removal			
Switching threshold			
Low	<5 V		
High	>15 V		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Quantity	1		
Nominal voltage	24 VDC		
Response time	≤100 ms		
Input impedance	1.5 kΩ		
Input circuit	Sink		
Interfaces			
Type	POWERLINK and CANopen		
Digital inputs			
Quantity	6 [6]		
Nominal voltage	24 VDC		
Input circuit	Source or sink		
Electrical isolation			
Input - ACOPOSinverter	Yes		
Input - Input	No		
Sampling time	<2 ms ±0.5 ms		
Input impedance	3.5 kΩ		
Analog inputs			
Quantity	2		
Electrical isolation			
Input - Input	No		
Input - ACOPOSinverter	Yes		
Input			
Voltage	±10 V		
Voltage/Current	0 to 10 V or 0 to 20 mA		
Resolution	±11 bits		
Sampling time	<2 ms ±0.5 ms		
Input impedance			
Voltage	30 kΩ		
Current	242 Ω		
Relay outputs			
Quantity	2		
Nominal voltage	30 VDC / 250 VAC		
Switching capacity			
Min.	3 mA for 24 VDC		
Max.			
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC		
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC		
Design			
Relay 1	1 NO contact and 1 NC contact with a common point		
Relay 2	1 NO contact		
Response time (max.)	<7 ms ±0.5 ms		

Table 14: 8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1 - Technical data

Model number	8I84T203000.01P-1	8I84T203700.01P-1	8I84T204500.01P-1
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Analog outputs			
Quantity	1		
Output	0 to 10 V or 0 to 20 mA [7)]		
Electrical isolation			
Output - ACOPOSinverter	Yes		
Output - Output	No		
Max. load impedance			
Voltage	470 Ω		
Current	500 Ω		
Update time	<2 ms ±0.5 ms		
Resolution	10-bit		
Operating conditions			
Installation at elevations above sea level	0 to 1000 m		
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)		
Ambient temperature	-10 to 50°C		
Max. ambient temperature	Up to 60°C		
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water		
Maximum installation elevation	Up to 3000 m [8)]		
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)		
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2		
Operating position	Vertical mounting orientation ±10%		
Environmental conditions			
Temperature			
Storage	-25 to 70°C		
Vibration			
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g		
Shock			
Operation	15 g, 11 ms		
Mechanical characteristics			
Dimensions			
Width	320 mm		
Height	550 mm		
Depth	266 mm		
Weight	37 kg		

Table 14: 8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1 - Technical data

1) Shield plate included in delivery
2) For shielded motor cables
   ≤50 m → At a clock frequency of 2 to 2.5 kHz
   ≤25 m → At a clock frequency of 2.6 to 12 kHz
3) For shielded motor cables
   ≤100 m → At a clock frequency of 2 to 2.5 kHz
   ≤50 m → At a clock frequency of 2.6 to 12 kHz
4) These values are valid for the rated clock frequency.
5) The min. resistance value is specified at a temperature of 20°C.
6) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
7) The analog output is configurable as a logic output.
8) From 1000 to 3000 m, current reduced by 1% per 100 m

1.3.4.1.6 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1, 8I84T400300.01P-1

Model number	8I84T400075.01P-1	8I84T400150.01P-1	8I84T400220.01P-1	8I84T400300.01P-1
General information				
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Motor power				
Listed on nameplate	0.75 kW 1 PS	1.5 kW 2 PS	2.2 kW 3 PS	3 kW -
Mains connection				
Mains input voltage	3x 380 VAC -15% to 480 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 380 VAC)	2.4 kVA	3.8 kVA	5.4 kVA	7 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	5 kA			
Max. mains current with optional mains choke				
At 400 VAC	1.8 A	3.3 A	5.0 A	6.4 A
Mains current				
At 380 VAC	3.7 A	5.8 A	8.2 A	10.7 A
At 480 VAC	3 A	5.3 A	7.1 A	9 A
Power dissipation at nominal load and nominal clock frequency	44 W	64 W	87 W	114 W
Integrated EMC filter	Yes [1]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤10 m / ≤5 m [2]			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤10 m / ≤5 m [2]			
With add-on filter	8I0FT012.300-1			8I0FT026.300-1
With add-on filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤50 m / ≤20 m [3]			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤100 m / ≤50 m [4]			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤100 m / ≤50 m [4]			
Motor connection				
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of continuous output current depending on installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. continuous output current (In)				
At 380 VAC	2.3 A [5]	4.1 A [5]	5.8 A [5]	7.8 A [5]
At 460 VAC	2.1 A [5]	3.4 A [5]	4.8 A [5]	6.2 A [5]
Max. transient current for 60 s	3.5 A	6.2 A	8.7 A	11.7 A
Max. transient current for 2 s	3.8 A	6.8 A	9.6 A	12.9 A
Output frequency range	0.5 to 599 Hz			
Nominal clock frequency	4 kHz			
Nominal clock frequency				
Min.	1 kHz			
Max.	16 kHz			

Table 15: 8I84T400075.01P-1. 8I84T400150.01P-1. 8I84T400220.01P-1. 8I84T400300.01P-1 - Technical data

Model number	8I84T400075.01P-1	8I84T400150.01P-1	8I84T400220.01P-1	8I84T400300.01P-1
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s			
Braking torque				
With braking resistor	Up to 150% of the rated motor torque			
Without braking resistor (typical value)	30% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m [5]			
Non-shielded cable	100 m [5]			
Closed-loop motor control profiles				
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads			
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, overcurrent between output phases and ground, overvoltages on the DC bus, interruptions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply			
Motor protection	Thermal protection integrated in the inverter through continually calculating the I²t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s			
Min. resistance value (external)	56 Ω [6]			34 Ω [6]
24 VDC supply				
Input voltage	24 VDC (min. 19 V, max. 30 V)			
Power consumption	30 W			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)			
Output voltage 24 VDC				
Max. output current at 24 VDC	200 mA			
Output voltage 10.5 VDC	10.5 VDC ±5%			
Output voltage 10.5 VDC				
Max. output current 10.5 VDC	10 mA			
Safe input - Power removal				
Switching threshold				
Low	<5 V			
High	>15 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Quantity	1			
Nominal voltage	24 VDC			
Response time	≤100 ms			
Input impedance	1.5 kΩ			
Input circuit	Sink			
Interfaces				
Type	POWERLINK and CANopen			
Digital inputs				
Quantity	6 [7]			
Nominal voltage	24 VDC			
Input circuit	Source or sink			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	<2 ms ±0.5 ms			
Input impedance	3.5 kΩ			
Analog inputs				
Quantity	2			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	±10 V			
Voltage/Current	0 to 10 V or 0 to 20 mA			
Resolution	±11 bits			
Sampling time	<2 ms ±0.5 ms			

Table 15: 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1, 8I84T400300.01P-1 - Technical data

Model number	8I84T400075.01P-1	8I84T400150.01P-1	8I84T400220.01P-1	8I84T400300.01P-1
Input impedance				
Voltage	30 kΩ			
Current	242 Ω			
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Switching capacity				
Min.	3 mA for 24 VDC			
Max.				
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC			
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC			
Design				
Relay 1	1 NO contact and 1 NC contact with a common point			
Relay 2	1 NO contact			
Response time (max.)	<7 ms ±0.5 ms			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA [8)]			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	500 Ω			
Update time	<2 ms ±0.5 ms			
Resolution	10-bit			
Operating conditions				
Installation at elevations above sea level	0 to 1000 m			
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)			
Ambient temperature	-10 to 50°C			
Max. ambient temperature	Up to 60°C			
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 3000 m [9)]			
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2			
Operating position	Vertical mounting orientation ±10%			
Environmental conditions				
Temperature				
Storage	-25 to 70°C			
Vibration				
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g			
Shock				
Operation	15 g, 11 ms			
Mechanical characteristics				
Dimensions				
Width	130 mm			155 mm
Height	230 mm			260 mm
Depth	175 mm			187 mm
Weight	3 kg			4 kg

Table 15: 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1, 8I84T400300.01P-1 - Technical data

1) Shield plate included in delivery
2) For shielded motor cables
≤10 m → At a clock frequency of 4 kHz
≤5 m → At a clock frequency of 4.1 to 16 kHz
3) For shielded motor cables
≤50 m → At a clock frequency of 4 kHz
≤20 m → At a clock frequency of 4.1 to 16 kHz
4) For shielded motor cables
≤100 m → At a clock frequency of 4 kHz
≤50 m → At a clock frequency of 4.1 to 16 kHz
5) These values are valid for the rated clock frequency.
6) The min. resistance value is specified at a temperature of 20°C.

7) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
8) The analog output is configurable as a logic output.
9) From 1000 to 3000 m, current reduced by 1% per 100 m

1.3.4.1.7 8I84T400400.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1, 8I84T401100.01P-1

Model number	8I84T400400.01P-1	8I84T400550.01P-1	8I84T400750.01P-1	8I84T401100.01P-1
General information				
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Motor power				
Listed on nameplate	4 kW 5 PS	5.5 kW 7.5 PS	7.5 kW 10 PS	11 kW 15 PS
Mains connection				
Mains input voltage	3x 380 VAC -15% to 480 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 380 VAC)	9.3 kVA	13.4 kVA	17.8 kVA	24.1 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	5 kA	22 kA		
Max. mains current with optional mains choke				
At 400 VAC	8.3 A	11.4 A	15 A	21.9 A
Mains current				
At 380 VAC	14.1 A	20.3 A	27 A	36.6 A
At 480 VAC	11.5 A	17 A	22.2 A	30 A
Power dissipation at nominal load and nominal clock frequency	144 W	185 W	217 W	320 W
Integrated EMC filter	Yes [1]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤10 m / ≤5 m [2]		-	
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤10 m / ≤5 m [2]			
With add-on filter	8I0FT026.300-1	8I0FT035.300-1		8I0FT046.300-1
With add-on filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤50 m / ≤20 m [3]			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤100 m / ≤50 m [4]			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤100 m / ≤50 m [4]			
Motor connection				
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of continuous output current depending on installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. continuous output current (In)				
At 380 VAC	10.5 A [5]	14.3 A [5]	17.6 A [5]	27.7 A [5]
At 460 VAC	7.6 A [5]	11 A [5]	14 A [5]	21 A [5]
Max. transient current for 60 s	15.8 A	21.5 A	26.4 A	41.6 A
Max. transient current for 2 s	17.3 A	23.6 A	29 A	45.7 A
Output frequency range	0.5 to 599 Hz			
Nominal clock frequency	4 kHz			
Nominal clock frequency				
Min.	1 kHz			
Max.	16 kHz			

Table 16: 8I84T400400.01P-1. 8I84T400550.01P-1. 8I84T400750.01P-1. 8I84T401100.01P-1 - Technical data

Model number	8I84T400400.01P-1	8I84T400550.01P-1	8I84T400750.01P-1	8I84T401100.01P-1
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s			
Braking torque				
With braking resistor	Up to 150% of the rated motor torque			
Without braking resistor (typical value)	30% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m [5]			
Non-shielded cable	100 m [5]			
Closed-loop motor control profiles				
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads			
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, overcurrent between output phases and ground, overvoltages on the DC bus, interruptions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply			
Motor protection	Thermal protection integrated in the inverter through continually calculating the I^2t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s			
Min. resistance value (external)	34 Ω [6]	23 Ω [6]	19 Ω [6]	12 Ω [6]
24 VDC supply				
Input voltage	24 VDC (min. 19 V, max. 30 V)			
Power consumption	30 W			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)			
Output voltage 24 VDC				
Max. output current at 24 VDC	200 mA			
Output voltage 10.5 VDC	10.5 VDC ±5%			
Output voltage 10.5 VDC				
Max. output current 10.5 VDC	10 mA			
Safe input - Power removal				
Switching threshold				
Low	<5 V			
High	>15 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Quantity	1			
Nominal voltage	24 VDC			
Response time	≤100 ms			
Input impedance	1.5 kΩ			
Input circuit	Sink			
Interfaces				
Type	POWERLINK and CANopen			
Digital inputs				
Quantity	6 [7]			
Nominal voltage	24 VDC			
Input circuit	Source or sink			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	<2 ms ±0.5 ms			
Input impedance	3.5 kΩ			
Analog inputs				
Quantity	2			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	±10 V			
Voltage/Current	0 to 10 V or 0 to 20 mA			
Resolution	±11 bits			
Sampling time	<2 ms ±0.5 ms			

Table 16: 8I84T400400.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1, 8I84T401100.01P-1 - Technical data

Model number	8I84T400400.01P-1	8I84T400550.01P-1	8I84T400750.01P-1	8I84T401100.01P-1
Input impedance				
Voltage	30 kΩ			
Current	242 Ω			
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Switching capacity				
Min.	3 mA for 24 VDC			
Max.				
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC			
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC			
Design				
Relay 1	1 NO contact and 1 NC contact with a common point			
Relay 2	1 NO contact			
Response time (max.)	<7 ms ±0.5 ms			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA [8)]			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	500 Ω			
Update time	<2 ms ±0.5 ms			
Resolution	10-bit			
Operating conditions				
Installation at elevations above sea level	0 to 1000 m			
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)			
Ambient temperature	-10 to 50°C			
Max. ambient temperature	Up to 60°C			
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 3000 m [9)]			
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2			
Operating position	Vertical mounting orientation ±10%			
Environmental conditions				
Temperature				
Storage	-25 to 70°C			
Vibration				
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g			
Shock				
Operation	15 g, 11 ms			
Mechanical characteristics				
Dimensions				
Width	155 mm	175 mm		210 mm
Height	260 mm	295 mm		
Depth	187 mm			213 mm
Weight	4 kg	5.5 kg		7 kg

Table 16: 8I84T400400.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1, 8I84T401100.01P-1 - Technical data

1) Shield plate included in delivery
2) For shielded motor cables
   ≤10 m → At a clock frequency of 4 kHz
   ≤5 m → At a clock frequency of 4.1 to 16 kHz
3) For shielded motor cables
   ≤50 m → At a clock frequency of 4 kHz
   ≤20 m → At a clock frequency of 4.1 to 16 kHz
4) For shielded motor cables
   ≤100 m → At a clock frequency of 4 kHz
   ≤50 m → At a clock frequency of 4.1 to 16 kHz
5) These values are valid for the rated clock frequency.
6) The min. resistance value is specified at a temperature of 20°C.

7) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
8) The analog output is configurable as a logic output.
9) From 1000 to 3000 m, current reduced by 1% per 100 m

1.3.4.1.8 8I84T401500.01P-1, 8I84T401850.01P-1, 8I84T402200.01P-1, 8I84T403000.01P-1

Model number	8I84T401500.01P-1	8I84T401850.01P-1	8I84T402200.01P-1	8I84T403000.01P-1
General information				
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Motor power				
Listed on nameplate	15 kW 20 PS	18.5 kW 25 PS	22 kW 30 PS	30 kW 40 PS
Mains connection				
Mains input voltage	3x 380 VAC -15% to 480 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 380 VAC)	31.6 kVA	29.9 kVA	32.9 kVA	43.4 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	22 kA			
Max. mains current with optional mains choke				
At 400 VAC	28.8 A	35.3 A	40.9 A	54.5 A
Mains current				
At 380 VAC	48 A	45.5 A	50 A	66 A
At 480 VAC	39 A	37.5 A	42 A	56 A
Power dissipation at nominal load and nominal clock frequency	392 W	486 W	574 W	799 W
Integrated EMC filter	Yes [1]			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤10 m / ≤5 m [2]	≤50 m / ≤25 m [3]		
With add-on filter	8I0FT072.300-1		8I0FT090.300-1	8I0FT092.300-1
With add-on filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤100 m [4]			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤300 m / ≤200 m [5]			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤300 m / ≤200 m [5]			
Motor connection				
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of continuous output current depending on installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. continuous output current (In)				
At 380 VAC	33 A [6]	41 A [6]	48 A [6]	66 A [6]
At 460 VAC	27 A [6]	34 A [6]	40 A [6]	56 A [6]
Max. transient current for 60 s	49.5 A	61.5 A	72 A	99 A
Max. transient current for 2 s	54.5 A	67.7 A	79.2 A	109 A
Output frequency range	0.5 to 599 Hz			
Nominal clock frequency	4 kHz			
Nominal clock frequency				
Min.	1 kHz			
Max.	16 kHz			

Table 17: 8I84T401500.01P-1. 8I84T401850.01P-1. 8I84T402200.01P-1. 8I84T403000.01P-1 - Technical data

Model number	8I84T401500.01P-1	8I84T401850.01P-1	8I84T402200.01P-1	8I84T403000.01P-1
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s			
Braking torque				
With braking resistor	Up to 150% of the rated motor torque			
Without braking resistor (typical value)	30% of the rated motor torque			
Max. motor cable length				
Shielded cable	50 m 6)	100 m 6)		
Non-shielded cable	100 m 6)	150 m 6)		
Closed-loop motor control profiles				
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads			
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, overcurrent between output phases and ground, overvoltages on the DC bus, interruptions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply			
Motor protection	Thermal protection integrated in the inverter through continually calculating the I²t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s			
Min. resistance value (external)	7 Ω 7)		13.3 Ω 7)	
24 VDC supply				
Input voltage	24 VDC (min. 19 V, max. 30 V)			
Power consumption	30 W			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)			
Output voltage 24 VDC				
Max. output current at 24 VDC	200 mA			
Output voltage 10.5 VDC	10.5 VDC ±5%			
Output voltage 10.5 VDC				
Max. output current 10.5 VDC	10 mA			
Safe input - Power removal				
Switching threshold				
Low	<5 V			
High	>15 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Quantity	1			
Nominal voltage	24 VDC			
Response time	≤100 ms			
Input impedance	1.5 kΩ			
Input circuit	Sink			
Interfaces				
Type	POWERLINK and CANopen			
Digital inputs				
Quantity	6 8)			
Nominal voltage	24 VDC			
Input circuit	Source or sink			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	<2 ms ±0.5 ms			
Input impedance	3.5 kΩ			
Analog inputs				
Quantity	2			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	±10 V			
Voltage/Current	0 to 10 V or 0 to 20 mA			
Resolution	±11 bits			
Sampling time	<2 ms ±0.5 ms			

Table 17: 8I84T401500.01P-1, 8I84T401850.01P-1, 8I84T402200.01P-1, 8I84T403000.01P-1 - Technical data

Model number	8I84T401500.01P-1	8I84T401850.01P-1	8I84T402200.01P-1	8I84T403000.01P-1
Input impedance				
Voltage	30 kΩ			
Current	242 Ω			
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Switching capacity				
Min.	3 mA for 24 VDC			
Max.				
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC			
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC			
Design				
Relay 1	1 NO contact and 1 NC contact with a common point			
Relay 2	1 NO contact			
Response time (max.)	<7 ms ±0.5 ms			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA [9]			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	500 Ω			
Update time	<2 ms ±0.5 ms			
Resolution	10-bit			
Operating conditions				
Installation at elevations above sea level	0 to 1000 m			
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)			
Ambient temperature	-10 to 50°C			
Max. ambient temperature	Up to 60°C			
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 3000 m [10]			
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2			
Operating position	Vertical mounting orientation ±10%			
Environmental conditions				
Temperature				
Storage	-25 to 70°C			
Vibration				
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g			
Shock				
Operation	15 g, 11 ms			
Mechanical characteristics				
Dimensions				
Width	230 mm		240 mm	
Height	400 mm		420 mm	550 mm
Depth	213 mm		236 mm	266 mm
Weight	9 kg		30 kg	37 kg

Table 17: 8I84T401500.01P-1, 8I84T401850.01P-1, 8I84T402200.01P-1, 8I84T403000.01P-1 - Technical data

1) Shield plate included in delivery
2) For shielded motor cables
≤10 m → At a clock frequency of 4 kHz
≤5 m → At a clock frequency of 4.1 to 16 kHz
3) For shielded motor cables
≤50 m → At a clock frequency of 4 kHz
≤25 m → At a clock frequency of 4.1 to 16 kHz
4) For shielded motor cables
≤100 m → at a clock frequency of 3.5 to 4 kHz and at a clock frequency of 4.1 to 12 kHz
5) For shielded motor cables
≤300 m → At a clock frequency of 3.5 to 4 kHz
≤200 m → At a clock frequency of 4.1 to 12 kHz
6) These values are valid for the rated clock frequency.
7) The min. resistance value is specified at a temperature of 20°C.

8) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
9) The analog output is configurable as a logic output.
10) From 1000 to 3000 m, current reduced by 1% per 100 m

1.3.4.1.9 8I84T403700.01P-1, 8I84T404500.01P-1, 8I84T405500.01P-1, 8I84T407500.01P-1

Model number	8I84T403700.01P-1	8I84T404500.01P-1	8I84T405500.01P-1	8I84T407500.01P-1
General information				
Certifications				
CE	Yes			
KC	Yes			
UL	cULus E225616 Power conversion equipment			
Motor power				
Listed on nameplate	37 kW 50 PS	45 kW 60 PS	55 kW 75 PS	75 kW 100 PS
Mains connection				
Mains input voltage	3x 380 VAC -15% to 480 VAC +10%			
Frequency	50 to 60 Hz ±5%			
Apparent power (at 380 VAC)	55.3 kVA	68.5 kVA	79 kVA	109.9 kVA
Max. assumed short circuit current (Isc) (short circuit current at connection point)	22 kA			
Max. mains current with optional mains choke				
At 400 VAC	67.3 A	81.5 A	98.9 A	135.7 A
Mains current				
At 380 VAC	84 A	104 A	120 A	167 A
At 480 VAC	69 A	85 A	101 A	137 A
Power dissipation at nominal load and nominal clock frequency	861 W	1060 W	1210 W	1720 W
Integrated EMC filter	Yes 1)			
Line-conducted and radiated emissions				
With integrated filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	-			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤50 m / ≤25 m 2)			
With add-on filter	8I0FT092.300-1	8I0FT180.300-1		
With add-on filter				
Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power system)	≤100 m 3)			
Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power system)	≤300 m / ≤200 m 4)			
Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system)	≤300 m / ≤200 m 4)			
Motor connection				
Derating of continuous output current depending on ambient temperature				
At nominal clock frequency (4 kHz or 2.5 kHz with higher inverter power)	No derating (up to 50°C)			
Other clock frequencies	The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com).			
Derating of continuous output current depending on installation elevation				
Starting at 1000 m above sea level	1%, per 100 m			
Max. continuous output current (In)				
At 380 VAC	79 A 5)	94 A 5)	116 A 5)	160 A 5)
At 460 VAC	65 A 5)	77 A 5)	96 A 5)	124 A 5)
Max. transient current for 60 s	118.5 A	141 A	174 A	240 A
Max. transient current for 2 s	130 A	155 A	191 A	264 A
Output frequency range	0.5 to 599 Hz	0.5 to 500 Hz		
Nominal clock frequency	2.5 kHz			
Nominal clock frequency				
Min.	1 kHz			
Max.	16 kHz			

Table 18: 8I84T403700.01P-1. 8I84T404500.01P-1. 8I84T405500.01P-1. 8I84T407500.01P-1 - Technical data

Model number	8I84T403700.01P-1	8I84T404500.01P-1	8I84T405500.01P-1	8I84T407500.01P-1
Short-term overload torque (typical value)	170% of the motor's rated torque (typical value at ±10%) for 60 s 220% of the motor's rated torque (typical value at ±10%) for 2 s			
Braking torque				
With braking resistor	Up to 150% of the rated motor torque			
Without braking resistor (typical value)	30% of the rated motor torque			
Max. motor cable length				
Shielded cable	100 m [5]			
Non-shielded cable	150 m [5]			
Closed-loop motor control profiles				
Induction motor	Flux vector control (FVC) with encoder (voltage vector) (current vector) Flux vector control (SFVC) without encoder (voltage or current vector) Voltage/frequency ratio - V/f characteristic curve (2 or 5 points) ENA energy adjustment system for asymmetrical loads			
Main protective functions of inverter	Thermal protection against power stage overheating Protection against short circuits between the motor phases, line phase failures, overcurrent between output phases and ground, overvoltages on the DC bus, interruptions in the control loop, exceeding the speed limit. Safety function for: Over- and undervoltage of the power supply system, line phase failure with 3-phase supply			
Motor protection	Thermal protection integrated in the inverter through continually calculating the I²t value while taking the speed into consideration: -The thermal state of the motor is stored when the frequency inverter is switched off. -The functionality can be adjusted according to the motor type (external cooling or self-cooling) using an operator interface. Protection against motor phase failures Protection provided by PTC sensors			
Brake chopper				
Integrated dynamic brake transistors	Yes			
Operating ratio for dynamic brake transistors	The dynamic brake transistor is designed to tolerate the following values: -Nominal motor power continuously -150% of the nominal motor power for 60 s			
Min. resistance value (external)	6.7 Ω [6]	5 Ω [6]		3.3 Ω [6]
24 VDC supply				
Input voltage	24 VDC (min. 19 V, max. 30 V)			
Power consumption	30 W			
Available internal power supplies				
Output voltage 24 VDC	24 VDC (min. 21 V, max. 27 V)			
Output voltage 24 VDC				
Max. output current at 24 VDC	200 mA			
Output voltage 10.5 VDC	10.5 VDC ±5%			
Output voltage 10.5 VDC				
Max. output current 10.5 VDC	10 mA			
Safe input - Power removal				
Switching threshold				
Low	<5 V			
High	>15 V			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Quantity	1			
Nominal voltage	24 VDC			
Response time	≤100 ms			
Input impedance	1.5 kΩ			
Input circuit	Sink			
Interfaces				
Type	POWERLINK and CANopen			
Digital inputs				
Quantity	6 [7]			
Nominal voltage	24 VDC			
Input circuit	Source or sink			
Electrical isolation				
Input - ACOPOSinverter	Yes			
Input - Input	No			
Sampling time	<2 ms ±0.5 ms			
Input impedance	3.5 kΩ			
Analog inputs				
Quantity	2			
Electrical isolation				
Input - Input	No			
Input - ACOPOSinverter	Yes			
Input				
Voltage	±10 V			
Voltage/Current	0 to 10 V or 0 to 20 mA			
Resolution	±11 bits			
Sampling time	<2 ms ±0.5 ms			

Table 18: 8I84T403700.01P-1, 8I84T404500.01P-1, 8I84T405500.01P-1, 8I84T407500.01P-1 - Technical data

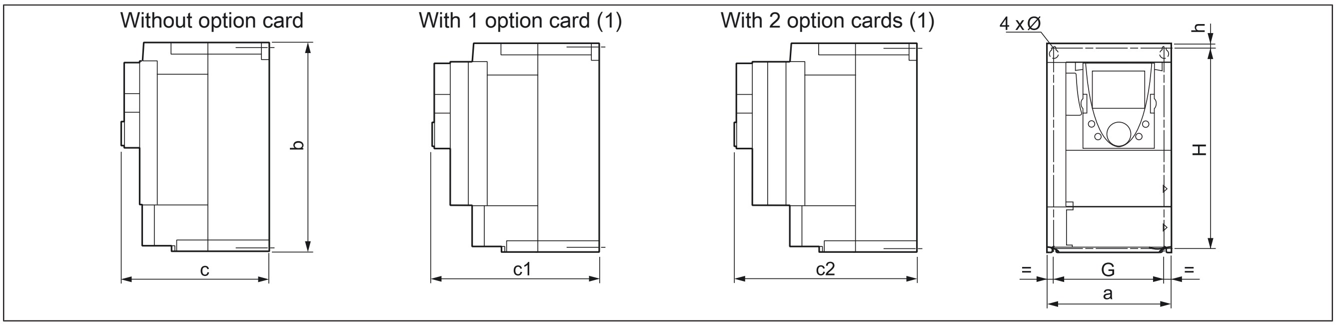
Model number	8I84T403700.01P-1	8I84T404500.01P-1	8I84T405500.01P-1	8I84T407500.01P-1
Input impedance				
Voltage	30 kΩ			
Current	242 Ω			
Relay outputs				
Quantity	2			
Nominal voltage	30 VDC / 250 VAC			
Switching capacity				
Min.	3 mA for 24 VDC			
Max.				
With resistive load (cos φ = 1 and L/R = 0 ms)	2 A for 250 VAC or 30 VDC			
With inductive load (cos φ = 0.4 and L/R = 7 ms)	1.5 A for 250 VAC or 30 VDC			
Design				
Relay 1	1 NO contact and 1 NC contact with a common point			
Relay 2	1 NO contact			
Response time (max.)	<7 ms ±0.5 ms			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Analog outputs				
Quantity	1			
Output	0 to 10 V or 0 to 20 mA 8)			
Electrical isolation				
Output - ACOPOSinverter	Yes			
Output - Output	No			
Max. load impedance				
Voltage	470 Ω			
Current	500 Ω			
Update time	<2 ms ±0.5 ms			
Resolution	10-bit			
Operating conditions				
Installation at elevations above sea level	0 to 1000 m			
Degree of protection per EN 60529	Upper part: IP21 and IP41 Lower part: IP54 (heat sink)			
Ambient temperature	-10 to 50°C			
Max. ambient temperature	Up to 60°C			
Relative humidity per IEC 60068-2-3	5 to 95%, non-condensing No dripping water			
Maximum installation elevation	Up to 3000 m 9)			
Max. pollution degree per IEC/EN 61800-5-1	2 (non-conductive pollution)			
Environmental conditions per IEC 60721-3-3	Class 3C1 and 3S2			
Operating position	Vertical mounting orientation ±10%			
Environmental conditions				
Temperature				
Storage	-25 to 70°C			
Vibration				
Operation	3 to 13 Hz: 1.5 mm amplitude / 13 to 200 Hz: 1 g			
Shock				
Operation	15 g, 11 ms			
Mechanical characteristics				
Dimensions				
Width	240 mm	320 mm		
Height	550 mm	630 mm		
Depth	266 mm	290 mm		
Weight	37 kg	45 kg		

Table 18: 8I84T403700.01P-1, 8I84T404500.01P-1, 8I84T405500.01P-1, 8I84T407500.01P-1 - Technical data

1) Shield plate included in delivery
2) For shielded motor cables
≤50 m → At a clock frequency of 2 to 2.5 kHz
≤25 m → At a clock frequency of 2.6 to 12 kHz
3) For shielded motor cables
≤100 m → At a clock frequency of 2 to 2.5 kHz and at a clock frequency of 2.6 to 12 kHz
4) For shielded motor cables
≤300 m → At a clock frequency of 2 to 2.5 kHz
≤200 m → At a clock frequency of 2.6 to 12 kHz
5) These values are valid for the rated clock frequency.
6) The min. resistance value is specified at a temperature of 20°C.
7) 1 logic input, configurable as a logic input or PTC sensor input using a switch. Input for max. 6 PTC sensors in series: Nominal value <1.5 kΩ, 3 kΩ trigger resistance, 1.8 kΩ reset value, short-circuit proof <50 Ω
8) The analog output is configurable as a logic output.
9) From 1000 to 3000 m, current reduced by 1% per 100 m

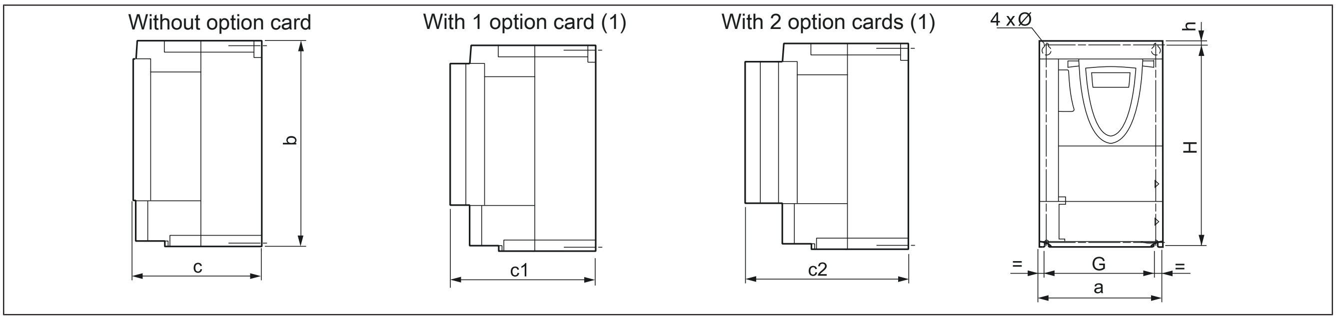
1.3.4.2 Mechanical data

1.3.4.2.1 With graphic display terminal



	a mm	b mm	c mm	c1 mm	c2 mm	G mm	H mm	h mm	ø mm	For Screws	Weight kg
8I84T200037.01P-1 **8I84T200075.01P-1** **8I84T200150.01P-1** **8I84T400075.01P-1** **8I84T400150.01P-1** **8I84T400220.01P-1**	130 (5.12)	230 (9.05)	175 (6.89)	198 (7.80)	221 (8.70)	113.5 (4.47)	220 (8.66)	5 (0.20)	5 (0.20)	M4	3 (6.61)
8I84T200220.01P-1 **8I84T200300.01P-1** **8I84T200400.01P-1** **8I84T400300.01P-1** **8I84T400400.01P-1**	155 (6.10)	260 (10.23)	187 (7.36)	210 (8.27)	233 (9.17)	138 (5.43)	249 (9.80)	4 (0.16)	5 (0.20)	M4	4 (8.82)
8I84T200550.01P-1 **8I84T400550.01P-1** **8I84T400750.01P-1**	175 (6.89)	295 (11.61)	187 (7.36)	210 (8.27)	233 (9.17)	158 (6.22)	283 (11.14)	6 (0.24)	5 (0.20)	M4	5.5 (12.13)
8I84T200750.01P-1 **8I84T401100.01P-1**	210 (8.27)	295 (11.61)	213 (8.39)	236 (9.29)	259 (10.20)	190 (7.48)	283 (11.14)	6 (0.24)	6 (0.24)	M5	7 (15.43)
8I84T201100.01P-1 **8I84T201500.01P-1** **8I84T401500.01P-1** **8I84T401850.01P-1**	230 (9.05)	400 (15.75)	213 (8.39)	236 (9.29)	259 (10.20)	210 (8.26)	386 (15.20)	8 (0.31)	6 (0.24)	M5	9 (19.84)
8I84T201850.01P-1 **8I84T202200.01P-1** **8I84T402200.01P-1**	240 (9.45)	420 (16.54)	236 (9.29)	259 (10.20)	282 (11.10)	206 (8.11)	403 (15.87)	11 (0.45)	6 (0.24)	M5	30 (66.14)
8I84T403000.01P-1 **8I84T403700.01P-1**	240 (9.45)	550 (21.65)	266 (10.47)	289 (11.38)	312 (12.28)	206 (8.11)	531.5 (20.93)	11 (0.45)	6 (0.24)	M5	37 (81.57)
8I84T203000.01P-1 **8I84T203700.01P-1** **8I84T204500.01P-1**	320 (12.60)	550 (21.65)	266 (10.47)	289 (11.38)	312 (12.28)	280 (11.02)	524 (20.93)	20 (0.79)	9 (0.35)	M8	37 (81.57)
8I84T404500.01P-1 **8I84T405500.01P-1** **8I84T407500.01P-1**	320 (12.60)	630 (24.80)	290 (11.42)	313 (12.32)	334 (13.15)	280 (11.02)	604.5 (23.80)	15 (0.59)	9 (0.35)	M8	45 (99.21)

1.3.4.2.2 With no graphic display terminal



For a inverter with no graphic display terminal, the dimensions indicated in the table above for c, c1 and c2 is reduced by 26 mm. The rest of the dimensions remain unchanged.

(1) To add communication cards.

1.3.5 Max. leakage current

Material number	Power value (kW)	Input voltage (V)	Max. leakage current (mA)	
			at 240 V - 50 Hz	at 240 V - 60 Hz
8I84T200037.01P-1	0.37 / 0.4	240	1.2	1.5
8I84T200075.01P-1	0.75	240	1.2	1.5
8I84T200150.01P-1	1.5	240	1.2	1.5
8I84T200220.01P-1	2.2	240	1.8	2.2
8I84T200300.01P-1	3	240	1.8	2.2
8I84T200400.01P-1	3.7 / 4	240	1.8	2.2
8I84T200550.01P-1	5.5	240	1.8	2.2
8I84T200750.01P-1	7.5	240	1.8	2.2
8I84T201100.01P-1	11	240	4	4.7
8I84T201500.01P-1	15	240	4	4.7
8I84T201850.01P-1	18.5	240	0.2	0.2
8I84T202200.01P-1	22	240	0.2	0.2
8I84T203000.01P-1	30	240	0.2	0.2
8I84T203700.01P-1	37	240	0.2	0.2
8I84T204500.01P-1	45	240	0.2	0.2

Material number	Power value (kW)	Input voltage (V)	Max. leakage current (mA)	
			at 480 V - 50 Hz	at 480 V - 60 Hz
8I84T400075.01P-1	0.75	480	2.6	3.2
8I84T400150.01P-1	1.5	480	2.6	3.2
8I84T400220.01P-1	2.2	480	2.6	3.2
8I84T400300.01P-1	3	480	3	3.6
8I84T400400.01P-1	4	480	3	3.6
8I84T400550.01P-1	5.5	480	3.7	4.5
8I84T400750.01P-1	7.5	480	3.7	4.5
8I84T401100.01P-1	11	480	3.9	4.7
8I84T401500.01P-1	15	480	3.9	4.7
8I84T401850.01P-1	18.5	480	3.9	4.7
8I84T402200.01P-1	22	480	7.9	9.5
8I84T403000.01P-1	30	480	6	7.2
8I84T403700.01P-1	37	480	3	7.2
8I84T404500.01P-1	45	480	3.9	4.7
8I84T405500.01P-1	55	480	3.9	4.7
8I84T407500.01P-1	75	480	3.9	4.7

1.3.6 Mounting and temperature conditions

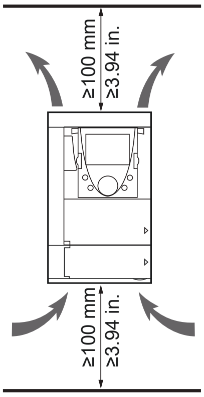
Install the frequency inverter vertically at ±10°.

Do not install the frequency inverter near heat sources.

Leave sufficient clearance so that the air required for cooling purposes can circulate from the bottom to the top of the device.

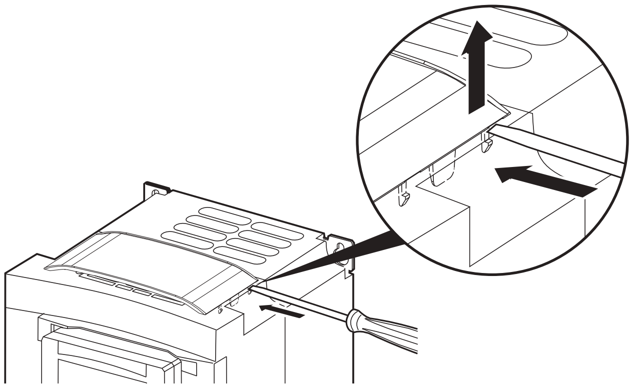
Leave a space of at least 10 mm front of the inverter.

If the degree of protection IP20 is sufficient, it is recommended that the protective cover on the inverter be removed as shown below.

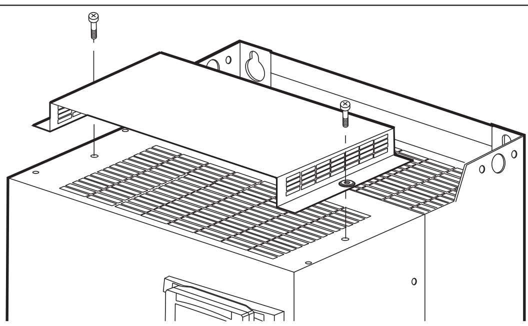


Removing the protective cover

8I84T200037.01P-1 to 8I84T201500.01P-1 and 8I84T400075.01P-1 to 8I84T401850.01P-1

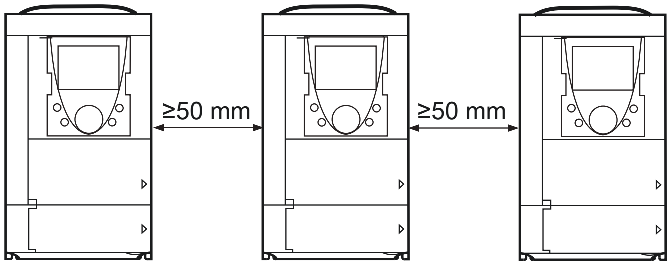


8I84T201850.01P-1 to 8I84T204500.01P-1 and 8I84T402200.01P-1 to 8I84T407500.01P-1

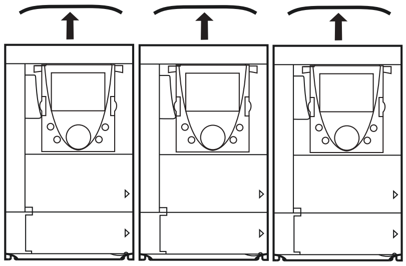


There are 2 possible installation types:

Installation type A Clearance ≥50 mm on each side, with mounted protective cover



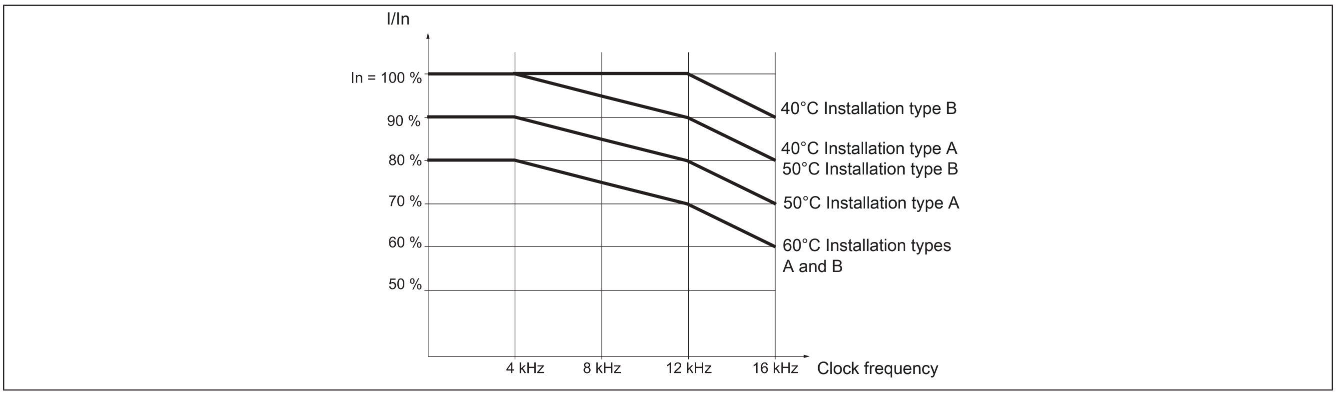
Installation type B Frequency inverters installed adjacent to each other with removed protective cover (degree of protection is IP20)



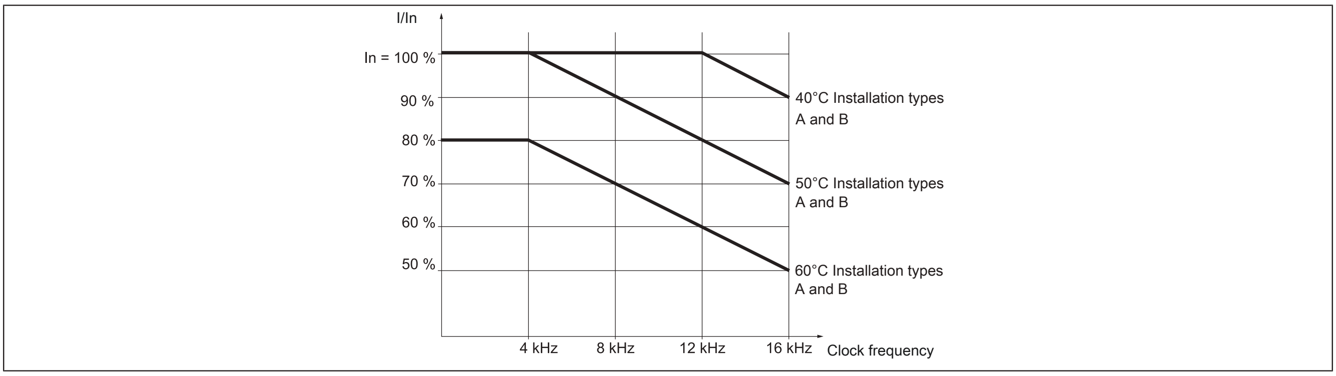
1.3.6.1 Derating curves

Declassification curves for the inverter current (In) based on temperature and switching frequency.

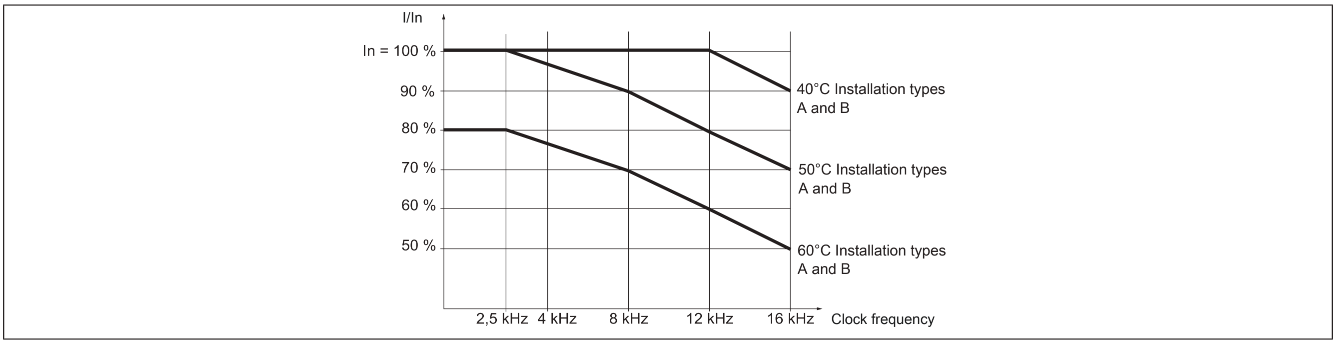
8I84T200037.01P-1 to 8I84T201500.01P-1 and 8I84T400075.01P-1 to 8I84T401850.01P-1



8I84T402200.01P-1 and 8I84T403000.01P-1 (1)



8I84T201850.01P-1 to 8I84T204500.01P-1 and 8I84T403700.01P-1 to 8I84T407500.01P-1 (1)



At intermediate temperatures (e.g. 55°C), the values of the two curves must be interpolated.

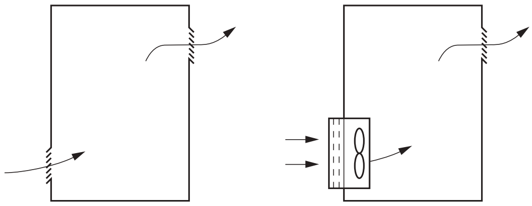
(1) Above 50°C, these inverters must be equipped with a control card cooling fan kit. See catalog.

1.3.7 Installation in a wall or free-standing enclosure

Refer to the installation recommendations on the next pages.

Ensure sufficient air circulation in the frequency inverter:

- Install ventilation grilles.
- Provide adequate ventilation: You may need to install a forced ventilation with a filter.
- Use specific IP54-filters.



1.3.7.1 Dust and humidity protected wall or free-standing enclosure (degree of protection IP54)

The frequency inverter must be installed in a dust and moisture-proof enclosure under certain ambient conditions: dust, corrosive gases, high air humidity with the danger of condensation and dripping water, splashes, etc.

To avoid the build-up of heat in the inverter, install a fan for the circulation of air in the enclosure, catalog number 8I0XF***.300-1 (see catalog).

1.3.7.2 Installation of the inverter in the enclosure

These power loss values apply for operation with the rated load and for the factory-set frequency.

	Power dissipation [W] 1)
8I84T200037.01P-1	46
8I84T200075.01P-1	66
8I84T200150.01P-1	101
8I84T200220.01P-1	122
8I84T200300.01P-1	154
8I84T200400.01P-1	191
8I84T200550.01P-1	293
8I84T200750.01P-1	363
8I84T201100.01P-1	566
8I84T201500.01P-1	620
8I84T201850.01P-1	657
8I84T202200.01P-1	766
8I84T203000.01P-1	980
8I84T203700.01P-1	1154
8I84T204500.01P-1	1366

1) 7 W must be added to this value for each additional option card.

	Power dissipation [W]1)
8I84T400075.01P-1	44
8I84T400150.01P-1	64
8I84T400220.01P-1	87
8I84T400300.01P-1	114
8I84T400400.01P-1	144
8I84T400550.01P-1	185
8I84T400750.01P-1	217
8I84T401100.01P-1	320
8I84T401500.01P-1	392
8I84T401850.01P-1	486
8I84T402200.01P-1	574
8I84T403000.01P-1	799
8I84T403700.01P-1	861
8I84T404500.01P-1	1060
8I84T405500.01P-1	1210
8I84T407500.01P-1	1720

1) 7 W must be added to this value for each additional option card.

Ensure that the air circulation in the enclosure for each inverter corresponds at least with the value specified in the following table.

	Throughput
	m^3/hr
8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1, 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1	17
8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1, 8I84T400300.01P-1, 8I84T400400.01P-1	56
8I84T200550.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1	112
8I84T200750.01P-1, 8I84T401100.01P-1	163

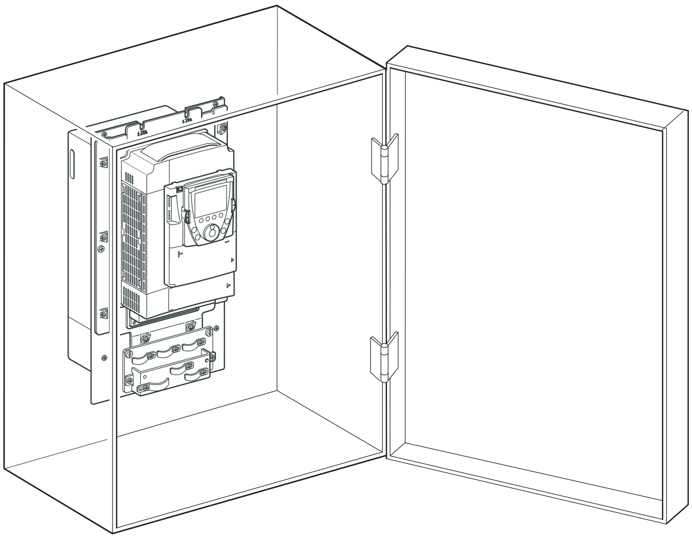
	Throughput
	m^3/hr
8I84T201100.01P-1, 8I84T201500.01P-1, 8I84T401500.01P-1, 8I84T401850.01P-1	252
8I84T201850.01P-1, 8I84T202200.01P-1, 8I84T402200.01P-1	203
8I84T403000.01P-1, 8I84T403700.01P-1	203
8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1	406
8I84T404500.01P-1, 8I84T405500.01P-1, 8I84T407500.01P-1	406

1.3.7.3 Dust and moisture protected installation

This type of installation is used for the reduction of the power dissipation in the enclosure if the power unit is installed outside of the enclosure.

The use of a kit for dust and moisture-proof installation is required for this 8I0MF***.300-1 (see catalog). The degree of protection of the inverter installed in this manner reaches IP54

See the instructions supplied with the kit for information about how to mount the kit to the inverter.



Power dissipation inside the enclosure with humidity and dust protected installation

These power loss values apply for operation with the rated load and for the factory-set frequency.

	Power dissipation [W] 1)
8I84T200037.01P-1	25
8I84T200075.01P-1	27
8I84T200150.01P-1	30
8I84T200220.01P-1	38
8I84T200300.01P-1	38
8I84T200400.01P-1	41
8I84T200550.01P-1	59
8I84T200750.01P-1	67
8I84T201100.01P-1	80
8I84T201500.01P-1	84
8I84T201850.01P-1	114
8I84T202200.01P-1	124
8I84T203000.01P-1	144
8I84T203700.01P-1	161
8I84T204500.01P-1	180

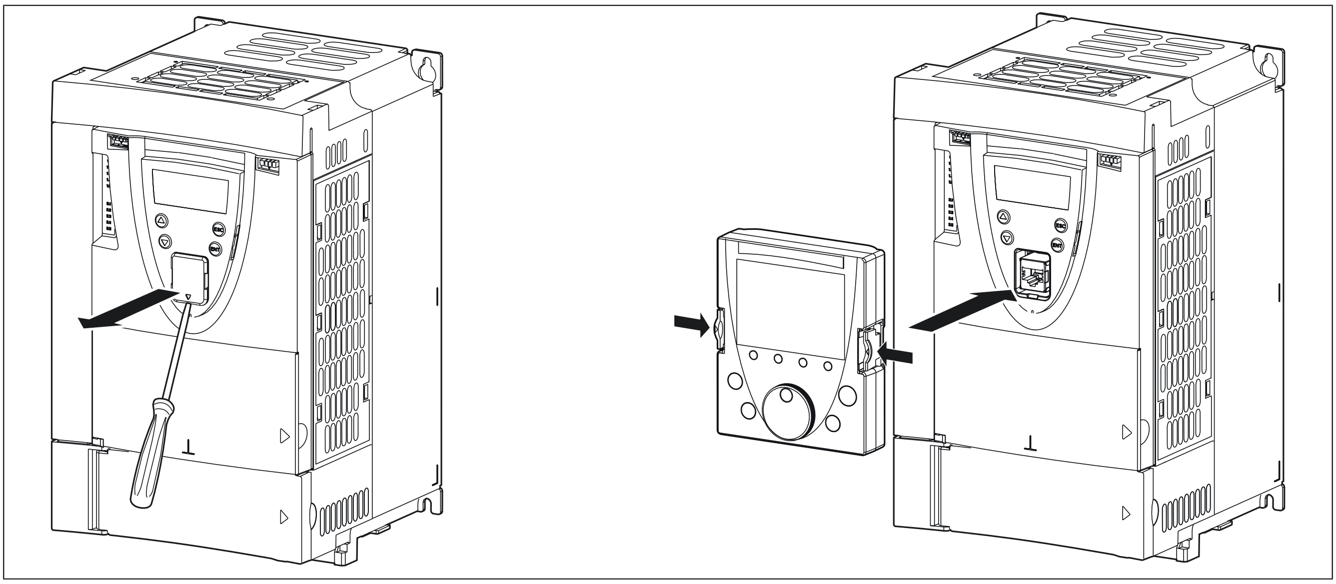
1) 7 W must be added to this value for each additional option card.

	Power dissipation [W]1)
8I84T400075.01P-1	26
8I84T400150.01P-1	28
8I84T400220.01P-1	30
8I84T400300.01P-1	35
8I84T400400.01P-1	40
8I84T400550.01P-1	50
8I84T400750.01P-1	55
8I84T401100.01P-1	65
8I84T401500.01P-1	85
8I84T401850.01P-1	86
8I84T402200.01P-1	110
8I84T403000.01P-1	133
8I84T403700.01P-1	137
8I84T404500.01P-1	165
8I84T405500.01P-1	178
8I84T407500.01P-1	225

1) 7 W must be added to this value for each additional option card.

1.3.8 Installation of the graphic display terminal

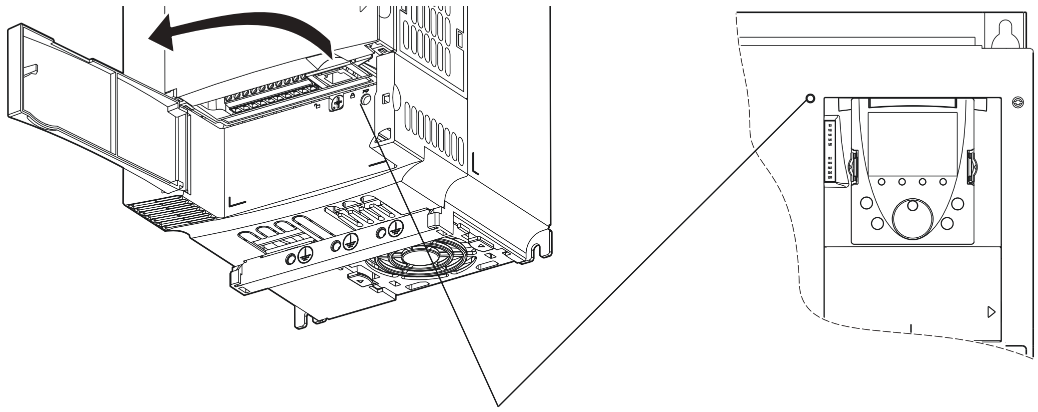
The ACOPOSinverter P84 is delivered without a graphic display terminal (8I0XD301.300-1). The terminal can be ordered separately. The installation of the terminal is shown below.



The graphic display terminal can be connected and removed again under voltage. Before removing the terminal, the inverter control of the terminals must be disabled (see programming guide).

1.3.9 Position of the LED status indicator of the capacitor charge

Before working on the frequency inverter, switch it off and wait until the red LED, which displays the charge level of the capacitors, is extinguished. Then measure the voltage of the DC bus.



The red LED indicates that the DC bus is under voltage.

Procedure for measuring the voltage of the DC bus.

Danger!

ELECTRICAL SHOCK HAZARD

Read the precautions **see "Before you begin" on page 12** **carefully before you perform this procedure.**

Failure to follow these instructions can result in death or injury.

The voltage of the DC bus can exceed 1000 VDC. When performing this procedure, use a voltage sensor with the correct rated voltage.

Measure the voltage of the DC bus as follows:

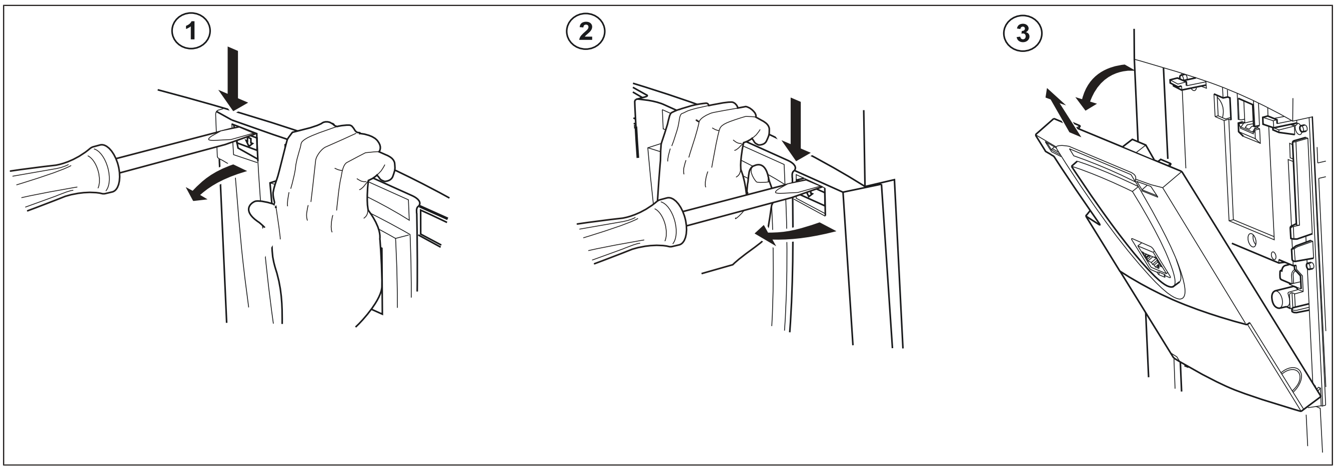
1. Interrupt the power supply of the inverter.
2. Wait 15 minutes to allow the DC bus capacitors to discharge.
3. Measure the voltage of the DC bus between the PA/+ and PC/- terminals to check that the voltage is less than 42 V.
   For detailed information about arranging the power terminals, see "Arrangement of the power terminals" on page 78.
4. If the capacitors of the DC bus are not fully discharged, contact your local B&R representation (do not repair the inverter and do not operate it).

1.3.10 Installing the option cards

The option cards should ideally be installed after the installation of the inverter and before it is wired. Check that the red LED for the display of the capacitor charge is off. Measure the voltage of the DC bus in accordance with the procedures described, see "Position of the LED status indicator of the capacitor charge" on page 69

The option cards are installed behind the front panel of the inverter. If the inverter is equipped with a graphic display terminal, remove it and then remove the front control panel as shown below.

Disassembly of the front control panel



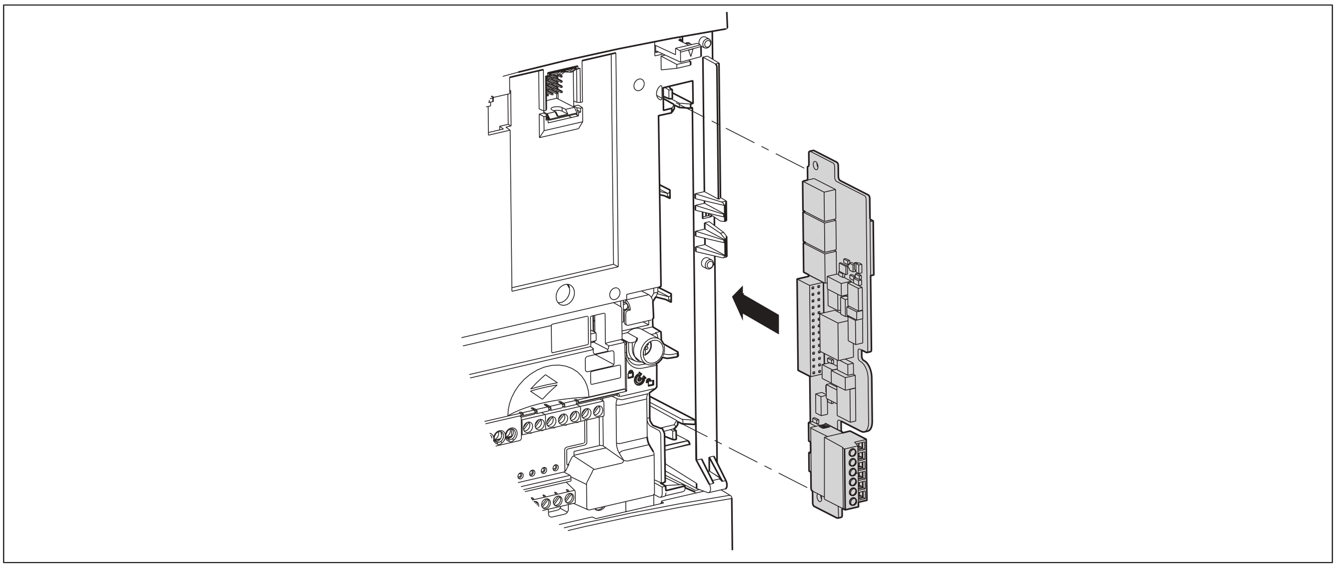
- Using a screwdriver, press on the release latch and pull to release the left-hand part of the front control panel.
- Perform the same procedure on the right hand side.
- Tilt the front control panel down and remove it.

Installation of an encoder interface card (8I0AC123.300-1 to 8I0AC123.304-1)

A special slot provided in the inverter for the encoder interface card.

Information:

If a communication option card has already been installed, this must be removed, so that the card slot provided for the encoder interface card is accessible.



Installation of a communication card (8I0IF108.400-1)

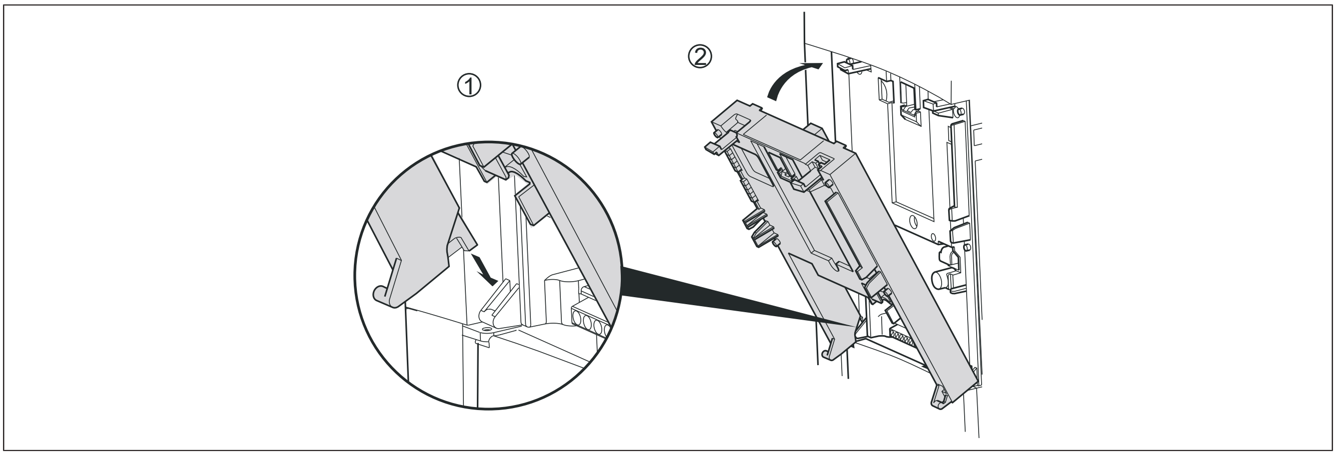
Caution!

RISK OF DETERIORATION OF THE CONNECTOR

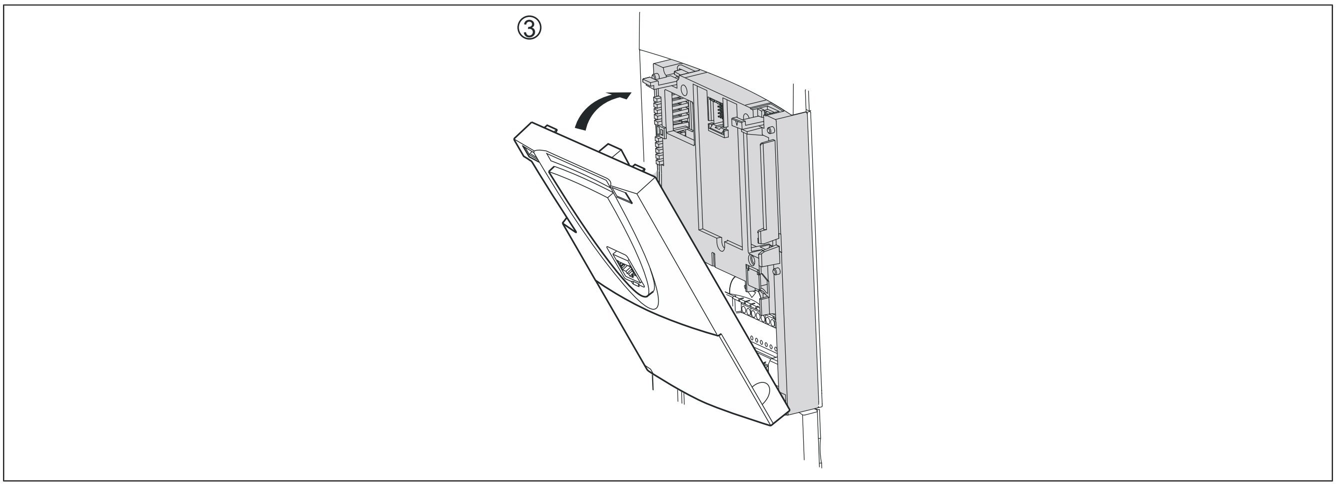
Place the option card correctly on the hooks so that the connector is not damaged.

Failure to follow this instruction can result in equipment damage.

1. Place the card on the locking hooks.
2. Tilt the card upward until it snaps into place.

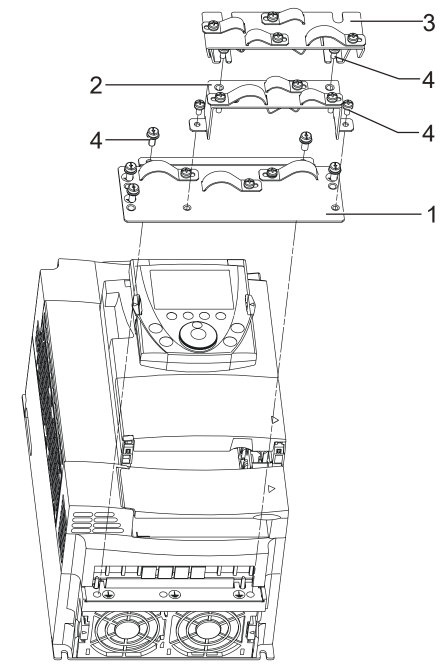


3. Place the front panel back on the option card. (The same procedure as when installing the option card, see 1 and 2).

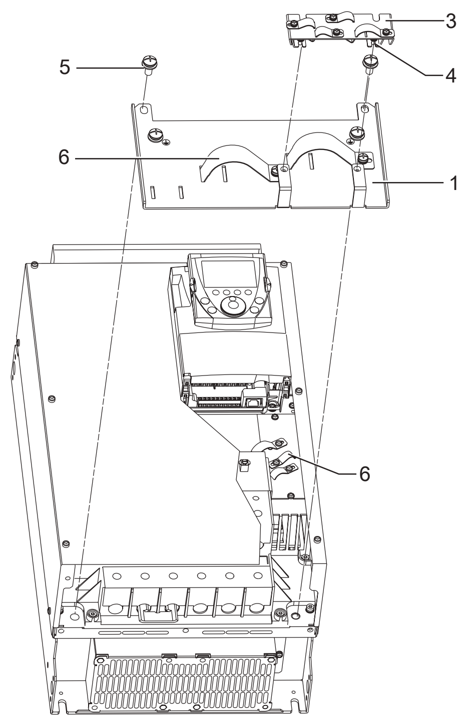


1.3.11 Installation of EMC plates

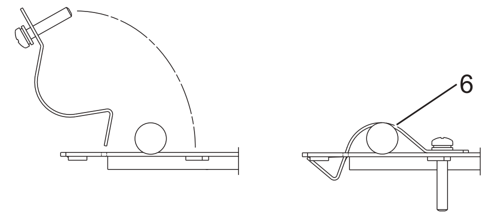
8I84T200037.01P-1 to 8I84T201500.01P-1 and 8I84T400075.01P-1 to 8I84T401850.01P-1



8I84T201850.01P-1 to 8I84T204500.01P-1 and 8I84T402200.01P-1 to 8I84T407500.01P-1

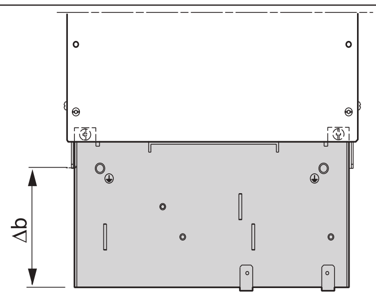


Installation of the EMC terminals



1. EMC plate for the power cable connection
2. EMC plate for the power cable connection (only for 8I84T200037.01P-1 to 8I84T201500.01P-1 and 8I84T400075.01P-1 to 8I84T401850.01P-1)
3. M4 screws (supplied)
4. M8 screws (supplied)
5. EMC terminals with captive screws (supplied)

	Δb	
	mm	in.
8I84T200037.01P-1 to 8I84T200400.01P-1, 8I84T400075.01P-1 to 8I84T400400.01P-1	55	2.17
8I84T200550.01P-1 to 8I84T201500.01P-1, 8I84T400550.01P-1 to 8I84T401850.01P-1	65	2.56
8I84T201850.01P-1 to 8I84T204500.01P-1, 8I84T402200.01P-1 to 8I84T407500.01P-1	120	4.12



1.3.12 Wiring recommendations

1.3.12.1 Power unit

The inverter must be connected to the protective grounding. To comply with the current rules for increased leakage currents (over 3.5 mA) requirements, use a protective conductor of at least 10 mm² or two protective conductors with the same conductor cross section as the conductors for the power supply of the power unit.

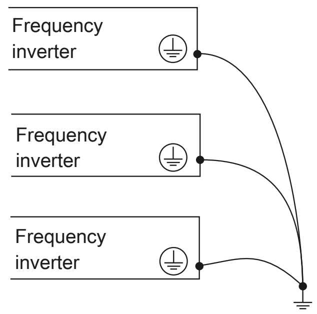
Danger!

ELECTRICAL SHOCK HAZARD

Connect the device to the protective grounding, using the grounding point provided, as shown in the following figure. The inverter panel must be properly grounded before power is applied.

Failure to follow this instruction can result in death or injury.

- Check that the resistance of the protective grounding is 1 ohm or less.
- Connect several inverters with the protective grounding, as shown in the illustration. Do not connect the cable to the protective ground in loop or in series.



Warning!

IMPROPER WIRING CONNECTIONS

- **The ACOPOSinverter P84 will be damaged if input line voltage is applied to the output terminals (U/T1,V/T2,W/T3).**
- **Check the power connections before energizing the ACOPOSinverter P84.**
- **If replacing the inverter, verify that the new inverter's electrical requirements comply with the wiring instructions in this manual.**

Failure to follow these instructions can result in death, serious injury or material damages.

If the installation specifications require upstream protection by means of a residual current device, you must use a "type A" device for single-phase inverters and a "type B" device for three-phase inverters. Choose a suitable model incorporating:

- High frequency current filtering
- Delay, which prevents tripping in the case of possible switching on of charged jamming capacity. The time delay is not possible for 30 mA devices. In this case, choose devices with immunity against nuisance tripping.

If the installation includes several frequency inverters, provide one "residual current device" per frequency inverter.

Warning!

INSUFFICIENT PROTECTION AGAINST OVERCURRENTS

- **Overcurrent protective devices must be properly coordinated.**
- **The Canadian Electrical Code and the National Electrical Code (USA) require branch circuit protection. Use the fuses recommended on the inverter nameplate to obtain the specified short-circuit current rating.**
- **Do not connect the inverter to a supply mains whose short-circuit capacity exceeds the assumed maximum short-circuit current specified on the nameplate of the inverter or in the tables see "Technical data" on page 29.**

Failure to follow these instructions can result in death, serious injury or material damages.

Keep the power cables separate from low-voltage signal circuits in the installation (sensors, PLCs, measuring apparatus, video, telephone, etc.).

The motor cables must have a minimum length of 0.5 m.

In certain situations where the motor cables have to pass under water, grounding currents could cause a tripping. Additional output filters must therefore be used.

Do not use a surge protector or capacitors with correction factor at the inverter output.

Caution!

IMPROPER USE OF A BRAKING RESISTOR

- **Only use the recommended braking resistors in our catalogs.**
- **Wire the thermal protection contact resistance so that the voltage supply of the inverter is immediately disconnected in the event of a fault (see instructions supplied with the resistor).**

Failure to follow these instructions can result in injury and/or equipment damage.

1.3.12.2 Control element

Route the control circuits and power circuits separately. For control and reference conductors, we recommend using shielded twisted cables with a pitch of between 25 mm and 50 mm. The shielding is grounded at each end.

If you use cable ducts, do not run motor, power and control cables in the same cable duct. Maintain at least 8 cm distance between the metal duct that contains the power supply cable and the metal duct with the control cables. Maintain at least 31 cm distance between the non-metallic pipes or cable ducts that contain the power cable and the metal ducts that contain the control cable. If it is necessary for control cables and power cables to cross, this must always be done at right angles.

1.3.12.3 Length of the motor cables

		0 m	10 m	50 m	100 m	150 m	300 m
8I84T200037.01P-1 to 8I84T200750.01P-1 8I84T400075.01P-1 to 8I84T401500.01P-1	Shielded cable						
8I84T200037.01P-1 to 8I84T200750.01P-1 8I84T400075.01P-1 to 8I84T401500.01P-1	Unshielded cable						
8I84T201100.01P-1 to 8I84T204500.01P-1 8I84T401850.01P-1 to 8I84T407500.01P-1	Shielded cable						
8I84T201100.01P-1 to 8I84T204500.01P-1 8I84T401850.01P-1 to 8I84T407500.01P-1	Unshielded cable						

With dU/dt filter

With sine wave filter

Accessories:

Information:

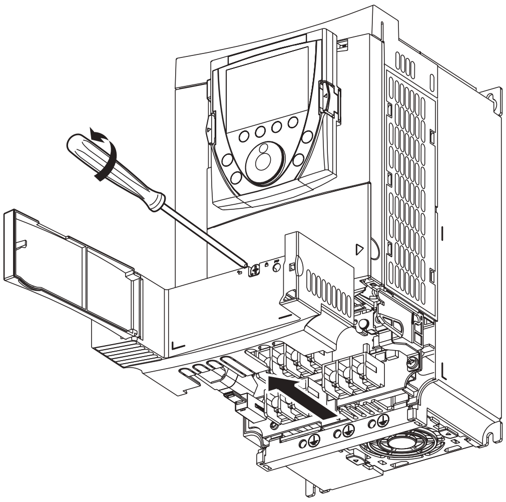
dU/dt and sine wave filters depend on the motor cable length and the frequency of the frequency inverter/IGBT. The selection of the dU/dt or sine-wave filter should be done in close cooperation with the filter manufacturer. A well-known manufacturer of dU/dt and sine-wave filters is Schneider Electronics.

1.3.13 Power terminals

1.3.13.1 Access to the power terminals

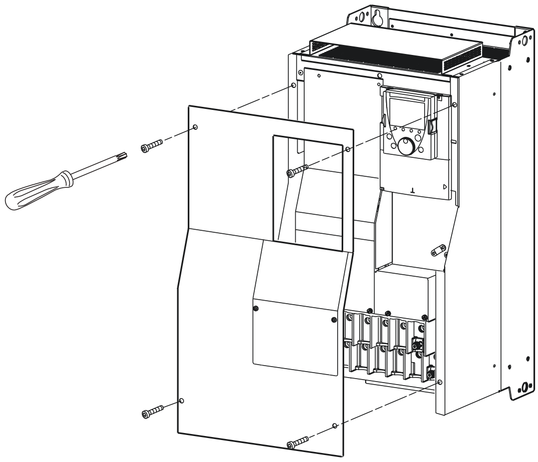
8I84T200037.01P-1 to 8I84T201500.01P-1 and 8I84T400075.01P-1 to 8I84T401850.01P-1

Unlock the door to the power unit and pull it out as shown below.



8I84T201850.01P-1 to 8I84T204500.01P-1 and 8I84T402200.01P-1 to 8I84T407500.01P-1

Remove the front panel as shown below, to gain access to the power terminals.



1.3.13.2 Characteristics and function of the power terminals

Terminal	Function
⏚	Terminal for connection to the protective grounding
R/L1 S/L2 T/L3	AC voltage supply for power unit
PO	Polarity+ of the DC bus
PA/+	Output to braking resistor (polarity+)
PB	Output to braking resistor
PC/-	DC bus polarity –
U/T1 V/T2 W/T3	Outputs to the motor

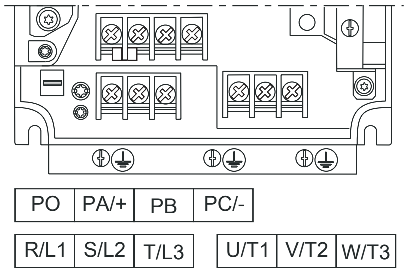
Information:

Remove the jumper between the PO and PA/+ only if a DC reactor has been added. The bolts of the PO and PA/+ terminals must always be tightened, as a high current flows through the busbar.

1.3.13.3 Arrangement of the power terminals

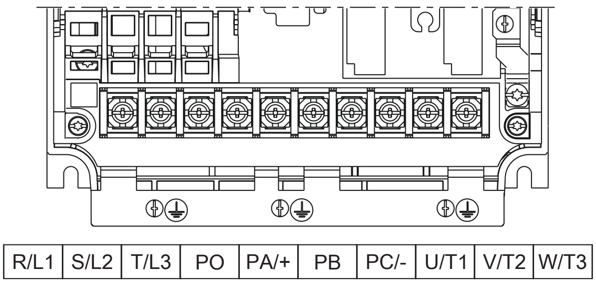
8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1, 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1, 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1, 8I84T400300.01P-1 and 8I84T400400.01P-1

	Maximum wire thickness		Tightening torque
	mm²	AWG	Nm
8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1, 8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1, 8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1, 8I84T400300.01P-1, 8I84T400400.01P-1	6	8	1.4



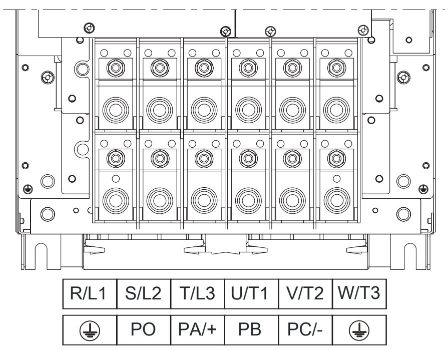
8I84T200550.01P-1, 8I84T200750.01P-1, 8I84T201100.01P-1, 8I84T201500.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1, 8I84T401100.01P-1, 8I84T401500.01P-1 and 8I84T401850.01P-1

	Maximum wire thickness		Tightening torque
	mm²	AWG	Nm
8I84T200550.01P-1, 8I84T400550.01P-1, 8I84T400750.01P-1	6	8	3
8I84T200750.01P-1, 8I84T401100.01P-1	16	4	3
8I84T201100.01P-1, 8I84T201500.01P-1, 8I84T401500.01P-1, 8I84T401850.01P-1	25	3	5.4



18I84T201850.01P-1, 8I84T202200.01P-1, 8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1, 8I84T402200.01P-1, 8I84T403000.01P-1, 8I84T403700.01P-1, 8I84T404500.01P-1, 8I84T405500.01P-1 and 8I84T407500.01P-1

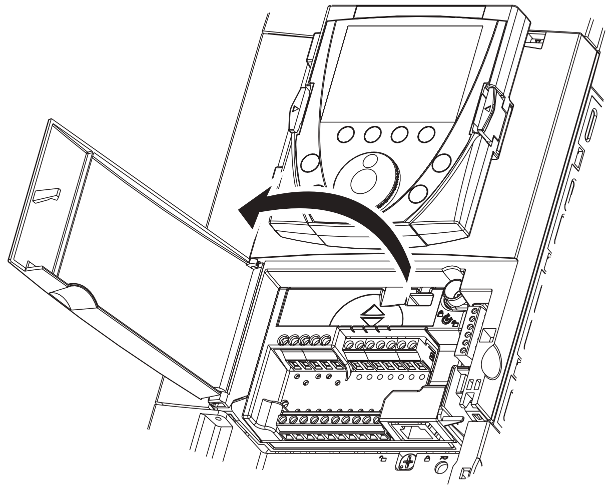
	Maximum wire thickness		Tightening torque
	mm²	AWG	Nm
8I84T201850.01P-1, 8I84T202200.01P-1, 8I84T402200.01P-1, 8I84T403000.01P-1, 8I84T403700.01P-1	50	1/0	12
8I84T203000.01P-1, 8I84T203700.01P-1, 8I84T204500.01P-1, 8I84T404500.01P-1, 8I84T405500.01P-1, 8I84T407500.01P-1	150	300	41



1.3.14 Control terminals

1.3.14.1 Access to the control terminals

Open the cover on the front panel of the frequency inverter to expose the control terminals.

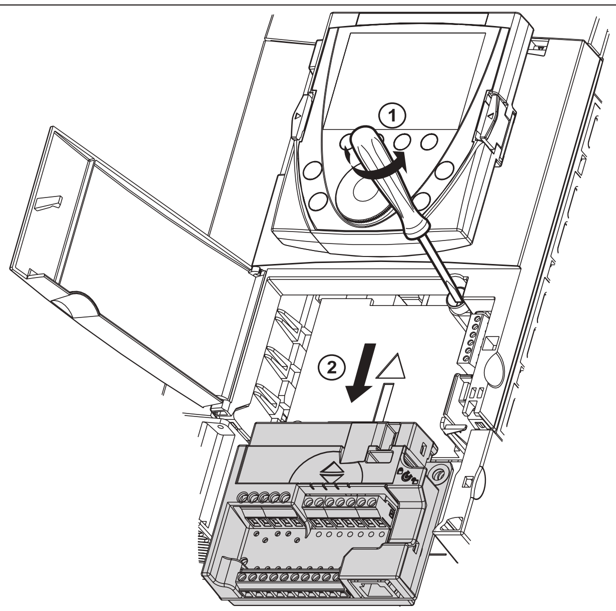


1.3.14.2 Removing the terminal card

For easier wiring of the control section of the inverter, the control terminal card can be removed.

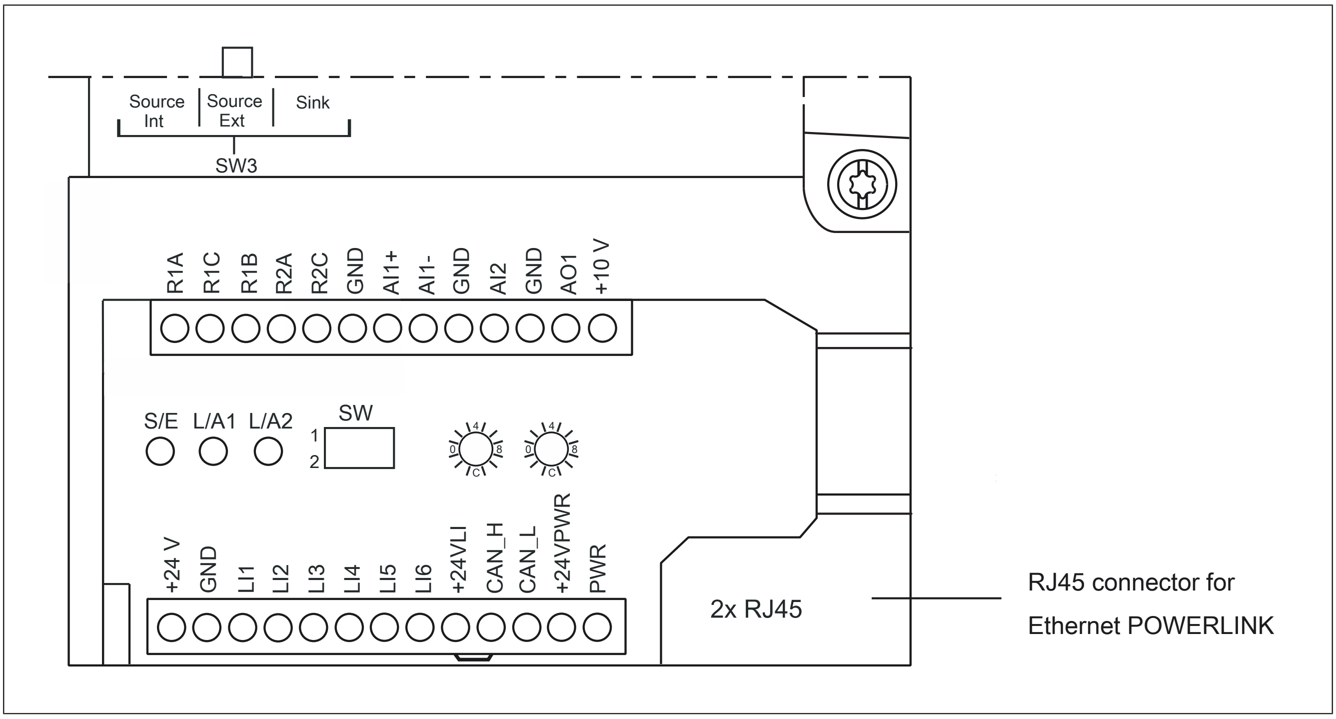
1. Turn the screw until the spring is fully extended.
2. Remove the card by sliding it downwards.

> **Caution!**
>
> **IMPROPER MOUNTING OF THE TERMINAL CARD**
>
> **When refitting the control terminal card, ensure that the captive screw is fully tightened.**
>
> **Failure to follow these instructions can result in injury and/or equipment damage.**



1.3.14.3 Arrangement of the control terminals

Maximum wire thickness: 1.5 mm²



1.3.14.4 Characteristics and function of the power terminals

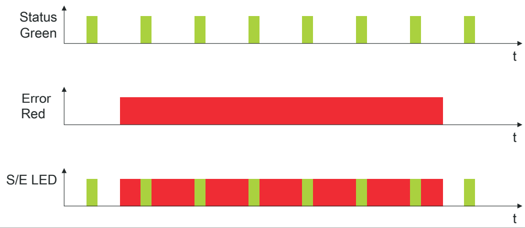
<table>
<tr><th>Terminal</th><th>Function</th><th>Electrical characteristics</th></tr>
<tr><td>R1A
R1B
R1C</td><td>Common point NC contact (R1C) of the R1 programmable relay</td><td rowspan="2">• Minimum switching capacity: 3 mA at 24 V
• Maximum switching power with a resistive load:
2 A at 250 V or 30 V
• Maximum switching power with an inductive load
(cos ϕ = 0.4 L/R = 7 ms):
1.5 A at 250 V or 30 V
• Response time: 7 ms ±0.5 ms
• Lifetime: 100,000 operations at maximum switching power</td></tr>
<tr><td>R2A
R2C</td><td>NO contact of programmable relay r2</td></tr>
<tr><td>GND</td><td>Analog I/O common</td><td>0 V</td></tr>
<tr><td>AI1+
AI1-</td><td>Differential analog input AI1</td><td>• -10 to 10 V (maximum permitted voltage 24 V)
• Response time: 2 ms ±0.5 ms, resolution 11 bits + 1 sign bit
• Accuracy with Δθ = 60°C (140°F), Linearity ±0.15% of maximum value</td></tr>
<tr><td>COM</td><td>Analog I/O common</td><td>0 V</td></tr>
<tr><td>AI2</td><td>Depends on the software configuration: Analog voltage input
or analog current input</td><td>• Analog input 0 to 10 V (maximum permitted voltage 24 V), impedance 30 kΩ
or
• Analog input X to Y mA; X and Y are programmable from 0 to 20 mA
• Impedance 250 Ω
• Response time: 2 ms ±0.5 ms
• Resolution11-bit , Accuracy with Δθ = 60°C (140°F), Linearity ±0.2% of maximum value
or
• Logic output: 0 to 10 V or 0 to 20 mA</td></tr>
<tr><td>COM</td><td>Analog I/O common</td><td>0 V</td></tr>
<tr><td>AO1</td><td>Depending on the software configuration:
Analog voltage output or
Analog current output</td><td>• Analog output 0 to 10 V, Min. load impedance 50 kΩ
or
• Analog input X to Y mA, X and Y are programmable from 0 to 20 mA
• Max. load impedance 500 Ω
• Resolution 10-bit , Response time: 2 ms ±0.5 ms
• Accuracy for Δθ = 60°F, Linearity ±0.2% of maximum value
or
• Logic output: 0 to 10 V or 0 to 20 mA.</td></tr>
<tr><td>+10 V</td><td>10 V voltage supply for the reference potentiometer 1 to 10 kΩ</td><td>• 10 V (10.5 V ±0.5 V)
• 30 W power</td></tr>
<tr><td>+24 V</td><td>Input for the external 24 V power supply of the control unit</td><td>• 24 V (min. 19 V, max. 30 V)
• 31.62 W power</td></tr>
<tr><td>COM</td><td>Reference conductor for logic inputs and 0 V of the P24 external supply voltage</td><td>0 V</td></tr>
<tr><td>LI1
LI2
LI3
LI4
LI5</td><td>Programmable logic inputs</td><td>• 24 V (max. 30 V)
• Impedance
– Typ.: 3.7 kΩ
– Max.: 3.75 kΩ
• Response time: 2 ms ±0.5 ms
<table><tr><th></th><th>State 0</th><th>State 1</th></tr><tr><td>Source
(factory setting)</td><td><5 V</td><td>>11 V</td></tr><tr><td>Int. sink or
ext. sink</td><td>>16 V</td><td><10 V</td></tr></table></td></tr>
<tr><td>LI6</td><td>In accordance with the position of the SW1 switch:
• Programmable logic input
or
• Input for PTC sensor</td><td>SW1 in right-hand position ➔ LI: (factory setting):
• Same characteristics as logic inputs LI1 to LI5
or
SW1 in left-hand position ➔ PTC:
• Trigger threshold value 3 kΩ, Reset threshold 1.8 kΩ
• Short-circuit detection threshold <50 Ω</td></tr>
<tr><td>+24 VLI</td><td>Logic input power supply
Important!
Only switch on the SW3 when the power supply is switched off.</td><td>SW3 in right-hand position (sink) or left-hand position (Source Int.)
• Supply voltage 24 V (min. 21 V, max. 27 V), protected against short circuit and overload
• Max. current available for user 125 mA
SW3 in middle position (Source Ext.)
• Input for external 24 V power supply of the logic inputs</td></tr>
<tr><td>+24 VPWR</td><td>24 VDC power supply for input of the safety function "power removal"</td><td></td></tr>
<tr><td>PWR</td><td>"Power removal"
If PWR is not connected to 24 V, it is not possible to start the motor (corresponds to the standards for functional safety SIL 2 (IEC/EN 61508) and PL d (ISO 13849)).</td><td>• Power supply 24 V (max. 30 V)
• Impedance 1.5 kΩ
• State 0 at <2 V, state 1 at >17 V
• Response time 10 ms</td></tr>
</table>

1.3.14.5 LED status indicators

Fig.	LED	Color	Status	Description
	S/E [1]	Green/Red		Status/Error LED.
	L/A1	Green	On	The connection to the remote device has been established.
			Blinking	A connection to the remote device has been established. The LED blinks if Ethernet activity is present on the bus.
	L/A2	Green	On	A connection to the remote device has been established
			Blinking	A connection to the remote device has been established. The LED blinks if Ethernet activity is present on the bus.

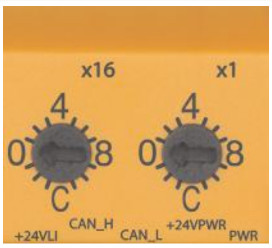
1 The Status/Error LED is a dual function LED (green/red).

The Status/Error LED is a dual function LED (green/red). The color green (Status) overlays the color red (Error).

Red - Error	Description
On	The POWERLINK interface has detected an error (not transferred Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following status, the green LED flashes over the red LED: • BASIC_ETHERNET • PRE_OPERATIONAL_1 • PRE_OPERATIONAL_2 • READY_TO_OPERATE 

Green - Status	Description
Off NOT_ACTIVE	The bus is monitored for POWERLINK frames. When a frame is not received within the configured time window (timeout), the ACOPOSinverter P84 switches directly into BASIC_ETHERNET status (blinking). If POWERLINK communication is detected during this time, however, the CN switches immediately to the PRE_OPERATIONAL_1 status (single flashes).
Blinking green (approx. 10 Hz) BASIC_ETHERNET	The ACOPOSinverter P84 is in the status BASIC_ETHERNET and being operated purely as an Ethernet TCP/IP interface. If POWERLINK communication is detected in this status, the CN switches immediately to the PRE_OPERATIONAL_1 status (single flash). A permanently lit red LED indicates a manager error.
Single flash (approx. 1 Hz) PRE_OPERATIONAL_1	The ACOPOSinverter P84 is in the status PRE_OPERATIONAL_1. The CN waits until it has received SoC-frame and then switches to the status PRE_OPERATIONAL_2 (double flash). A permanently lit red LED indicates a manager error.
Double flash (approx. 1 Hz) PRE_OPERATIONAL_2	The ACOPOSinverter P84 is in the status PRE_OPERATIONAL_2. The CN is normally configured by the manager in this status. Then change the status of a command in the READY_TO_OPERATE (three flashes). A permanently lit red LED indicates a manager error.
Three flashes (approx. 1 Hz) READY_TO_OPERATE	The ACOPOSinverter P84 is in the status READY_TO_OPERATE. The configuration of the CN is completed. Normal cyclic and asynchronous communication. The PDO data being sent corresponds to the PDO mapping used. However, cyclic data have not yet been evaluated. A permanently lit red LED indicates a manager error.
On - OPERATIONAL	The ACOPOSinverter P84 is in the status OPERATIONAL.
Blinking (approx. 2.5 Hz) STOPPED	The ACOPOSinverter P84 is in the status STOPPED. No output data is generated and no input data received. This status can only be activated or exited with the corresponding manager command.

1.3.14.6 Device number



The device number for the POWERLINK station is set via the two number switches. Device numbers between 0x01 and 0xEF are permitted.

Switch position	Description
0x00	Reserved, switch position not permitted.
0x01 to 0xEF	Device number for POWERLINK station. Operating as controlled nodes.
0xF0 to 0xFF	Reserved, switch position not permitted.

1.3.14.7 System failure error codes

An incorrect configuration or defective hardware can cause a system failure error. The error code is indicated by the red Error LED using four switch-on phases. The switch-on phases are either 150 ms or 600 ms. Error code outputs are repeated cyclically after 2 seconds.

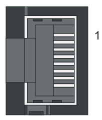
Legend	• ...	150 ms
	- ...	600 ms
	Pause ...	2 s delay

Error description	Error code indicated by red status LED									
RAM error (1)	•	•	•	-	Pause	•	•	•	-	Pause
Bus error (2)	-	•	•	•	Pause	-	•	•	•	Pause

(1) The module is defective and must be replaced.
(2) The module or a system component is defective and must be replaced.

1.3.14.8 POWERLINK interface

POWERLINK 1 and POWERLINK 2

Interface	Pinout		
Application interface POWERLINK  Shielded RJ45 port	Pin	Ethernet	
	1	RxD	Receiving data
	2	RxD\	Receiving data\
	3	TxD	Sending data
	4	Termination	
	5	Termination	
	6	TxD\	Sending data\
	7	Termination	
	8	Termination	

Note:

When transferring the SDC task, SDC is inactive (making SDC_SetTime inactive as well).

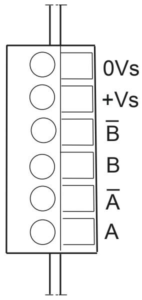
- **The POWERLINK interface card triggers a reset of the frequency inverter.**
- **In order for the frequency inverter to be configured correctly again, the POWERLINK interface card must be reset.**

This interrupts the bus communication, and the CPU goes into service mode if "Module supervised = on".

For this reason, transferring the project when "Module supervised = on" is only possible in service mode.

1.3.15 Option terminals

1.3.15.1 Encoder interface card terminals



Maximum wire thickness: 1.5 mm²

Maximum tightening torque: 0.25 Nm

1.3.15.2 Characteristics and function of the terminals

Encoder interface cards with RS422-compatible differential outputs

Terminals	Function	Electrical characteristics	
		8I0AC123.300-1	8I0AC123.301-1
+Vs 0 Vs	Power supply for encoder	• 5 V (max. 5.5 V), protected against short circuit and overload • Max. current 200 mA	• 15 V (max. 16 V), protected against short circuit and overload • Max. current 175 mA
A, /A B, /B	Incremental logic inputs	• Max. resolution: 5,000 pulses/revolution • Max. frequency: 300 kHz • Available Input voltage: 5 V	

Encoder interface cards with open-collector outputs

Terminals	Function	Electrical characteristics	
		8I0AC123.302-1	8I0AC123.303-1
+Vs 0 Vs	Power supply for encoder	• 12 V (max. 13 V), protected against short circuit and overload • Max. current 175 mA	• 15 V (max. 16 V), protected against short circuit and overload • Max. current 175 mA
A, /A B, /B	Incremental logic inputs	• Max. resolution: 5,000 pulses/revolution • Max. frequency: 300 kHz	

Encoder interface cards with push-pull outputs

Terminals	Function	Electrical characteristics		
		8I0AC123.304-1	8I0AC123.305-1	8I0AC123.306-1
+Vs 0 Vs	Power supply for encoder	• 12 V (max. 13 V), protected against short circuit and overload • Max. current 175 mA	• 15 V (max. 16 V), protected against short circuit and overload • Max. current 175 mA	• 24 V (min. 20 V, max. 30 V), protected against short circuit and overload • Max. current 100 mA
A, /A B, /B	Incremental logic inputs	• Max. resolution: 5,000 pulses/revolution • Max. frequency: 300 kHz		

1.3.15.3 Wiring of the encoder

Use a shielded cable with three twisted pairs with a pitch between 25 and 50 mm. Ground the shield at both ends.

The minimum cross section of the conductor must meet the requirements listed in the tables below, so as to limit line voltage drops:

Max encoder Cable length	8I0AC123.300-1, 8I0AC123.301-1			8I0AC123.302-1 to 8I0AC123.306-1		
	Max. current consumption of the encoder	Minimum cross section of the conductor		Max. current consumption of the encoder	Minimum cross section of the conductor	
10 m	100 mA	0.2 mm²	24 AWG	100 mA	0.2 mm²	24 AWG
	200 mA	0.2 mm²	24 AWG	200 mA	0.2 mm²	24 AWG
50 m	100 mA	0.5 mm²	20 AWG	100 mA	0.5 mm²	20 AWG
	200 mA	0.75 mm²	18 AWG	200 mA	0.75 mm²	18 AWG
100 m	100 mA	0.75 mm²	18 AWG	100 mA	0.75 mm²	18 AWG
	200 mA	1.5 mm²	15 AWG	200 mA	1.5 mm²	15 AWG
200 m	-	-	-	100 mA	0.5 mm²	20 AWG
	-	-	-	200 mA	1.5 mm²	15 AWG
300 m	-	-	-	100 mA	0.75 mm²	18 AWG
	-	-	-	200 mA	1.5 mm²	15 AWG

1.3.16 Connection diagram

1.3.16.1 Wiring diagram

Wiring diagram in accordance with standard EN 954-1 category 1 and IEC/EN 61508 SIL 1, stopping category 0 in accordance with standard IEC/EN 60204-1

Single-phase voltage supply (8I84T200075.01P-1 to 8I84T200750.01P-1)

Diagram with line contactor

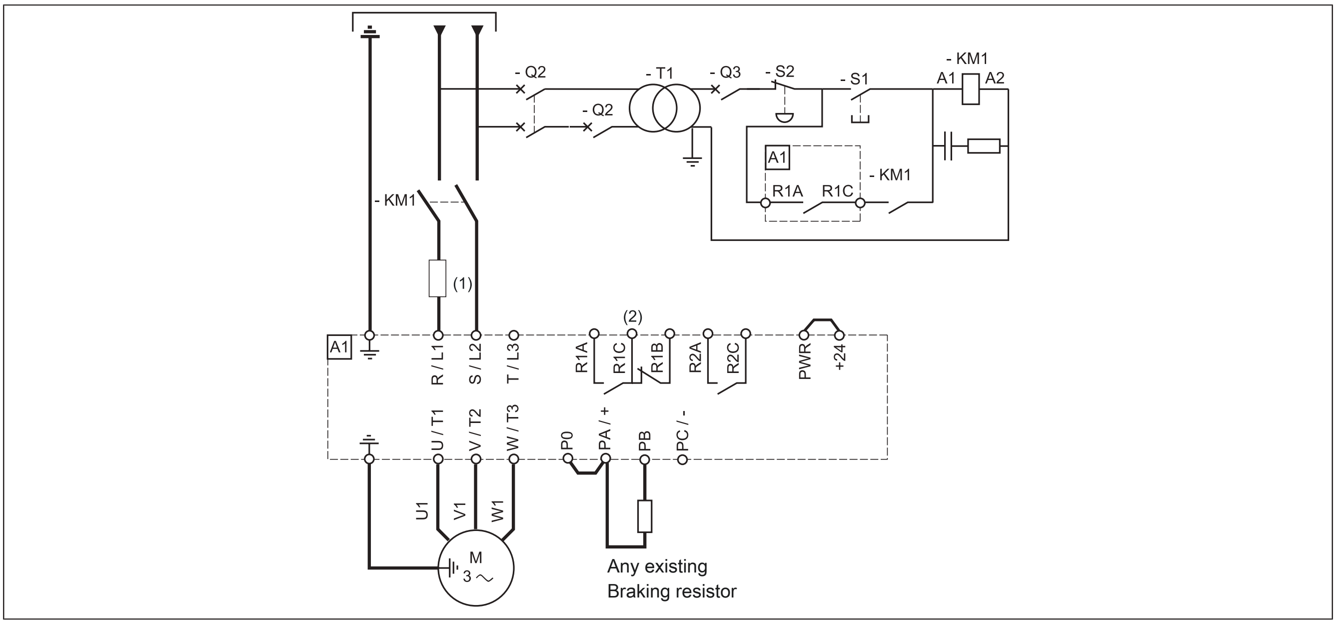
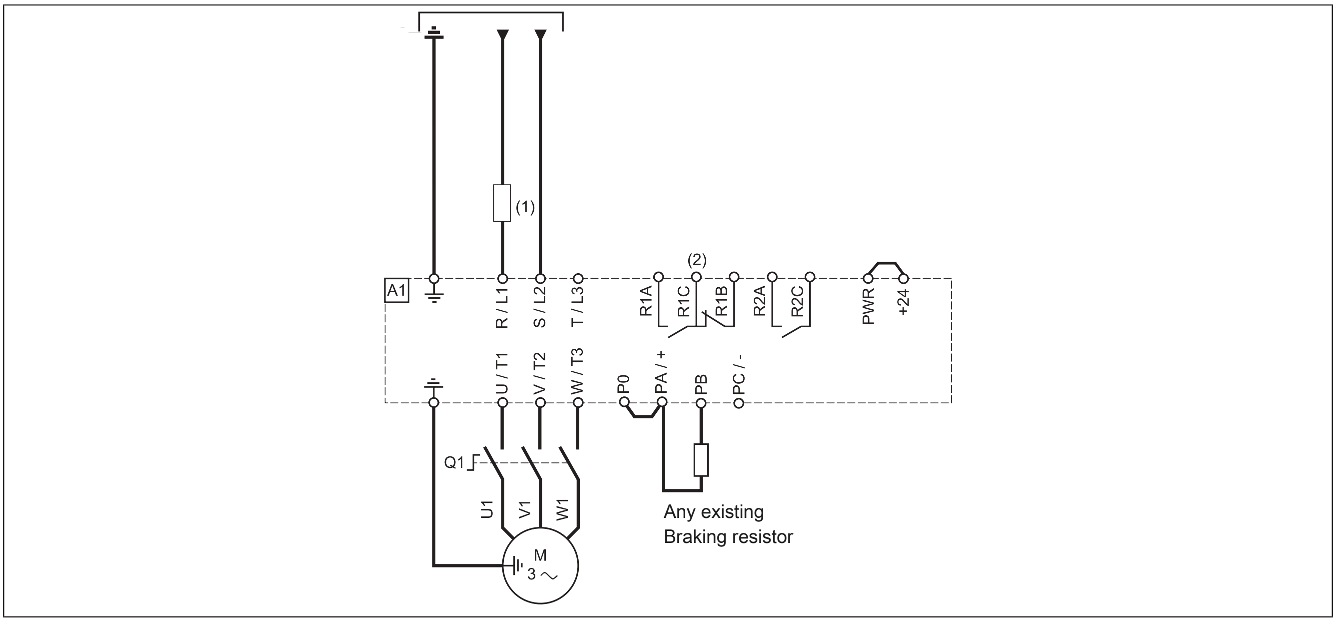


Diagram with switch disconnecter



(1) Mains choke, if required (mandatory for inverters 8I84T200400.01P-1 to 8I84T200750.01P-1)

(2) Fault relay contacts, for remote signaling of inverter status

Information:

Lock the error that displays the loss of a line phase (IPL), to enable the operation of the models 8I84T200075.01P-1 to 8I84T200750.01P-1 in a single-phase network (see programming manual). If the error is set to the factory values, the inverter remains locked in error mode.

Note:

Install suppressors in all inductive control circuits that are in the vicinity of the inverter or connected to the same circuit (relays, contactors, solenoid valves, etc.).

Three-phase power supply

Diagram with line contactor

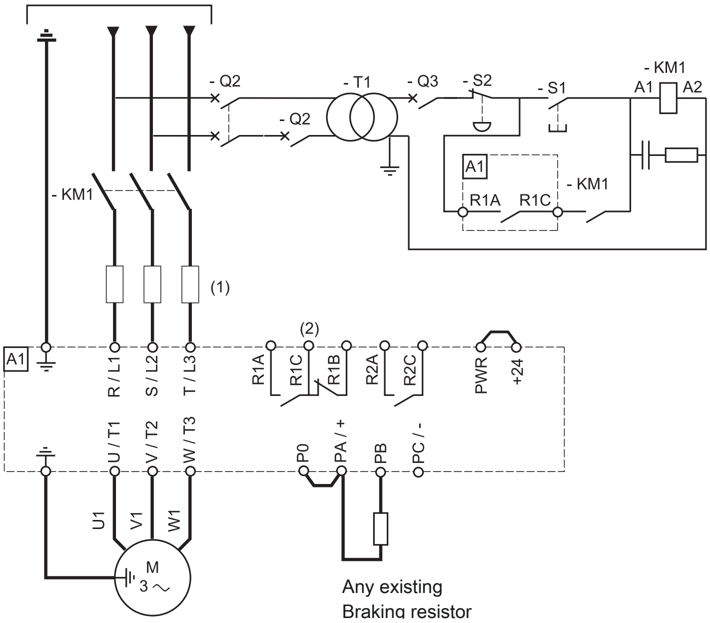
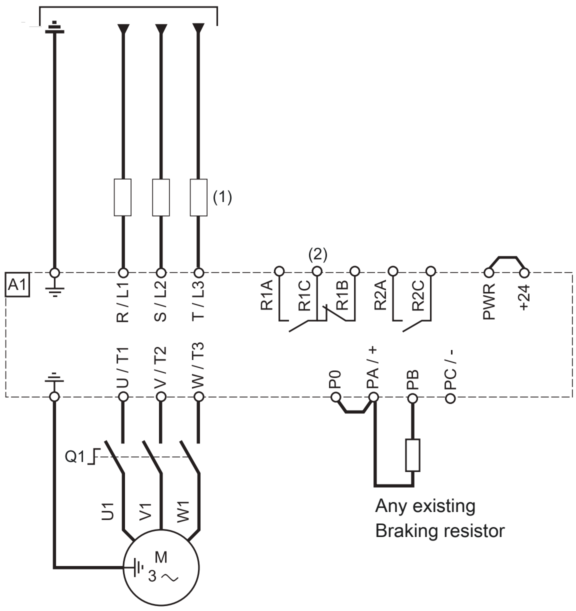


Diagram with switch disconnecter



(1) Mains choke (if required)

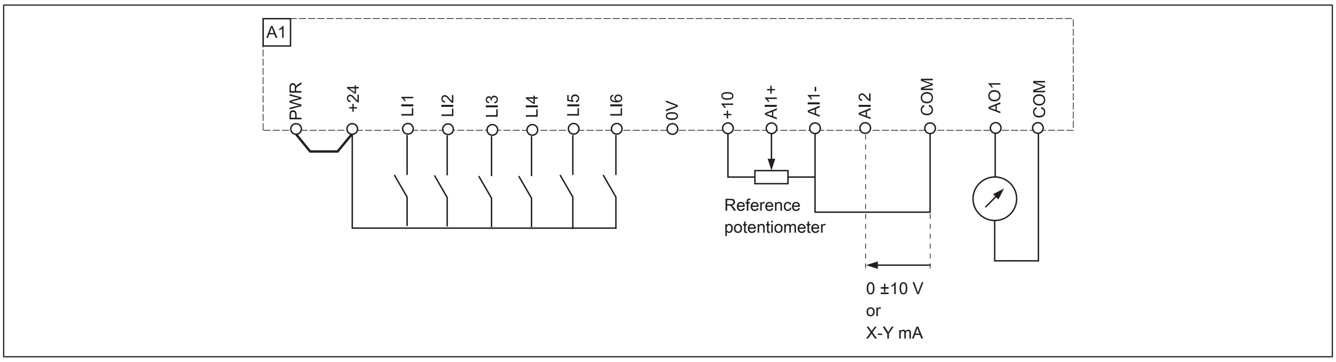
(2) Fault relay contacts, for remote signaling of inverter status

Note:

Install suppressors in all inductive control circuits that are in the vicinity of the inverter or connected to the same circuit (relays, contactors, solenoid valves, etc.).

1.3.16.2 Connection diagrams for the control

Connection diagram of control card



Switch for logic input (SW3)

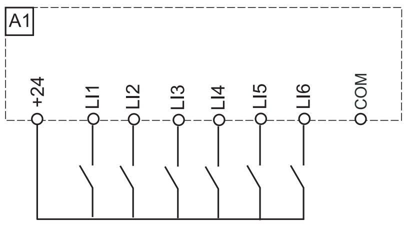
The logic input switch (SW3) is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- When using PLC outputs with PNP transistors switch to the right-hand position (Sink).
- When using PLC outputs with NPN transistors switch to the left-hand position (Source Int.) or the middle position (Source Ext.)

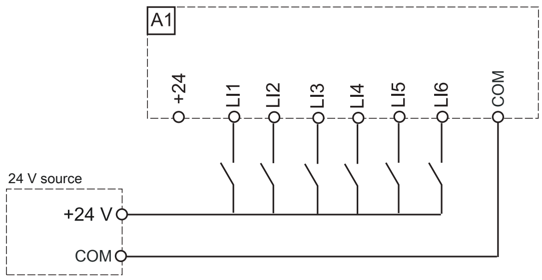
Important!

Only switch on the SW3 when the power supply is switched off.

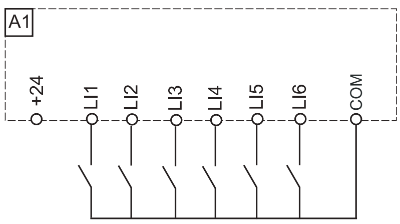
- SW3 in right-hand position (sink)



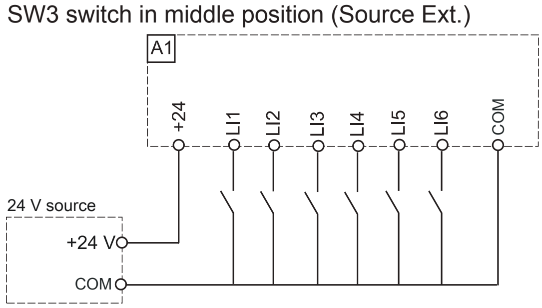
- SW3 switch in right-hand position (Sink) and use of an external power supply for the logic inputs



- SW3 switch in left-hand position (Source Int.)



- SW3 switch in middle position (Source Ext.)



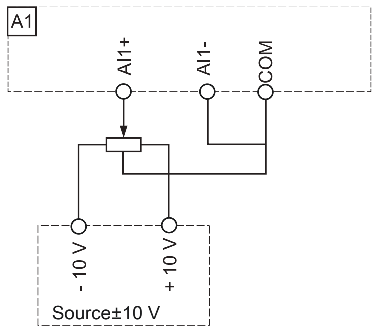
Warning!

ACCIDENTAL OPERATION OF DEVICE

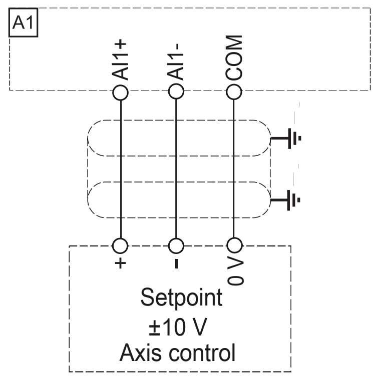
If switch SW3 is in position "Source int." or "Source ext.", then the reference conductor is never permitted to be connected to ground or protective ground; otherwise, there is the risk of unintended device operation when the first insulation fault occurs.

Failure to follow this instruction can result in death, serious injury or material damages.

Bipolar frequency reference



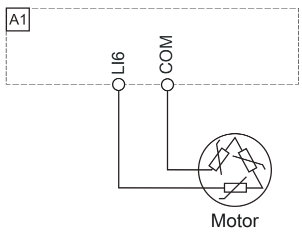
Frequency reference by axis control



Switch SW1

The switch of the logic input LI6 (SW1) allows the use of the LI6 input:

- Either as a logic input by setting the switch to the right position (factory setting)
- Or for the motor protection using PTC sensor by setting the switch to the left position

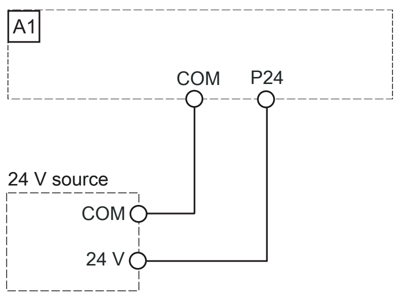


SW2 switch

With SW2, the integrated terminating resistor for the external CAN bus (CAN H and CAN L) is switched on or off.

Voltage supply to the control unit by an external source

The control card can be supplied by an external source of +24 V.

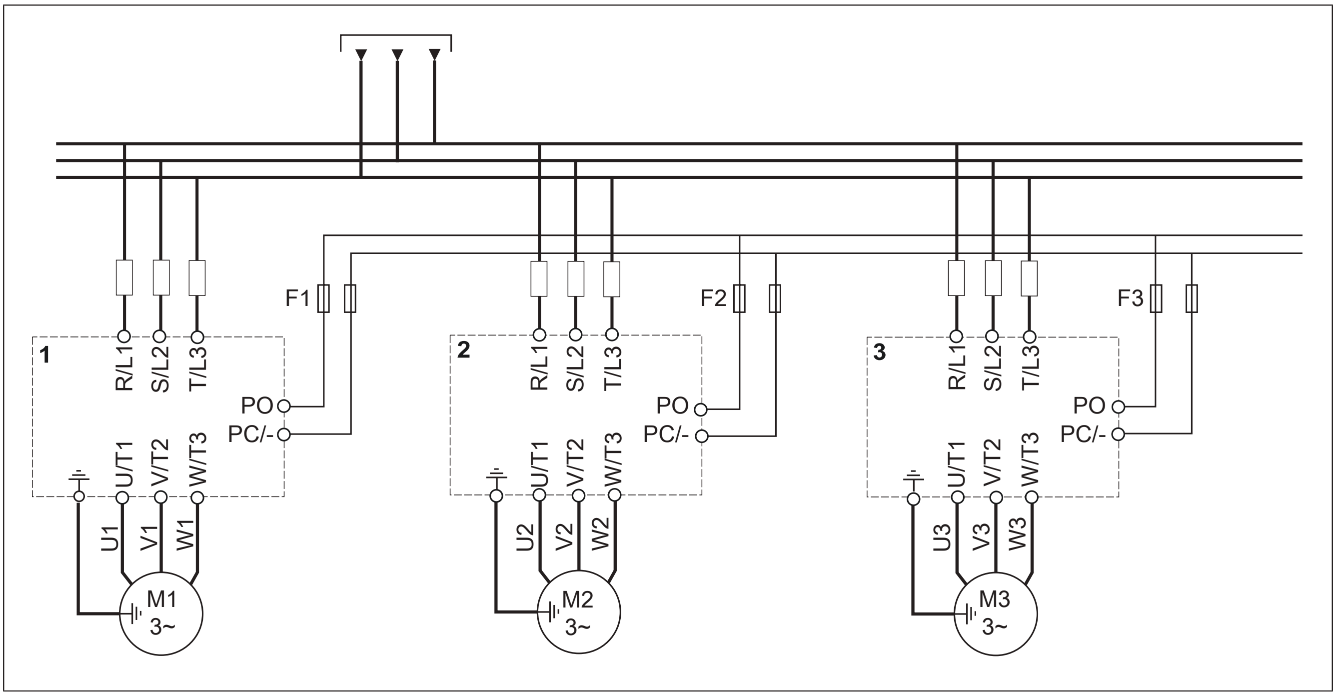


1.3.16.3 Connection of several inverters connected in parallel on the DC bus

It is important that these inverters all have the same rated voltage.

Connection to the DC bus between inverters of the same type

Each inverter uses its own charging circuit



Inverters 1, 2 and 3 are not permitted to be more than one size apart if they are connected in this way.

F1, F2, F3: Super fast-acting semiconductor fuses for the protection of the DC bus.

DC bus fuses according to the frequency inverter power

ACOPOSinverter P84	Semiconductor fuses [A]
8I84T200037.01P-1, 8I84T200075.01P-1, 8I84T200150.01P-1	25
8I84T200220.01P-1, 8I84T200300.01P-1, 8I84T200400.01P-1	50
8I84T200550.01P-1, 8I84T200750.01P-1	100
8I84T201100.01P-1, 8I84T201500.01P-1, 8I84T201850.01P-1	160
8I84T202200.01P-1, 8I84T203000.01P-1	250
8I84T203700.01P-1, 8I84T204500.01P-1	350
8I84T400075.01P-1, 8I84T400150.01P-1, 8I84T400220.01P-1	25
8I84T400300.01P-1, 8I84T400400.01P-1	50
8I84T400550.01P-1, 8I84T400750.01P-1, 8I84T401100.01P-1	80
8I84T401500.01P-1, 8I84T401850.01P-1, 8I84T402200.01P-1	100
8I84T403000.01P-1, 8I84T403700.01P-1	160
8I84T404500.01P-1	200
8I84T405500.01P-1	250
8I84T407500.01P-1	350

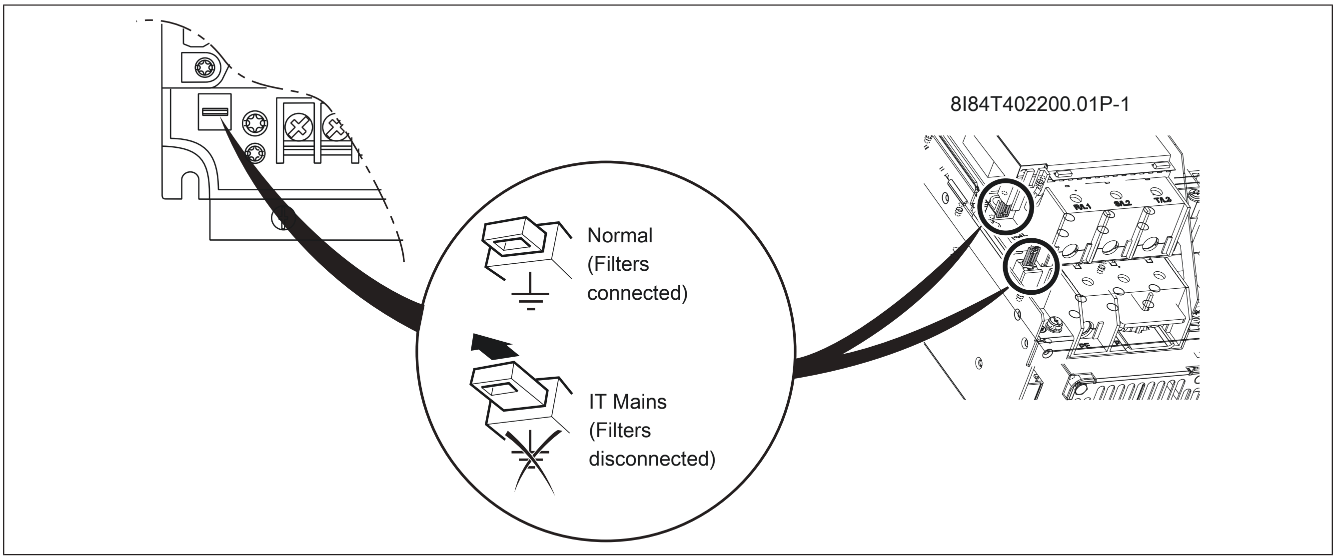
1.3.17 Operation in IT system or distribution network with grounding of the type "corner-grounded"

IT system: Isolated or impedance-grounded neutral conductor. Use a permanent insulation monitoring that is compatible with non-linear loads

Distribution network with grounding of the type "corner-grounded": System with a grounded phase

All inverters of the type 8I84T4*****.01P-1 and 8I84T200037.01P-1 to 8I84T200750.01P-1 contain integrated EMC filters. When operating the inverter in an IT system, the connection between these filters and the ground can be disconnected as shown in the following figure. The separation of this connection is possible but not mandatory.

Remove the jumper plug on the left side of the power terminals (two jumpers for 8I84T402200.01P-1).



Caution!

RISK OF DAMAGE TO FREQUENCY INVERTER

If the models 8I84T400075.01P 1 to 8I84T400400.01P-1 are not connected to the filter, the switching frequency of the inverter is not permitted to exceed 4 kHz. For information on setting the corresponding parameter, refer to the programming instructions.

Failure to follow these instructions can result in injury and/or equipment damage.

1.3.18 Electromagnetic compatibility - wiring

Principle

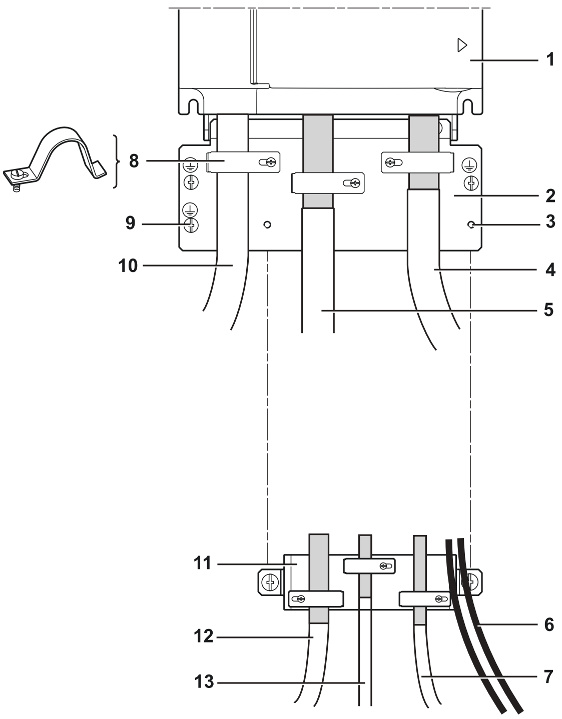
- Ground connections between the frequency inverter, motor and cable shielding must have high frequency equipotentiality.
- Use shielded cable with shielding grounded at both ends for the motor cable, the braking resistor (if used), and the control signal cable. This shielding can be partly in the form of metal pipes or ducts as long as no interruption of the grounding connections occurs.
- Ensure maximum separation between the power cable (line supply) and the motor cable.

Installation diagram 8I84T200037.01P-1 to 8I84T201500.01P-1 and 8I84T400075.01P-1 to 8I84T401850.01P-1

- Install the shielding of cables **4** and **5** as close as possible to the inverter and ground them:
  - Strip the shielding.
  - Attach the bare parts of the shielding with stainless steel cable clamps to the metal plate **2**.

    The shielding must be firmly attached to the metal plate so that the contact is ensured.
- Install the EMC plate of the control unit **11** onto the EMC plate **2**, as shown in the figure.
- Install the shielding of cables **7**, **12** and **13** as close as possible to the inverter and ground them:
  - Strip the shielding.
  - Attach the stripped parts of the shielding with stainless steel cable clamps to the EMC plate flange of control unit **9**.

    The shielding must be firmly attached to the metal plate so that the contact is ensured.



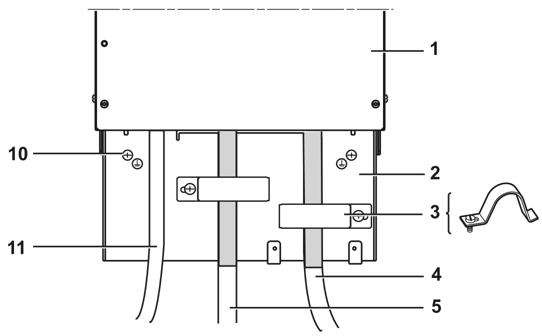
1 ACOPOSinverter P84
2 EMC plate supplied with the frequency inverter
3 Tapped holes for mounting the EMC plate of the control unit
4 Shielded motor cable, shielding grounded at both ends. The shielding must be uninterrupted; any intermediate terminals must be located on the EMC-shielded metal enclosures.
5 Shielded cable for connecting the braking resistor (if used). The shielding must be uninterrupted; any intermediate terminals must be located on the EMC-shielded metal enclosures.
6 Non-shielded lines for relay contact output.
7 Shielded cable for the connection of the input of the safety function "power removal". The shielding must be uninterrupted; any intermediate terminals must be located on the EMC-shielded metal enclosures.
8 Metal clips
9 Connection to the protective grounding
10 Non-shielded cables or lines for voltage supply
11 EMC plate of the control unit
12 Shielded cable for connection of the control signal unit. For applications that require multiple conductors, use cable with a small cross section (0.5 mm²).
13 Shielded cable for connection of the encoder or POWERLINK. The shielding must be uninterrupted; any intermediate terminals must be located on the EMC-shielded metal enclosures.

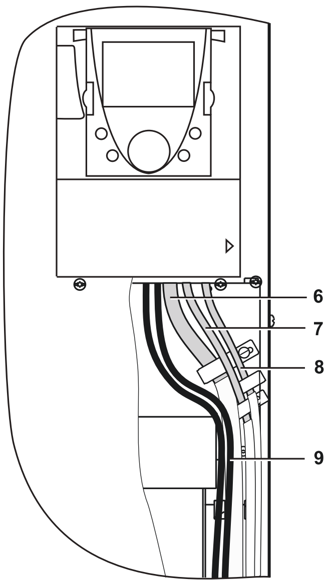
Note:

- **If using an additional input filter, it should be mounted as close as possible under the inverter and connected directly to the mains supply via an unshielded cable. Connection 10 on the inverter is via the filter output cable.**
- **In spite of the high-frequency grounding with equipotential bonding between the frequency inverter, motor and cable shielding, the PE protective conductors (green-yellow) must be connected to the appropriate terminals on each unit.**

Installation diagram 8I84T201850.01P-1 to 8I84T204500.01P-1 and 8I84T402200.01P-1 to 8I84T407500.01P-1

- Install the shielding of cables **4** and **5** as close as possible to the inverter and ground them:
  - Strip the shielding.
  - Attach the bare parts of the shielding with stainless steel cable clamps to the metal plate **2**. The shielding must be firmly attached to the metal plate so that the contact is ensured.
- Install the shielding of cables 6, 7 and 8 as close as possible to the inverter and ground them:
  - Strip the shielding.
  - Attach the stripped parts of the shielding to the inverter with stainless steel cable clamps. The shielding must be firmly attached to the metal plate so that the contact is ensured.





1 ACOPOSinverter P84

2 EMC plate supplied with the frequency inverter

3 Metal clips

4 Shielded motor cable, shielding grounded at both ends. The shielding must be uninterrupted; any intermediate terminals must be located on the EMC-shielded metal enclosures.

5 Shielded cable for connecting the braking resistor (if used). The shielding must be uninterrupted; any intermediate terminals must be located on the EMC-shielded metal enclosures.

6 Stripped cable for connection of the control signal unit. For applications that require multiple conductors, use cable with a small cross section (0.5 mm²).

7 Shielded cable for the connection of the input of the safety function "power removal". The shielding must be uninterrupted; any intermediate terminals must be located on the EMC-shielded metal enclosures.

8 Shielded cable for connection of the encoder or POWERLINK. The shielding must be uninterrupted; any intermediate terminals must be located on the EMC-shielded metal enclosures.

9 Non-shielded lines for relay contact output.

10 Connection to the protective grounding

11 Non-shielded cables or lines for voltage supply

Note:

- **If using an additional input filter, it should be mounted as close as possible under the inverter and connected directly to the mains supply via an unshielded cable. Connection 11 on the inverter is via the filter output cable.**
- **In spite of the high-frequency grounding with equipotential bonding between the frequency inverter, motor and cable shielding, the PE protective conductors (green-yellow) must be connected to the appropriate terminals on each unit**

EMC conditions for ACOPOSinverter P84

For details on the permissible length of the shielded cable for the motor connection, please refer to the catalog.

2 Programming guidelines

2.1 Before you begin

Read these instructions carefully before you use the frequency inverter.

Danger!

DANGER HAZARDOUS VOLTAGE

- **Please read the installation instructions completely and carefully before installing and commissioning the ACOPOSinverter P84. Installation, adjustment, repair and maintenance must be performed by qualified personnel.**
- **You are responsible for compliance with all applicable international and national electrical standards for protective grounding of all equipment.**
- **Numerous components of the frequency inverter, including the circuit boards, are supplied via the mains voltage. DO NOT TOUCH!**
  Use only electrically insulated tools.
- **Do not touch the unshielded components or terminal screws if power to the device is switched on.**
- **Do NOT short across terminals PA/+ and PC/- or the DC bus capacitors.**
- **Install and close all covers before switching on the voltage supply or before starting and stopping the inverter.**
- **Before servicing the frequency inverter:**
  - **Disconnect any power supply.**
  - **Place a "DO NOT TURN ON" label on the disconnection switch of the frequency inverter.**
  - **Lock the disconnection switch in the open position.**
- **Disconnect the entire power supply before servicing the inverter, including any attached external control voltage supply. WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then perform the procedure indicated in the installation manual for measuring the DC bus voltage, to check whether the DC voltage is below 42 V. The LEDs on the inverter no longer reliably display whether there is no DC bus voltage.**

Failure to follow these instructions will result in death or serious injury.

Caution!

DAMAGED EQUIPMENT

Do not operate or install the inverter, if it is damaged.

Failure to follow this instruction can result in equipment damage.

Servo drives, inverter modules and frequency inverters from B&R are not dual-use goods per appendix I of Council Regulation (EC) No. 428/2009 | 3A225, amended by Commission Delegated Regulation (EU) No. 2015/2420.

2.2 Steps for setting up

**INSTAL-
LATION**

1 Read the installation instructions

PROGRAMMING

Usable procedure if the factory configuration and the use of the **[SIMPLE START]**(SIM-) menu is sufficient for the application.

2 Apply input power but do not give a start command

- For instructions on how to use a separate power supply for the control unit see "Separate voltage supply of the control unit" on page 98

3 If the inverter has a graphic display terminal, select the language

4 Configure the menu [SIMPLE START] (SIM-)

- 2 or 3-wire control
- Macro configuration
- Motor parameters

  ⇨ Perform an autotuning.

- Nominal thermal current
- Acceleration and deceleration ramps
- Speed variation range

5 Start

Tips:

- Before programming, fill out the tables see "Tables with user-specific settings" on page 340 with user-specific settings
- Perform an autotuning to optimize performance, see "Overview of parameters [SIMPLE START] (SIM-)" on page 127
- In the event of a fault, restore factory settings, Factory setting parameters (FCS1 - SCS1)

Note:

Check that the wiring of the inverter is compatible with its configuration.

2.3 Factory configuration

Factory setting of the frequency inverter

The ACOPOSinverter P84 is factory preset for the most common applications:

- Macro configuration: Start/Stop
- Motor frequency: 50 Hz
- Application with constant torque for induction motor and sensorless flux vector control
- Normal stop mode at the deceleration ramp
- Stop mode in the event of fault: Freewheel stop
- Linear, acceleration and deceleration ramps: 3 seconds
- Low speed: 0 Hz
- High speed: 50 Hz
- Therm. nominal current = Inverter nominal current
- Standstill braking current = 0.7 x the rated inverter current, 0.5 seconds
- No automatic restart after a fault
- Switch frequency of 2.5 or 4 kHz, depending on the inverter type
- Logic inputs
  - LI1: Forward, LI2: Clockwise (2 in operating directions), 2-wire control during the transition
  - LI3, LI4, LI5, LI6: Inactive (not assigned)
- Analog inputs:
  - AI1: Speed reference 0 to 10 V
  - AI2: 0 to 20 mA inactive (not used)
- Relay R1: The contact opens in the event of an error (or switching off the inverter).
- Relay R2: Inactive (not assigned)
- Analog output AO1: 0 to 20 mA inactive (not assigned)

If the above values are compatible with the application, the inverter can be used without changing the settings.

2.4 Application Functions

The tables on the following pages show function assignments for the most standard applications, in order to guide your selection.

The applications in these tables relate to the following machines in particular:

- **Hoisting gear:** Cranes, overhead traveling cranes, portal cranes (vertical, horizontal lift procedure, rotate), lifting and lowering stations
- **Lifts:** Load lifts up to 1.2 m/s
- **Conveyor technology:** Pallets, conveying equipment, rotary tables
- **Packaging:** Carton packaging machines and labeling machines
- **Textiles:** Weaving looms, carding frames, washing machines, spinners, drawing frames
- **Wood processing:**Lathes, sawing, metal cutting
- **Machines with a high inertia moment:** Centrifuges, mixing machines, imbalance machines (handle pumps, press machines)
- **Process handling**

Each machine has its own special features, and the combinations listed here are neither mandatory nor exhaustive.

Some functions are designed specifically for a particular application.

2.4.1 Motor control functions

Function	Applications							
	Hoisting	Lifts	Material handling	Packaging	Tex-tiles	Wood pro-cessing	Machines with a high inertia moment	Process handling
V/f characteristic curve			■			■	■	
Sensorless flux vector control	■	■	■	■	■	■	■	■
Flux vector control with sensor	■	■	■	■	■	■	■	■
2-point vector control	■				■			
Motor speed up to 599 Hz					■	■		
Motor overvoltage limiting					■	■		
DC-bus connection (see catalog / installation manual)					■			■
Motor fluxing using a logic input	■		■	■				
Switching frequency up to 16 kHz		■			■	■		
Autotuning	■	■	■	■	■	■	■	■

2.4.2 Functions of the speed references

Function	Applications							
	Hoisting	Lifts	Material handling	Packaging	Tex-tiles	Wood pro-cessing	Machines with a high inertia moment	Process handling
Differential bipolar reference	■		■	■		■		
Reference delinearization (magnifying glass effect)	■		■					
Frequency control input					■			■
Reference switching				■				
Reference summing				■				
Reference subtraction				■				
Reference multiplication				■				
S-ramps	■	■	■					
Step mode			■		■			■
Preset frequencies	■	■	■	■			■	
+/- speed using single-action pushbuttons (1 step)								■
+/- speed using double-action pushbuttons (2 steps)	■							
+/- speed on reference					■			■
Save reference								■

2.4.3 Application-specific functions

Function	Applications							
	Hoisting	Lifts	Material handling	Packaging	Tex-tiles	Wood pro-cessing	Machines with a high inertia moment	Process handling
Fast stop						■	■	
Limit switch management	■	■	■					
Brake controller	■	■	■					
Load measurement	■	■						
High-speed hoisting	■							
Rope slack	■							
PID controllers								■
Torque monitoring			■		■			■
Motor/generator torque limit			■		■		■	■
Load distribution	■		■					
Line contactor control	■		■			■		
Motor protection control		■						
Positioning by limit switches or sensors			■	■				
Calculated stopping distance (remote stop) after deceleration limit switch			■	■				
ENA system (mechanically with unbalanced load)							■	
Parameter switching	■	■	■	■	■	■	■	■
Motor or configuration switching	■		■	■				
Traverse control					■			
Stop configuration			■		■	■	■	
Evacuation		■						
Interim level		■						

2.4.4 Functions of the speed references

Function	Applications							
	Hoisting	Lifts	Material handling	Packaging	Tex-tiles	Wood pro-cessing	Machines with a high inertia moment	Process handling
Power removal (safety function "safe stop", see catalog/installation instructions)	■	■	■	■	■	■	■	■
Deferred stop on thermal alarm		■						
Alarm management	■	■	■	■	■	■	■	■
Error management	■	■	■	■	■	■	■	■
IGBT tests	■	■	■	■	■	■	■	■
Reference subtraction					■	■	■	
Thermal overload protection for the braking resistor	■	■	■	■				
Motor protection with PTC probes	■	■	■	■	■	■	■	■
Managing undervoltages					■	■	■	
4-20 mA loss	■	■	■		■	■		■
Uncontrolled output cut (output phase loss)			■					
Automatic restart			■					
Load variation detection	■							

2.5 Commissioning - Preliminary Recommendations

2.5.1 Switching on and the configuration of the inverter

Danger!

RISKS OF ACCIDENTAL DEVICE OPERATION

- **Before turning on and configuring the ACOPOSinverter P84, to avoid an unintended operation ensure that the PWR input (POWER REMOVAL) is deactivated (state 0).**
- **Before you turn on the inverter or when you exit the configuration menu make sure that the inputs assigned to the operating commands are deactivated (state 0), since these could result in the immediate starting of the motor.**

Failure to follow these instructions will result in death or serious injury.

Caution!

INCOMPATIBLE MAINS VOLTAGE

Before switching on and configuring the frequency inverter, ensure that the mains voltage is compatible with the supply voltage shown on the frequency inverter nameplate. The frequency inverter may be damaged if the mains voltage is not compatible.

Failure to follow this instruction can result in equipment damage.

2.5.2 Separate voltage supply of the control unit

Only switch on the power supply of the power unit when the inverter is next switched on if:

A) The control unit of the inverter is supplied with power (terminals P24 and 0V) independently of the power unit.

(B) An option card is added or replaced.

2.5.3 On/Off switching of the power supply via the line contactor

Caution!

RISK OF DAMAGE TO THE SYSTEM

- **Avoid frequent operation of the line contactor to prevent premature wear of the filter capacitors.**
- **Cycle times of <60 s can damage the pre-charge resistor**

Failure to observe these instructions can result in damage to property.

2.5.4 Adaptation and extension of functions by the user

- You can change the settings and extend the functions described on the following pages via the display and the buttons.
- The factory settings can be easily restored via the menu **[FACTORY SETTING]** (FCS-) (see "[FACTORY SETTINGS] (FCS-)" on page 314).
- There are three types of parameters:
  - Display: Values displayed by the frequency inverter
  - Setting: Parameters that can be modified during operation or when the motor is stopped
  - Configuration: Can only be changed when the motor is stopped and no braking is taking place. Can be displayed during operation

Warning!

RISKS OF ACCIDENTAL DEVICE OPERATION

- **Make sure that changes to settings during operation do not cause any hazards.**
- **We recommend stopping the frequency inverter before making any changes.**

Failure to follow these instructions will result in death or serious injury.

2.5.5 Starting the device

Important:

- In the factory-default state, the engine can be supplied with power only after the commands "Clockwise rotation", "Anti-clockwise rotation" and "Stop run by DC injection" have been reset:
  - ⇨ When turning on, at a manual error reset or after a stop command

    If these commands have not been reset, the inverter indicates the message "nSt" and cannot be started.
- If the function for automatic restart has been configured (parameter **[Aut. restart]** (Atr) in the menu **[ERROR MANAGEMENT]** (FLt-), see "AUTOMATIC RESTART (Atr-)" on page 290), then these commands are taken into consideration and a reset is not required.

2.5.6 Firmware of the 8I0IF248.300-1

The firmware is a component of the automation runtime. The module is updated to this version automatically. In order to update the firmware included in Automation Studio, a hardware upgrade must be performed (see the "Project management - Upgrade from Automation Studio" in Automation Help).

2.5.7 Test on a low power motor or without a motor:

- According to the factory setting, the function for the detection of output phase losses **[output phase loss]** (OPL) is activated (OPL = YES), see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292. To test the inverter in a test or maintenance environment, without having to convert a motor with the same rated power as the inverter (especially useful with high-performance converters), disable [output phase loss] (OPL = no)
- Set **[motor control type]** (Ctt) = **[U/F Reg 2P]** (UF2) or **[U/F Reg 5P]** (UF5) (menu **[DRIVE DATA]** (drC-), see "Drive parameters (Ctt)" on page 153)

Caution!

ACCIDENTAL OPERATION OF DEVICE

There is no thermal protection of the motor by the inverter when the motor rating is 20% lower than the inverter rating. Provide an alternative means of thermal protection.

Failure to follow this instruction can result in equipment damage.

2.5.8 The use of motors connected in parallel

- Set **[motor control type]** (Ctt) = **[U/F Reg 2P]** (UF2) or **[U/F Reg 5P]** (UF5) (menu **[DRIVE DATA]** (drC-)).

Caution!

BE CAREFUL OF ACCIDENTAL DEVICE OPERATION

The thermal motor protection is no longer provided by the frequency inverter. Therefore, an alternative method must be provided for the protection of the individual motor.

Failure to follow this instruction can result in equipment damage.

2.5.9 Motor with a lower rated voltage than the power supply of the inverter

- Set **[Vector control 2pt]** (VC2) = **[Yes]** (YES) (menu **[DRIVE DATA]** (drC-), see "Drive parameters (U0 - F5)" on page 154)

Caution!

ACCIDENTAL OPERATION OF DEVICE

- **To protect a motor with a rated voltage under the supply voltage of the inverter, the function [Vector control 2pt] (VC2) must be used to keep the maximum voltage of the motor below the mains voltage.**
- **Nevertheless, it must be ensured that the moment voltage supplied to the motor (connection to the DC bus voltage) is compatible with its characteristic.**

Failure to observe these instructions can result in damage to property.

2.5.10 Operation with SDC

2.5.10.1 Timing behavior

There is a delay between the control system and the ACOPOSinverter P84 (approx. 20 ms to 60 ms), which depends on various parameters.

The ACP10SDC library is automatically entered into the 1# task class. This is set to the X2X cycle time of the X2X configuration (default 2 ms).

Because of the delay time of the ACOPOSinverter P84, refresh of the input values (every 2 ms) is not guaranteed.

2.5.10.2 PLC - Open components

The following motion functions are for use with the ACOPOSinverter P84:

- MC_MoveVelocity
- MC_BR_EventMoveVelocity
- MC_BR_MoveCyclicVelocity

2.5.10.3 Quick stop/ Emergency stop

When the ACOPOSinverter P84 is operating with the ACP10SDC library, the QSTD parameter (quick stop option code) is set to 2 automatically.

> **Note:**
>
> **This value should not be changed if the ACOPOSinverter P84 is integrated with the ACP10SDC.**
>
> **If the parameter is changed, the motor of the ACOPOSinverter P84 will stop in the event of an active Quick stop or Emergency stop, but the ACP10SDC library will continue running.**

2.5.10.4 Acceleration and deceleration ramps

When an ACOPOSinverter P84 is integrated with SDC, the ACC and DEC ramp parameters are set to 0.1 ms automatically.

This corresponds to the fastest acceleration/deceleration.

> **Note:**
>
> **These values should not be modified if the ACOPOSinverter P84 is integrated with the ACP10SDC library.**

2.5.10.5 Operation of the ACOPOSinverter P84 in rpm or Hertz

The standard entry for speed is read in revolutions per minute (rpm).

2.5.10.5.1 Conversion formula SERVO_V_MAX_OUTPUT in rpm

$$\max \; Output = 32767 \;\rightarrow\; \max \; Speed \; RPM \;=\; 32767 \, [U/\min]$$

$$SERVO\_V\_MAX\_OUTPUT \;=\; \max \; Speed \; RPM \left[\frac{U}{Min}\right] \times \frac{SCALE\_LOAD\_UNITS \; [E]}{SCALE\_LOAD\_MOTOR\_REV \; [U]} \times \frac{1}{60 \, [S]}$$

Example

SCALE_LOAD_UNIT = 1000

SCAL_LOAD_MOTOR_REV = 1

$$SERVO\_V\_MAX\_OUTPUT = \left(32767 \times \frac{1}{1000} \times \frac{1}{60}\right) [E/s]$$

$$SERVO\_V\_MAX\_OUTPUT = 546116,\dot{6} \; [E/s] \;\cong\; 546116,67 \; [E/s]$$

$$SERVO\_V\_MAX\_OUTPUT = 546116,6875 \; [E/s] \;\rightarrow\; dueto \; Quantification \; float$$

2.5.10.5.2 Conversion formula SERVO_V_MAX_OUTPUT in Hertz (resolution 0.1 Hz)

$$\max \; Output = 32767 \;\rightarrow\; \max \; Speed \; RPM \;=\; 3276,7 \, [U/\min]$$

$$\max \; mech \, Speed = \frac{\max \; electr \, Speed \, Hz}{Number\_Polepairs} \; [U/s]$$

$$SERVO\_V\_MAX\_OUTPUT = \; \max \; mech \, Speed \; \left[\frac{U}{s}\right] \times \frac{SCALE\_LOAD\_UNITS \, [E]}{SCALE\_LOAD\_MOTOR\_REV \, [U]}$$

Example

SCALE_LOAD_UNITS = 1000

SCALE_LOAD_MOTOR_REV = 1

Number_Polepairs = 2

$$\max \; mech \, Speed = \frac{3276,7}{2} \;=\; 1638,35 \; [U/s]$$

$$SERVO\_V\_MAX\_OUTPUT = \left(1638,35 \times \frac{1000}{1}\right) [E/s]$$

$$SERVO\_V\_MAX\_OUTPUT = 1638350 \; [E/s]$$

2.5.10.5.3 Conversion formula SERVO_V_MAX_OUTPUT in Hertz (resolution 0-TFR)

In this configuration, the default value is specified in hertz [Hz].

The resolution is not predefined in this case; however, it can be influenced by the user. This is done by setting the "TFR Max frequency [0.1 Hz]" configuration parameter in the ACOPOSinverter I/O configuration under "ACOPOSinverter ➜ DRC - Motor control".

The default value is a data point of type "INT" for this configuration as well; however, it corresponds to a frequency of 0 up to the value of the TFR parameter.

> **Note:**
>
> **To scale the default value to 0 to TFR, the user must set bit "CMI_Output_09 → Definition of the frequency reference (LFr) and output frequency (rFr) unit(0 = 0.1 Hz, 1 = Standardized value 16 signed bits based on the maximum frequency)" to "TRUE".**

$$\max Output = 32767 \quad \rightarrow \quad \max electrSpeedHz \ = \ \frac{TFR}{10}\ [Hz]$$

The remainder of the calculation is identical to the configuration described above with the default value in Hertz.

Example

SCALE_LOAD_UNITS = 1000

SCALE_LOAD_MOTOR_REV = 1

Number_Polepairs = 2

$$TFR = \ 600 \quad \rightarrow \quad \max electrSpeed \ = \ 60\ [Hz]$$

$$\max mechanicalSpeed \ = \ \frac{60}{2} \ = \ 30[U/s]$$

$$SERVO\_V\_MAX\_OUTPUT = \left(30 \ \times \ \frac{1000}{1}\right)\ [E/s]$$

$$SERVO\_V\_MAX\_OUTPUT = 3000\ [E/s]$$

2.5.10.6 Parameter AUt

To improve ACOPOSinverter P84 precision, a tuning must be performed.

Operating the motor on an ACOPOSinverter P84 without tuning is not recommended.

2.6 Graphic display terminal

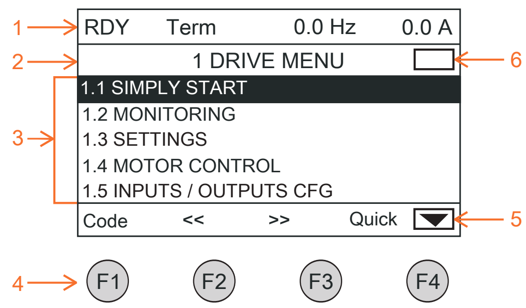
This graphic display terminal is optional. The graphic display terminal can be connected externally (for example on the door of an enclosure) with the aid of the optionally available cables and the corresponding accessories.

2.6.1 Description of the terminal

Note:

Buttons 3, 4, 5 and 6 can be used to control the inverter directly, if control via the terminal is activated.

2.6.2 Description of the screen



1. Display line. The content can be configured. The following is shown in the factory setting:

- The inverter state (see "Codes for the inverter state:" on page 106)
- The active control channel:
  - Term: Terminals
  - HMI: Graphics terminal
  - CAN: Integrated communication interface
  - NET: Communication card
- Frequency reference
- Current in the motor

2. Menu bar: Displays the name of the current menu or submenu.

3. The menus, submenus, parameters, values, bar charts, etc., are displayed in the drop-down window format on up to 5 lines. Selected lines and values are displayed with light characters on a dark background using the navigation button.

4. Section in which the functions assigned to keys F1 to F4 are displayed via these, for example:

Code	F1	Displays the code of the selected parameter (in accordance with the 7-segment display).
HELP	F1	Context help
<<	F2	Navigate horizontally to the left or to return to the previous menu/submenu or (in the case of values) to switch the next higher position (displayed with light characters on a dark background, see "Example configuration window for one value:" on page 107).
>>	F3	Navigate horizontally to the right or to switch to the previous menu/submenu or (in the case of values) to the next lower position (displayed with light characters on a dark background, see "Example configuration window for one value:" on page 107).
Quick	F4	Quick navigation, see "Quick navigation" on page 111.

The function keys are dynamic and context-dependent.

These keys can be assigned to other functions (application functions) via the menu **[CONTROL]** .

If a preset speed is assigned to a function key and then the function key is pressed, the motor runs with the preset speed, until a different preset speed or JOG is pressed, the speed reference is changed or the stop button is pressed.

5.  Indicates that there are no further levels below this display window.

Indicates that there are more levels beneath this display window.

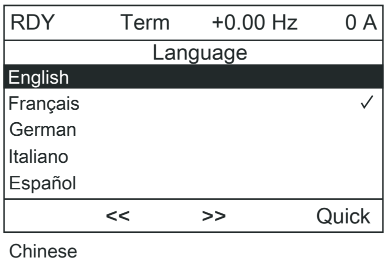
6.  Indicates that you can no longer scroll this display window up any further.

Indicates that there are more levels above this display window.

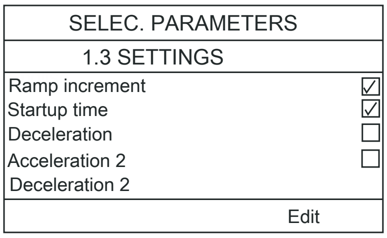
2.6.3 Codes for the inverter state:

ACC	Startup time
CLI	Current limiting
CTL	Controlled stop in the event of a failure of the input phase
DCB	DC injection is taking place
DEC	Deceleration
FLU	Motor magnetizing taking place
FST	Fast stop
NLP	No power supply (No mains voltage on L1, L2, L3)
NST	Freewheel stop
OBR	Automatically adjusted deceleration
PRA	Power removal function (safe stop) active (inverter locked)
RDY	Drive ready
RUN	The inverter is running.
SOC	Controlled output shutdown
TUN	Autotuning taking place
USA	Low voltage alarm

2.6.4 Example of configuration windows

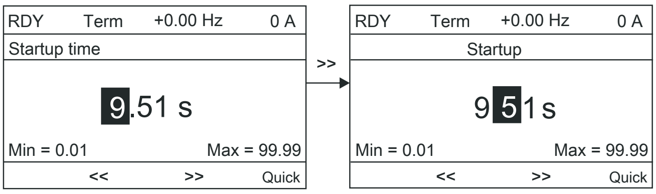


When only one selection is possible, the selected item is indicated by the ✓.
Example: Only one language can be chosen.



When multiple selection is possible, the selected items are indicated by the ✓symbol.
Example: To create the **[USER MENU]**, you can select more than one parameter.

2.6.5 Example configuration window for one value:



The << and >> arrows (keys F2 and F3) allow you to select the figure to be changed. The navigation button can then be turned to increase or reduce this figure.

2.6.6 Initial turn-on - [LANGUAGE] menu

At initial turn-on, the navigation is specified in the menus up to **[DRIVE MENU]** for user guidance.
The parameters of submenu **[SIMPLY START MENU]** must be configured, and the autotuning must be performed in every case before starting the motor.

8I84T400220.01P-1
2.2 kW/3 PS 380/480 V
Config. no. 1

Is displayed 3 seconds after switching on

↓ 3 seconds

5 languages
English
French ✔
German
Italian
Spanish
Chinese

Automatically switches after 3 seconds to the menu **[5 LANGUAGE]**.
Select the language and press ENT.

↓

RDY	Term	+0.00 Hz	0.0 A

2 ACCESS LEVEL
Base
Standard ✔
Advanced
Expert

Switches to the menu **[2 ACCESS LEVEL]**.
Select the access level and press ENT.

↓

RDY	Term	+0.00 Hz	0.0 A

1 DRIVE MENU
1.1 SIMPLE START MENU
1.2 MONITORING
1.3 SETTINGS
1.4 MOTOR CONTROL
1.5 INPUTS/OUTPUTS CFG
Code << >> Quick

Go to the menu **[1 DRIVE MENU]**.

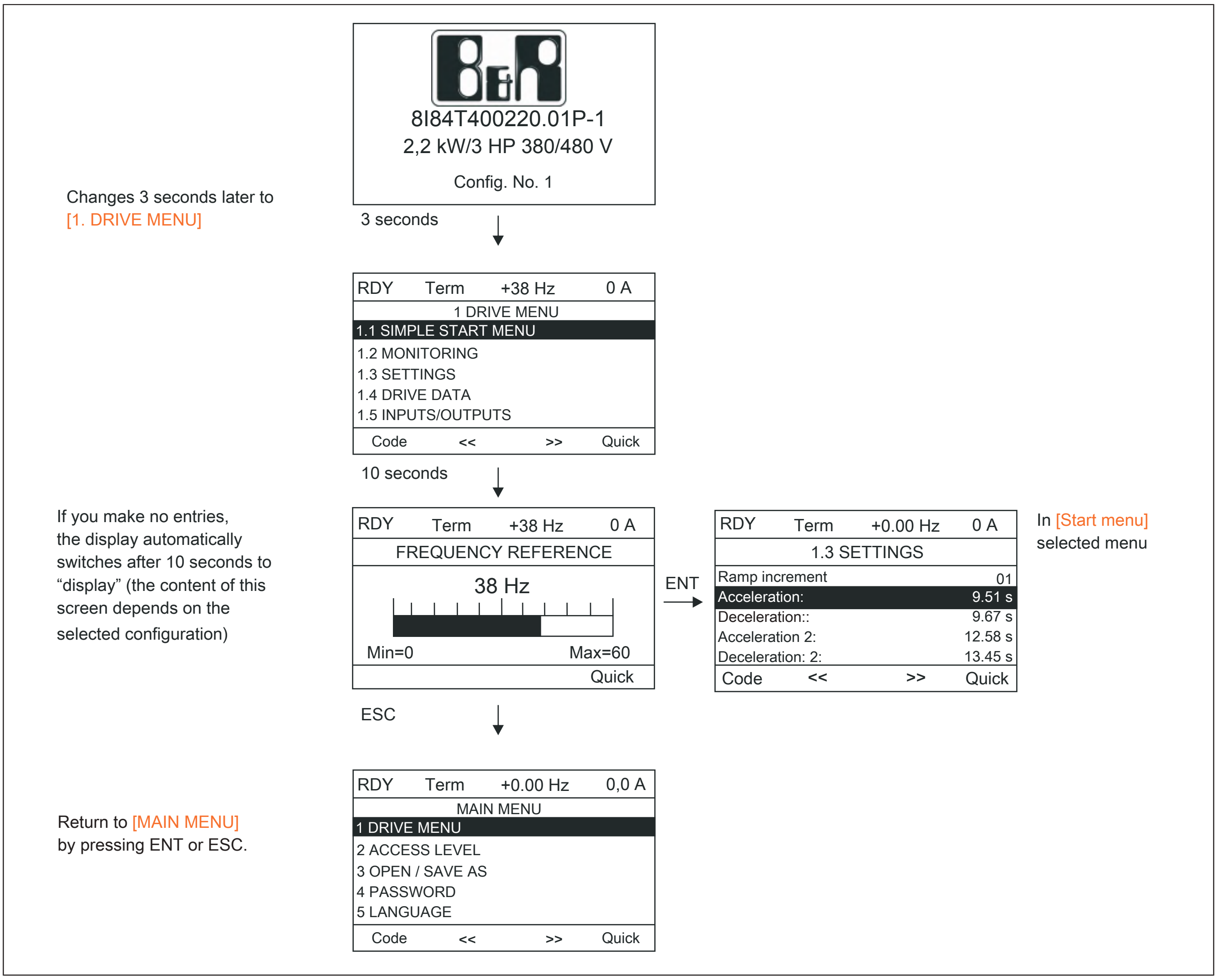
↓ ESC

RDY	Term	+0.00 Hz	0.0 A

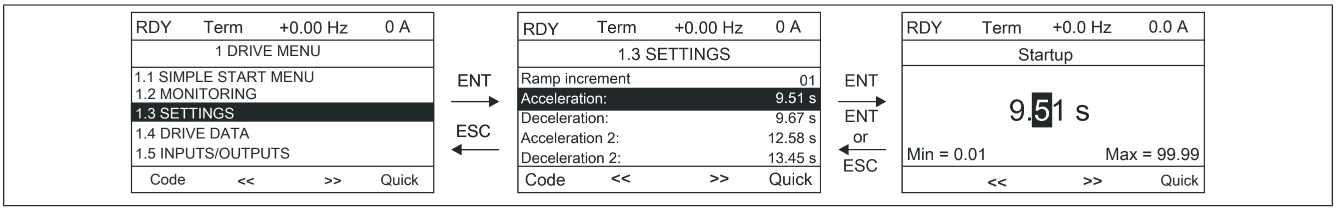
MAIN MENU
1 DRIVE MENU
2 ACCESS LEVEL
3 OPEN / SAVE AS
4 PASSWORD
5 LANGUAGE
Code << >> Quick

Press ESC to return to the **[MAIN MENU]** screen.

2.6.7 Subsequent power ups



2.6.8 Programming: Example for setting a parameter



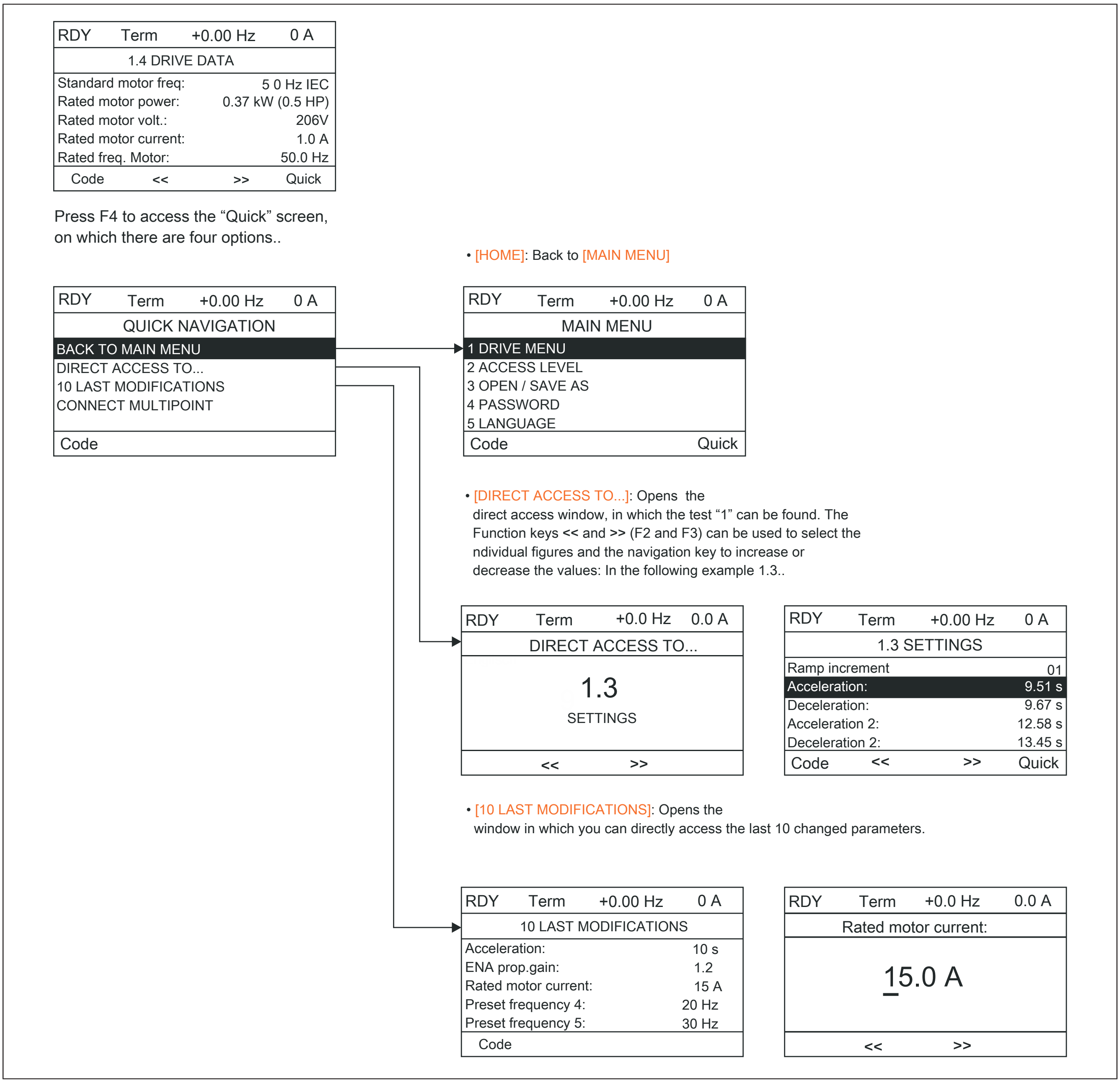
Note:

- **To select a parameter**
  - **Turn the navigation button to scroll in the vertical direction.**
- **To change a parameter**
  - **Scroll with the << and >> keys (F2 and F3) in the horizontal direction and select the point to be changed (the selected point is white on a black background).**
  - **Turn the navigation button to change the point.**
- **To cancel the change:**
  - **Press ESC**
- **To save the modification:**
  - **Press the navigation button (ESC).**

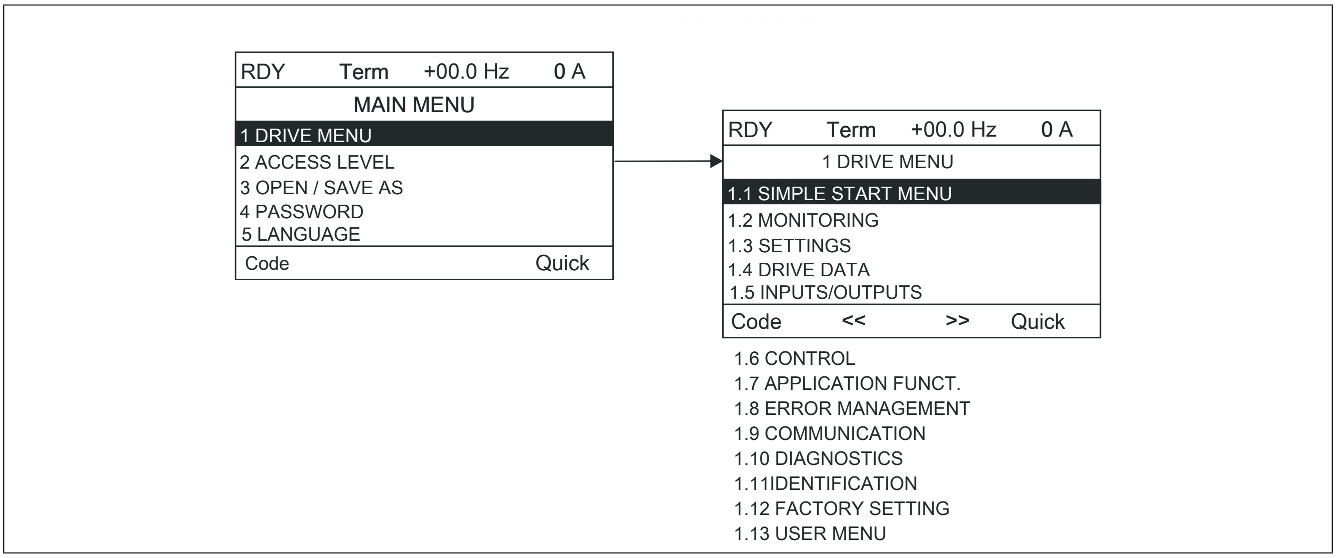
2.6.9 Quick navigation

If the "Quick" function is displayed via F4, you can select from any screen to quickly access a parameter.

Example:



2.6.10 [MAIN MENU]



Contents of the menu **[MAIN MENU]**

Menu	Contents
[DRIVE MENU]	See next page
[ACCESS LEVEL]	Defines on which menus the access is granted (degree of complexity)
[LOAD / SAVE AS]	To save and restore the configuration files of the inverter
[PASSWORD]	Offers a password protection for configuration
[LANGUAGE]	Language selection
[SELECT DISPLAY TYPE]	For user-defined configuration of the information displayed on the graphic display screen during operation
[DISPLAY CONFIG.]	• Customized configuration of the parameters • Creation of a customized menu • Customization of the visibility and protection mechanisms of menus and parameters.

2.6.11 [DRIVE MENU]

```
RDY      Term      +0.00 Hz      0 A
          1 DRIVE MENU
1.1 SIMPLE START MENU
1.2 MONITORING
1.3 SETTINGS
1.4 DRIVE DATA
1.5 INPUTS/OUTPUTS
  Code        <<         >>       Quick
1.6 CONTROL
1.7 APPLICATION FUNCT.
1.8 ERROR MANAGEMENT
1.9 COMMUNICATION
1.10 DIAGNOSTICS
1.11 IDENTIFICATION
1.12 FACTORY SETTING
1.13 USER MENU
```

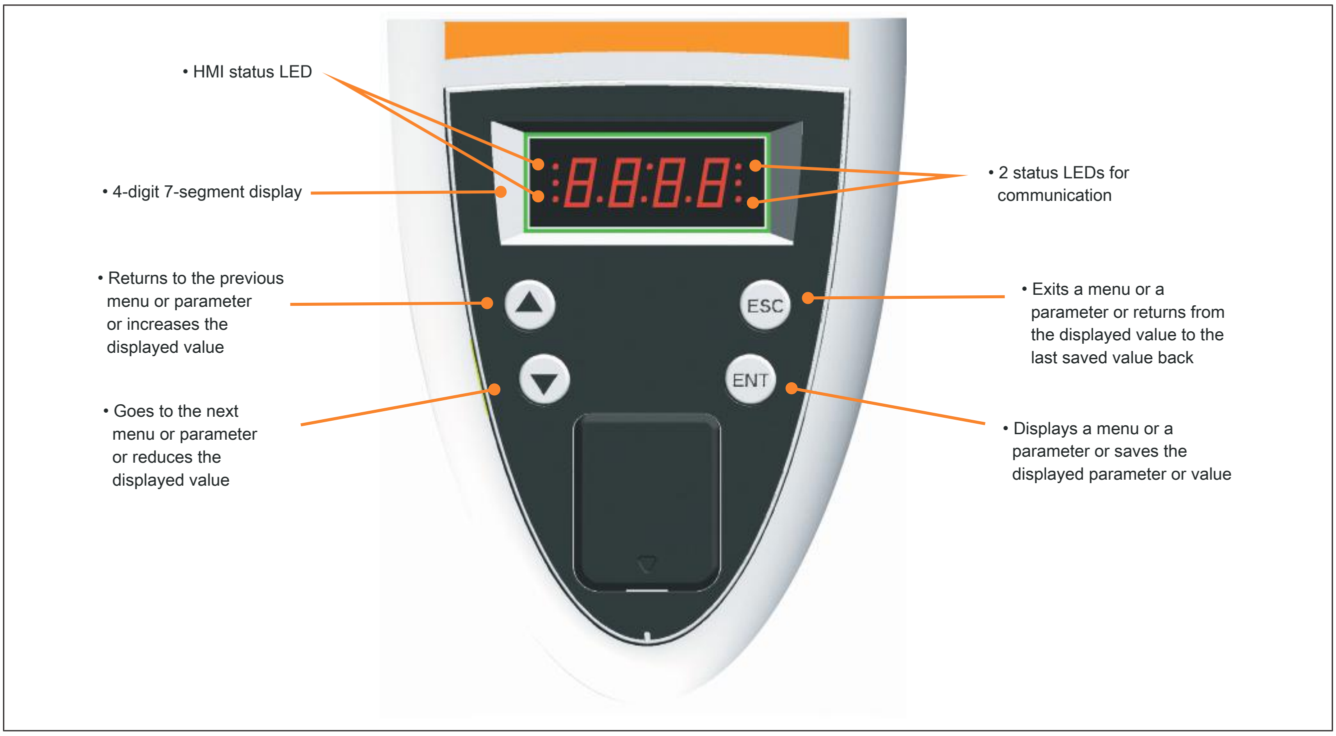
Contents of the menu **[DRIVE MENU]**

Menu	Contents
[SIMPLE START]	Simplified menu for fast commissioning
[MONITORING]	Visualization of current, motor and input/output values
[SETTINGS]	Setting parameters that can be changed during operation
[MOTOR CONTROL]	The motor parameters (motor nameplate, autotuning, switching frequency, control algorithms, etc.)
[INPUTS / OUTPUTS CFG]	I/O configuration (scaling, filters, 2-wire control, 3-wire control, etc.)
[COMMAND]	Configuration of the command and reference channels (terminal, terminal strips, bus, etc.).
[APPLICATION FUNCT.]	Configuration of the application functions (e.g. preset frequencies, PID controller, brake logic, etc.)
[ERROR MANAGEMENT]	Configuration of the error management
[COMMUNICATION]	Communication parameters (Fieldbus)
[DIAGNOSTICS]	Motor/Inverter diagnostics
[IDENTIFICATION]	Identifies the inverter and the internal options
[Factory settings]	Access to configuration files and reset to factory settings
[USER MENU]	Special menu that the user sets up with the menu **[DISPLAY CONFIG.]**.

2.7 Integrated display terminal

All ACOPOSinverter P84 have an integrated display terminal with a 4-digit 7-segment display. The graphic display terminal described on the previous pages can also be connected to this inverter as an optional accessory.

2.7.1 Functions of the display and keys



Note:

Pressing ▲ or ▼ does not save the selection.

Press ▲ or ▼ (>2 s) button to quickly scroll through the data.

Save the selection: ENT

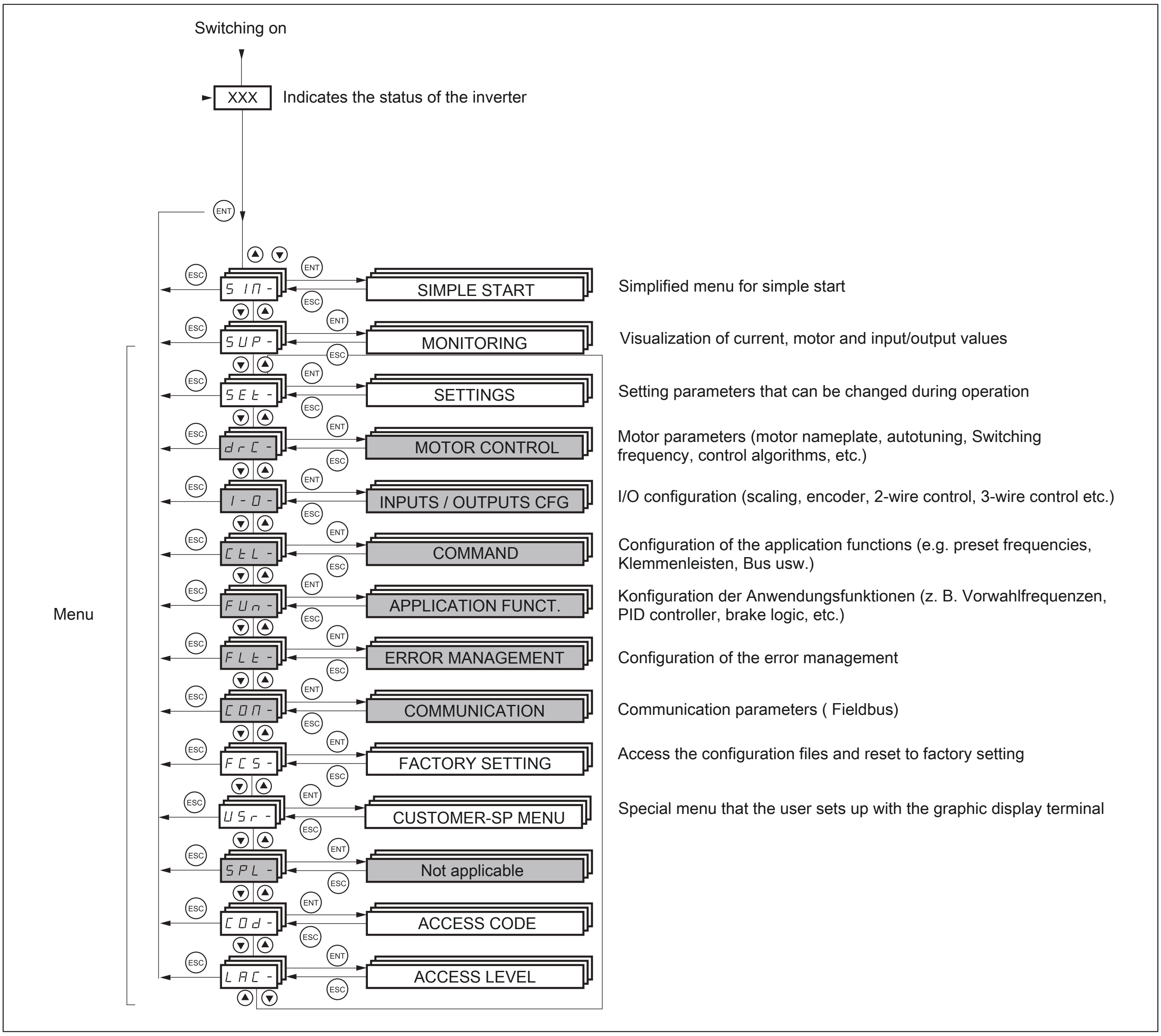
If a value is saved, the display flashes.

Normal display (no error and no startup):

- 43.0: Display of the parameter selected in the SUP menu (default value: motor frequency)
- (CLI): Current limiting
- (CtL): Controlled stop in the event of a failure of the input phase
- (dCb): DC injection is taking place
- (FLU): Motor magnetizing taking place
- (FSt): Quick stop
- (nLP): No power supply. (no mains voltage on L1, L2, L3)
- (nSt): Freewheel stop
- (Obr): Automatically adjusted deceleration.
- (PrA): Power removal function (safe stop) active (inverter locked)
- (rdY): Inverter ready for operation
- (SOC): Controlled output shutdown
- (tUn): The autotuning is running
- (USA): Undervoltage alarm

In the event of an error the display flashes.

2.7.2 Accessing the menus



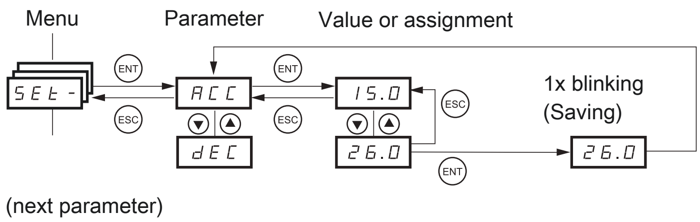
A hyphen is displayed behind the menu and submenu codes to distinguish them from parameter codes

Examples: Menu FUn-, Parameter ACC.

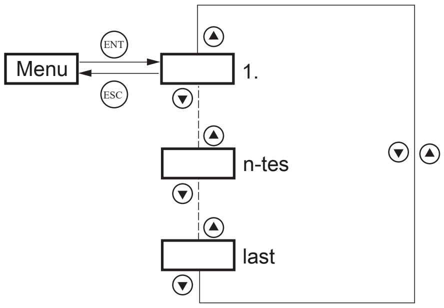
Grayed-out menus might not be retrievable depending on the configuration of the access level LAC.

2.7.3 Accessing the menu parameters

Save the displayed selection: ENT

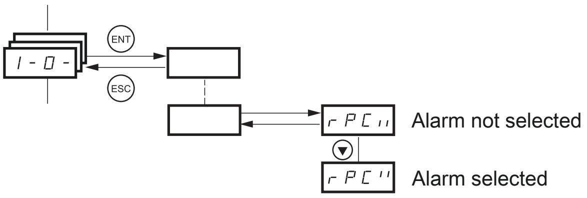


If a value is saved, the display flashes

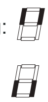


All menus are drop-down menus That means that if you continue pressing after the last parameter, ▼ you return to the first parameter. You also get by pressing ▲ on the first parameter to the last parameter.

2.7.4 Selection of multiple assignments for one parameter



Example: list of alarms of group 1 in the menu
[INPUTS / OUTPUTS CFG] (I-O)
Multiple alarms can be selected. These must be marked as follows:



The right-hand position has the following meaning: selected

not selected

The same principle is used for all multiple selections.

2.8 Programming

2.8.1 [ACCESS LEVEL](LAC-)

2.8.1.1 With graphic display terminal:

RDY Term +0.00 Hz 0A
2 ACCESS LEVEL
Base
Standard ✓
Advanced
Expert
Code << >> Quick

Base

Access only to 5 menus, and in the [1. DRIVE MENU] access to 6 sub-menus.
A single function can be assigned to each input.

RDY Term +0.00 Hz 0A
MAIN MENU
1 DRIVE MENU
2 ACCESS LEVEL
3 OPEN / SAVE AS
4 PASSWORD
5 LANGUAGE
Code << >> Quick

RDY Term 1,250A +50.00 Hz
1 DRIVE MENU
1.1 SIMPLE START MENU
1.2 MONITORING
1.3 SETTINGS
1.11 IDENTIFIKATION
1.12 FACTORY SETTING
Code << >> Quick
1.13 USER MENU

Standard

This is the factory-reference. Access only to 6 menus, and in the [1. DRIVE MENU] access to all sub-menus.
A single function can be assigned to each input.

RDY Term +0.00 Hz 0A
MAIN MENU
1 DRIVE MENU
2 ACCESS LEVEL
3 OPEN / SAVE AS
4 PASSWORD
5 LANGUAGE
Code Quick
6 MONITORING CONFIG.

RDY Term 1,250A +50.00 Hz
1 DRIVE MENU
1.1 SIMPLE START MENU
1.2 MONITORING
1.3 SETTINGS
1.4 DRIVE DATA
1.5 INPUTS/OUTPUTS
Code << >> Quick
1.6 CONTROL
1.7 APPLICATION FUNCT.
1.8 ERROR MANAGEMENT
1.9 COMMUNICATION
1.10 DIAGNOSTICS
1.11 IDENTIFICATION
1.12 FACTORY SETTING
1.13 USER MENU

Advanced

Access to all menus and sub-menus.
Each input can be assigned to several functions.

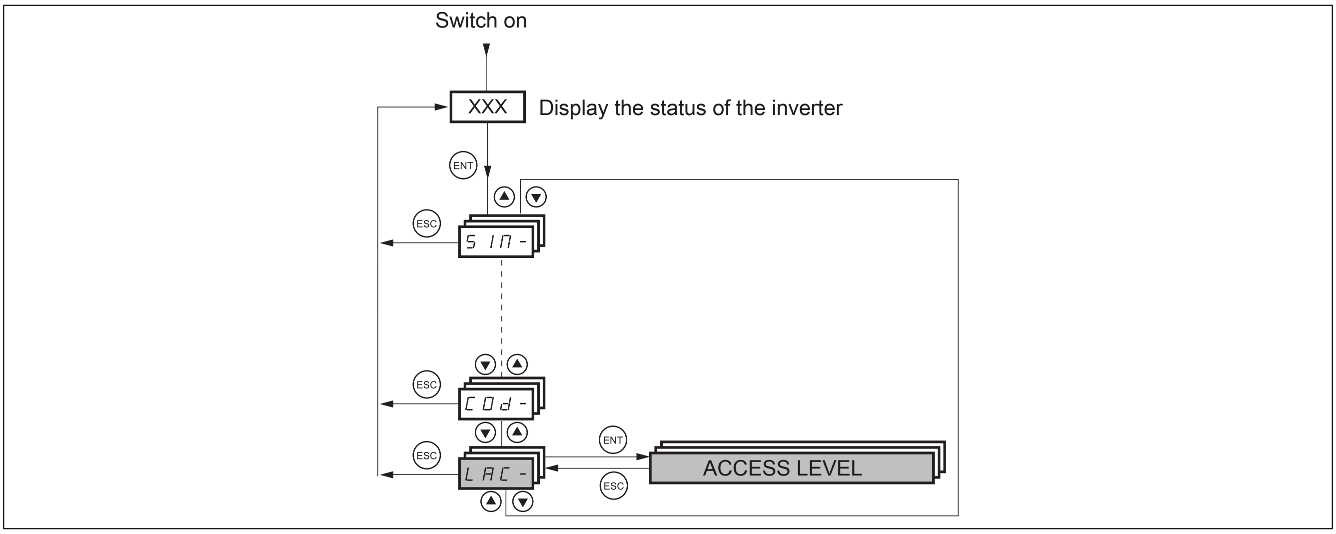
RDY Term +0.00 Hz 0A
MAIN MENU
1 DRIVE MENU
2 ACCESS LEVEL
3 OPEN / SAVE AS
4 PASSWORD
5 LANGUAGE
Code Quick
6 MONITORING CONFIG.
7 DISPLAY CONFIG.

Expert

Access to all menus as in the access level [Advanced] and access to additional parameters.
Several functions can be assigned to each input.

RDY Term +0.00 Hz 0A
MAIN MENU
1 DRIVE MENU
2 ACCESS LEVEL
3 OPEN / SAVE AS
4 PASSWORD
5 LANGUAGE
Code Quick
6 MONITORING CONFIG.
7 DISPLAY CONFIG.

2.8.1.2 With integrated display terminal:



Access level LAC-

Code	Name/Description	Factory settings
LAC-		Std
bAS	bAS: restricted access to the menus SIM, SUP, SEt, FCS, USr, COd and LAC. Only one function can be assigned to each input.	
Std	Std: Access to all menus on the integrated display terminal. Only one function can be assigned to each input.	
Adu	AdU: Access to all menus on the integrated display terminal. Several functions can be assigned to each input.	
Epr	EPr: Access to all menus on the integrated display terminal and access to additional parameters. Several functions can be assigned to each input.	

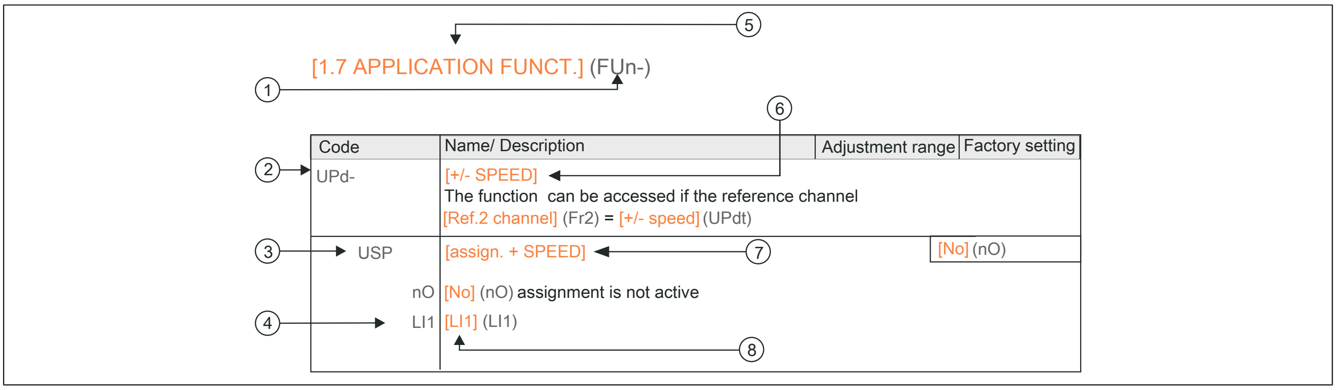
2.8.1.3 Overview of the menus that can be activated from the graphic display terminal/ integrated display terminal

Graphic display terminal		Integrated display terminal		Access level
[2 ACCESS LEVEL]		LAC-	(Access level)	Basic bAS
[3 LOAD/SAVE AS]				Basic bAS
[4 ACCESS CODE]		COd -	(Access code)	Basic bAS
[5 LANGUAGE]				Basic bAS
[1 DRIVE MENU]				Basic bAS
	[1.1 SIMPLE START MENU]	SIM-	(Simple start)	Basic bAS
	[1.2 MONITORING]	SUP -	(Monitoring)	Basic bAS
	[1.3 SETTINGS]	SEt -	(Settings)	Basic bAS
	[1.11 IDENTIFICATION]			Basic bAS
	[1.12 FACTORY SETTING]	FCS-	(factory setting)	Basic bAS
	[1.13 USER MENU]	USr -	(User menu)	Basic bAS
A single function can be assigned to each input.				Basic bAS
	[1.4 DRIVE DATA]	drC -	(Drive data)	Standard Std
	[1.5 INPUTS/OUTPUTS]	I-O -	(I/O configuration)	Standard Std
	[1.6 CONTROL]	CtL -	(Control)	Standard Std
	[1.7 APPLICATION FUNCT.]	FUn -	(Application function)	Standard Std
	[1.8 ERROR MANAGEMENT]	FLt -	(Error management)	Standard Std
	[1.9 COMMUNICATION]	COM -	(Communication)	Standard Std
	[1.10 DIAGNOSTICS]			Standard Std
[6 MONITORING CONFIG.]				Standard Std
A single function can be assigned to each input.				Standard Std
[7 DISPLAY CONFIG.]				Advanced AdU
A single function can be assigned to each input.				Advanced AdU
Expert parameters				Expert Epr
A single function can be assigned to each input.				Expert Epr

2.8.2 Structure of parameter tables

The parameter tables in the descriptions of the various menus can be used with the graphic display terminal and the integrated display. They therefore contain the information described below for both terminals.

Example:



1. Menu name on the 4-digit 7-segment display.

2. Submenu code on 4-digit 7-segment display.

3. Parameter code on 4-digit 7-segment display.

4. Parameter value on 4-digit 7-segment display.

5. The name of the menu on the graphic display terminal/ in B&R Automation Studio

6. The name of the submenu on the graphic display terminal/ in B&R Automation Studio

7. The name of the parameter on the graphic display terminal/ in B&R Automation Studio

8. Value of the parameter on the graphic display terminal/ in B&R Automation Studio/

Note:

- **Text in square brackets [ ] corresponds to the graphic display terminal display.**
- **The factory setting corresponds to [Macro Config.] (CFG) = [Start/Stop] (StS). This is the factory-set macro configuration**

2.8.3 Independence of the parameter values

To reduce the risk of errors, the configuration of certain parameters changes the setting range of other parameters. This **can result in a change in a default setting or a previously selected value.**

1 **[Current Limiting]** (CLI) see "Setting parameters (SFr - CL2)" on page 144 set to 1.6 in or left on default value 1.5 in

2 **[Frequency]** (SFr) see "Setting parameters (SFr - CL2)" on page 144 is set to 1 kHz (and confirmed with "ENT") limited **[Current limiting]** (CLI) to 1.36 in

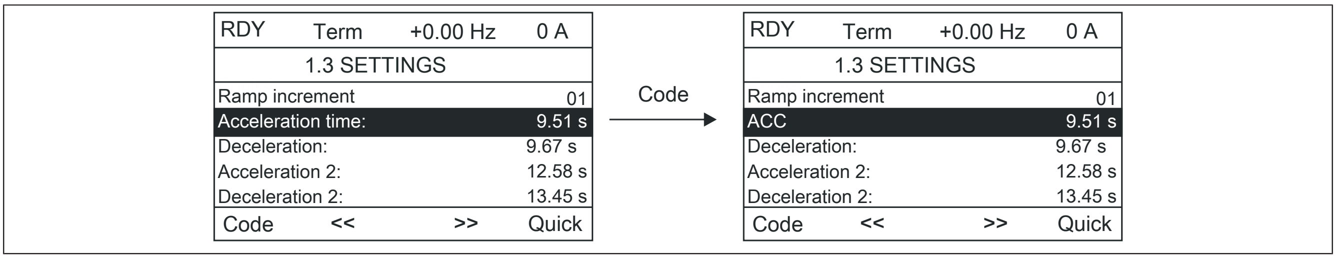
3 If **[Frequency]** (SFr) is increased to 4 kHz, **[Current limiting]** (CLI) is no longer limited, but remains at 1.36 In. If you need 1.6 In, you must reset **[Current limiting]** (CLI) .

2.8.4 Finding a parameter in this document

The following aid is available to you when searching for parameter descriptions:

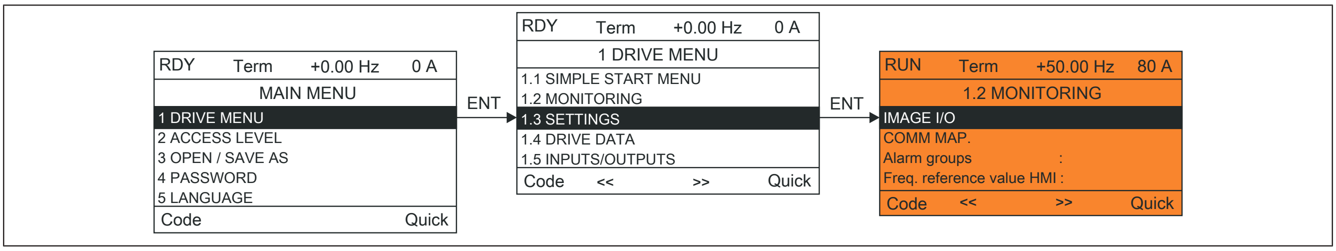
- **With the graphic display terminal:** Select the search parameters and press the key F1: **[Code]**. As long as the key remains pressed, in place of the name of the code the parameter is displayed.

Example: ACC

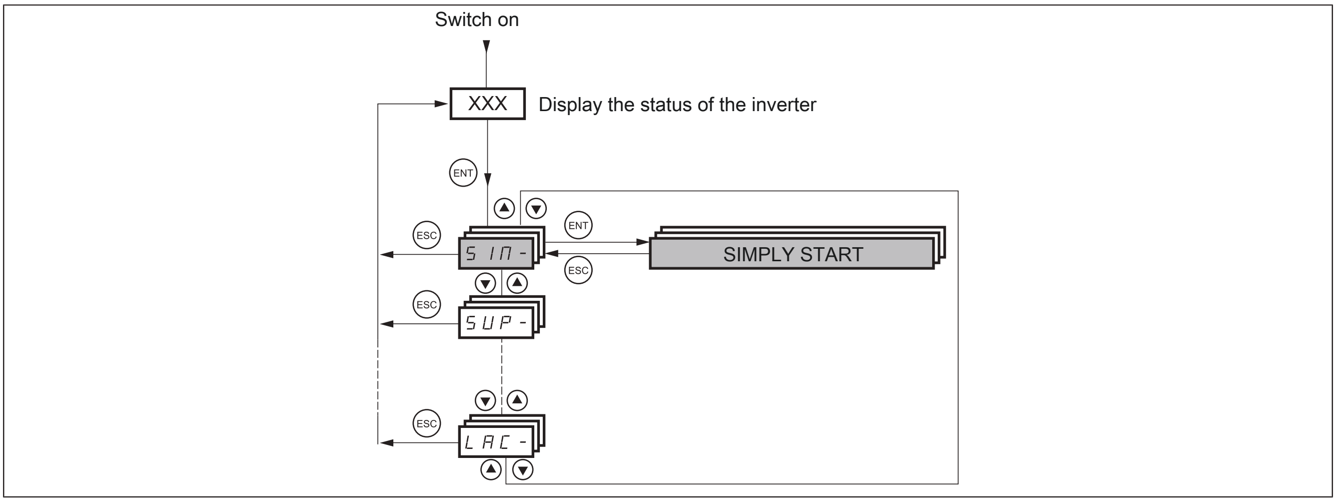


2.8.5 [SIMPLE START](SIM-)

2.8.5.1 With graphic display terminal:



2.8.5.2 With integrated display terminal:



The menu **[SIMPLE START]** (SIM) can be used for a quick start, which is sufficient for the majority of applications.

The parameters in this menu can only be changed if the inverter is stopped and no run command is present, with the following exceptions:

- Autotuning, which starts the motor.
- The setting parameters, see "Parameters that can be modified during operation or when the motor is stopped." on page 130

Note:

The parameters of the menu [SIMPLE START] (SIM) must be entered in the displayed order, as the later ones depend on the former.

For example, [2/3 wire control] (tCC) must be configured before all other parameters.

The **[SIMPLE START]** (SIM) should be configured by itself or before other menus for configuration of the inverter. If a change has been made on one of these menu settings, in particular to **[DRIVE DATA]** (DRC), parameters in **[SIMPLE START]** (SIM) can be changed. After changing another menu for configuring the inverter, it is not required, but not harmful, to return to **[SIMPLY START MENU]** (SIM-). So as not to unnecessarily complicate this section, the changes resulting from entries in other configuration menus will not be described here.

2.8.5.3 Macro configuration

The macro configuration allows the faster configuration of functions for a specific area of application.

7 macro configurations are available:

- Start/Stop (factory configuration)
- Material handling
- General applications
- Hoisting
- PID controllers
- Communication bus
- Master/Slave

If you select a macro configuration, the parameters defined in this macro configuration are included.

Each macro configuration can still be changed in the other menus.

2.8.5.4 Macro configuration parameters

Assignment of the inputs / outputs

Input/Output	[Start/Stop]	[M. handling]	[Gen. Use]	[Hoisting]	[PID REGULATOR]	[Network C.]	[Mast./Slave]
[AI1]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel]	[Ref.1 channel] (PID setpoint)	[Ref.2 channel] ([Ref.1 channel] = Integrated bus connection)	[Ref.1 channel]
[AI2]	[No]	[Summing ref. 2]	[Summing ref. 2]	[No]	[PID feedback]	[No]	[Ref. Torq.]
[AO1]	[No]	[No]	[No]	[No]	[No]	[No]	[No]
[R1]	[No fault]	[No fault]	[No fault]	[No fault]	[No fault]	[No fault]	[No fault]
[R2]	[No]	[No]	[No]	[BRAKE LOGIC CONTROL]	[No]	[No]	[No]
[LI1] (2-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI2 (2-wire)	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]
LI3 (2-wire)	[No]	[2 preset speeds]	[Jog]	[Fault reset configuration]	[PID integral reset]	[Ref channel switching]	[Alt Torque / v]
LI4 (2-wire)	[No]	[4 preset speeds]	[Fault reset configuration]	[External fault]	[Assign 2 PID ref.]	[Fault reset configuration]	[Fault reset configuration]
LI5 (2-wire)	[No]	[8 preset speeds]	[Torque limit. activ.]	[No]	[Assign 4 PID ref.]	[No]	[No]
LI6 (2-wire)	[No]	[Fault reset configuration]	[No]	[No]	[No]	[No]	[No]
[LI1] (3-wire)	Start enab.	Start enab.	Start enab.	Start enab.	Start enab.	Start enab.	Start enab.
LI2 (3-wire)	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]	[Forward]
LI3 (3-wire)	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]	[Reverse assign.]
LI4 (3-wire)	[No]	[2 preset speeds]	[Jog]	[Fault reset configuration]	[PID integral reset]	[Ref. 2 switching]	[Alt Torque / v]
LI5 (3-wire)	[No]	[4 preset speeds]	[Fault reset configuration]	[External fault]	[Assign 2 PID ref.]	[Fault reset configuration]	[Fault reset configuration]
LI6 (3-wire)	[No]	[8 preset speeds]	[Torque limit. activ.]	[No]	[Assign 4 PID ref.]	[No]	[No]
Graphic display terminal keys							
F1 key	[No]	[No]	[No]	[No]	[No]	Control via graphic display terminal	[No]
Keys F2, F3, F4	[No]	[No]	[No]	[No]	[No]	[No]	[No]

In 3-wire control, the assignment of inputs LI1 to LI6 shifts.

Note:

These assignments are reinitialized every time the macro configuration changes.

Other configurations and settings

Only in the "Hoist" macro configurations and "Mast./Slave" are additional parameters assigned outside the I/O assignment.

Hoisting:

- **[Movement type]** (bSt) = **[Hoisting]** (UEr), see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Brake contact]** (bCI) = **[No]** (nO), see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Start pulse brake]** (bCI) = **[No]** (nO), see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[I Brake release upw.]** (Ibr) = **[Rated current motor]** (nCr), see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Brake release time]** (brt) = 0.5 s, see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Freq. brake release]** (bIr) = **[Auto]** (AUtO), see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Freq. brake engage]** (bEn) = **[Auto]** (AUtO), see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Brake engage time]** (bEt) = 0.5 s, see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Engage at rev.]** (bEd) = **[No]** (nO), see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Jump at reversal]** (JdC) = **[Auto]** (AUtO), see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Time to restart]** (ttr) = 0 s, see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
- **[Current ramp time]** (brr) = 0 s, see "Overview of parameters for the brake logic (brH2 - brr)" on page 226
- **[Low speed]** (LSP) = Motor slip calculated by inverter, see "Parameters that can be modified during operation or when the motor is stopped." on page 130
- **[Output Phase Loss]** (OPL) = **[Yes]** (YES), see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292. No more changes can be made to this parameter.
- **[TRAP WHEN RUNNING]** (FLr) = **[No]** (nO), see "CATCH ON THE FLY (FLr-)" on page 290. No more changes can be made to this parameter.

Mast./Slave:

- **[MOTOR CONTROL TYPE]** (Ctt) = **[SVC I]** (CUC), see "Drive parameters (Ctt)" on page 153

> ## Note:
> **These assignments are forced for each change of the macro configuration, except [Motor control type] (Ctt) for the case of in [FVC] (FUC) Mast./Slave configured macro configuration.**

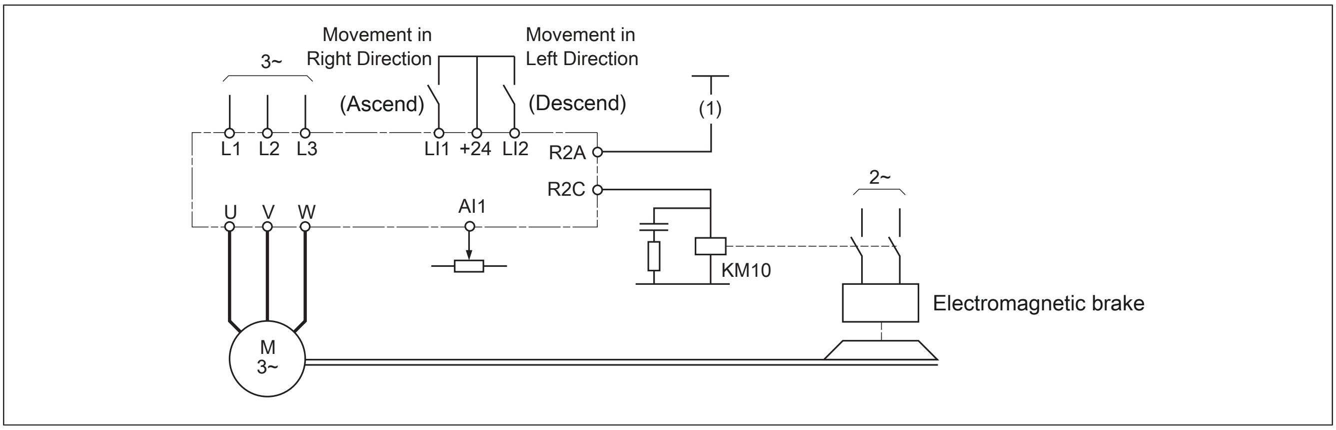
Reset to factory settings:

When resetting to factory settings with the command **[Select config.]** (Source config.) (FCSI) = **[Macro conf]** (InI),, see "Factory setting parameters (FCS1 - SCS1)" on page 315 the inverter is reset to the selected macro reset configuration. The parameter **[Macro config.]** (CFG) does not change, however **[Customer spec. macro]** (CCFG) is deleted.

> ## Note:
> **The factory setting displayed in the parameter tables corresponds to [Macro config.] (CFG) = [Start/Stop] (StS). This is the factory-set macro configuration**

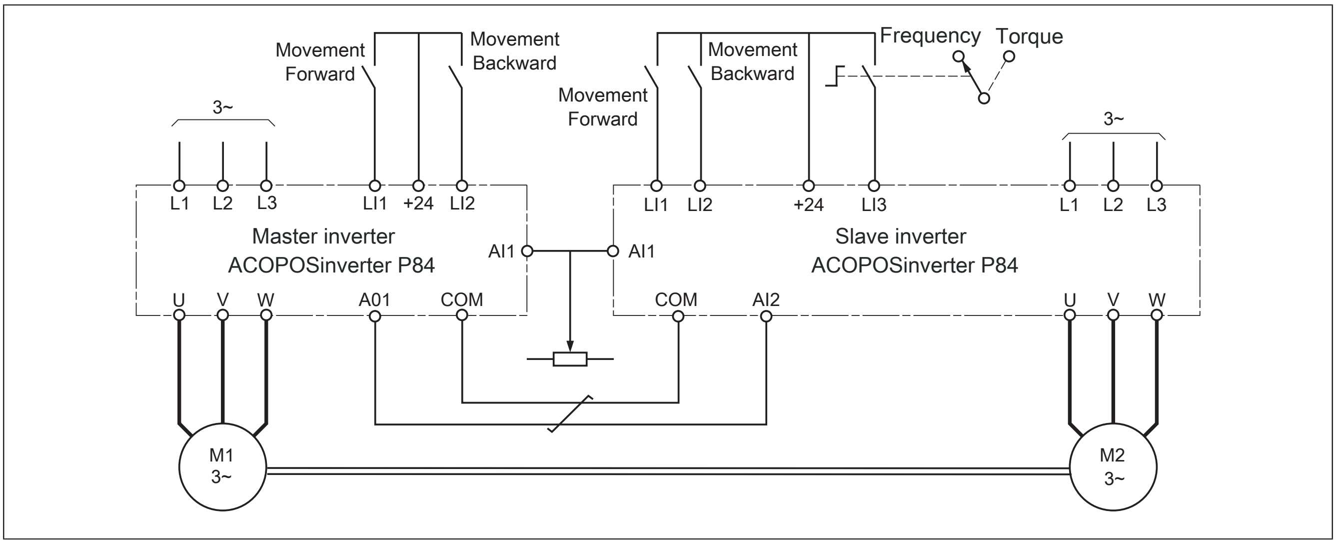
2.8.5.5 Example diagrams for use with the macro configurations

Wiring diagram [Hoisting] (HSt)



1) A safety CPU contact (e.g. X20 SafeLOGIC with X20SO****) must be integrated into the brake control circuit so that the brake is safely applied when safety function "Power removal" is activated (see wiring diagram in the installation instructions).

Wiring diagram[Mast./Slave] (MSL)

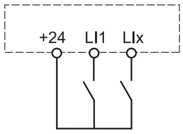


If the two motors are connected mechanically, the tightening of the speed/torque contact activates the master/slave mode. The master inverter regulates the speed and controls the torque of the slave inverter to guarantee the distribution of the load.

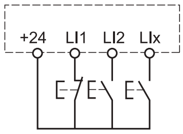
Overview of parameters [SIMPLE START] (SIM-)

<table>
<tr><th>Code</th><th>Name/Description</th><th>Setting range</th><th>Factory settings</th></tr>
<tr><td>tCC
2C
3C</td><td>[2/3 wire control]
[2 wire control] (2C)
[3 wire control] (2C)

2 wire control: This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping.

Example for wiring as "source":

LI1: Forward
LIx: Reverse

3-wire control (edge-controlled): A "forward" or "reverse" pulse is sufficient for motor startup. A "stop" pulse is sufficient to stop the motor.

Example for wiring as "source":

LI1: Stop
LI2: Forward
LIx: Reverse

Warning!

ACCIDENTAL OPERATION OF DEVICE

To change the assignment of [2/3 wire control] (tCC), press down on the "ENT" key for 2 s. The following function is reset to the factory settings: [Type 2 wire control] (tCt), see "Input and output parameters (tCC - rr5)" on page 166, as well as all the functions that assign the logic inputs.

The selected macro configuration will also be reset if they contain customer-specific settings (loss of customer-specific settings).

Check that this change is compatible with the wiring diagram used.

Failure to follow these instructions will result in death or serious injury.</td><td></td><td>[2 wire control] (2C)</td></tr>
<tr><td>CFG
StS
HdG
HSt
GEn
PId
nEt
MSL</td><td>[Macro configuration]
[Start/Stop] (StS): Operating / Standstill
[Mater.Handl] (HdG): Conveyor technology
[Hoist] (HSt): Hoisting gear
[Gen. Use] (GEn): General applications
[PID CONTROLLER] (PId): PID control
[Buscom.] (nEt): Communication bus
[Mast./Slave] (MSL): Master / Slave

Warning!

ACCIDENTAL OPERATION OF DEVICE

To change the assignment of [Macro config.] (CFG), press down on the "ENT" key for 2 s.

Check that the selected macro configuration is compatible with the wiring diagram used.

Failure to follow these instructions will result in death or serious injury.</td><td></td><td>[Start/Stop] (StS)</td></tr>
<tr><td>CCFG

YES</td><td>[Customized macro]
Read-only parameter, only visible if at least one macro configuration parameter has been modified.
[Yes] (YES)</td><td></td><td></td></tr>
<tr><td>bFr
50
60</td><td>[Standard mot. freq]
[50 Hz IEC] (50): IEC
[60 Hz NEMA] (60): NEMA

This parameter changes the default setting of the following parameters:[Rated motor voltage] (UnS), [Size frequency] (HSP), [F. thresh. Mot] (Ftd), [Rated motor freq.] (FrS) , [Max. output freq.] (tFr), [Rated motor current:] (nCr), [Rated motor speed] (nSP) and [Brake tightening power] (Ibr).</td><td></td><td>[50 Hz IEC] (50)</td></tr>
<tr><td>IPL

nO
YES</td><td>[Input phase fault]

[Ign fault] (nO): Fault ignored; to be used when the inverter is supplied via a single phase supply or by the DC bus.
[freewheel stop] (YES): Fault with stop in freewheel stop.
At the loss of a phase the inverter goes into the fault mode [Line phase error] (IPL). In case of a loss of 2 or 3 phases, the operation of the inverter continues until the triggering of an undervoltage fault.
This parameter can be set in this menu only for inverters of type 8I84T200037.01P-1 to 8I84T200750.01P-1 (single-phase operation).</td><td></td><td>According to inverter performance</td></tr>
<tr><td>nPr</td><td>[Rated motor power]

Rated motor power in accordance with the nameplate in kW if [Standard Motorfreq.] (bFr) = [50 Hz IEC] (50); in HP, if [Standard Motorfreq.] (bFr) = [60 Hz NEMA] (60).</td><td>According to inverter performance</td><td>According to inverter performance</td></tr>
</table>

Code	Name/Description	Setting range	Factory settings
UnS	**[Rated motor volt.]** Rated voltage given on the nameplate. 8I84T2*****.01P-1: 100 to 240 V - 8I84T4*****.01P-1: 200 to 480 V	According to inverter performance	In accordance with the inverter power and **[Standard Motor Freq.]** (bFr)
nCr	**[Rated mot. current]** Rated motor current given on the nameplate.	0.25 to 1.5 In [1]	In accordance with the inverter power and **[Standard Motor Freq.]** (bFr)
FrS	**[Rated motor frequency]** Rated motor frequency given on the nameplate. The factory setting is 50 Hz and is replaced by a default of 60 Hz if **[Motor frequency]** (bFr) is set to 60 Hz.	10 to 599 Hz	50 Hz
nSP	**[Rated motor speed]** Rated motor speed given on the nameplate. 0 to 9999 rpm then 10.00 to 60.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: •Nominal speed = Synchronous speed x $\frac{100 - \text{slip in } \%}{100}$ or •Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or •Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)	0 to 60000 rpm	According to inverter performance
tFr	**[Max frequency]** The factory setting is 60 Hz and is replaced by a default of 72 Hz if the parameter **[Motor frequency]** (bFr) is set to 60 Hz. The maximum value is limited by the following conditions: • The value of the **[Rated motor frequency.]** (FrS) should not exceed 10 times. • It may not exceed 500 Hz for inverter models greater than 37 kW.	10 to 599 Hz	60 Hz
tUn nO YES dOnE	**[Autotuning]** **[No]** (nO): Autotuning not performed. **[Yes]** (YES): The autotuning is being done as soon as possible. The parameter then automatically changes to **[Done]** (dOnE). **[Done]** (dOnE): Use of the values from the previous autotuning. **Caution!** • **All motor parameters ([Rated voltage Mot.] (UnS), [Rated motor frequency] (FrS), [Rated motor current] (nCr), [Rated motor speed] (nSP), [Rated motor power] (nPr)) must always be properly configured before the autotuning. If one of these parameters is changed after the autotuning [AUTO-TUNE FAULT] (tUn) switches to [No] (nO) and must be performed again.** • **Autotuning is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be set to 1 (active at 0).** • **The autotuning has precedence over any operation or premagnetization commands, which are taken into account after the autotuning sequence.** • **If the autotune fails, the inverter displays [No] (nO) and, depending on the configuration of [Mgt error auto tune] (tnL), can switch into the fault mode [AUTO-TUNE FAULT] (tnF) .** • **Autotuning may last for 1 to 2 seconds. Do not interrupt the process and wait for the display to change to "[Done] (dOnE)" or to "[No] (nO)".** **Note:** **During the autotuning, the rated current flows through the motor.**		**[No]** (nO)
tUS tAb PEnd PrOG FAIL dOnE CUS	**[Auto tuning status]** (For information only, not adjustable) **[Not done]** (tAb): The default value of the stator resistance is used to frequency inverter the motor. **[Wait]** (PEnd): Autotuning has been requested but not yet executed. **[Active]** (PrOG): The autotuning is being executed. **[Failed]** (FAIL): The autotuning has failed. **[Done]**(dOnE): The stator resistance measured by the autotuning function is used to control the motor. **[Customer spec]** (CUS): If the parameters are configured manually and not via the autotuning, the parameter **[Auto-tune state]** (tUS) is equal to **[Customer spec]** (CUS).		**[Not done]** (tAb)
PHr AbC ACb	**[Phase rotation]** **[ABC]** (AbC): Clockwise operation. **[ACB]** (ACb): Anti-clockwise operation. This parameter can be used to reverse the motor without changing the cabling.		**[ABC]** (AbC)

1) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

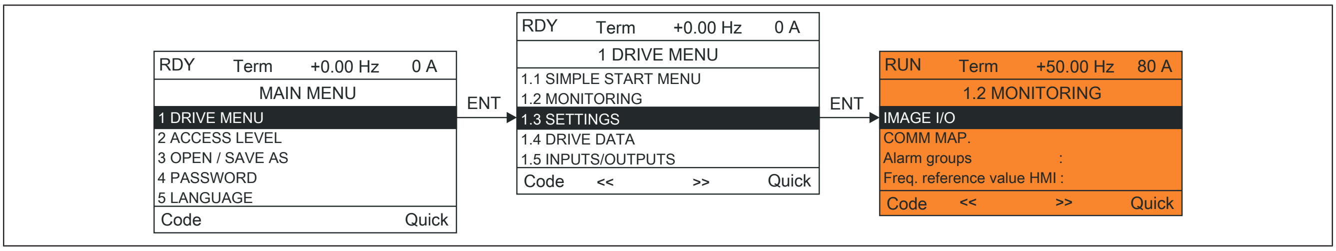
2.8.5.6 Parameters that can be modified during operation or when the motor is stopped.

Code	Name/Description	Setting range	Factory settings
ItH	**[Mot. therm. current]** Motor thermal protection current, to be set to the rated current indicated on the nameplate.	0.2 to 1.5 In [1]	According to inverter performance
ACC	**[Acceleration]** Time for the ramp-up from 0 to **[Rated motor frequency]** (FrS). Make sure that this value is compatible with the moment of inertia of the frequency inverter load.	0.1 to 999.9 s	3 s
dEC	**[Deceleration]** Time till deceleration of **[Rated motor frequency]** (FrS) (see "Overview of parameters [SIMPLE START] (SIM-)" on page 127) to 0. Make sure that this value is compatible with the moment of inertia of the frequency inverter load.	0.1 to 999.9 s	3 s
LSP	**[Low speed]** Motor frequency with minimum reference value, setting from 0 to **[High frequency]** (HSP).	0 to 599 Hz	0
HSP	**[High speed]** Motor frequency with maximum reference value, setting from **[Low frequency]** (LSP) to **[Max. output freq.]** (tFr). The factory setting changes to 60 Hz if **[Standard Motorfreq.]** (bFr) = **[60 Hz NEMA]** (60).	0 to 599 Hz	50 Hz

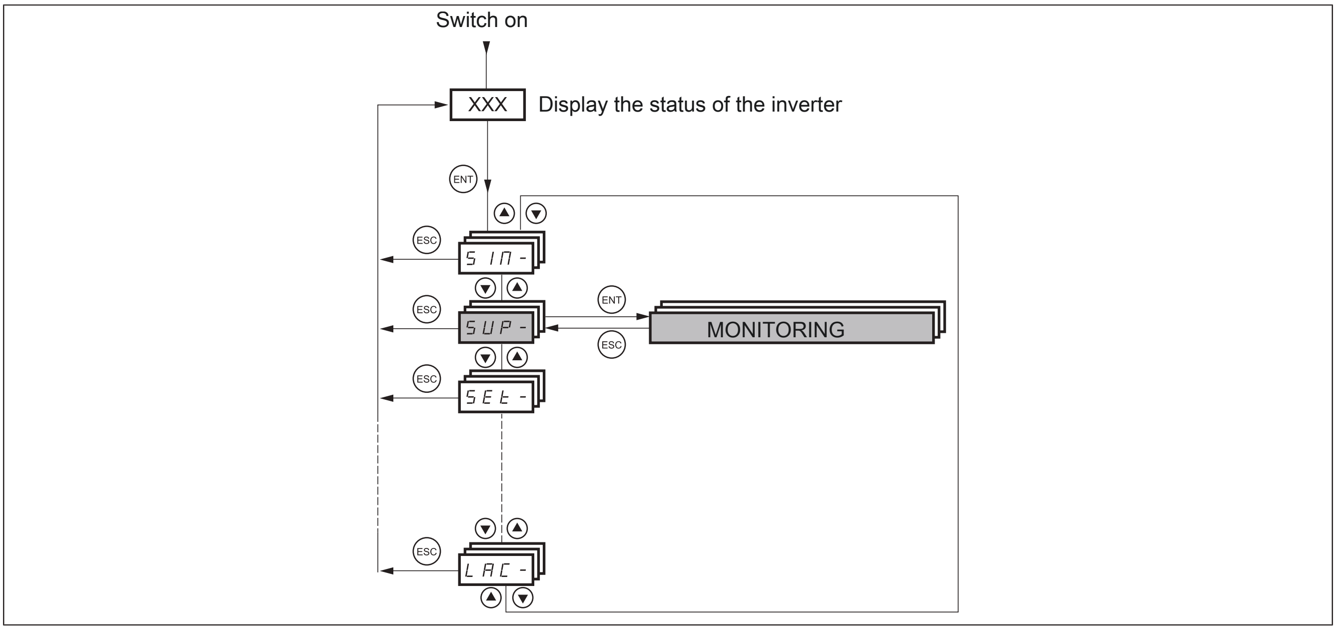
1) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

2.8.6 [MONITOR] (SUP-)

2.8.6.1 With graphic display terminal:

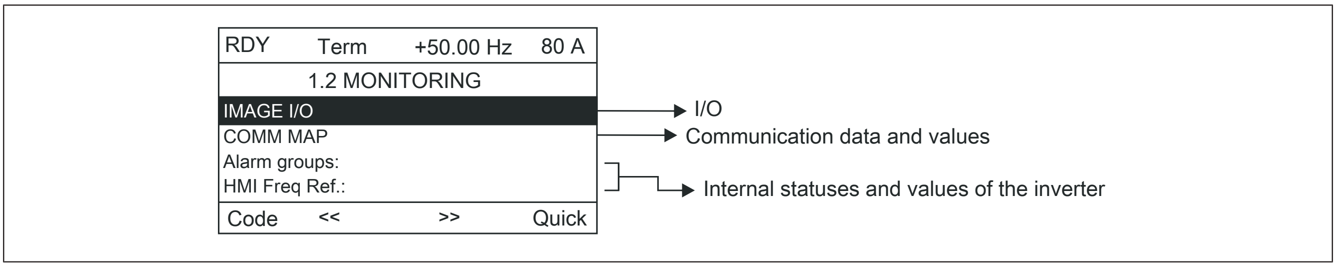


2.8.6.2 With integrated display terminal:



2.8.6.3 With graphic display terminal

This menu can be used to display inputs and outputs, internal states and values of the inverter and the communication data and values.



2.8.6.3.1 I/O

RDY Term +50.00 Hz 80 A
IMAGE I/O
IMAGE LOGIC INPUTS
STAT ANALOG INPUT
LOGIC INPUT
STAT ANALOG OUTPUT
STATUS FREQ SIGNAL
Code << >> Quick

By turning the navigation button you switch from a screen to another (from [LI with / without VIA] to [STATUS FREQ SIGNAL])

State 0
State 1

RDY Term +50.00 Hz 80 A
IMAGE LOGIC INPUTS
PR LI1 LI2 LI3 LI4 LI5 LI6 LI7
1
0
LI8 LI9 LI10 LI11 LI12 LI13 LI14
1
0
<< >> Quick

Access to the selected input or output configuration: Press ENT

RUN Term +50.00 Hz 80 A
LI1 assignment
Movement in Right Direction
Mot. Magn.
Switch on Del. LI1: 0 ms
<< >> Quick

RDY Term +50.00 Hz 80 A
STAT ANALOG INPUT
AI1 : 9.87 V
AI2 : 2.35 mA
Code << >> Quick

ENT

RUN Term +50.00 Hz 80 A
AI1 assignment
Ref.1 channel
Forced local
Torque-
Reference
AI1 min value: 0.0 V
AI1 max value: 10.0 V
Quick

State 0
State 1

RDY Term +50.00 Hz 80 A
LOGIC OUTPUT
R1 R2 LO
LOA: 0000000000000010b
<< >> Quick

ENT

RUN Term +50.00 Hz 80 A
LO1 assignment
No
Switch on Del. LO1: 0 ms
LO1 active at: 1
Switch off Del. LO1: 0 ms
Quick

RDY Term +50.00 Hz 80 A
STAT ANALOG OUTPUT
AO1 : 9.87 V
Code << >> Quick

ENT

RUN Term +50.00 Hz 80 A
AO1 assignment
Freq. motor
AO1 min value: 4 mA
AO1 max value: 20 mA
Filter output: 10 ms
AO1
Quick

RDY Term +50.00 Hz 80 A
STATUS FREQ SIGNAL
Customer sp. Filt RP Ref: 25.45 kHz
Encoder: 225 kHz
Code << >> Quick

ENT

RUN Term +50.00 Hz 80 A
RP assignment
Frequency reference
RP min value: 2 kHz
RP max value: 50 kHz
RP filter: 0 ms
Quick

2.8.6.3.2 Communication

RUN Term +50.00 Hz 80 A	
COMM MAP	
Command channel:	CANOpen
CMD value:	ABCD Hex
Active channel ref.:	CANOpen
Frequency reference:	-12.5 Hz
Stat Status ETA:	2153 Hex
Code	Quick

W3141 : F230 Hex
W2050 : F230 Hex
W4325 : F230 Hex
W0894 : F230 Hex
SCANNER COMM INPUT
SCANNER COMM OUTPUT
CONTROL REG CMD MAP
DRIVE REF. MAP
HMI DIAG MODBUS
CANopen MAP

[COMM MAP] specifies the bus types used for control or reference, the corresponding command and reference values, the status word that are configured in the menu [DISPLAY CONFIG.].
The display format (hexadecimal or decimal) can be configured in the menu [DISPLAY CONFIG.].

RUN Term +50.00 Hz 80 A	
SCANNER COMM INPUT	
Com Scan In1 val.:	0
Com Scan In2 val.:	0
Com Scan In3 val.:	0
Com Scan In4 val.:	0
Com Scan In5 val.:	0
Code	Quick

Com Scan In6 val.: 0
Com Scan In7 val.: 0
Com Scan In8 val.: 0

RUN Term +50.00 Hz 80 A	
SCANNER COMM OUTPUT	
Com Scan Out1 val.:	0
Com Scan Out2 val.:	0
Com Scan Out3 val.:	0
Com Scan Out4 val.:	0
Com Scan Out5 val.:	0
Code	Quick

Com Scan Out6 val.: 0
Com Scan Out7 val.: 0
Com Scan Out8 val.: 0

RUN Term +50.00 Hz 80 A	
CONTROL REG CMD MAP	
CANopen CMD.:	0000 Hex.
Com. card CMD:	0000 Hex.
Code	Quick

RUN Term +50.00 Hz 80 A	
DRIVE REF. MAP	
Freq. reference value. CAN:	0.0 Hz
Freq. reference value. Comm.	0.0 Hz
Code	Quick

[SCANNER COMM INPUT] and **[SCAN COMM. OUTPUT]**:

Representation of regularly exchanged registers (8x input and 8x output).

Communication (continued)

RUN	Term	+50.00 Hz	80 A
	COMM MAP		
Command channel:			CANopen
CMD value:			ABCD Hex
Active channel ref.:			CANopen
Frequency reference:			-12.5 Hz
Stat Statusv ETA:			2153 Hex
Code			Quick

W3141 : F230 Hex
W2050 : F230 Hex
W4325 : F230 Hex
W0894 : F230 Hex
SCANNER COMM INPUT
SCAN COMM ISSUED
CONTROL REG CMD MAP
DRIVE REF. MAP
HMI DIAG MODBUS →
CANopen MAP →

The status of the LEDs, the periodic data, the address, the speed and the format etc. is specified for each bus.

⊗ LED off
LED on

Communication via graphic display terminal

RUN	Term	+50.00 Hz	80 A
	MODBUS HMI DIAG		
COM LED:			(LED on)
Mb HMI frames num.			
Mb HMI. CRC errors			
Code			Quick

Communication via CANopen

RUN	Term	+50.00 Hz	80 A
	CANopen MAP		
RUN LED:			⊗
ERR LED:			⊗
PDO1 MAP →			
PDO2 MAP →			
PDO3 MAP →			
Code			Quick

Slave NMT Statu	
Number of Tx PDO	0
Number of Tx PDO	0
Error code	0
Rx Error Counter	0
Tx Error Counter	0

PDO images are only visible, if CANopen was activated (address other than OFF) and if the PDOs are active

RUN	Term	+50.00 Hz	80 A
	PDO1 MAP		
Received PDO1-1:			FDBA Hex
Received PDO1-2:			
Received PDO1-3:			
Received PDO1-4:			
Received PDO1-1:			FDBA Hex
Code			Quick

Transmit PDO1-2
Transmit PDO1-3
Transmit PDO1-4

RUN	Term	+50.00 Hz	80 A
	PDO2 MAP		
Received PDO2-1:			FDBA Hex
Received PDO2-2:			
Received PDO2-3:			
Received PDO2-4:			
Received PDO2-1:			FDBA Hex
Code			Quick

Transmit PDO2-2
Transmit PDO2-3
Transmit PDO2-4

RUN	Term	+50.00 Hz	80 A
	PDO3 MAP		
Received PDO3-1:			FDBA Hex
Received PDO3-2:			
Received PDO3-3:			
Received PDO3-4:			
Received PDO3-1:			FDBA Hex
Code			Quick

Transmit PDO3-2
Transmit PDO3-3
Transmit PDO3-4

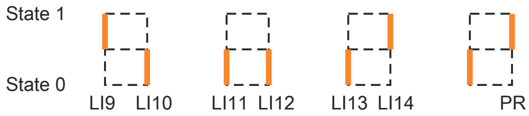
2.8.6.4 With graphics terminal: Internal inverter states and values

Name/Description		
[Alarm group] (ALGr)	Current alarm group numbers	
[HMI Freq Ref.] (LFr)	in Hz. Frequency reference via the graphic display terminal (can be activated if the function has been configured).	
[Int. Ref. PID] (rPI)	As process value. PID reference via the graphic display terminal (can be activated if the function has been configured).	
[Ref. Torq. HMI] (Ltr)	As % of nominal torque. Torque reference via graphic display terminal.	
[Multiplic coeff] (MFr)	in % (can be called if [Multiplier -] (MA2,MA3), see "CONFIG REF (OAI-)" on page 203, was assigned)	
[Reference frequency] (FrH)	In Hz	
[Ref. Torq.] (trr)	In % of nominal torque (can be called if the function was configured)	
[Motor frequency] (rFr)	In Hz	
[Meas. MotFreq. pref.] (MMF)	In Hz: The measured motor speed is displayed if an encoder card is inserted; otherwise, 0 is displayed.	
[Motor current] (LCr)	In A	
Mean Speed ENA] (OFF)	In Hz: The parameter can be called if [ENA System] (EnA) = [Yes] (YES) (see "Drive parameters (EnA - rAP)" on page 160)	
[Speed.] (SPd)	In rpm	
[Motor volt.] (UOP)	In V	
[Motor power] (OPr)	As % of nominal power	
[Motor torque] (Otr)	As % of nominal torque	
[Line voltage] (ULn)	In V. line voltage from the point of view of the DC bus with the motor stopped or running.	
[Therm. FU state] (tHr)	As %	
[Therm. FU state] (tHd)	As %	
[Th. brake val. state] (tHb)	As % (can only be called on inverters with high nominal current)	
[Consumption] (APH)	In Wh, kWh or MWh (cumulative consumption)	
[Motor run time] (rtH)	In seconds, minutes or hours (motor duty cycle)	
[Drive operating time] (PtH)	In seconds, minutes or hours (inverter duty cycle).	
[Temp Al IGBT time] (tAC)	In seconds (period in which alarm "IGBT-Temperature" was active).	
[Ref. PID] (rPC)	As process value (can be called if the PID function has been configured)	
[PID feedback] (rPF)	As process value (can be called if the PID function has been configured)	
[PID error] (rPE)	As process value (can be called if the PID function has been configured)	
[PID out] (rPO)	In Hz (can be called if the PID function has been configured)	
[act. configuration] (CnFS)	Active configuration [Config no. 0, 1 or 2]	
[act. parameter set] (CFPS)	[Set no. 1, 2 or 3] (access possible if the parameter switch has been activated (see "PARAMETER SWITCH (MLP-)" on page 270).	
[ALARMS] (ALr-)	List of currently configured alarms. In the event of an alarm, a check mark appears.	
[OTHER STATE] (SSt-)	List of secondary states:	
	• [Magn motor active] (FLX): In-motor magnetization	• [HSP err.] (FLA): High frequency attained
	• [Alarm PTC1] (PtC1): LI6 = PTC sensor alarm	• [Load relax.] (AnA): Alarm for a lag error
	• [Alarm PTC2] (PtC2): Alarm PTC sensor 2	• [Set 1 active] (CFP1): Parameter set 1 active
	• [Alarm LI6=PTC] (PtC3): Alarm PTC sensor LI6=PTC	• [Set 2 active] (CFP2): Parameter set 2 active
	• [Quick stop] (FSt): Quick stop	• [Set 3 active] (CFP3): Parameter set 3 active
	• [Thresh. I err.] (CtA): Current threshold value reached ([Current threshold] (Ctd))	• [Brake active] (brS): Drive braking
	• [Thresh. Freq. err.] (FtA): Frequency threshold is reached ([F.-Thresh. Mot] (Ftd))	• [Load DC Bus] (dbL): Load of the DC bus
	• [Thresh. Freq 2 err.] (F2A): 2. Frequency threshold • Achieved ([Freq. threshold 2] (F2d))	• [Forward] (MFrd): Motor rotating in the forward direction (right)
	• [FRH err.] (SrA): Frequency reference reached	• [Reverse] (MrrS): Motor rotating in the reverse direction (left)
	• [Th Status Motor err] (tSA): Motor thermal state 1 reached	• [Alarm high torque] (ttHA): Motor torque above upper threshold [Torque thd. high] (ttH)
	• [Ext. fault] (EtF): Alarm for an external fault	• [Alarm low torque] (ttLA): Motor torque below lower threshold [Torque thd. low] (ttL)
	• [Auto] (AUtO): Automatic restart	
	• [Remote] (FtL): Control in online mode	
	• [Autotuning] (tUn): Autotuning	
	• [Undervoltage] (USA): Alarm for an undervoltage	
	• [Config.1] (CnF1): Configuration 1 active	
	• [Config.2] (CnF2): Configuration 2 active	

2.8.6.5 With integrated display terminal

This menu can be used to view the inputs, states and internal values of the inverter.

IMAGE I/O (IOM-)

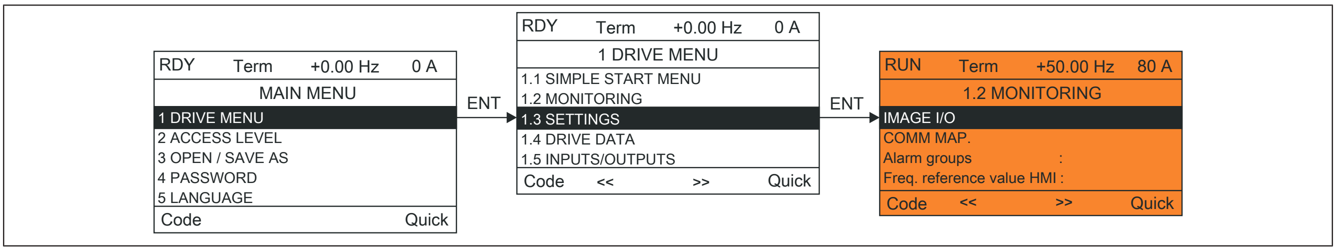
Code	Name/Description	Setting range	Factory settings
IOM- LIA- L1A to L14A	**IMAGE I/O** **Logic input functions** Is used for display of functions assigned to each input. NO is displayed if no functions have been assigned. Use the arrows ▲ and ▼, to scroll through the functions. If several functions have been assigned to the same input, you must make sure that they are compatible.		
LIS1	**Status of logic inputs LI1 to LI8** Can be used to display the state of logic inputs LI1 to LI8 (segment display: high = 1, low = 0).  Above example: LI1 and LI6 are set at 1; LI2 to LI5, LI7 and LI8 are set at 0.		
LIS2	**State of the logic inputs LI9 to LI14 and power removal** Can be used to display the state of logic inputs LI9 to LI14 and PR (power removal) (segment display: high = 1, low = 0).  In the above example: LI9 and LI14 are at 1, LI10 to LI13 are at 0 and PR (power removal) is at 1.		
AIA- AI1A AI2A	**Functions of the analog inputs** Is used for display of functions assigned to each input. NO is displayed if no functions have been assigned. Use the arrows ▲ and ▼, to scroll through the functions. If several functions have been assigned to the same input, you must make sure that they are compatible.		

2.8.6.6 Internal values and states of the inverter

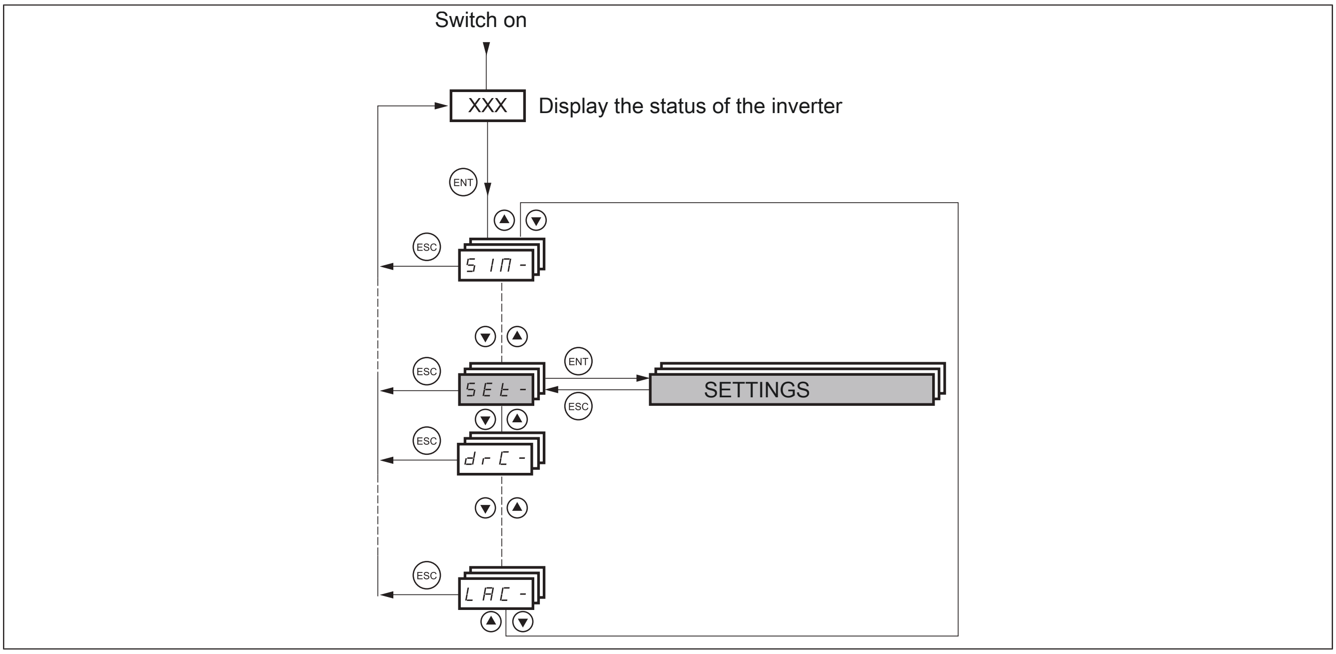
Code	Name/Description	Unit
ALGr	**[Alarm group]**: Numbers of the group of the existing alarms.	
rPI	**[Internal PID reference value]:** PID reference value via the graphic display terminal (can be retrieved if the function has been configured).	Process value
MFr	**[Multiplication factor]**(can be activated if **[Ref multi]** (MA2,MA3) is assigned).	%
FrH	**[Frequency ref.]**	Hz
trr	**[Torque reference]**: Can be activated if the function is configured.	%
rFr	**[Output frequency]**	Hz
MMF	**[Actual value of the motor speed with sign]**, if an encoder card is present, otherwise display 0.	Hz
LCr	**[I motor]**	A
OFF	**[Middle speed ENA]**: Parameter can be activated if (EnA) = (YES)	Hz
SPd	**[Motor speed]**	rpm
UOP	**[Motor voltage]**	V
OPr	**[Motor power]**	%
Otr	**[Motor torque]**	%
ULn	**[Line voltage]**: Line voltage detected via the DC bus voltage with operation of the motor or at standstill.	V
tHr	**[Therm State mot]**	%
tHd	**[Drive thermal state]**	%
tHb	**[Thermal state of the braking resistor]**: Can only be activated for inverters with high power.	%
APH	**[Consumption]**	Wh, kWh or MWh
rtH	**[Operating time]**: Duty cycle of the motor.	Seconds, minutes or hours
PtH	**[Drive operating time]**: Duty cycle of the inverter.	
tAC	**[Time Temp AI IGBT]**: Duration of alarm triggering "IGBT temperature".	Seconds
rPC-	**[PID reference]**: Can be activated if the function is configured.	Process value
rPF	**[PID actual value]**: Can be activated if the function is configured.	
rPE	**[PID error]**: Can be activated if the function is configured.	
rPO	**[PID output]**: Can be activated if the function is configured.	Hz
CnFS	**[Act. configuration]**: CnF0, 1 or 2 (can be activated if the motor or configuration change is valid)	
CFPS	**[Active parameter set]**: CFP1, 2 or 3 (can be activated if the switching of the parameters is valid)	

2.8.7 [SETTINGS] (SEt-)

2.8.7.1 With graphic display terminal:



2.8.7.2 With integrated display terminal:



The adjustment parameters can be modified with the inverter running or stopped.

Danger!

ACCIDENTAL OPERATION OF DEVICE

- **Make sure that changes to settings during operation do not cause any hazards.**
- **We recommend stopping the frequency inverter before making any changes.**

Failure to follow these instructions will result in death or serious injury.

Configuration parameters

Code	Name/Description	Setting range	Factory settings
Inr 0.01 0.1 1	**[Ramp increment]** [0.01]: Accelerate until 99.99 seconds [0.1]: Accelerate until 999.9 seconds [1]: Accelerate until 6000 seconds This parameter is used for [acceleration time] (ACC), [deceleration time] (dEC), [acceleration time 2] (AC2) and [deceleration time2] (dE2).	0.01 to 1	0.1
ACC	**[Acceleration]** Time for the acceleration from 0 to [rated motor frequency] (FrS). Make sure that this value is compatible with the moment of inertia.	0.01 to 6000 s 1)	3 s
dEC	**[Deceleration]** Time for the deceleration of the [rated motor frequency] (FrS) until 0. Make sure that this value is compatible with the frequency inverter's moment of inertia.	0.01 to 6000 s 1)	3 s
AC2	**[Acceleration 2]** Time for the ramp-up from 0 to [Rated motor frequency] (FrS). Make sure that this value is compatible with the frequency inverter's moment of inertia.	0.01 to 6000 s 1)	5 s
dE2	**[Deceleration 2]** Time for the deceleration of the [rated motor frequency] (FrS) until 0. Make sure that this value is compatible with the frequency inverter's moment of inertia.	0.01 to 6000 s 1)	5 s
tA1	**[Begin Acc round]** Rounding of the start of the acceleration in % of the acceleration time [acceleration time] (ACC) or [acceleration time 2] (AC2).	0 to 100%	10%
tA2	**[End Acc round]** • Rounding of the end of the acceleration in % of the acceleration time [acceleration time] (ACC) or [acceleration time 2] (AC2). • Can be set from 0 to (100% to [Round Start ACC] (tA1)).		10%
tA3	**[Begin Dec round]** Rounding of the start of the deceleration in % of the deceleration time [deceleration time] (dEC) or [deceleration time 2] (dE2).	0 to 100%	10%
tA4	**[End Dec round]** • Rounding of the end of the deceleration in % of the deceleration time [deceleration time] (dEC) or [deceleration time 2] (dE2). • Can be set from 0 to (100% to [Round DEC Start] (tA3)).		10%
LSP	**[Low speed]** Motor frequency with minimum reference value, setting from 0 to [High speed] (HSP).		0 Hz
HSP	**[High speed]** Motor frequency with maximum reference value, setting from [Low frequency] (LSP) to [Max. output freq.] (tFr). The factory setting changes to 60 Hz if [Standard Motorfreq.] (bFr) = [60 Hz NEMA] (60).		50 Hz
ItH	**[Mot. therm. current]** Motor thermal protection current, to be set to the rated current indicated on the nameplate.	0.2 to 1.5 In 1)	According to inverter performance
VOLT	**[Speed prop. gain]** Proportional gain of the speed controller.	0 to 1000%	40%
SIt	**[Speed time integral]** Time constant of the I component of the speed controller.	1 to 1000%	100%
SFC	**[K speed loop filter]** Filter coefficient for the speed controller.	0 to 100	0

1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 9999 s in accordance with [ramp increment] (Inr).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2.8.7.3 [K speed loop filter] (SFC), [Speed prop. gain] (SPG) and [Speed time integral] (SIt)

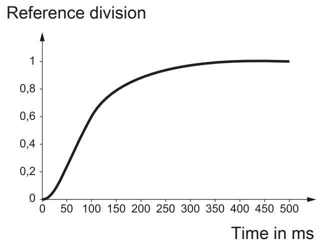
- The following parameters can only be activated in vector control profiles: **[Motor control type]** (Ctt) (see "Drive parameters (Ctt)" on page 153) = **[SVC U]** (UUC), **[SVC I]** (CUC), **[FVC]** (FUC) or **[Sync. Motor.]** (SYn) and if **[ENA System]** (EnA) (see "Drive parameters (EnA - rAP)" on page 160) = **[No]** (nO).
- The factory settings are suitable for most applications.

Generally, setting with [K FILT P Ant Speed] (SFC) = 0

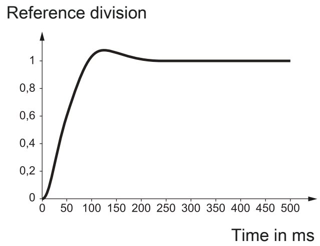
The regulator is an "IP" type with filtering of the speed reference, for applications requiring flexibility and stability (hoisting or high inertia, for example).

- **[P- ant. v-Control]** (SPG) acts on the overshoot of the frequency.
- **[I Speed time integral]** (SIT) acts on the bandwidth and the response time.

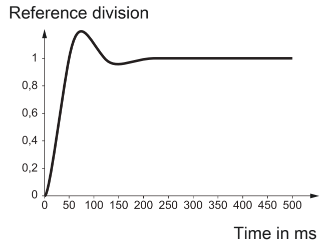
Initial response



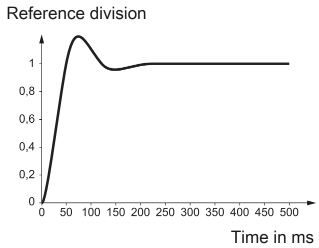
Reduction in SIT ↘



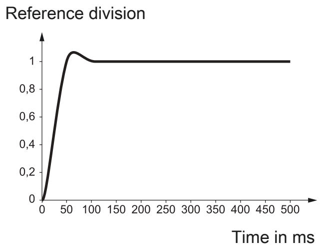
Reduction in SIT ↘ ↘



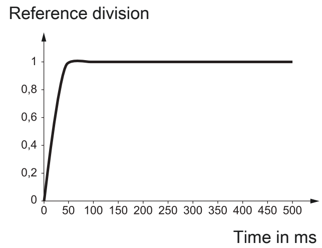
Initial response



Increase in SPG ↗



Increase in SPG ↗ ↗



Special case: Parameter [K speed loop filter] (SFC) not equal to 0

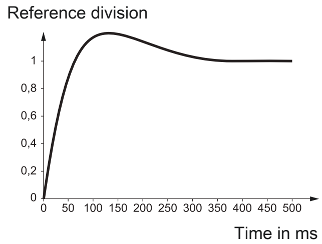
This parameter must be reserved for specific applications that require a short response time (trajectory positioning or servo control).

- When set to 100 as described below, the regulator is a "PI" type, without filtering of the speed reference.
- Settings between 0 and 100 will obtain an intermediate function between the settings below and those on the previous page.

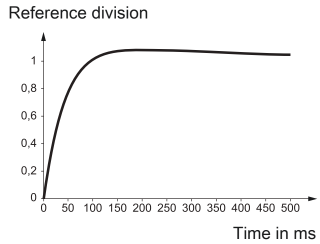
Example: Setting where [K speed loop filter] (SFC) = 100

- [Speed prop. gain] (SPG) acts on the bandwidth and the response time.
- [I Speed time integral] (SIt) acts on the overshoot of the frequency.

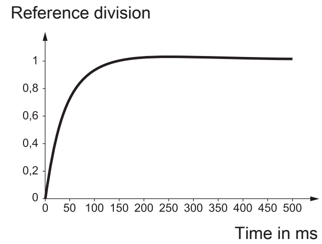
Initial response



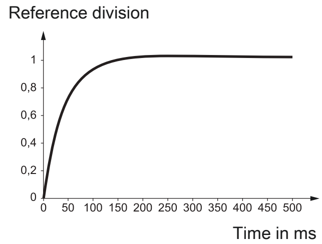
Reduction in SIT ↘



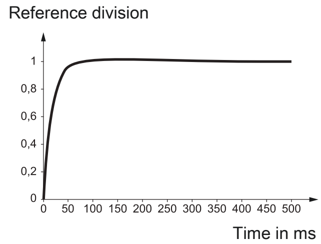
Reduction in SIT ↘ ↘



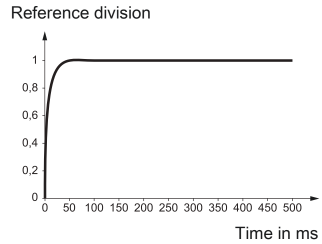
Initial response



Increase in SPG ↗



Increase in SPG ↗ ↗



Configuration parameters (continued)

Code	Name/Description	Setting range	Factory settings
GPE	**[P component ENA]** see "Drive parameters (EnA - rAP)" on page 160	1 to 9999	250
GIE	**[I component ENA]** see "Drive parameters (EnA - rAP)" on page 160	0 to 9999	100
UFr	**[IR compensation]** see "Drive parameters (U0 - F5)" on page 154	25 to 200%	100%
SLP	**[Slip compensation]** see "Setting parameters (FLU - JGt)" on page 145	0 to 300%	100%
dCF	**[Ramp divider]** see "STOP MODE (Stt-)" on page 206	0 to 10	4
IdC	**[DC inject. level 1]** Level of DC injection braking current activated via logic input or selected as stop mode. see "STOP MODE (Stt-)" on page 206. **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0.1 to 1.41 In [1]	0.64 In [1]
tdI	**[DC injection time 1]** see "STOP MODE (Stt-)" on page 206. Maximum duration of current injection **[Current DC brake 1]** (IdC). After this time has expired, the DC connection becomes **[DC current brake 2]** (IdC2).	0.1 to 30 s	0.5 s
IdC2	**[DC inject. level 2]** see "STOP MODE (Stt-)" on page 206. The braking current is activated by the logic input or as a stop mode is selected, once the time span **[DC injection time 1]** (tdI) has expired. **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0.1 In (2) to **[DC current brake 1]** (IdC)	0.5 In [1]
tdC	**[DC injection time 2]** see "STOP MODE (Stt-)" on page 206. Maximum duration of the connection **[DC injection current 2]** (IdC2), if the activation is selected as stop mode.	0.1 to 30 s	0.5 s

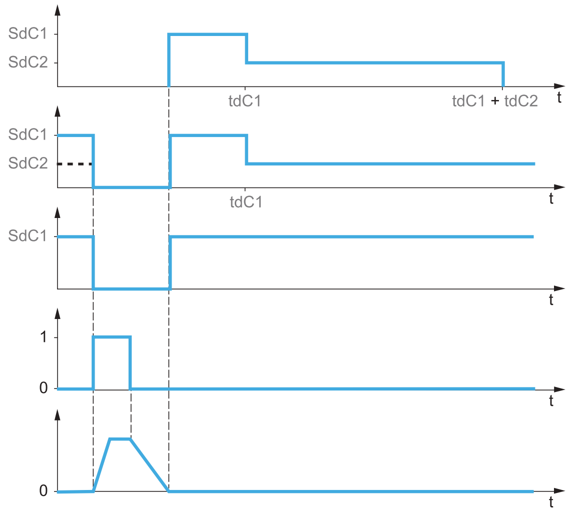
1) In is the same as the rated current specified in the installation instructions or on the nameplate of the inverter.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Code	Name/Description	Setting range	Factory settings
SdC1	**[Auto DC inj. level 1]** Level of standstill DC injection current. This parameter can be activated if **[Auto DC injection]** (AdC)see "[Auto DC injection] AdC-" on page 208 is not set to **[No]** (nO). For this parameter, the value 0 will be forced if **[Motor control type]** (Ctt), see "Drive parameters (Ctt)" on page 153 = **[Sync. Motor.]** (SYn). **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.2 In 1)	0.7 In 1)
tdCI	**[Auto DC inj. time 1]** Standstill injection time. This parameter can be activated if **[Auto DC injection]** (AdC)see "[Auto DC injection] AdC-" on page 208 is not set to **[No]** (nO). If **[Motor control type]** (Ctt) page 63 on **[FVC]** (FUC) or**[Sync. Motor.]** (SYn) is set, this time is the hold time at zero speed.	0.1 to 30 s	0.5 s
SdC2	**[Auto DC inj. level 2]** 2. Level of standstill DC injection current. This parameter can be activated if **[Auto DC injection]** (AdC)see "[Auto DC injection] AdC-" on page 208 is not set to **[No]** (nO). For this parameter, the value 0 will be forced if **[Motor control type]** (Ctt), see "Drive parameters (Ctt)" on page 153 = **[Sync. Motor.]**(SYn). **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.2 In 1)	0.5 In 1)
tdC2	**[Auto DC inj. time 2]** 2. Standstill injection time. This parameter can be activated if **[Auto DC injection]** (AdC), see "[Auto DC injection] AdC-" on page 208 is set to **[Yes]** (YES)	0 to 30 s	0 s

1) In is the same as the rated current specified in the installation instructions or on the nameplate of the inverter.

AdC	SdC2	Function
YES	x	
Ct	≠ 0	
Ct	= 0	
Movement command		
Frequency		



Note:

If [Motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) is set to [FVC] (FUC): [I DC auto braking 1] (SdC1), [I DC auto braking 2] (SdC2) and [time aut. DC brake2] (tdC2) cannot be activated. Only [time aut. DC brake 1] (tdC1) can be activated. This is then a hold time at zero speed.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Code	Name/Description	Setting range	Factory settings
SFr	**[Switching freq.]** Switching frequency setting. **Setting range:** Can vary between 1 and 16 kHz, but the minimum and maximum values and the default value, depending the inverter type, the rated current (power and voltage) and the configuration of the parameter **[Sine-wave filter]** (OFI) and **[Motor surge limit]** (SVL)(see "Drive (nrd - SOP)" on page 161) are restricted. If the value is lower than 2 kHz, then **[current limit]** (CLI) and **[2nd current limit]** (CL2) are limited to 1.36 In. Setting during operation: • If the initial value is under 2 kHz, it can not be increased over 1.9 kHz during operation. • If the start value is greater than or equal to 2 kHz, during operation a minimum value of 2 kHz should be maintained. Adaptation with stopped inverter: No restrictions. **Note:** **In the event of excessive temperature rise, the inverter will automatically reduce the switching frequency and reset it once the temperature returns to normal.** **Note:** **If [Motor control type] (Ctt), see "Drive parameters (Ctt)" on page 153, is set to [FVC] (FUC) , it is not recommended to set the switching frequency to a value below 2 kHz (to avoid unstable speeds).** **Caution!** **On inverters of the models 8I84T400075.01P-1 to 8I84T400400.01P-1, if the RFI filters are disconnected (operation on an IT system), the inverter's switching frequency is not permitted to exceed 4 kHz.** **Failure to follow this instruction can result in equipment damage.**	Depending on the size	Depending on the size
CLI	**[CURRENT LIMIT.]** Used to limit the motor current. The adjustment range is limited to 1.36 In if **[Switch frequency]** (SFr), see "Setting parameters (SFr - CL2)" on page 144, is under 2 kHz. **Note:** **If the setting is less than 0.25 In, the inverter can remain in error mode [output phase loss] (OPF), if this has been enabled, see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292). If it is below the no-load current of the motor, the limitation has no effect.** **Caution!** **Make sure that the motor is designed to this current, since these are susceptible to a demagnetization.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.65 In 1)	1.5 In 1)
CL2	**[2nd current limit]** see "CURRENT LIMIT (CLI-)" on page 259 The adjustment range is limited to 1.36 In if **[Switch frequency]** (SFr), see "Setting parameters (SFr - CL2)" on page 144, is under 2 kHz. **Note:** **If the setting is less than 0.25 In, the inverter can remain in error mode [output phase loss] (OPF), if this has been enabled, see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292). If it is below the no-load current of the motor, the limitation has no effect.** **Caution!** **Make sure that the motor is designed to this current, since these are susceptible to a demagnetization.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.65 In 1)	1.5 In 1)

1) In is the same as the rated current specified in the installation instructions or on the nameplate of the inverter.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Setting range	Factory settings
FLU	[Motor fluxing]		[No] (FnO)
FnC	[not perm.] (FnC): Non-permanent mode		
FCt	[permanent] (FCt): Permanent mode. This option is not possible if [Auto DC injection] (AdC) (see "[Auto DC injection] AdC-" on page 208) is set to [Yes] (YES) or if [STOP MODE] (Stt) (see "STOP MODE (Stt-)" on page 206) has been set to [freewheel stop](nSt).		
FnO	[No] (FnO): Function not active This option is not possible if [Motor control type] (Ctt) (Drive parameters (Ctt)) is set to [SVC I] (CUC) or [FVC] (FUC). If [Motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) is set to [SVC I] (CUC) or [FVC] (FUC) , the factory setting is replaced by [not perm.] (FnC). In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. • In the mode [permanent] (FCt) the inverter automatically creates the magnetic flux at its start. • In the mode [not perm.] (FnC) a magnetization occurs when the motor has started. The magnetic flux current is greater than the [rated motor current] (nCr) (configured rated current of the motor), if the magnetization has been established. After this, the flux current will be adjusted to the motor's magnetizing current. **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.** If [motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) = [Sync. Motor] (SYn) is set, the parameter [Magnet Mot] (FLU) results in the assignment of the rotor and not of the magnetization. **Note:** **(FLU) is not permitted to be set to (FnC) , if (Ctt) is set to (Syn).** If [BRAKE LOGIC] (bLC) (see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223) is not [No] (nO), the parameter [Magnet Mot] (FLU) has no effect.		
tLS	[Low speed time out] Maximum operating time with [low speed] (LSP), see "Parameters that can be modified during operation or when the motor is stopped." on page 130). Following operation at LSP for a defined period, a motor stop is requested automatically. The motor restarts when the speed reference is greater than LSP and if a run command is still present. **Note:** **If [operating hours for LSP] (tLS) is not equal to 0, the parameter [STOP MODE] (Stt), see "STOP MODE (Stt-)" on page 206, is forced to [stop ramp] (rMP) (only if stop can be configured via ramp).**	0 to 999.9 s	0 s
JGF	[Setpoint step mode] Reference in jog operation	0 to 10 Hz	10 Hz
JGt	[Jog delay] Anti-repeat delay between 2 consecutive jog operations.	0 to 2 s	0.5 s

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Setting range	Factory settings
SP2	**[Preset speed 2]** see "PRESET SPEEDS (PSS-)" on page 211. 2nd preset frequency	0 to 599 Hz	10 Hz
SP3	**[Preset speed 3]** 3rd preset frequency	0 to 599 Hz	15 Hz
SP4	**[Preset speed 4]** 4th preset frequency	0 to 599 Hz	20 Hz
SP5	**[Preset speed 5]** 5th preset frequency	0 to 599 Hz	25 Hz
SP6	**[Preset speed 6]** 6th preset frequency	0 to 599 Hz	30 Hz
SP7	**[Preset speed 7]** 7th preset frequency	0 to 599 Hz	35 Hz
SP8	**[Preset speed 8]** 8th preset frequency	0 to 599 Hz	40 Hz
SP9	**[Preset speed 9]** 9th preset frequency	0 to 599 Hz	45 Hz
SP10	**[Preset speed 10]** 10th preset frequency	0 to 599 Hz	50 Hz
SP11	**[Preset speed 11]** 11th preset frequency	0 to 599 Hz	55 Hz
SP12	**[Preset speed 12]** 12th preset frequency	0 to 599 Hz	60 Hz
SP13	**[Preset speed 13]** 13th preset frequency	0 to 599 Hz	70 Hz
SP14	**[Preset speed 14]** 14th preset frequency	0 to 599 Hz	80 Hz
SP15	**[Preset speed 15]** 15th preset frequency	0 to 599 Hz	90 Hz
SP16	**[Preset speed 16]** 16th preset frequency	0 to 599 Hz	100 Hz
MFr	**[Multiplying coeff.]** Access to the coefficients is possible if **[Multiplier ref. -]** (MA2,MA3) (see "CONFIG REF (OAI-)" on page 203) has been assigned to the graphic display terminal.	0 to 100%	100%
SrP	**[+/-Speed limitation]** see "+/- SPEED BY REFERENCE (SrE-)" on page 215. Limitation of +/- speed variation.	0 to 50%	10%
rPG	**[PID prop. gain]** see "PID CONTROLLER (PId-)" on page 239. Proportional amplifier	0.01 to 100	1
rIG	**[PID integral gain]** see "PID CONTROLLER (PId-)" on page 239. Integral gain	0.01 to 100	1
rdG	**[PID derivative gain]** see "PID CONTROLLER (PId-)" on page 239. Derivative gain	0.00 to 100	0
PrP	**[PID ramp]** see "PID CONTROLLER (PId-)" on page 239. Ramp-up/down ramp of the PID, which is set for a range of **[min PID ref]** (PIP1) to **[max PID ref]** (PIP2) or vice versa.	0 to 99.9 s	0
POL	**[Min PID output]** see "PID CONTROLLER (PId-)" on page 239. Minimum value of regulator output in Hz.	-500 to +500 or -599 to 599, depending on the size	0 Hz
POH	**[Max PID output]** see "PID CONTROLLER (PId-)" on page 239. Maximum value of regulator output in Hz.	0 to 500 or 599, depending on the size	60 Hz
PAL	**[Min fbk alarm]** see "PID CONTROLLER (PId-)" on page 239. Minimum monitoring threshold for regulator feedback.	[1]	100
PAH	**[Max fbk alarm]** see "PID CONTROLLER (PId-)" on page 239. Maximum monitoring threshold for regulator feedback.	[1]	1000

1) If there is no graphic display terminal, then on the four-digit display the values over 9999 are shown with one point after the thousands unit, for example, 15.65 for 15650.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Code	Name/Description	Setting range	Factory settings
PEr ★	**[PID error Alarm]** see "PID CONTROLLER (PId-)" on page 239. Regulator error monitoring threshold.	0 to 65535 1)	100
PSr ★	**[Speed input %]** see "PID CONTROLLER (PId-)" on page 239. Multiplying coefficient for predictive speed input.	1 to 100%	100%
rP2 ★	**[Preset ref. PID 2]** see "PRESET PID REF (PrI-)" on page 241. Preset PID reference	1)	300
rP3 ★	**[Preset ref. PID 3]** see "PRESET PID REF (PrI-)" on page 241. Preset PID reference	1)	600
rP4 ★	**[Preset ref. PID 4]** see "PRESET PID REF (PrI-)" on page 241. Preset PID reference	1)	900
Ibr ★	**[Brake locked rotor current]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223. Current threshold of the break release for ascending or forward movement.	0 to 1.32 In 2)	0
Ird ★	**[Brake release I Rev]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223. Brake release current threshold for descending or reverse movement.	0 to 1.32 In 2)	0
brt ★	**[Brake Release time]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223. Brake release time delay.	0 to 5.00 s	0 s
bIr ★	**[Brake release freq.]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223. Threshold value of the brake drop rate (brake release).	**[Auto]** (AUtO) 0 to 10 Hz	**[Auto]** (AUtO)
bEn ★	**[Brake engage freq.]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223. Threshold of the braking torque frequency.	**[Auto]** (AUtO) 0 to 10 Hz	**[Auto]** (AUtO)
tbE ★	**[Brake engage delay]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223. Time delay before request to engage brake. To delay the engaging of the brake (only for horizontal stroke) if the brake is applied as soon as the inverter is completely stopped.	0 to 5 s	0 s

1) If there is no graphic display terminal, then on the four-digit display the values over 9999 are shown with one point after the thousands unit, for example, 15.65 for 15650.
2) In is the same as the rated current specified in the installation instructions or on the nameplate of the inverter.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Code	Name/Description	Setting range	Factory settings
bEt	**[Brake engage time]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223. Brake engage time (brake response time)	0 to 5.00 s	0 s
JdC	**[Jump at reversal]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223	**[Auto]** (AUtO) 0 to 10 Hz	**[Auto]** (AUtO)
ttr	**[Time to restart]** see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223. Delay between the end of a brake engage sequence and the start of a brake release sequence	0.00 to 15.00 s	0 s
tLIM	**[Motoring torque lim]** see "LIM. TORQUE (tOL-)" on page 258. Torque limiting for generator operation in percent or 0.1% of the rated torque in accordance with the parameter **[Torque limit. activ.]** (IntP).	0 to 300%	100%
tLIG	**[Gen. torque lim]** see "LIM. TORQUE (tOL-)" on page 258. Torque limiting for generator operation in percent or 0.1% of the rated torque in accordance with the parameter **[Torque ref. assign.]** (IntP).	0 to 300%	100%
trH	**[Traverse freq. high]** see "TRAVERSE CONTROL (trO-)" on page 282.	0 to 10 Hz	4 Hz
trL	**[Traverse freq. low]** see "TRAVERSE CONTROL (trO-)" on page 282.	0 to 10 Hz	4 Hz
qSH	**[Quick step High]** see "TRAVERSE CONTROL (trO-)" on page 282.	0 to **[Traverse HSP]** (trH)	0 Hz
qSL	**[Quick step Low]** see "TRAVERSE CONTROL (trO-)" on page 282.	0 to **[Traverse LSP]** (trL)	0 Hz
Ctd	**[Current threshold]** Current threshold value of the function **[thresh. I err.]** (CtA), that is assigned to a relay or a logic output, see "R1 CONFIGURATION" on page 176.	0 to 1.5 In 1)	In 1)
ttH	**[High torque thd.]** Upper torque threshold value of function **[high torque alarm]** (ttHA) that is assigned to a relay or logic output, see "R1 CONFIGURATION" on page 176.	-300 to 300%	100%
ttL	**[Low torque thd.]** Lower torque threshold value of function **[Low torque alarm]** (ttLA) that is assigned to a relay or logic output (see "R1 CONFIGURATION" on page 176) as a percentage of the nominal torque	-300 to 300%	50%

1) In is the same as the rated current specified in the installation instructions or on the nameplate of the inverter.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

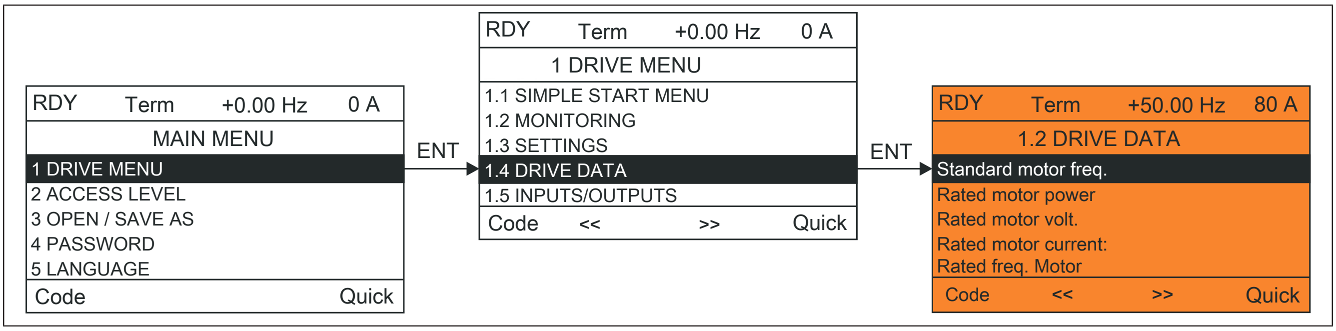
Code	Name/Description	Setting range	Factory settings
Ftd	[Freq. threshold] Frequency threshold of the function [thresh. freq. err.] (FtA), that is assigned to a relay or a logic output (see "R1 CONFIGURATION" on page 176) or that is used by the [SET SWITCHING] (MLP-) function (see "PARAMETER SWITCH (MLP-)" on page 270).	0 to 599 Hz	[High speed] (HSP)
F2d	[Freq. threshold 2] Frequency threshold of the function [thresh. freq. 2 err.] (F2A), that is assigned to a relay or a logic output (see "R1 CONFIGURATION" on page 176) or that is used by the [SET SWITCHING] (MLP-) function (see "PARAMETER SWITCH (MLP-)" on page 270).	0 to 599 Hz	[High speed] (HSP)
FFt ★	[Freewheel stop Thd.] see "STOP MODE (Stt-)" on page 206 This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. It can be enabled if [STOP MODE] (Stt) = [Fast stop] (FSt) or [ramp stop] (rMP)). • 0.0: No transition into freewheel stop. • 0.1 to 599 Hz: Frequency threshold at which the motor goes into freewheel stop.	0 to 599 Hz	0 Hz
ttd ★	[Motor therm. level] see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292. Trip threshold for motor thermal alarm (logic output or relay)	0 to 118%	100%
JPF	[Skip frequency] Skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0 to 500 or 599 Hz, depending on the size	0 Hz
JF2	[Skip frequency 2] 2nd skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0 to 500 or 599 Hz, depending on the size	0 Hz
JF3	[3rd Skip Frequency] 3rd skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.	0 to 500 or 599 Hz, depending on the size	0 Hz
JFH	[Skip Frequency Hyst.] The parameter is visible if at least one skip frequency [skip frequency] (JPF), [skip frequency 2] (JF2) or [skip frequency 2] (JF3) is not equal to 0. Area for the skip frequency: From (JPF - JFH) to (JPF + JFH), for example. This setting applies to all 3 frequencies JPF, JF2 and JF3 together.	0.1 to 10 Hz	1 Hz
LbC ★	[Load sharing correction] Nominal compensation in Hz	0 to 599 Hz	0
trt	[Torque coeff] Factor applied to [Torq. Ref.] (tr1) .	0 to 1000%	100%

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

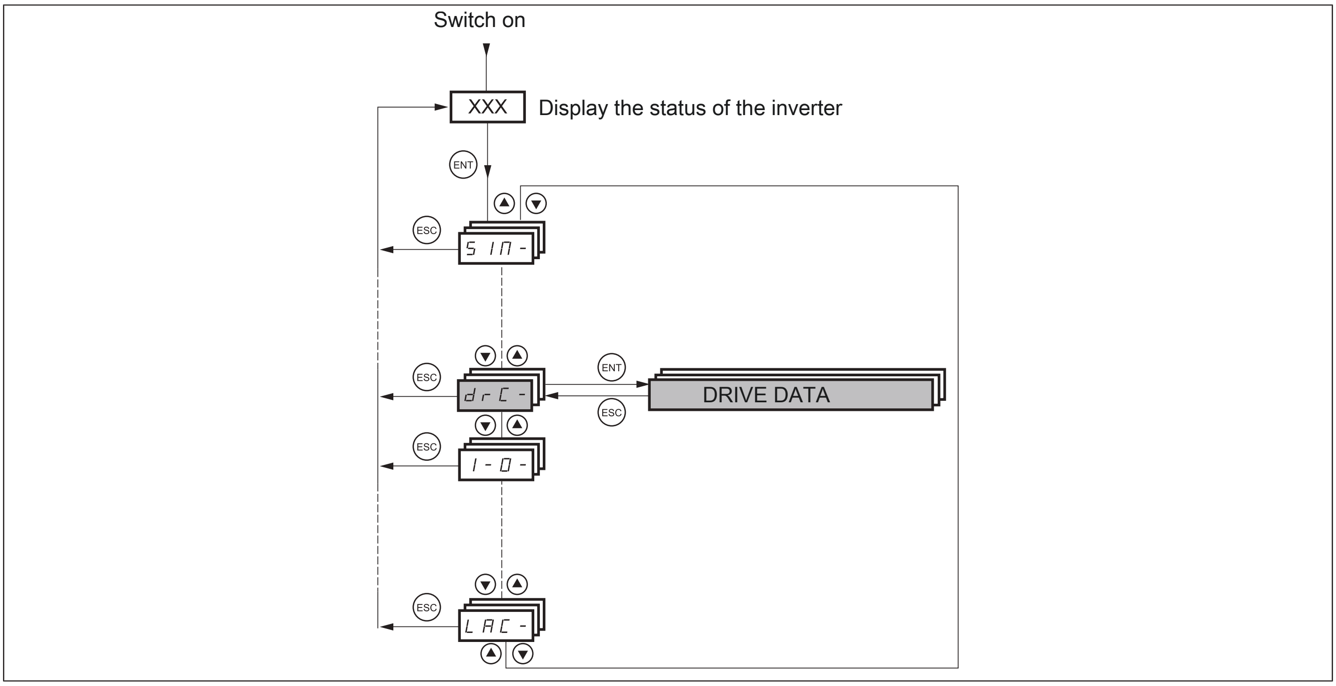
Parameter that can be modified during operation or when stopped.

2.8.8 [MOTOR CONTROL] (drC-)

2.8.8.1 With graphic display terminal:



2.8.8.2 With integrated display terminal:



The parameters in the **[DRIVE DATA]** (drC-) menu can only be changed if the inverter is stopped and no run command is present, with the following limitations:

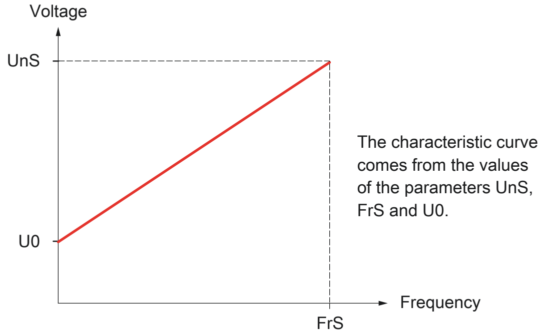
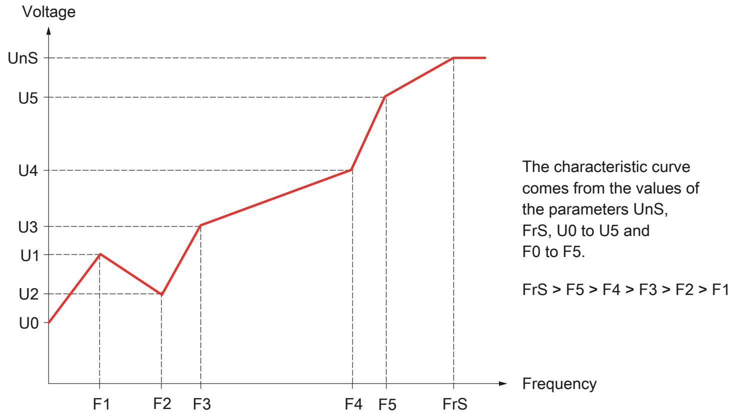
- **[AUTOTUNE ERROR]** (tUn) (see "Drive parameters (tFr - PHr)" on page 152) can cause a motor start.
- A parameter whose code contains the arrow sign, can be modified with the frequency inverter running or stopped.

Drive parameters

Code	Name/Description	Setting range	Factory settings
bFr 50 60	**[Standard mot. freq]** **[50 Hz IEC]** (50): IEC **[60 Hz NEMA]** (60): NEMA This parameter is used to change the default settings of the following parameters: **[high speed]** (HSP), **[F. thresh. Mot]]** (Ftd), **[Mot. rated volt]** (UnS), **[Motor rated frequency]** (FrS), **[Max. output freq.]** (tFr), **[Motor rated current]** (nCr), **[Motor rated speed]** (nSP) and **[brake tightening power]** (Ibr).		**[50 Hz IEC]** (50)
nPr	**[Rated motor power]** This parameter cannot be accessed if **[Motor control type]** (Ctt) (see "Drive parameters (Ctt)" on page 153) = **[Sync. Motor.]** (SYn). Rated motor power in accordance with the nameplate in kW if **[Standard Motorfreq.]** (bFr) = **[50 Hz IEC]** (50); in PS (HP), if **[Standard Motorfreq.]** (bFr) = **[60 Hz NEMA]** (60).	According to inverter performance	According to inverter performance
UnS	**[Rated motor volt.]** This parameter cannot be accessed if **[Motor control type]** (Ctt) (see "Drive parameters (Ctt)" on page 153) = **[Sync. Motor.]**(SYn). Rated motor voltage given on the nameplate. 8I84T2******.01P-1: 100 to 240 V - 8I84T4*****0.01P-1: 200 to 480 V	According to inverter performance	In accordance with the inverter power and **[Standard Motor Freq.]** (bFr)
nCr	**[Rated mot. current]** This parameter cannot be accessed if **[Motor control type]** (Ctt) (see "Drive parameters (Ctt)" on page 153) = **[Sync. Motor.]** (SYn). Rated motor current given on the nameplate.	0.25 to 1.5 In [1)]	In accordance with the inverter power and **[Standard Motor Freq.]** (bFr)
FrS	**[Rated motor frequency]** This parameter cannot be accessed if **[Motor control type]** (Ctt) (see "Drive parameters (Ctt)" on page 153) = **[Sync. Motor.]**(SYn). Rated motor frequency given on the nameplate. The factory setting is 50 Hz and is replaced by a default of 60 Hz if **[Standard motor freq.** (bFr) is set to 60 Hz. The maximum value is limited to 500 Hz if **[Motor control type]** (Ctt) (see "Drive parameters (Ctt)" on page 153) is not V/F, or for inverters with a nominal value greater than 37 kW. Values between 500 Hz and 599 Hz are only possible in V/F control and for power limited to 37 kW (50 HP). In this case configure **[Motor control type]]** (Ctt) before **[Rated motor frequency]** (FrS).	10 to 599 Hz	50 Hz
InSP 1 10	**[Increments rpm]** Increment of the parameter **[rated motor speed]** (nSP). **[x1 tr/mn]** (1): Increment of 1 U/min; is used if the **[rated motor speed]** (nSP) does not exceed 65535 r/min. **[x10 tr/mn]** (10): Increment of 10 U/min; is used if the **[rated motor speed]** (nSP) exceeds 65535 r/min. **Note:** **Each change of [increments rpm] (InSP) sets the parameter [rated motor speed] (nSP) back to the factory setting.**		**[x1 tr/mn]** (1)
nSP	**[Rated motor speed]** The parameter is not accessible if **[motor control type]** (Ctt) = **[Sync. Motor]** (SYn). Rated motor speed given on the nameplate Adjustable from 0 to 65535 rpm, if **[Increments rpm]** (InSP) = **[x1 tr/mn]** (1) or from 0.00 to 96.00 kr/min, if **[Increments rpm]** (InSP) = **[x10 tr/mn]** (10). 0 to 9999 rpm then 10.00 to 65.53 or 96.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: •Nominal speed = Synchronous speed x $\frac{100 - \text{slip in \%}}{100}$ or •Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors) or •Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)	0 to 96000 rpm	According to inverter performance

1) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

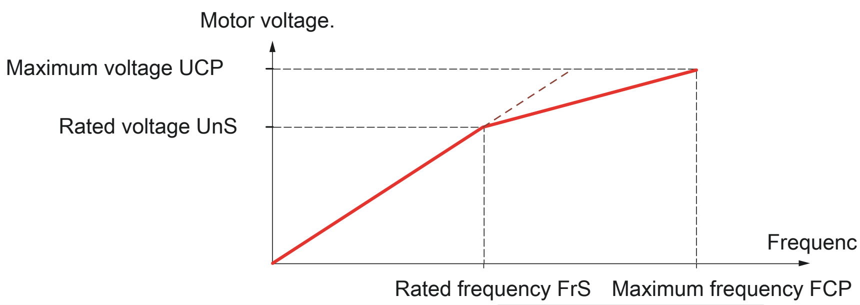
Code	Name/Description	Factory settings
tFr	**[Max frequency]** The factory setting is 60 Hz and is replaced by a default of 72 Hz if the parameter **[Standard motor freq.** (bFr) is set to 60 Hz. The maximum value is limited by the following conditions: • It is not permitted to exceed 10 times the value of the **[rated motor frequency]** (FrS) • It is not permitted to be exceed 500 Hz if **[Motor control type]** (Ctt) (see "Drive parameters (Ctt)" on page 153) is not V/F or for inverters with a nominal value greater than 37 kW. Values between 500 Hz and 599 Hz are only possible in V/F control and for power limited to 37 kW (50 HP). In this case configure **[Motor control type]]** (Ctt) before **[Max output frequency]** (tFr).	10 to 599 Hz
tUn nO YES dOnE	**[Auto-tuning]** **[No]** (nO): Autotuning not performed. **[Yes]** (YES): The autotuning is being done as soon as possible. The parameter then automatically changes to **[Done]** (dOnE). **[Done]** (dOnE): Use of the values from the previous autotuning. If one of these parameters is changed after the autotuning **[AUTO-TUNE FAULT]** (tUn) switches to **[No]** (nO) and must be performed again. • Autotuning is only performed if no stop command has been activated. If a freewheel stop or fast stop function has been assigned to a logic input, this input must be set to 1 (input active at 0). • Autotuning has priority over any movement or premagnetization commands. These will be observed only after the autotuning. • If the autotune fails, the inverter displays **[No]** (nO) and, depending on the configuration of **[Mgt fault auto tune]** (tnL) (see "BRAKE RESIST PROTECTION (brP-) and AUTO-TUNE FAULT (tnF-)" on page 304) switches into the **[AUTO-TUNE FAULT]** (tnF) fault mode. • Autotuning may last for 1 to 2 seconds. Do not interrupt the process. Wait until the display switches to "**[done]** (dOnE)" or "**[No]** (nO)". **Note:** **During autotuning, the motor is supplied with rated current.**	**[No]** (nO)
AUt nO YES	**[Automatic autotune]** **[No]** (nO): Function not active. **[Yes]** (YES): The autotuning is done at every start. **Caution!** **See Notes to the [AUTOTUNING FAULT] (tUn) above.** **Note:** **If [Profile] (CHCF) = [Serie 8] (SE8), then [autom autotuning] (AUt) is fixed at [No] (nO).**	**[No]** (nO)
tUS tAb PEnd PrOG FAIL dOnE CUS	**[Auto tuning status]** For information only, cannot be modified. **[Not done]** (tAb): The default value of the stator resistance is used to frequency inverter the motor. **[Wait]** (PEnd): Autotuning has been requested but not yet executed. **[Active]** (PrOG): Autotuning active. **[Failed]** (FAIL): The autotuning has failed. **[Done]**(dOnE): The stator resistance measured by the autotuning function is used to control the motor. **[customer-spec]** (CUS): The autotuning has been performed, but then at least one of the parameters defined by this autotuning was changed. The parameter **[AUTO-TUNE FAULT]** (tUn) then changes again to **[No]** (nO). The relevant parameters for the motor measurement are: **[R.Stat inp.synMot]** (rSAS), **[R.Stat inp. Mot]** (rSA), **[Idw]** (IdA), **[LFw]** (LFA) and **[Cust rotor time const]** (trA).	**[Not done]** (tAb)
PHr AbC ACb	**[Phase rotation]** **[ABC]** (AbC): Clockwise operation **[ACB]** (ACb): Anti-clockwise operation This parameter can be used to reverse the motor without changing the cabling. **Note:** **Do not change the parameter [phase rotation] (PHr) , if [Motor control type] (Ctt) = [FVC] (FUC).** **see "Drive parameters (Ctt)" on page 153 = [FVC] (FUC). The direction of rotation must be changed if necessary before or during the test of the encoder (see "Encoder testing" on page 157) if [Motor control type] (Ctt) is not [FVC] (FUC).**	**[ABC]** (AbC)

Code	Name/Description	Factory settings
Ctt	[Motor control type]	[SVC U] (UUC)
UUC	[SVC U] (UUC): Voltage flux vector control in open control loop with automatic slip compensation depending on the load. This supports operation with several motors connected parallel on the same inverter (if the motors are identical).	
CUC	[SVC I] (CUC): Current-flow vector control in open control loop. This supports operation with several motors connected parallel on the same inverter.	
FUC	[FVC] (FUC): Current-flow vector control in closed control loop for motors with incremental encoder sensor. This option can only be selected if an incremental encoder card has been inserted. This function is not possible, however, if an encoder that only generates signal "A" is used. It provides precise speed and torque values and allows you to obtain a torque at zero speed. It supports operation with several motors connected parallel on the same inverter. **Note:** **It is important that prior to the selection of [FVC] (FUC) the encoder test, see "Encoder testing" on page 157, is performed.**	
UF2	[V/f Reg 2P] (UF2): Simple V/f characteristic curve, without slip compensation. Enables the operation with the following motors: • Special motors (slip ring rotor, piston rotor, etc.) • Several motors connected in parallel to the same inverter • High-speed motors • Motors with low power in comparison to the inverter 	
UF5	[V/f Reg 5P] (UF5): V/f-characteristic with 5 segments: As for the V/f characteristic with 2 points, but also possible resonance phenomena (saturation) can be avoided. 	

Code	Name/Description	Setting range	Factory settings
U0	**[U0]** Setting the V/f characteristic The parameter can be accessed when **[motor control type]** (Ctt) = **[V/f Reg 2P]** (UF2) or **[V/f Reg 5P]** (UF5).	0 to 599 depending on the size	0
U1	**[U1]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 depending on the size	0
F1	**[F1]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 Hz	0
U2	**[U2]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 depending on the size	0
F2	**[F2]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 Hz	0
U3	**[U3]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 depending on the size	0
F3	**[F3]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 Hz	0
U4	**[U4]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 depending on the size	0
F4	**[F4]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 Hz	0
U5	**[U5]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 depending on the size	0
F5	**[F5]** Setting the V/f characteristic The parameter is accessible when **[Motor control type]** (Ctt) = **[V/f Reg 5P]** (UF5).	0 to 599 Hz	0
UFr	**[IR compensation]** 1) This parameter can be accessed if **[motor control type]** (Ctt) is not **[V/f Reg 2P]** (UF2) and **[V/f Reg 5P]** (UF5) . Enables increase in the optimization of the torque at very low speed (**[IR-compens.]** (UFr) if the torque is not sufficient). Make sure that the value of **[IR compens.]** (UFr) is not too high in relation to the heated motor (risk of instability).	25 to 200%	100%
SLP	**[Slip compensation]** 1) This parameter can be accessed if **[motor control type]** (Ctt) is not **[V/f Reg 2P]** (UF2) and **[V/f Reg 5P]** (UF5) . Allows the adjustment of the rated motor speed by entering the set slip compensation. The speeds given on motor nameplates are not necessarily exact. • If slip setting is < actual slip: The motor is not rotating at the correct speed in steady state, but at a speed lower than the reference. • If slip setting is > actual slip: The motor is overcompensated and the speed is unstable.	0 to 300%	100%

1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.

Code	Name/Description	Setting range	Factory settings
VC2	**[Vector control 2pt]** This parameter cannot be accessed if **[Motor control type]** (Ctt) is not **[Sync. Motor.]** (SYn).		**[No]** (nO)
nO	**[No]** (nO): Function not active.		
YES	**[Yes]** (YES): Function active. Is used in applications in which the motor rated speed and frequency must be exceeded to optimize the operation for constant power, or if the maximum voltage of the motor must be limited to a value below the line voltage. The voltage/frequency profile must be adapted based on the capabilities of the motor for operating at maximum voltage (UCP) and maximum frequency (FCP).		



Code	Name/Description	Setting range	Factory settings
UCP	**[Volt. const. power]** The parameters can be activated if **[vector control 2pt]** (VC2) = **[Yes]** (YES).	According to inverter performance	In accordance with the inverter power and **[Standard Motor Freq.]** (bFr)
FCP	**[Freq const power]** The parameters can be activated if **[vector control 2pt]** (VC2) = **[Yes]** (YES).	0 to 599 Hz	**[Standard Motor freq.]** (bFr)

Motor parameters that can be accessed in the [expert] mode

This includes:

- Parameters that are calculated by the inverter during autotuning in write-protected mode. For example, R1r, calculated stator resistance in cold condition.
- Some of these calculated parameters can be replaced by other values, if necessary. For example, R1w, measured stator resistance in cold condition.

If a parameter Xyw is changed by the user, the inverter uses it instead of the calculated parameter Xyr.

Induction motor

If an autotuning is running or if a parameter of the motor that the autotuning depends on is amended, the parameters (**[Rated mot. volt.]** (UnS), **[Rated motor frequency]** (FrS), **[Rated motor current]** (nCr), **[Rated motor speed]** (nSP), **[Rated motor power]** (nPr)), put Xyw back to their factory settings.

Code	Name/Description
rSM	**[R measured stator]** Stator resistance in cold condition, calculated by the inverter, in read-only mode. Value in milliohms (mΩ) to 75 kW (100 hp), in hundredths of a milliohms (mΩ/100) over 75 kW (100 hp).
IdM	**[Calc. magnpower]** Magnetizing current in A, calculated by the inverter, in read-only mode.
LFM	**[Calculated stray field]** Leakage inductance in mH, calculated by the inverter, in read-only mode.
trM	**[T2r]** Rotor time constant in ms, calculated by the inverter, in read-only mode.
nSL	**[NSLr]** Nominal slip in Hz, calculated by the inverter, in read-only mode. To change the nominal slip, change the **[nominal motor speed]** (nSP) (see "Drive parameters (bFr - nSP)" on page 151).
PPn	**[Number of pole pairs]** Number of pole pairs, calculated by the inverter, in read-only mode.
rSA	**[Cust stator resist.]** Cold state stator resistance (per winding), modifiable value. In milliohms (mΩ) to 75 kW (100 hp), in hundredths of a milliohms (mΩ/100) over 75 kW (100 hp). On the integrated display terminal: 0 to 9999 then 10.00 to 65.53 (10000 to 65536).
IdA	**[Idw]** Magnetizing current in A, modifiable value.
LFA	**[LFw]** Leakage inductance in mH, modifiable value.
trA	**[Cust. rotor t const.]** Rotor time constant in ms, modifiable value.

2.8.8.3 Selection of the encoder

Follow the recommendations in the catalog and in the installation manual.

Code	Name/Description	Setting range	Factory settings
EnS	**[Encoder type]** The parameter is accessible if an incremental encoder card is present 1). To be configured according to the cards and encoder type used.		**[AABB]** (AAbb)
AA	**[AABB]** (AAbb): For the signals A, A-, B, B-.		
Ab	**[AB]** (Ab): For the signals A, B		
A	**[A]** (A): For signal A. Value is not accessible if **[Encoder active]** (EnU) = **[Control]** (rEG)		
PGI	**[Number of pulses]** Number of pulses per revolution of the encoder. The parameter is accessible if an incremental encoder card is present 1).	100 to 5000	1024

1) The access to the encoder-specific parameter is only possible if the encoder card is present. The available selection depends on the type of encoder card used. The configuration of the encoder can also be accessed via the **[INPUTS/ OUTPUTS]** (I/O) menu.

2.8.8.4 Encoder testing

This process applies to all types of encoders.

1. Set **[Motor control type]** (Ctt) to another value than **[FVC]** (FUC), even if this is the required configuration. For example, use **[SVC U]** (UUC) for an induction motor.
2. Configure the motor parameters according to the technical data on the nameplate.
   - Induction motor (see "Drive parameters (bFr - nSP)" on page 151):
     [Rated motor power] (nPr), **[Rated motor volt.]** (UnS), **[Rated mot. current]** (nCr),
     [Rated motor frequency] (FrS), **[Rated motor speed]** (nSP).
3. Set **[Encoder active]** (EnU) = **[No]** (nO).
4. Perform an autotuning.
5. For an incremental encoder, set **[Encoder type]** (EnS) and **[Number of pulses]** (PGI) (see "Selection of the encoder" on page 157) according to the encoder used.
6. Set **[Encoder active]** (EnU) = **[Yes]** YES).
7. Check that the motor is turning securely.
8. Ensure a stable motor speed ≈15% of the rated speed for at least 3 seconds. Use the menu **[MONITOR]** (SUP-), to monitor the behavior.
9. In the event of a triggering of **[Encoder fault]** (EnF), **[Encoder]** (EnC) switches to **[No]** (nO).
   - Check the parameter settings (see 1 to 4 above).
   - Check the correct mechanical and electrical operation of the encoder as well as the supply and the connection.
   - Change the rotation direction of the motor (parameter **[Phase rotation]** (PHr)) or the signals from the encoder.
10. Repeat this procedure again from step 5 until **[Encoder]** (EnC) switches to **[done]** (dOnE) .
11. Reconfigure **[motor control type]** (Ctt), if this should correspond with **[FVC]** (FUC).

> **Note:**
>
> **If the fault [Invalid config] (CFI) is triggered, set [Encoder] (EnC) = [No] (nO).**

Parameters for the encoder test

Code	Name/Description	Factory settings
EnC	**[Encoder]**	**[Not done]**(nO)
	Check the encoder feedback. See process on the previous page. The parameter is accessible if an encoder card is present [1].	
nO	**[Not done]** (nO): Test not performed.	
YES	**[Yes]** (YES): Activates monitoring of the encoder.	
dOnE	**[done]** (dOnE): Test performed successfully. The test procedure is used to check the following: • The direction of rotation of the encoder / motor • Existing signals (continuity of wiring) • Number of pulses/rotations In the event of a fault, the inverter switches off with**[Encoder fault]** (EnF) .	
EnU	**[Encoder active]**	**[No]** (nO)
	The parameter is accessible if an encoder card is present [1].	
nO	**[No]** (nO): Function not active.	
SEC	**[Security]** (SEC): The encoder is only for the monitoring as a speed feedback.	
rEG	**[Control]** (rEG): The encoder is used for the control and for the monitoring as a speed feedback. This configuration is performed automatically if the inverter is configured with closed control loop (**[Motor control type]** (Ctt) = **[FVC]** (FUC)). If **[motor control type]** (Ctt) = **[SVC U]** (UUC), then the encoder acts as speed feedback and allows the static correction of the speed. For the other values of **[motor control type]** (Ctt) this configuration cannot be accessed.	
PGr	**[Reference]** (PGr): The encoder is used as reference. The choice is only possible with an incremental encoder card.	

1) The access to the encoder-specific parameter is only possible if the encoder card is present. The available selection depends on the type of encoder card used. The configuration of the encoder can also be accessed via the **[INPUTS/ OUTPUTS]** (I/O) menu.

2.8.8.5 [ENA system]

ENA system is a control profile for rotary machines with unbalanced loads.

It is primarily used for oil pumps. The applied principle of operation:

- Allows operation without braking resistance
- Reduces the mechanical load of the rod
- Reduces power fluctuations
- Reduces the energy consumption by improving the electrical power/current ratio

2.8.8.5.1 [P component ENA]

This setting is used to make a compromise between the reduced energy consumption (and/or power fluctuations) and the mechanical load to be achieved on the rod.

By reducing the current fluctuations and increasing the current at the same average speed, energy is saved.

2.8.8.5.2 [I component ENA]

This setting is used to smooth the DC bus voltage.

Start the machine with low integral and proportional gain (proportional 25% and integral 10%), to avoid an over-voltage fault in the absence of a braking resistor. Check whether these settings are suitable.

2.8.8.5.3 Adjustments recommended during operation:

- To eliminate the braking resistance and to increase the DC bus voltage as a result:
  Show the speed of the machine on the graphic display terminal
  Reduce the integral gain value until the machine speed falls. If this point is reached, increase the integral gain until the machine speed stabilizes.
  Check the stability of the DC bus voltage with the graphic display terminal or an oscilloscope.
- To save energy:
  The (gradual) reduction the proportional gain can lead to greater energy savings through the reduction of the maximum value of the line current. However, it increases the fluctuations in speed and thus the mechanical load.
  The aim is to identify the settings that enable energy saving and minimize the mechanical load.
  If the proportional gain is reduced, a readjustment of the integral gain is required in order to avoid an overvoltage fault.

> **Note:**
>
> **Check after completion of the adjustments that the auxiliary pump starts correctly. If the setting [I component ENA] is too low, this can lead to an insufficient torque at the start.**

2.8.8.5.4 [Reduction ratio]

This setting corresponds to the ratio of motor speed before transmission to speed after the transmission. This parameter is used to access the average speed in Hz and the speed of the machine in user-defined units (for example, in beats per minute) on the graphic display terminal. For these values to be displayed on the graphic display terminal, in the menu **[MONITOR]** , you must select (SUP-) .

2.8.8.5.5 Setting recommendations to avoid error messages of the type [overspeed] (SOF)

ENA system authorizes overspeeds that can trip a fault **[overspeed]** (SOF). To avoid this, it is recommended that the value of the following parameters be increased slightly:

- **[Max. output freq.]** (tFr), see "Drive parameters (tFr - PHr)" on page 152.

Code	Name/Description	Setting range	Factory settings
EnA nO YES	**[ENA system]** The parameter is accessible when **[Motor control type]** (Ctt) = **[SVC U]** (UUC). **[No]** (nO): Function not active. **[Yes]** (YES): Function active.		**[No]** (nO)
GPE	**[P component ENA]** [1] Parameter can be enabled if **[ENA System]** (EnA) = **[Yes]** (YES).	1 to 9999	250
GIE	**[I component ENA]** [1] Parameter can be enabled if **[ENA System]** (EnA) = **[Yes]** (YES).	0 to 9999	100
rAP	**[Translation]** [1] Parameter can be enabled if **[ENA System]** (EnA) = **[Yes]** (YES).	10 to 999.9	10

1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.

Parameter that can be modified during operation or when stopped.

Drive parameters (continued)

Code	Name/Description	Setting range	Factory settings
OFI nO YES	**[Sine-wave filter]** **[No]** (nO): No sine-wave filter **[Yes]** (YES): Use of a sine-wave filter to limit overvoltages of the motor and reduce leakage current to ground. Der **[Sine-wave filter]** (OFI) is forced to **[No]** (nO) with the following types of inverters: 8I84T200037.01P-1 and 8I84T400075.01P-1. **Note:** **The settings of [Current limiting] (CLI) and [2nd current limit] (CL2) must be performed after this configuration of [Sine-wave filter] (OFI) = [Yes] (YES) and [Motor control type] (Ctt) = [V/f Reg 2P] (UF2) or [V/f Reg 5P] (UF5) as this configuration results in a factory setting with reduced current limiting (1.36 In) for certain models.** **Caution!** **If [sine-wave filter] (OFI) = [Yes] (YES), [Motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) must be [V/f Reg 2P] (UF2), [V/f Reg 5P] (UF5), (or for 8I84T2*****.01P-1 and 75 KW 8I84T4*****.01P-1 [SVC U] (UUC) only up to 45 kW) and [Max. output freq.] (tFr) is not permitted to exceed100 Hz.** **Failure to follow this instruction can result in equipment damage.**		**[No]** (nO)
SFr	**[Switching freq.]** 1) Switching frequency setting. **Setting range:** Can vary between 1 and 16 kHz, but the minimum and maximum values and the default value, depending the inverter type, the rated current (power and voltage) and the configuration of the parameter**[Sine-wave filter]** (OFI) and **[Motor surge limit]** (SVL)(see "Drive (nrd - SOP)" on page 161) are restricted. If the value is lower than 2 kHz, then **[current limit]** (CLI) and **[2nd current limit]** (CL2) , see "Setting parameters (SFr - CL2)" on page 144 are limited to 1.36 In. Adjustment with running inverter: • If the initial value is under 2 kHz, it can not be increased over 1.9 kHz during operation. • If the start value is greater than or equal to 2 kHz, during operation a minimum value of 2 kHz should be maintained. Adaptation with stopped inverter: No restrictions. **Note:** **In the event of excessive temperature rise, the inverter will automatically reduce the switching frequency and reset it once the temperature returns to normal.** **Note:** **If [Motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) is set to [FVC] (FUC), it is not recommended to set the switching frequency to a value below 2 kHz (to avoid unstable speeds).** **Caution!** **On inverters of the models 8I84T400075.01P-1 to 8I84T400400.01P-1, if the RFI filters are disconnected (operation on an IT system), the inverter's switching frequency is not permitted to exceed 4 kHz.** **Failure to follow this instruction can result in equipment damage.**	Depending on the size	Depending on the size
CLI	**[CURRENT LIMIT.]** 1) Used to limit the motor current. The adjustment range is limited to 1.36 In if **[Switch frequency]** (SFr) is under 2 kHz. **Note:** **If the setting is less than 0.25 in, the inverter can remain in error mode [output phase loss] (OPF), if this has been enabled, see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292). If it is below the no-load current of the motor, the limitation has no effect.** **Caution!** **Make sure that the motor is designed to this current, since these are susceptible to a demagnetization.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.65 In 2)	1.5 In 2)

1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.
2) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Factory settings
nrd	**[Noise reduction]**	Depending on the size
nO	**[No]** (nO): Fixed frequency.	
YES	**[Yes]** (YES): Frequency with random controlled modulation. Factory setting up to the sizes 8I84T204500.01P-1 and 8I84T407500.01P-1. Random frequency modulation prevents any resonance, which may occur at a fixed frequency.	
SUL	**[Motor surge limit.]**	**[No]** (nO)
	This function limits motor overvoltages. It is used under the following circumstances: • Motors to NEMA specification • Japanese motors • Spindle motors • Rewound motors	
nO	**[No]** (nO): Function not active.	
YES	**[Yes]** (YES): Function active This parameter is forced to **[No]** (nO) if **[sine-wave filter]** (OFI), previous page = **[Yes]** (YES). This parameter can remain **[Nein]** (nO) for 230/400 V motors used with 230 V or if the cable length between the inverter and motor does not exceed the following lengths: • 4 m with unshielded cables • 10 m with shielded cables	
SOP	**[Volt surge limit. opt]**	10 µs
	Optimization parameter for transient overvoltages at the motor terminals. This parameter can be accessed if **[Motor surge limit]** (SUL) = **[Yes]** (YES). Set to 6, 8 or 10 µs according to the following table.	

The value of parameter "SOP" corresponds to the damping time of the cable used. It is defined to prevent the superimposition of voltage wave reflections resulting from long cable lengths. It limits overvoltages to twice the DC bus rated voltage.

The following table shows examples of the relationship between parameter "SOP" and the length of the cable between the inverter and the motor. For longer cable lengths, a sine-wave filter or a dV/dt protective filter must be used.

- For motors in parallel, the sum of all the cable lengths must be taken into consideration. Compare the length given in the table row corresponding to the power for one motor with that corresponding to the total power, and select the shorter length. Example: Two motors with 7.5 kW (10 HP): Take the lengths from the 15 kW (20 HP) column that are shorter than those in the 7.5 kW (10 HP) column, and divide the corresponding length by the number of motors to obtain the length per motor (with unshielded "GORSE" cable and SOP = 6, the result is 40/2 motors = 20 m per motor maximum for each 7.5 kW (10 HP) motor).

In special cases (for example, different types of cable, different motor powers in parallel, different cable lengths in parallel, etc.), we recommend using an oscilloscope to check the overvoltage values obtained at the motor terminals.

To retain the overall inverter performance, the SOP value is not permitted to be increased unnecessarily.

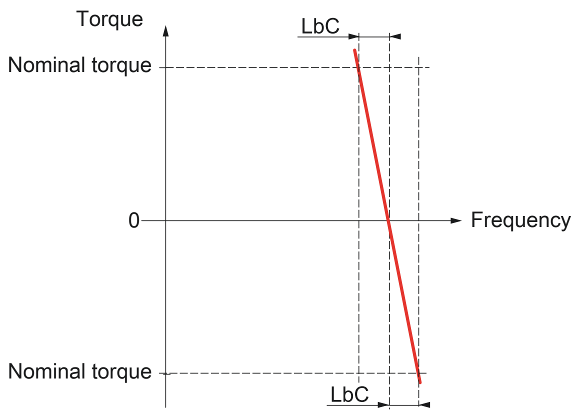
2.8.8.6 Correspondence between the SOP parameter and the cable length, for 400 V line supply

ACOPOSinverter P84	**Motor**		**Cable cross section**		**Maximum cable length in meters**					
Order reference	Power supply				Unshielded "GORSE" H07 RN-F 4Gxx cable			Shielded "GORSE" GVCSTV-LS/LH cable		
	kW	HP	In mm²	AWG	SOP = 10	SOP = 8	SOP = 6	SOP = 10	SOP = 8	SOP = 6
8I84T400075.01P-1	0.75	1	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m
8I84T400150.01P-1	1.5	2	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m
8I84T400220.01P-1	2.2	3	1.5	14	110 m	65 m	45 m	105 m	85 m	65 m
8I84T400300.01P-1	3	-	1.5	14	110 m	65 m	45 m	105 m	85 m	65 m
8I84T400400.01P-1	4	5	1.5	14	110 m	65 m	45 m	105 m	85 m	65 m
8I84T400550.01P-1	5.5	7.5	2.5	14	120 m	65 m	45 m	105 m	85 m	65 m
8I84T400750.01P-1	7.5	10	2.5	14	120 m	65 m	45 m	105 m	85 m	65 m
8I84T401100.01P-1	11	15	6	10	115 m	60 m	45 m	100 m	75 m	55 m
8I84T401500.01P-1	15	20	10	8	105 m	60 m	40 m	100 m	70 m	50 m
8I84T401850.01P-1	18.5	25	10	8	115 m	60 m	35 m	150 m	75 m	50 m
8I84T402200.01P-1	22	30	16	6	150 m	60 m	40 m	150 m	70 m	50 m
8I84T403000.01P-1	30	40	25	4	150 m	55 m	35 m	150 m	70 m	50 m
8I84T403700.01P-1	37	50	35	5	200 m	65 m	50 m	150 m	70 m	50 m
8I84T404500.01P-1	45	60	50	0	200 m	55 m	30 m	150 m	60 m	40 m
8I84T405500.01P-1	55	75	70	2/0	200 m	50 m	25 m	150 m	55 m	30 m
8I84T407500.01P-1	75	100	95	4/0	200 m	45 m	25 m	150 m	55 m	30 m

ACOPOSinverter P84	**Motor**		**Cable cross section**		**Maximum cable length in meters**					
Order reference	Power supply				Shielded "BELDEN" 2950x cable			Shielded "PROTOFLEX" EMV 2YSLCY-J cable		
	kW	HP	In mm²	AWG	SOP = 10	SOP = 8	SOP = 6	SOP = 10	SOP = 8	SOP = 6
8I84T400075.01P-1	0.75	1	1.5	14	50 m	40 m	30 m			
8I84T400150.01P-1	1.5	2	1.5	14	50 m	40 m	30 m			
8I84T400220.01P-1	2.2	3	1.5	14	50 m	40 m	30 m			
8I84T400300.01P-1	3	-	1.5	14	50 m	40 m	30 m			
8I84T400400.01P-1	4	5	1.5	14	50 m	40 m	30 m			
8I84T400550.01P-1	5.5	7.5	2.5	14	50 m	40 m	30 m			
8I84T400750.01P-1	7.5	10	2.5	14	50 m	40 m	30 m			
8I84T401100.01P-1	11	15	6	10	50 m	40 m	30 m			
8I84T401500.01P-1	15	20	10	8	50 m	40 m	30 m			
8I84T401850.01P-1	18.5	25	10	8	50 m	40 m	30 m			
8I84T402200.01P-1	22	30	16	6				75 m	40 m	25 m
8I84T403000.01P-1	30	40	25	4				75 m	40 m	25 m
8I84T403700.01P-1	37	50	35	5				75 m	40 m	25 m
8I84T404500.01P-1	45	60	50	0				75 m	40 m	25 m
8I84T405500.01P-1	55	75	70	2/0				75 m	30 m	15 m
8I84T407500.01P-1	75	100	95	4/0				75 m	30 m	15 m

In the case of motors with 230/400 V, which can be operated at 230 V, the parameter **[Motor surge limit]** (SUL) = **[No]** (nO) can remain.

Drive parameters (continued)

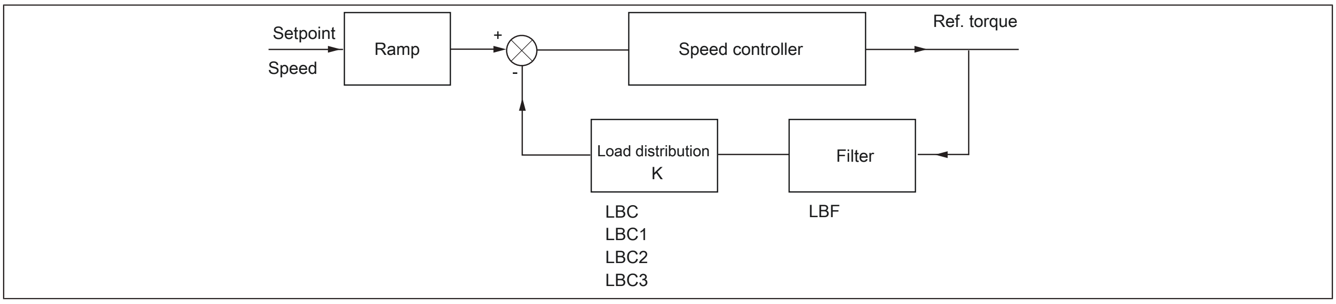
Code	Name/Description	Setting range	Factory settings
Ubr	**[Braking level]** DC bus voltage threshold value above which the brake transistor turns on, to limit the voltage. 8I84T2*****.01P-1: Factory setting 395 V 8I84T4*****.01P-1: Factory setting 785 V The setting range depends on the rated voltage of the inverter and the parameter **[line voltage]** (UrES), see "MGT. UNDERVOLTAGE (USB-) AND IGBT TEST (TLT-)" on page 298.		Depending on the voltage of the inverter
bbA	**[Control Braking perf.]**		**[No]** (nO)
nO	**[No]** (nO): Function not active.		
YES	**[Yes]** (YES): Function active. Must be used for inverters that are connected in parallel on the DC bus. Compensation of the brake power between the inverters. The parameter **[Switch point chopper]** (Vbr) must be set to the same value on all inverters. The value **[Yes]** (YES) is possible if **[Adj. decel ramp]** (brA) = **[No]** (nO).		
LbA	**[Load sharing]** When 2 motors are connected mechanically and therefore at the same speed, and each is controlled by a inverter, this function can be used to improve torque distribution between the two motors. To do this, it varies the speed based on the torque.		**[No]** (nO)
nO	**[No]** (nO): Function not active.		
YES	**[Yes]** (YES): Function active. The parameter can be accessed when **[motor control type]** (Ctt) does not correspond to **[V/f Reg 2P]** (UF2) or **[V/f Reg 5P]** (UF5) .		
LbC	**[Load sharing correction]**1) Correction of the nominal value in Hz. This parameter can be accessed if **[Load distribution]** (LbA) = **[Yes]** (YES) 	0 to 599 Hz	0

1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.

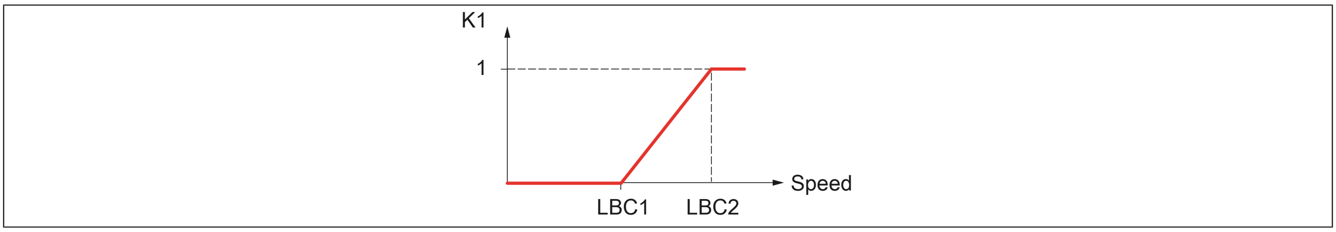
Parameter that can be modified during operation or when stopped.

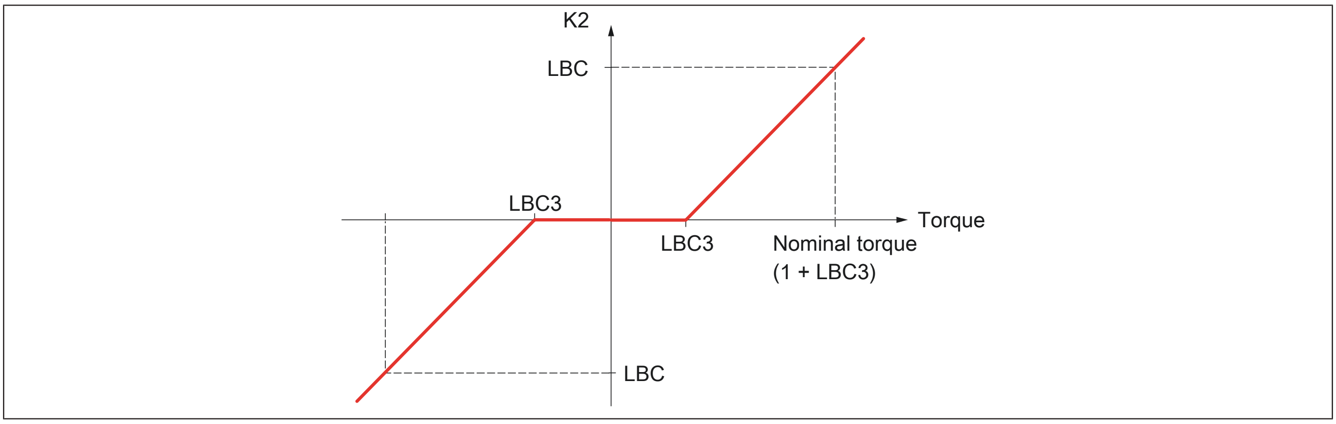
2.8.8.7 Load distribution parameters - expert level

Principle



The load sharing factor K is determined by the torque and speed, with two factors K1 and K2 (K = K1 x K2).





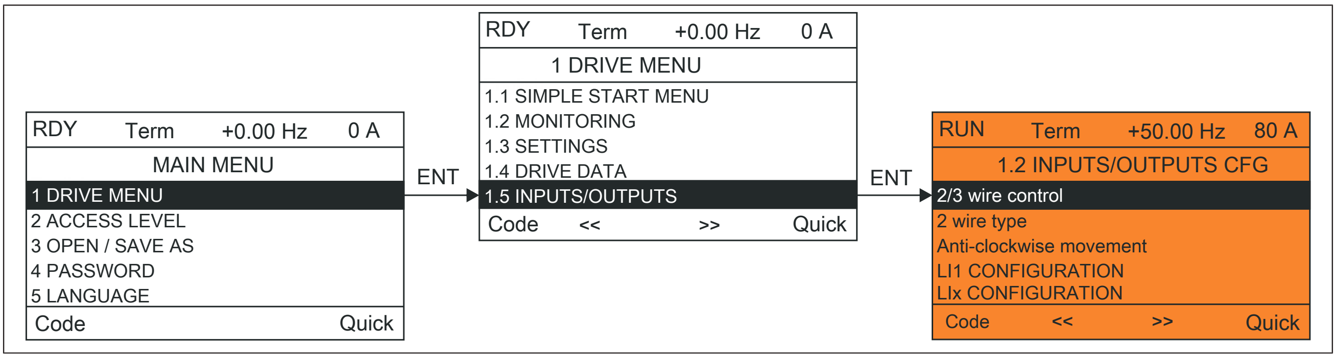
Load distribution parameters

Code	Name/Description	Setting range	Factory settings
LbC1	**[Correction min spd]** This parameter can be accessed if **[Load distribution]** (LbA) = **[Yes]** (YES) Minimum speed for load distribution correction in Hz. Below this threshold, no corrections are made. Used to prevent correction at very low speed if correction would hamper rotation of the motor.	0 to 598.9 Hz	0
LbC2	**[Correction max spd]** Parameter can be enabled if **[Load distribution]** (LbA) = **[Yes]** (YES). Speed threshold in Hz above which maximum load correction is applied.	**[Correction min spd]** (LbC1) + 0.1 to 599 Hz	0.1
LbC3	**[Torque offset]** Parameter can be enabled if **[Load distribution]** (LbA) = **[Yes]** (YES). Minimum torque for load correction as a % of the rated torque. Below this threshold, no corrections are made. Used to avoid torque instabilities when the torque direction is not constant.	0 to 300%	0%
LbF	**[Sharing filter]** Parameter can be enabled if **[Load distribution]** (LbA) = **[Yes]** (YES). The (filter) time constant for the correction in ms. Used with flexible mechanical clutches to avoid instability.	100 ms to 20 s	100 ms

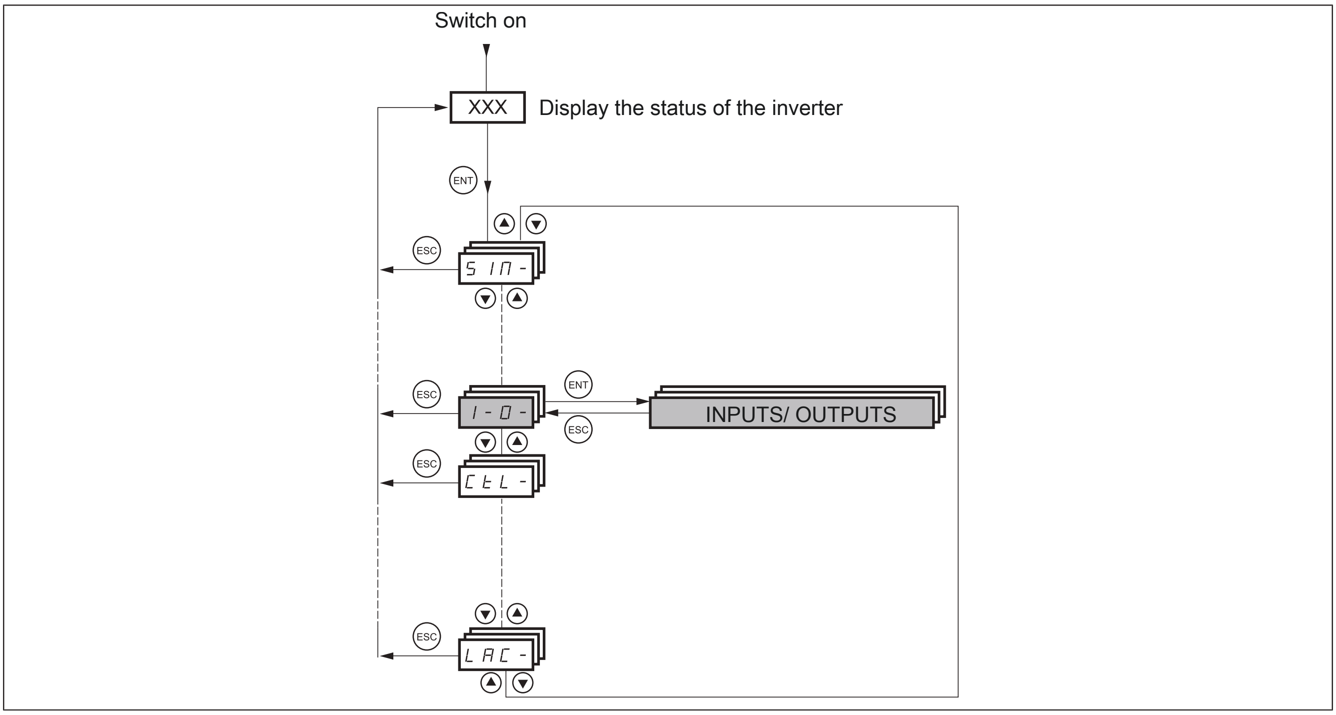
Parameter that can be modified during operation or when stopped.

2.8.9 [INPUTS/ OUTPUTS] (I-O-)

2.8.9.1 With graphic display terminal:



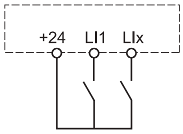
2.8.9.2 With integrated display terminal:



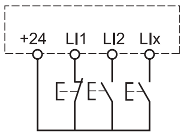
The parameters in the menu **[INPUTS/OUTPUTS CFG]** (I-O-) can only be changed if the inverter has been stopped and no run command is present.

Input and Output Parameters

<table>
<tr><th>Code</th><th>Name/Description</th><th>Factory settings</th></tr>
<tr><td>tCC
2C
3C</td><td>[2/3 wire control]
[2 wire control] (2C)
[3 wire control] (3C)

2 wire control: This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping.
Example for wiring as "source":


LI1: Forward
LIx: Reverse

3-wire control (edge-controlled): A "forward" or "reverse" pulse is sufficient for motor startup. A "stop" pulse is sufficient to stop the motor.
Example for wiring as "source":


LI1: Stop
LI2: Forward
LIx: Reverse

Warning!

ACCIDENTAL OPERATION OF DEVICE

To change the assignment of [2/3 wire control] (tCC), press down on ENT key for 2 s.

This resets the following functions to their default values: Type 2 wire control] (tCt) and [anti-clockwise operation] (rrS) below, and all of the functions that assign the logic inputs and analog inputs.

The selected macro configuration will also be reset if they contain customer-specific settings (loss of user-specific settings).

It is recommended that this parameter be configured before the menus [CONTROL] (CtL-) and [APPLICATIONS-FCT.] (FUn-) .

Check that this change is compatible with the wiring diagram used.

Failure to follow these instructions will result in death or serious injury.</td><td>[2 wire control] (2C)</td></tr>
<tr><td>tCt
LEL
trn
PFO</td><td>[2 wire type]
[Level] (LEL): The status 0 or 1 is used for the run command (1) or the stop command (0).
[Edge control](trn): A state change (edge or transition) is required to initiate operation and to prevent an inadvertent restart after power failure.
[Prio right] (PFO): State 0 or 1 is taken into account for run or stop, but the "run forward" input takes priority over the "run reverse" input</td><td>[Edge control] (trn)</td></tr>
<tr><td>rrS
nO
LI1
C101
-
-
Cd00
-</td><td>[Reverse assign.]
[No] (nO): Not active
[LI1] (LI1) to [LI6] (LI6)
[C101] (C101) to [C115] (C115): Not applicable
[C201] (C201) to [C215] (C215): With built-in communication interface in [I/O profile] (IO)
[C301] (C301) to [C315] (C315): With communication card in [I/O profile] (IO)
[CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) the switchover is possible with logic inputs
[CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) the switchover is possible with logic inputs
Assignment of the reverse direction command.</td><td>[LI2] (LI2)</td></tr>
</table>

[LI1] (L1-) and [LIx CONFIGURATION] (L--)

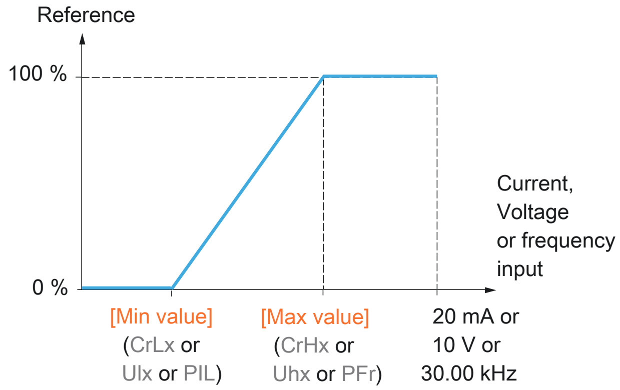
Code	Name/Description	Setting range	Factory settings
L1-	**[LI1]**		
L1A	**[Assign. LI1]** Read-only parameter, cannot be configured. It displays all the functions that are assigned to input LI1 in order to check for multiple assignments.		
L1d	**[LI1 On Delay]** This parameter is used to enable delayed consideration of the logic input's transition to state 1. This delay can be set to a value from 0 to 200 ms, and it serves to filter possible interference. The change to state 0 is taken into account without delay. **Warning!** **ACCIDENTAL OPERATION OF DEVICE** **Make sure that the set delay poses no threat and no unintentional operation.** **Depending on the deceleration values of the different logic inputs, the order of the acquisition of these inputs may change, leading to an unexpected operation.** **Failure to follow these instructions will result in death or serious injury.**	0 to 200 ms	0
L--	**[LIx CONFIGURATION]** All available logic inputs of the inverter are processed as in the example LI1 above (up to LI6, LI10 or LI14, depending on whether the option cards were used.		

2.8.9.3 Configuration of the analog inputs and the input "Pulse input"

The minimum and maximum input values (in volts, mA, etc.) are converted to % in order to adapt the references to the application.

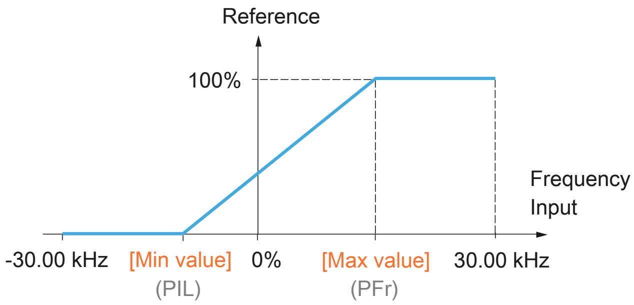
Minimum and maximum input values:

The minimum value corresponds to a reference of 0% and the maximum value to a reference of 100%. The minimum value may be greater than the maximum value:



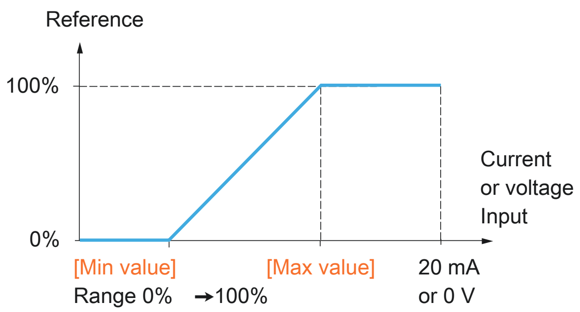
For bidirectional inputs (±), the min. and max. are relative to the absolute value, for example, +/- 2 to 8 V.

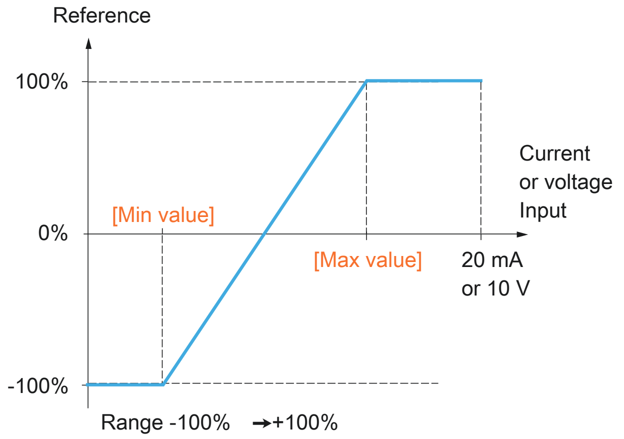
The negative minimum value of the pulse input:



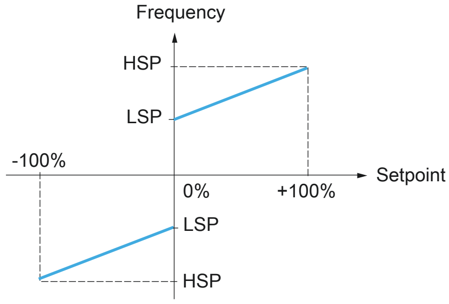
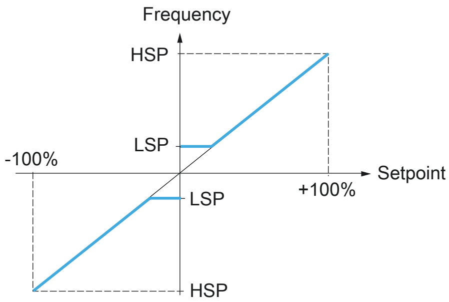
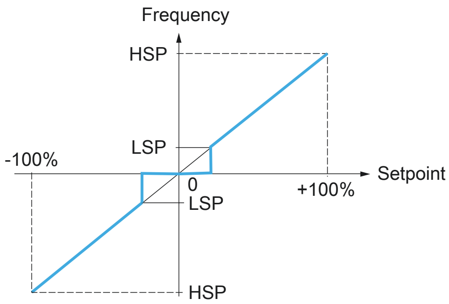
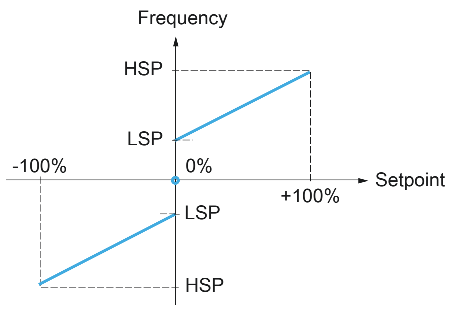
Area (output values): Only for analog inputs

With this parameter, the reference range is set to [0% → 100%] or [-100% → 100%]. This will result in bidirectional output from unidirectional input.




Reference
100%
0%
-100%
[Min value]
[Max value]
Current
or voltage
Input
20 mA
or 10 V
Range -100% → +100%

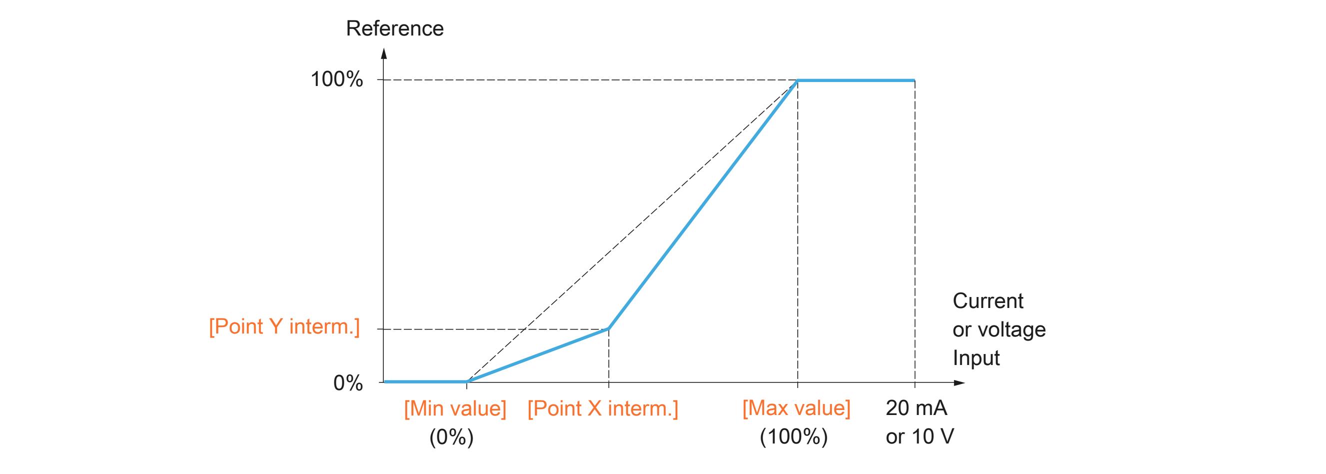
Input and output parameters (continued)

Code	Name/Description		Factory settings
bSP	**[Reference template]**		**[Standard]** (bSd)
bSd	**[Standard]** (bSd)		
		At zero reference the frequency = LSP	
bLS	**[LSP limit]** (bLS)		
		At reference = 0 with LSP the frequency = LSP	
bnS	**[Suppr LSP]** (bnS)		
		At reference = 0 with LSP the frequency = 0	
bnS0	**[deadband 0]** (bnS0)		
		This process is identical to **[Default]** (bSd), but in the following cases the frequency at reference = 0 is also = 0: • The signal is below the [min value], which in turn is greater than 0 (example: 1 V on a 2 to 10 V input) • The signal is above the [min value], which in turn is greater than 0the [max. value] (Example: 11 V on a 0 to 10 V input) If "bidirectional" has been set for the input field, the process is identical to **[Default]** (bSd).	
	This parameter defines how the speed reference is taken into account, for analog inputs and Pulse input only. In the case of the PID regulator, this is the PID output reference. The limits are defined by the parameters **[low speed]** (LSP) and **[high speed]** (HSP) (see "Parameters that can be modified during operation or when the motor is stopped." on page 130).		

2.8.9.4 Delinearization: Only for analog inputs

The input can be delinearized by configuring an intermediate point on the input/output curve of this input:

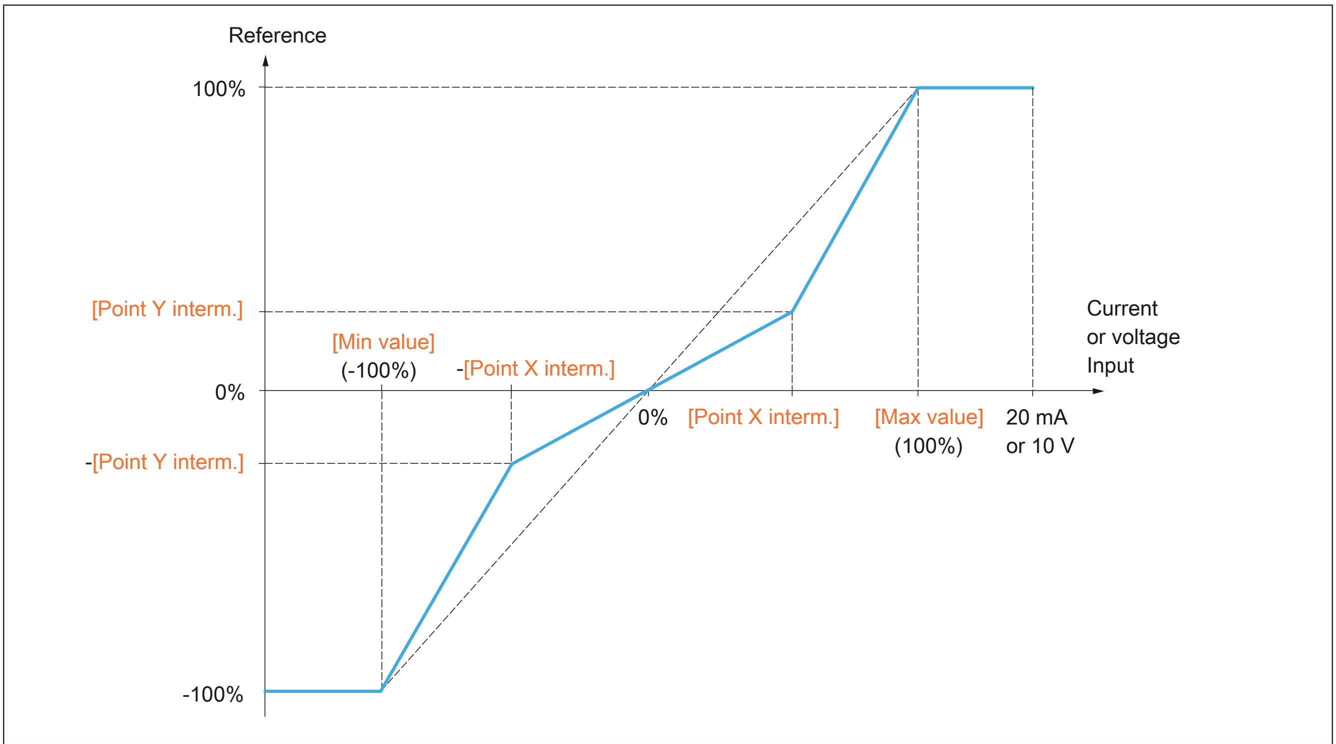
Range 0 → 100%



Note:

For [AI1 Interm. point] 0% corresponds to the [Min value] and 100% to the [Max value].

Range -100% → 100%



[AI1 CONFIGURATION] (AI1-)

Code	Name/Description	Setting range	Factory settings
AI1-	[AI1 CONFIGURATION]		
AI1A	[AI1 assignment] Read-only parameter, cannot be configured. This parameter displays all functions assigned to the AI1 input. This allows compatibility problems to be checked, for example.		
AI1t 10U n10U	[Type AI1] [0-10V] (10U): Positive voltage input (negative values are interpreted as zero: the input is unidirectional) [+/- volt] (10U): Positive and negative voltage input (input is bi-directional).		[0-10V] (10U)
UIL1	[AI1 min value]	0 to 10 V	0 V
UIH1	[AI1 max value]	0 to 10 V	10 V
AIF1	[AI1 filter] Filter	0 to 10 s	0 s
AI1E	[AI1 Interm. point X] Coordinate of the delinearization point at the input. • 0% corresponds to [min. value] (UIL1). • 100% corresponds to [max. value] (UIH1).	0 to 100%	0%
AI1S	[AI1 Interm. point Y] Output delinearization point coordinate (frequency reference).	0 to 100%	0%

[AI2 configuration](AI2-)

Code	Name/Description	Setting range	Factory settings
AI2-	[AI2 CONFIGURATION]		
AI2A	[AI2 assignment] Read-only parameter, cannot be configured. This parameter displays all functions assigned to the AI2 input. This allows compatibility problems to be checked, for example.		
AI2t 10U 0 A	[Type AI2] [voltage] (10U): Voltage input [current] (0 A): Current input		[current] (0 A)
CrL2	[AI2 min value] Parameter accessible if [Type AI2] (AI2t) = [Current] (0 A).	0 to 20 mA	0 to 20 mA
UIL2	[AI2 min value] Parameter accessible if [Type AI2] (AI2t) = [Voltage] (10U).	0 to 10 V	0 V
CrH2	[AI2 max value] Parameter accessible if [Type AI2] (AI2t) = [Current] (0 A).	0 to 20 mA	20 mA
UIH2	[AI2 max value] Parameter accessible if [Type AI2] (AI2t) = [Voltage] (10U).	0 to 10 V	10 V
AI2F	[AI2 filter] Filter.	0 to 10 s	0 s
AI2L POS nEG	[AI2 range] [0 - 100%] (POS): Unidirectional input [+/- 100%] (nEG): Bidirectional input Example: At an input of 0 to 10 V • 0 V corresponds to the reference -100%. • 5 V corresponds to the reference 0%. • 10 V corresponds to the reference 100%.		[0 - 100%] (POS)
AI2E	[AI2 Interm. point X] Input delinearization point coordinate. • 0% corresponds to [Min value], when the range = 0 → 100%. • 0% corresponds to $\frac{\text{[Max value] + [Min value]}}{2}$ when the range = -100% → 100% • 100% corresponds to [Max value].	0 to 100%	0%
AI2S	[AI2 Interm. point Y] Output delinearization point coordinate (frequency reference).	0 to 100%	0%

[Virtual AI1](AU1-)

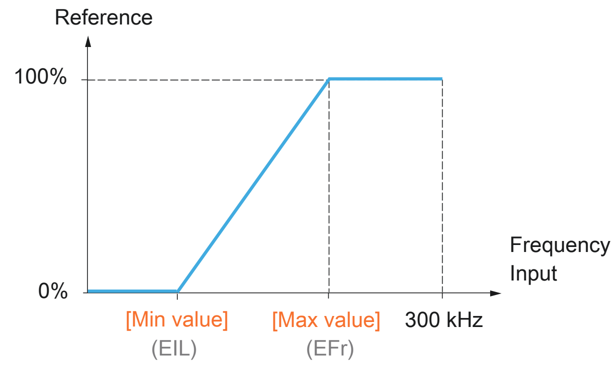
Code	Name/Description	Factory settings
AU1-	**[VIRTUAL AI1]**	
AIC1	**[AI1 communication]** Virtual input This parameter is also accessible on the submenu **[PID CONTrol]** (PId-), see "PID CONTROLLER (PId-)" on page 239.	**[No]** (nO)
nO	**[NO]** (nO): Not assigned (in this case, the virtual input does not appear in the parameters for the assignment of the analog inputs of the functions)	
Mdb	**[Modbus]** (Mdb): Not usable	
CAn	**[CANopen]** (CAn): Integrated communication interface (POWERLINK)	
nEt	**[Com. Card]** (nEt): Communication card, if present Scale: The value 8192 transmitted by this input is equivalent to 10 V on a 10 V input. **Warning!** **ACCIDENTAL OPERATION OF DEVICE** **If the equipment is switched to forced local mode (see "COMM. CARD and FORCED LOCAL (LCF-)" on page 310), the virtual input used in the current configuration remains fixed at the last value transmitted. The virtual input and mode "Forced local" are not permitted to be used in the same configuration.** **Failure to follow these instructions will result in death or serious injury.**	

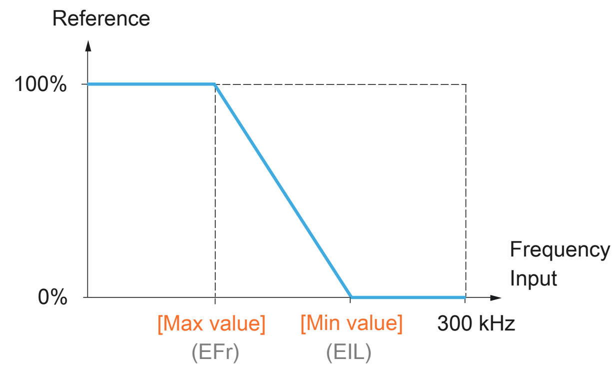
2.8.9.5 Configuration of the encoder input that serves as reference with a frequency generator

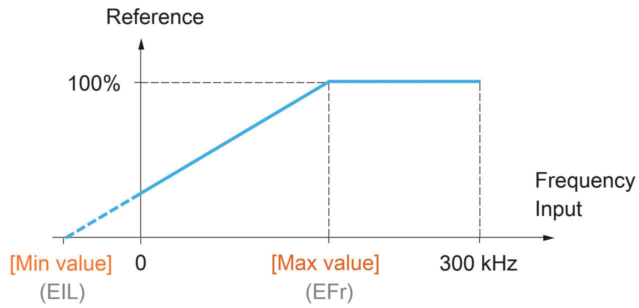
This reference is not signed, therefore, the directions of the function must be specified using the control channel (for example logic inputs).

Minimum and maximum values (input values):

The minimum value corresponds to a minimum reference of 0% and the maximum value to a maximum reference of 100%. The minimum value may be greater than the maximum value. It can also be negative.







A reference value with a frequency of zero can be achieved if it assigns a negative value to the minimum value.

The encoder configuration can also be accessed in the menu **[DRIVE DATA]** (drC-) .

[CONFIG. ENCODER] (IEn-)

Code	Name/Description	Setting range	Factory settings
IEn-	**[ENCODER CONFIG]** The encoder parameters can only be enabled if the encoder card has been inserted and the available selection options depend on the type of encoder card.		
EnS AAbb Ab A	**[Encoder type]** These parameters can only be accessed if an incremental encoder card has been inserted. To be configured according to the encoder type used. **[AABB]** (AAbb): For the signals A, A-, B, B-. **[AB]** (Ab): For the signals A, B **[A]** (A): For the signal A. The value is not accessible if **[Encoder active]** (EnU) = **[Control]** (rEG).		**[AABB]** (AAbb)
EnC nO YES dOnE	**[Encoder]** Checks the encoder feedback (see "Encoder testing" on page 157) This parameter can be accessed when an encoder card has been inserted and if **[Encoder active]** (EnU) is not **[Dig reference]** (PGr). **[Not done]** (nO): Test not performed. **[Yes]** (YES): Activates monitoring of the encoder. **[done]** (dOnE): Test performed successfully. The test procedure is used to check the following: • The direction of rotation of the encoder / motor • Existing signals (continuity of wiring) • Number of pulses/rotations If a fault is detected, the inverter is locked in fault mode **[Encoder fault]** (EnF) .		**[Not done]**(nO)
EnU nO SEC rEG PGr	**[Encoder active]** The parameter is accessible if an encoder card is present . **[No]** (nO): Function not active. In this case, access to the other parameters is not possible. **[Security]** (SEC): The encoder is only for the monitoring as a speed feedback. **[Control]** (rEG): The encoder indicates the actual speed value for control and monitoring purposes. This configuration is performed automatically if the inverter is configured to run with closed control loop (**[Motor control type]** (Ctt) = **[FVC]** (FUC). If **[motor control type]** (Ctt) = **[SVC U]** (UUC), then the encoder runs in speed feedback mode and allows the static correction of the speed. This configuration is not available for other values of **[Motor control type]** (Ctt). **[Reference]** (PGr): The encoder provides a reference. Can only be selected with an incremental encoder card.		**[No]** (nO)
PGI	**[Number of pulses]** Number of pulses per encoder revolution. These parameters can only be accessed if an incremental encoder card has been inserted.	100 to 5000	1024
PGA EnC PtG	**[Reference type]** The parameter is accessible if **[Encoder active]** (EnU) = **[reference]** (PGr). **[Encoder]** (EnC): Use of an encoder. **[Freq. Gene.]** (PtG): Use of a frequency generator (reference value without sign).		**[Encoder]** (EnC)
EIL	**[Min. freq. value]** The parameter is accessible if **[Encoder active]** (EnU) = **[reference]** (PGr) and if **[Reference type]** (PGA) = **[Freq. Gene.]** (PtG). The frequency is equal to the minimum speed.	-300 to 300 kHz	0
EFr	**[Max. freq. value]** The parameter is accessible if **[Encoder active]** (EnU) = **[reference]** (PGr) and if **[Reference type]** (PGA) = **[Freq. Gene.]** (PtG). The frequency is equal to the maximum speed.	0 to 300 kHz	300 kHz
EFI	**[Filter Freq. Signal]** The parameter is accessible if **[Encoder active]** (EnU) = **[reference]** (PGr). Filtering of any faults.	0 to 1000 ms	0

[R1 CONFIGURATION] (r1-)

Code	Name/Description	Setting range	Factory settings
r1-	[R1 CONFIGURATION]		
r1	[R1 CONFIGURATION]		[no fault] (FLt)
nO	[No] (nO): Not active		
FLt	[no fault] (FLt): Drive without fault (relay switches on in normal state and falls away in faulty state)		
rUn	[Start Motor] (rUn): Drive in operation		
FtA	[Thresh. Freq. err.] (FtA): Frequency threshold is reached ([F.-Thresh. Mot] (Ftd))		
FLA	[HSP err.] (FLA): High frequency attained		
CtA	[Thresh. I err.] (CtA): Current threshold value reached ([current threshold] (Ctd))		
SrA	[FRH err.] (SrA): Frequency reference reached		
tSA	[Th Status Motor err] (tSA): Motor thermal state 1 reached		
PEE	[PID error alarm] (PEE): PID controller error alarm		
PFA	[Al. PID feedb.] (PFA): PID alarm feedback		
AP2	[Al2 Al. 4-20] (AP2): Alarm 4-20 mA signal at AI2 input not available		
F2A	[Thresh. Freq. 2 err.] (F2A): Threshold frequency reached [Thresh. freq. 2] (F2d))		
tAd	[Th FU err] (tAd): Thermal state of the inverter is reached		
rSdA	[Rope spg al.] (rSdA): Slack rope (see parameter [Config. slack rope] (rSd))		
FLA	[Alarm high torque] (ttHA): Motor torque exceeds upper threshold [Torque thd. high] (ttH)		
ttLA	[Alarm low torque] (ttLA): Motor torque below lower threshold [Torque thd. low] (ttL)		
MFrd	[Forward] (MFrd): Motor rotating in the forward direction (right)		
MrrS	[Reverse] (MrrS): Motor rotating in the reverse direction (left)		
tS2	[Th Status Motor 2 err] (tS2): Motor thermal state 2 reached		
tS3	[Th Status Motor 3 err] (tS3): Motor thermal state 3 reached		
AtS	[Negative torque] (AtS): Negative torque (brakes)		
CnF0	[Config.0] (CnF0): Configuration 0 active		
CnF1	[Config.1] (CnF1): Configuration 1 active		
CnF2	[Config.2] (CnF2): Configuration 2 active		
CFP1	[Set 1 active] (CFP1): Parameter set 1 active		
CFP2	[Set 2 active] (CFP2): Parameter set 2 active		
CFP3	[Set 3 active] (CFP3): Parameter set 3 active		
dbL	[Load DC Bus] (dbL): Load of the DC bus		
brS	[Brake active] (brS): Drive braking		
PrM	[P locked] (PrM): Drive locked by "power removal" input		
MCP	[I Mot pres] (MCP): Motor current present		
LSA	[EM active] (LSA): Limit switch reached		
dLdA	[Alarm load variation] (dLdA): Detection of a load variation		
AG1	[Alarmgr1] (AG1): Alarm group 1		
AG2	[Alarmgr2] (AG2): Alarm group 2		
AG3	[Alarmgr3] (AG3): Alarm group 3		
P1A	[Alarm PTC1] (P1A): Alarm PTC sensor 1		
P2A	[Alarm PTC2] (P2A): Alarm PTC sensor 2		
PLA	[Al. LI6=PTC] (PLA): Alarm PTC sensor LI6=PTC		
EFA	[Al ext fault] (EFA): Alarm external fault		
USA	[Undervoltage] (USA): Alarm for an undervoltage		
UPA	[Voral. UVF] (UPA): Prevention of undervoltage		
AnA	[Al haul err.] (AnA): Alarm for a hauling error		
tHA	[Al. °C ATV] (tHA): Drive overheating		
bSA	[Al load mvt] (bSA): Alarm speed during braking		
bCA	[Al Brcont] (bCA): Alarm brake contact		
SSA	[Limt T/I err] (SSA): Alarm torque limiting		
rtA	[Al. T. contr.] (rtA): Alarm torque control		
tJA	[Alarm IGBT] (tJA): Alarm IGBT		
bOA	[Al. brake res.] (bOA): Alarm temperature of the braking resistor		
rdY	[ready] (rdY): Drive ready		
r1d	[R1 Delay time] The status change is only effective after the configured time as soon as the information is TRUE. In the assignment [no fault] (Flt),, the delay is not adjustable and remains at 0.	0 to 60000 ms 1)	0
r1S	[R1 Active at] Configuration of the function logic:		[1] (POS)
POS	[1] (POS): State 1 when the information is TRUE.		
nEG	[0] (nEG): State 0 when the information is TRUE. In the assignment [no fault] (FLt) , the configuration [1] (POS) cannot be changed.		
r1H	[R1 holding time] The status change is only effective after the configured time as soon as the information is UNTRUE. In the assignment [no fault] (Flt), the hold time is not adjustable and remains at 0.	0 to 9999 ms	0

1) 0 to 9999 ms then 10.00 to 60.00 s on the integrated display terminal.

[CONFIGURATION R2] (r2)

Code	Name/Description	Setting range	Factory settings
r2-	**[R2 CONFIGURATION]**		
r2	**[R2 CONFIGURATION]**		**[No]** (nO)
	Identical with R1 (see "R1 CONFIGURATION" on page 176) with the following addition (display only for information purposes, as is selection can only be configured from the **[APPLICATION FCT.]** (Fun-) menu):		
bLC	**[BRAKE LOGIC]** (bLC): Control braking contactor		
LLC	**[Line contactor assign]** (LLC):Control line contactor		
OCC	**[Mot. cont.]** (OCC): Control downstream motor contactor		
EbO	**[End wind.]** (EbO): End of winding ("Traverse control" function)		
tSY	**[Sync Wobble]** (tSY): Synchronization "counter wobble"		
dCO	**[DC load]** (dCO): Control pre-charge contactor DC bus		
r2d	**[R2 Delay time]**	0 to 60000 ms 1)	0
	For the assignments **[no fault]** (FLt), **[BRAKE LOGIC]** (bLC), **[Mot. cont.]** (OCC), **[DC load]** (dCO) and **[Assign line cont]** (LLC) the delay is not adjustable and remains at 0. The status change is only effective after the configured time as soon as the information is TRUE.		
r2S	**[R2 Active at]**		**[1]** (POS)
	Configuration of the function logic:		
POS	**[1]** (POS): State 1 when the information is TRUE.		
nEG	**[0]** (nEG): State 0 when the information is TRUE. For the assignments **[no fault]** (FLt), **[BRAKE LOGIC]** (bLC), **[DC load]** (dCO) and **[assign line cont]** (LLC) the configuration **[1]** (POS) cannot be changed.		
r2H	**[R2 Holding time]**	0 to 9999 ms	0
	For the assignments **[no fault]** (FLt), **[BRAKE LOGIC]** (bLC), **[DC load]** (dCO) and **[assign line cont]** (LLC) the hold time is not adjustable and remains at 0. The status change is only effective after the configured time as soon as the information is UNTRUE.		

1) 0 to 9999 ms then 10.00 to 60.00 s on the integrated display terminal.

2.8.9.6 Use of analog output AO1 as a logic output

Analog output AO1 can be used as a logic output, by assigning DO1. In this case, the state 0 of this output corresponds to the AO1 min. value (0 V or 0 mA, for example), and when set to 1 to the AO1 max. value (10 V or 20 mA, for example).
The electrical data of this analog output remains unchanged; they differ from the data of the logic outputs. Make sure that these are compatible with the actual application.

[DO1] (dO1-)

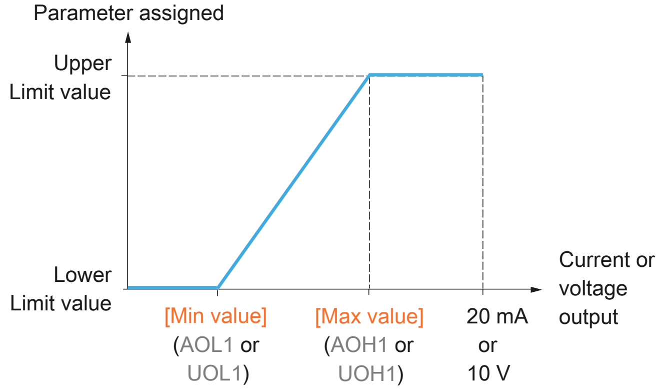
Code	Name/Description	Setting range	Factory settings
dO1-	[DO1]		
dO1	[DO1]		[No] (nO)
	Identical with R1 (see "R1 CONFIGURATION" on page 176) with the following addition (display only for information purposes, as is selection can only be configured from the [APPLICATION FCT.] (Fun-) menu):		
bLC	[BRAKE LOGIC] (bLC): Control braking contactor		
LLC	[Line contactor assign] (LLC):Control line contactor		
OCC	[Mot. cont.] (OCC): Control downstream motor contactor		
EbO	[End wind.] (EbO): End of winding ("Traverse control" function)		
tSY	[Sync Wobble] (tSY): Synchronization "counter wobble"		
dCO	[DC load] (dCO): Control pre-charge contactor DC bus		
dO1d	[DO1 delay time]	0 to 60000 ms 1)	0
	For the assignments [no fault] (FLt), [BRAKE LOGIC] (bLC), [Mot. cont.] (OCC), [DC load] (dCO) and [Assign line cont] (LLC) the delay is not adjustable and remains at 0. The status change is only effective after the configured time as soon as the information is TRUE.		
dO1S	[DO1 active at]		[1] (POS)
	Configuration of the function logic:		
POS	[1] (POS): State 1 when the information is TRUE.		
nEG	[0] (nEG): State 0 when the information is TRUE. For the assignments [no fault] (FLt), [BRAKE LOGIC] (bLC), [DC load] (dCO) and [assign line cont] (LLC) the configuration [1] (POS) cannot be changed.		
dO1H	[DO1 holding time]	0 to 9999 ms	0
	For the assignments [no fault] (FLt), [BRAKE LOGIC] (bLC), [DC load] (dCO) and [assign line cont] (LLC) the hold time is not adjustable and remains at 0. The status change is only effective after the configured time as soon as the information is UNTRUE.		

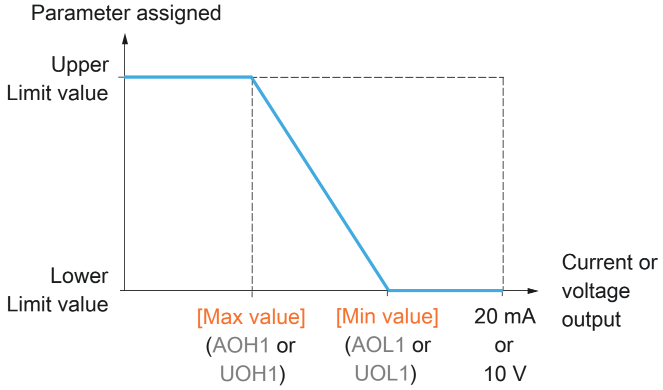
1) 0 to 9999 ms then 10 to 60 s on the integrated display terminal.

2.8.9.7 Configuration of analog output

Minimum and maximum values (output values):

The minimum output value, in volts or mA, corresponds to the lower limit of the assigned parameter and the maximum value corresponds to its upper limit. The minimum value may be greater than the maximum value:





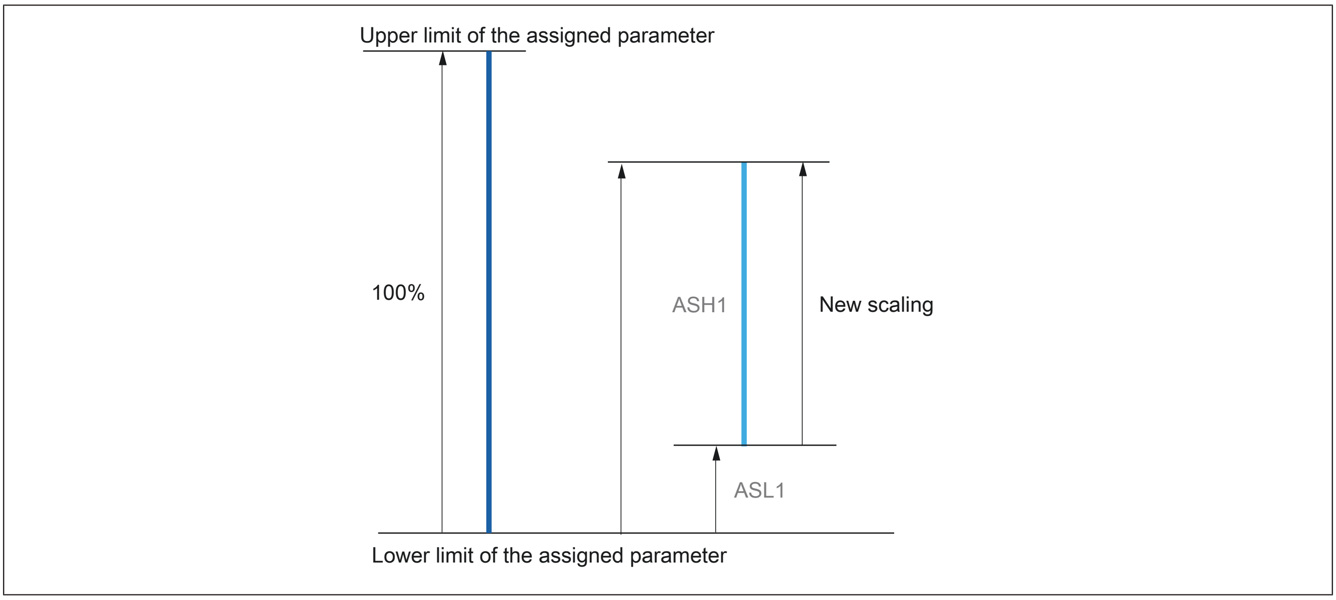
Scaling of the assigned parameter

The assigned parameter's scale can be adapted according to requirements. In doing so, the analog input's upper and lower limits will be changed via the corresponding parameter.

The parameters are specified in percent. 100% corresponds to the total variance range of the configured parameter. Accordingly the following applies:

– 100% = Upper limit value - Lower limit value.
For example, for the parameter **[M Motor +/-]** (Stq) (varies between -3 and +3 times the rated torque), the setting is 100% of 6 times the rated torque.

- The parameter **[Scal. min AO1]** (ASL1) changes the lower limit value: New value = lower limit value + (range x ASL1). The value 0% (factory setting) will not change the lower limit value.
- The parameter **[Scal. max AO1]** (ASH1) changes the upper limit value: New value = lower limit value + (range x ASH1). The value 100% (factory setting) will not change the upper limit value.
- **[Scal. min AO1]** (ASL1) must always be less than **[Scal. max AO1]** (ASH1) .



Application example

The value of the motor current must be transferred to output AO1 at 0 to 20 mA, with a variation range of 2 in the motor.
In motor is equal to 0.8 In of the inverter.

The parameter **[Motor current]** (OCr) varies between 0 and 2 times the rated current of the inverter or in the range of 2.5 times the inverter rated current.

[Scal. min AO1] (ASL1) is not permitted to change the lower limit value and it remains 0% in accordance with the factory setting.

[Scal. max AO1] (ASH1) must change the upper limit value by 0.5 times the nominal torque, i.e. 100 - 100/5 = 80% (new value = lower limit value + (range x ASH1)).

[AO1 configuration] (AO1-)

Code	Name/Description	Setting range	Factory settings
AO1-	[AO1 CONFIGURATION]		
AO1	[AO1 CONFIGURATION]		[No] (nO)
nO	[No] (nO): Not active.		
OCr	[Motor current] (OCr): Motor current from 0 to 2 In (In = rated current of the inverter as shown in the installation instructions and on the nameplate of the inverter).		
OFr	[Freq. Motor] (OFr): Frequency output from 0 to [Max. output freq.] (tFr).		
OrP	[Outp. ramp] (OrP): From 0 to [Max. output freq.] (tFr).		
trq	[Motor t] (trq): Motor torque, 0 to 3 times the rated torque of the motor.		
Stq	[T Motor +/-] (Stq): Motor torque with prefix, -3 to 3 times the rated torque of the motor. The prefix + corresponds to the motor operation and the prefix - the generator operation (braking).		
OrS	[Ramp +/-] (OrS): Ramp output with prefix - [Max. output freq.] (tFr) to + [Max. output freq.] (tFr).		
OPS	[Ref PID] (OPS): Reference of the PID controller, from [min PID ref] (PIP1) to [max PID ref] (PIP2).		
OPF	[PID feedback] (OPF): Feedback of the PID controller, from [PID min feedback] (PIF1) to [PID max feedback] (PIF2).		
OPE	[PID fault] (OPE): Deviation of the PID controller, from -5% to 5% of ([PID max feedback] (PIF2) - [PID min feedback] (PIF1)).		
OPI	[PID outp.] (OPI): Output of the PID controller, from [low speed] (LSP) to [high speed] (HSP).		
OPr	[Motor power] (OPr): Motor power, 0 to 2.5 times the [rated motor power] (nPr).		
tHr	[Th. Motor] (tHr): Thermal motor status, from 0 to 200% of thermal rated status.		
tHd	[Therm. FU state] (tHd): Thermal motor status, from 0 to 200% of thermal rated status.		
tqMS	[Torque 4Q] (tqMS): Motor torque with prefix, -3 to 3 times the rated torque of the motor. The prefixes + and - correspond with the direction of the torque regardless of the motor or inverter operation. Application example: "master-slave" with the function [TORQUE CONTROL] (tOr-)		
OFrr	[Meas. MotFreq.] (OFrr): Measured motor speed.		
OFS	[Mot freq +/-] (OFS): Frequency output with prefix - [Max. output freq.] (tFr) to + [Max. output freq.] (tFr).		
tHr2	[Th. Motor 2] (tHr2): Thermal motor status 2, from 0 to 200% of thermal rated status.		
tHr3	[Th. Motor 3] (tHr3): Thermal motor status 3, from 0 to 200% of thermal rated status.		
Utr	[Ref. M unip.] (Utr): Motor torque, 0 to 3 times the rated torque of the motor.		
Str	[M Ref +/-] (Str): Motor reference with prefix, -3 to 3 times the rated torque of the motor.		
tqL	[Torque limit] (tqL): Torque limitation, 0 to 3 times the rated torque of the motor.		
UOP	[Motor volt] (UOP): Voltage applied to motor, 0 to [Mot. rated voltage] (UnS).		
dO1	[DO1] (dO1): Assignment as logic output. This assignment only appears if [DO1] (dO1) has been assigned. In this case this is the only choice possible, and it is only displayed for information purposes.		
AO1t	[Type AO1]		[current] (0 A)
10U	[voltage] (10U): Voltage output		
0 A	[current] (0 A): Current output		
AOL1	[AO1 min Output] Parameter accessible if [Type AO1] (AO1t) = [Current] (0 A)	0 to 20 mA	0 mA
AOH1	[AO1 max Output] Parameter accessible if [Type AO1] (AO1t) = [Current] (0 A)	0 to 20 mA	20 mA
UOL1	[AO1 min Output] Parameter accessible if [Type AO1] (AO1t) = [Voltage] (10U).	0 to 10 V	0 V
UOH1	[AO1 max Output] Parameter accessible if [Type AO1] (AO1t) = [Voltage] (10U).	0 to 10 V	10 V
ASL1	[AO1 max scal] Scaling of the lower limit of the assigned parameter as a % of the maximum possible variation.	0 to 100%	0%
ASH1	[AO1 min scal] Scaling of the upper limit of the assigned parameter as a % of the maximum possible variation.	0 to 100%	100%
AO1F	[AO1 Filter] Filtering of any faults. This parameter is forced to 0 if [CONFIGURATION AO1] (AO1) = [DO1] (dO1).	0 to 10 s	0 s

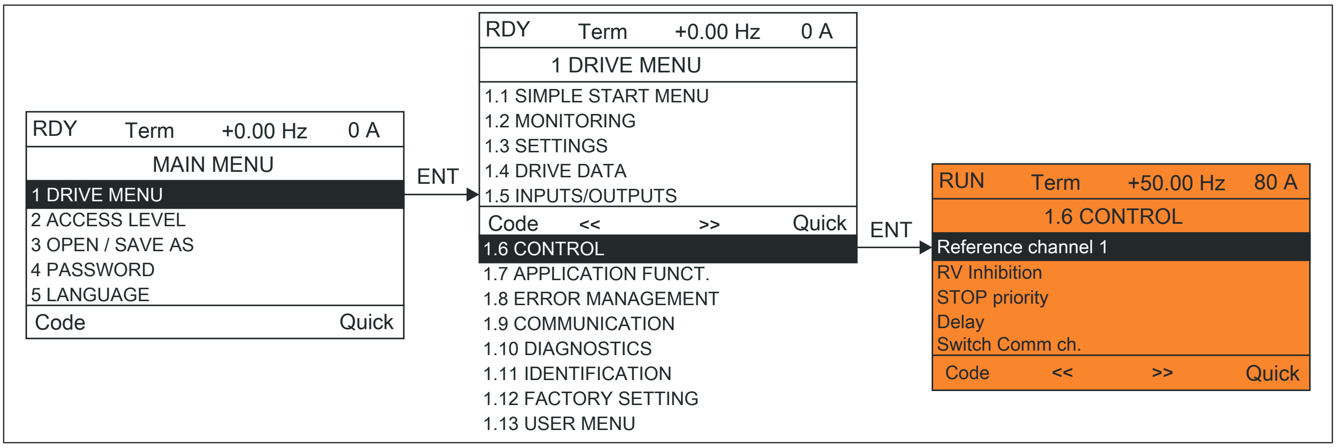
Alarms can be classified into 1 to 3 groups with the following submenus. Each of these groups can be assigned a relay or logic output to the distributed signals. These groups can also be retrieved on the graphic display terminal (see menu **[SELECT DISPLAY TYPE]**) and via the menu **[MONITOR]** (SUP).
If one or more of the alarms in a group of selected alarms occur, this alarm group is enabled.

[ERROR ALARM GR. 1] (A1C-), [ERROR ALARM GR. 2] (A2C-), [ERROR ALARM GR. 3] (A3C-)

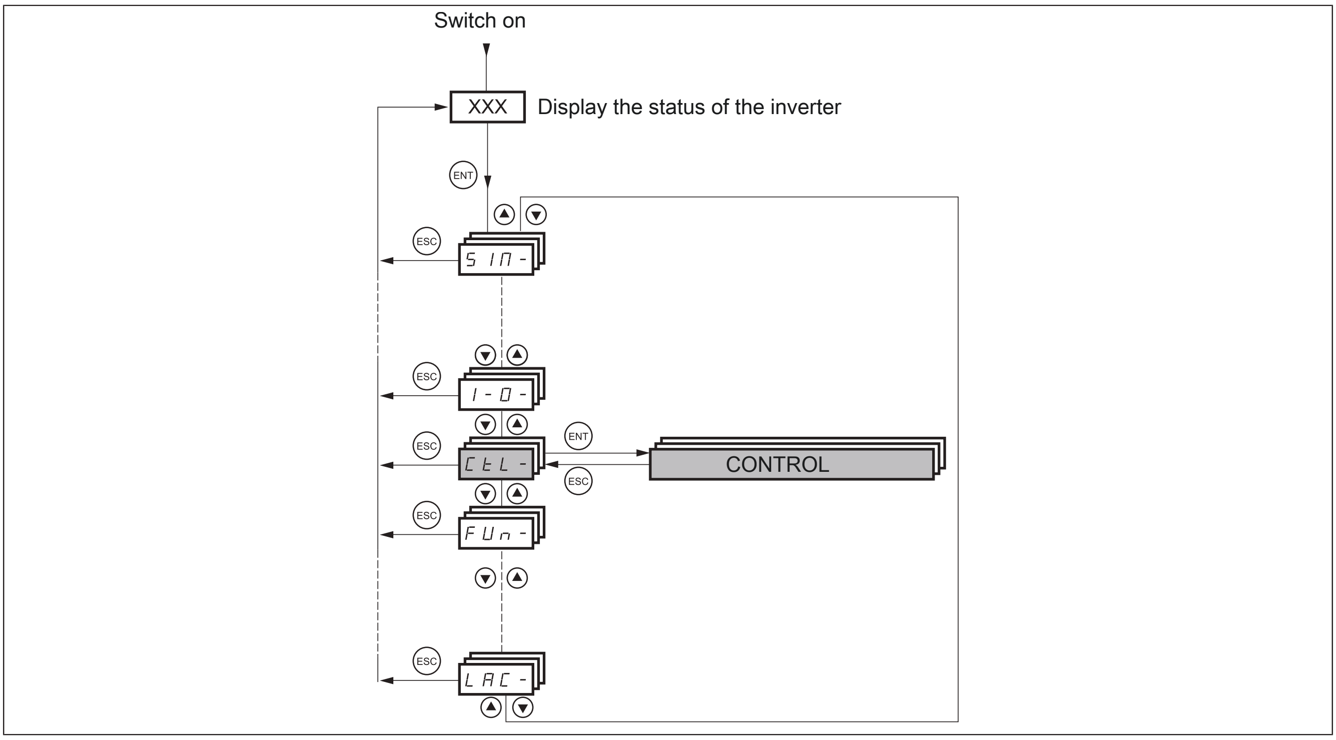
Code	Name/Description
A1C-	**[ALARM GRP1 DEFINITION]**
	A selection must be made from the following list:
PLA	**[Al. LI6=PTC]** (PLA): Alarm PTC sensor LI6=PTC
P1A	**[Alarm PTC1]** (P1A): Alarm PTC sensor 1
P2A	**[Alarm PTC2]** (P2A): Alarm PTC sensor 2
EFA	**[Al ext fault]** (EFA): Alarm external fault
USA	**[Undervoltage]** (USA): Alarm for an undervoltage
AnA	**[Al haul err.]** (AnA): Alarm for a hauling error
CtA	**[Thresh. I err.]** (CtA): Current threshold value reached (**[current threshold]** (Ctd))
FtA	**[Thresh. Freq. err.]** (FtA): Frequency threshold is reached (**[F.-Thresh. Mot]** (Ftd))
F2A	**[Thresh. Freq. 2 err.]** (F2A): Threshold frequency reached**[Thresh. freq. 2]** (F2d))
SrA	**[FRH err.]** (SrA): Frequency reference reached
tSA	**[Th Status Motor err]** (tSA): Motor thermal state 1 reached
tS2	**[Th Status Motor 2 err]** (tS2): Motor thermal state 2 reached
tS3	**[Th Status Motor 3 err]** (tS3): Motor thermal state 3 reached
UPA	**[Voral. UVF]** (UPA): Prevention of undervoltage
FLA	**[HSP err.]** (FLA): High frequency attained
tHA	**[Al. °C ATV]** (tHA): Drive overheating
bSA	**[Al brake haul err]** (bSA): Alarm speed during braking
bCA	**[Al Brcont]** (bCA): Alarm feedback brake contact
PEE	**[PID error alarm]** (PEE): PID controller error alarm
PFA	**[Al. PID feedb.]** (PFA): Alarm PID feedback
AP2	**[AI2 Al. 4-20]** (AP2): Alarm 4-20 mA signal at AI2 input not available
SSA	**[Limt T/I err]** (SSA): Alarm torque limiting
tAd	**[Th FU err]** (tAd): Thermal state of the inverter is reached
tJA	**[Alarm IGBT]** (tJA): Alarm IGBT
rtA	**[Al. T. contr.]** (rtA): Alarm torque control
bOA	**[Al. brake res.]** (bOA): Alarm temperature of the braking resistor
APA	**[Al. Option]** (APA): Alarm generated by an option card
UrA	**[Alarm USF cons.]** (UrA): Reserved
rSdA	**[Rope spg al.]** (rSdA): Slack rope (see parameter **[Config. slack rope]** (rSd))
ttHA	**[Alarm high torque]** (ttHA): Motor torque exceeds upper threshold **[Torque thd. high]** (ttH)
ttLA	**[Alarm low torque]** (ttLA): Motor torque below lower threshold **[Torque thd. low]** (ttL)
dLdA	**[Alarm load variation]** (dLdA): Detection of a load deviation (see **[DET. DELTA LOAD]** (dLd-)).
	Refer to the procedure for multiple selection
A2C-	**[ALARM GRP2 DEFINITION]**
	Identical to **[ERROR ALARM GR. 1]** (A1C-)
A3C-	**[ALARM GRP3 DEFINITION]**
	Identical to **[ERROR ALARM GR. 1]** (A1C-)

2.8.10 [COMMAND] (CtL-)

2.8.10.1 With graphic display terminal:



2.8.10.2 With integrated display terminal:



The parameters of the menu **[CONTROL]** (CtL) can only be changed in the stopped state without run command.

2.8.10.3 Command and reference channels

Run commands (forward, reverse, stop, etc.) and references can be sent using the following channels:

Controller

- Terminal strips: LI logic inputs
- Graphic display terminal
- Integrated communication interface
- Communication card

Setpoint

- Terminal strips: AI analog inputs, frequency input, encoder
- Graphic display terminal
- Integrated communication interface
- Communication card
- +/- speed via the terminal strips
- +/- speed via the graphic display terminal

2.8.10.3.1 Adjust behavior of the ACOPOSinverter P84

- **[Series 8]** (SE8): Not applicable
- **[together]** (SIM): Command and reference are sent via the same channel.
- **[separate]** (SIM): Command and reference are sent via different channels.

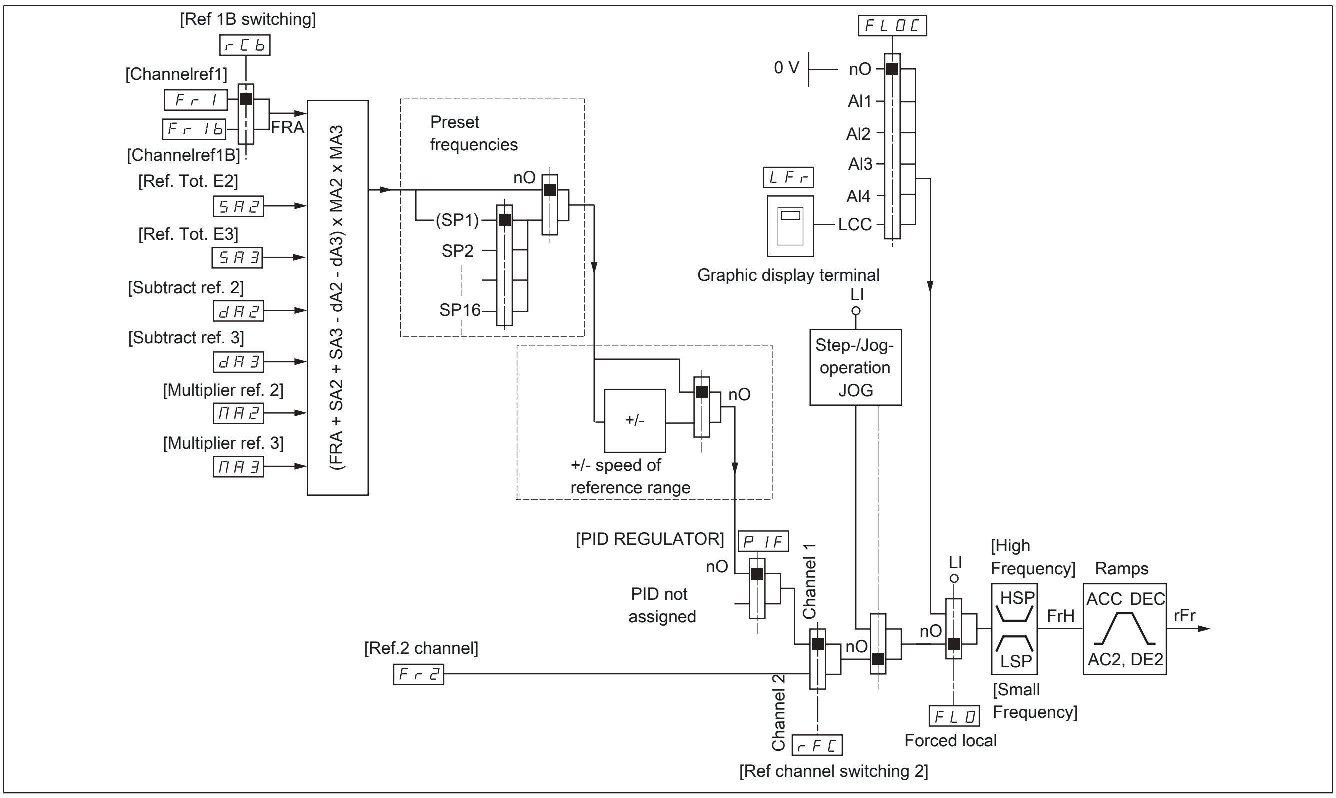
In these configurations, the control is carried out via the communication bus in accordance with the DRIVECOM standard (only 5 freely assignable bits, refer to the communication parameter manual). Access to the application functions is not possible via the communication interface.

- **[Profile I/O]** (IO): Control and reference can originate from different channels. This configuration both simplifies and extends use via the communication interface.
  Commands can be transmitted via the logic inputs on the terminals or via the communication bus.
  When transmitting via the bus, the commands are available as a word that functions as a virtual terminal with only logic inputs.
  Application functions can be assigned to the bits in this word. More than one function can be assigned to the same bit.

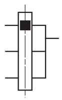
> **Note:**
>
> **Stop commands sent via the terminals remain active, even if the terminals no longer constitute the active command channel.**

2.8.10.4 Reference channel design 1

Reference channel for the configurations **[together]** (SIM), **[separate]** (SEP), **[Profile I/O]** (IO), PID not configured



Legend:



Parameters:
The black rectangle corresponds to the factory setting.

Information:

The operation "Forced local" is not active in the [Profile I/O] mode.

Statements

Fr1, SA2, SA3, dA2, dA3, MA2, MA3:

- Terminals, graphic display terminal, integrated communication interface, communication card

Fr1b for SEP and IO:

- Terminals, graphic display terminal, integrated communication interface, communication card

Fr1b for SIM:

- Terminals, access only if Fr1 = Terminals

Fr2:

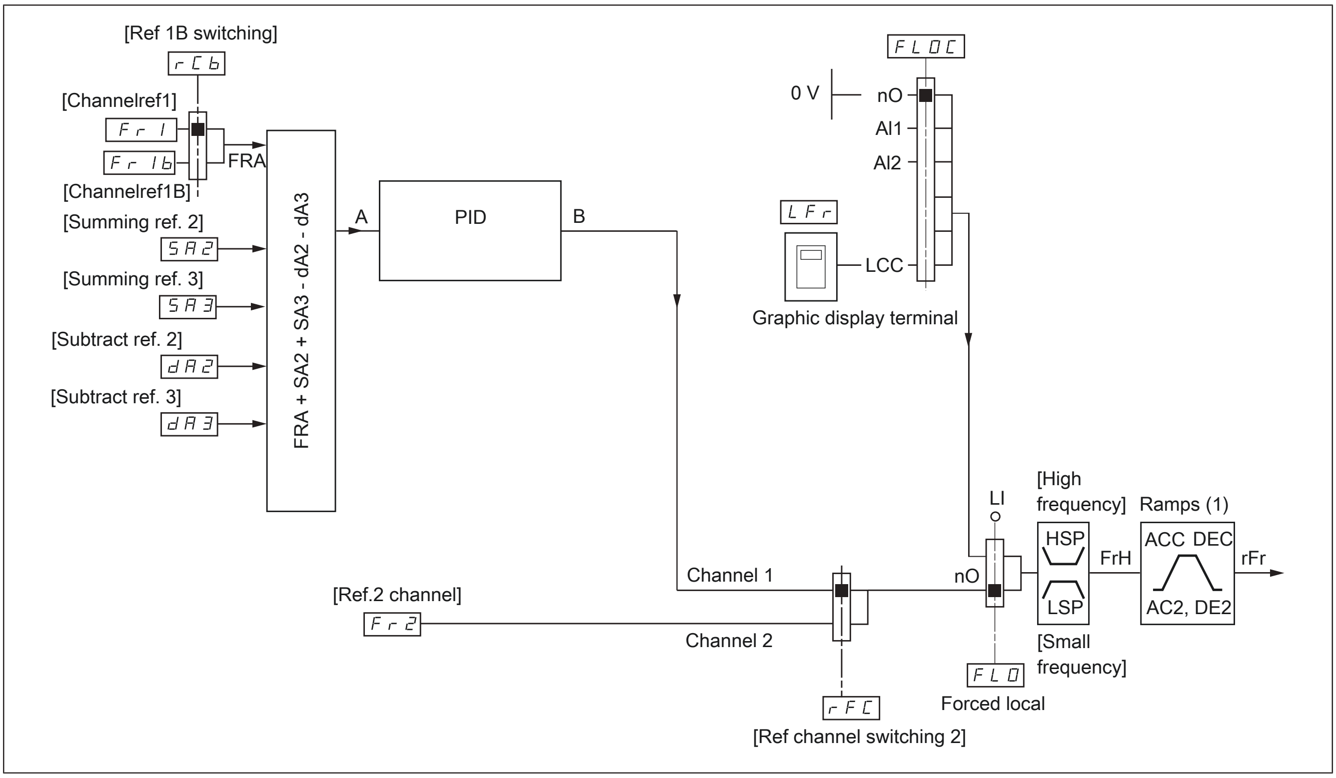
- Terminals, graphic display terminal, integrated communication interface, communication card and ±speed

Note:

[Channel1B act] (Fr1b) and [Ref switch 1B] (rCb) must be configured in the [APPLICATIONS-FCT.] (Fun-) menu.

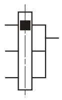
2.8.10.5 Reference channel design 2

Reference channel for the configurations **[together]** (SIM), **[separate]** (SEP), **[Profile I/O]** (IO)



1) Ramps not active if the PID function is active in automatic mode.

Legend:



Parameters: The black rectangle corresponds to the factory setting.

Information:

The operation "Forced local" is not active in the [Profile I/O] mode.

Statements

Fr1, Fr1b for SEP and IO::

- Terminals, graphic display terminal, integrated communication interface, communication card

Fr1b for SIM:

- Terminals, only available if Fr1 = Terminals

SA2, SA3, dA2, dA3:

- Terminals only

Fr2:

- Terminals, graphic display terminal, integrated communication interface, communication card and +/-speed

Note:

[Channel1B act] (Fr1b) and [Ref switch 1B] (rCb) must be configured in the [APPLICATIONS-FCT.] (Fun-) menu.

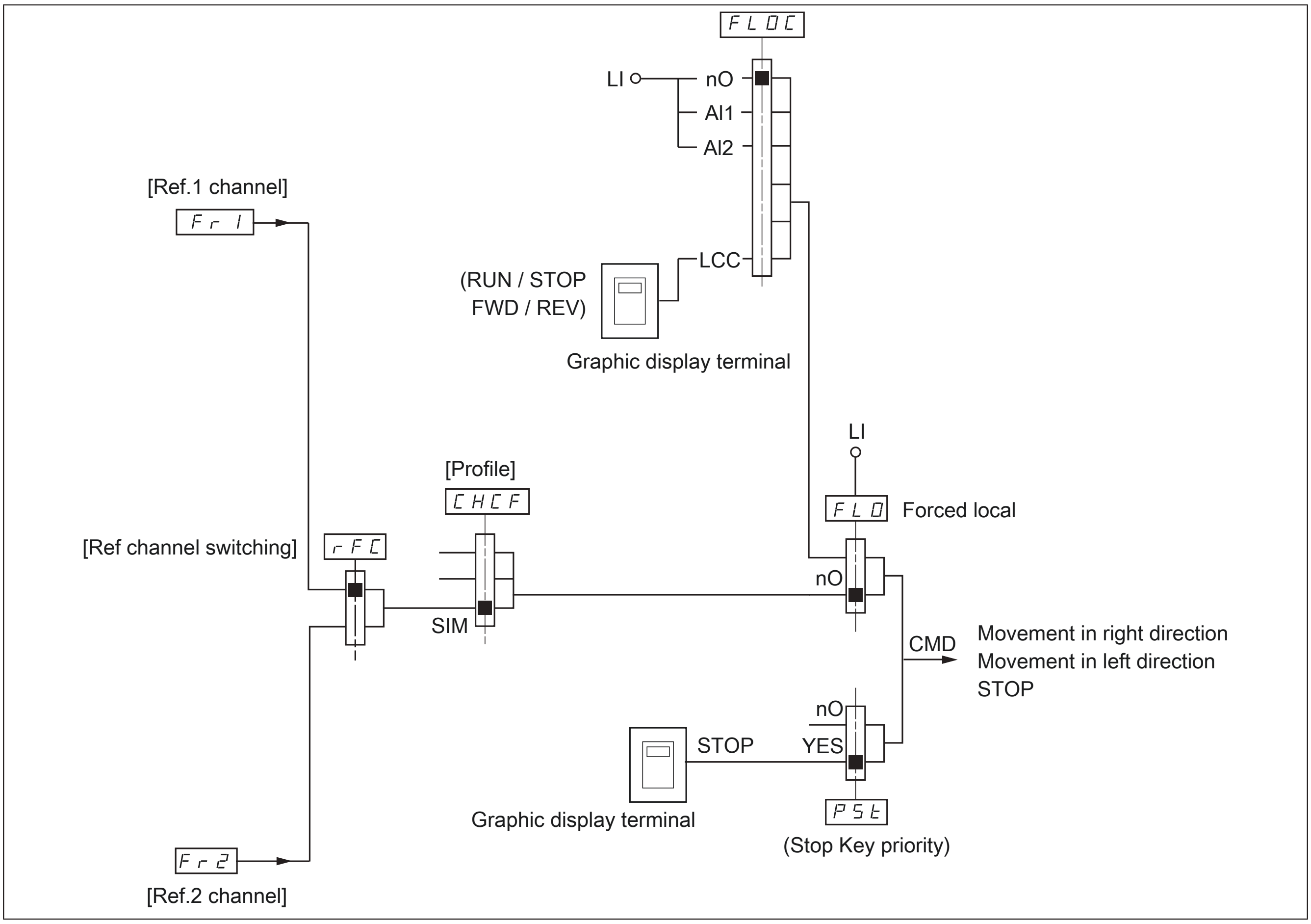
2.8.10.6 Reference channel design 3

Reference channel for the configurations **[together]** (SIM)

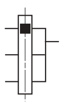
Reference and command, together not separated.

The command channel is determined by the reference channel. The parameters Fr1, Fr2, rFC, FLO and FLOC apply for reference and command.

Example: In the case of a reference setting Fr1 = AI1 (analog input AI1 (on the terminals), control is done via LI (logic input on the terminals).



Legend:



Parameters: The black rectangle corresponds to the factory setting.

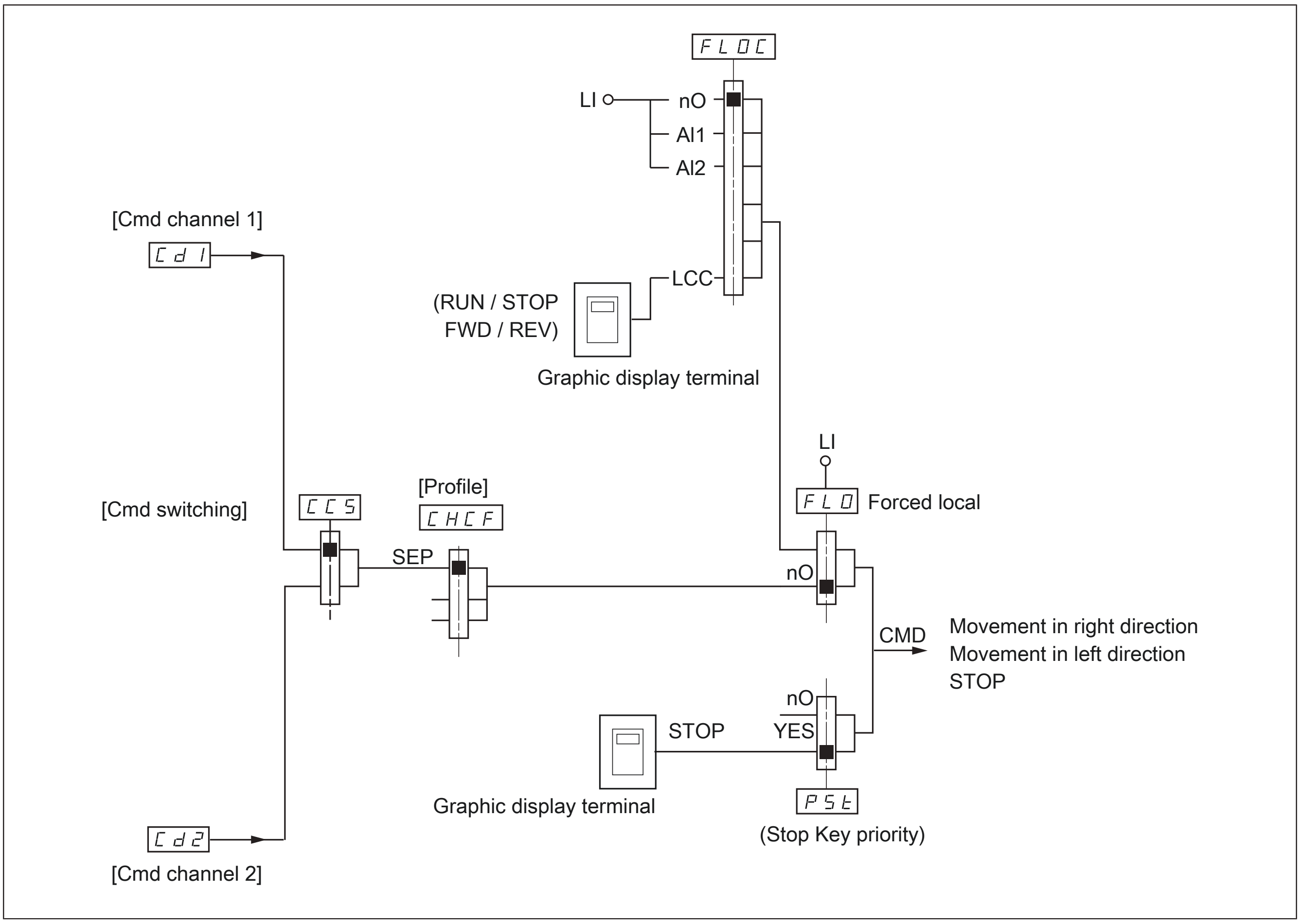
2.8.10.7 Command channel for the configuration [separated] (SEP)

Separate reference and command

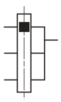
The parameters FLO and FLOC apply for reference and command.

Example: In the case of a reference in the "Forced local" mode via AI1 (analog input at the terminals), the command is done in the forced local mode via LI (logic input on the terminals).

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.



Legend:



Parameters: The black rectangle corresponds to the factory setting with the exception of [Profile].

Commands

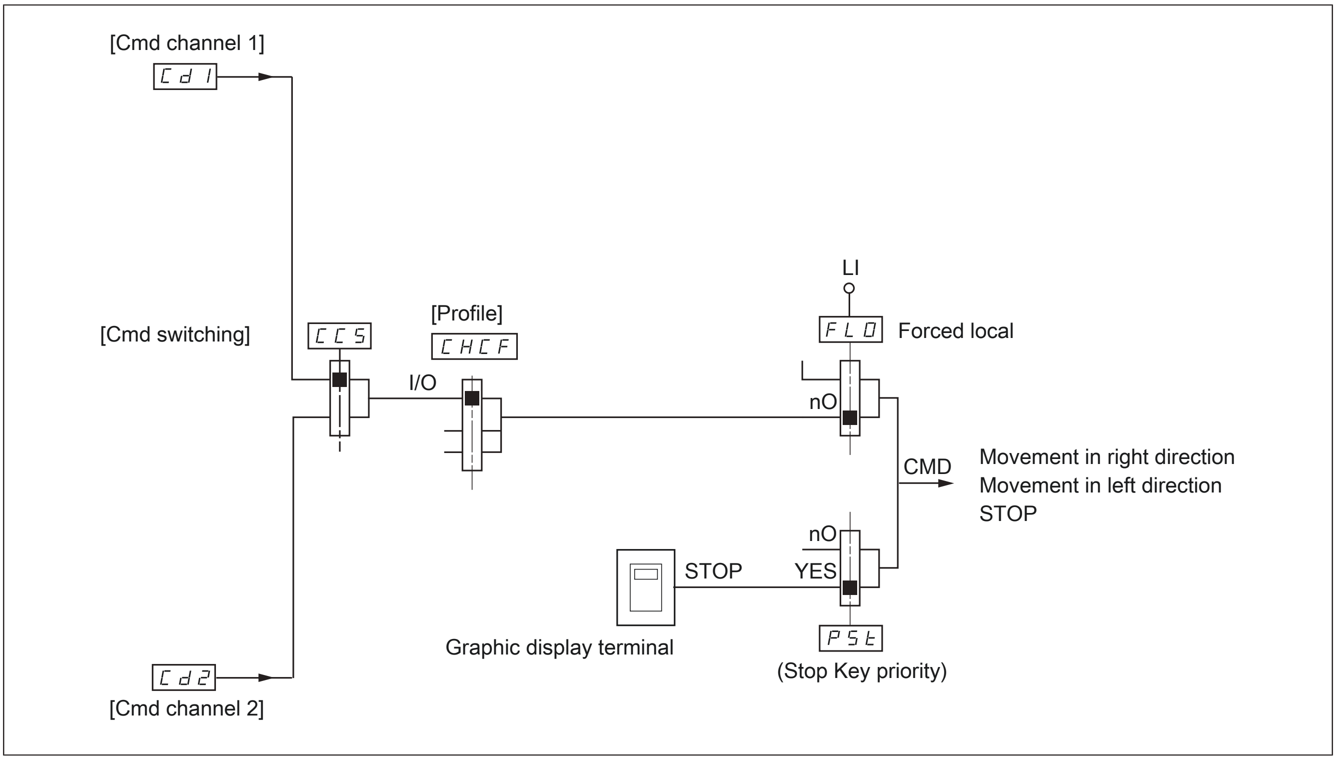
Cd1, Cd2:

- Terminals, graphic display terminal, integrated communication interface, communication card

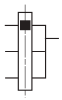
2.8.10.8 Command channel for configuration [profile I/O] (IO)

Reference and command separate, as in the configuration [separated] (SEP)

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.



Legend:



Parameters: The black rectangle corresponds to the factory setting with the exception of [Profile].

Information:

The operation "Forced local" is not active in the [Profile I/O] mode.

Commands

Cd1, Cd2:

- Terminals, graphic display terminal, integrated communication interface, communication card

2.8.10.8.1 Selecting a command channel:

A command or an action can be assigned to the following elements:

- Fixed channel by selecting a Li-input or a Cxxx bit:
  - If you select LI3, for example, this action is always triggered by LI3 , regardless of the switched command channel.
  - If you select C214, for example, this action is always triggered by the integrated communication interface with bit 14, regardless of the switched command channel.
- Switchable channel by selecting a CDxx bit:
  - If you select CD05, for example, this action is triggered by LI6 , if the terminal channel is active
    C105 not applicable
    C205, if the integrated communication interface is active
    C305, if the communication card channel is active

If the active channel is the graphic display terminal, the functions and commands assigned to CDxx switchable internal bits are inactive.

Terminal strip	Integrated communication interface	Communication card	Internal bit, switchable
			CD00
LI2 1)	C201 1)	C301 1)	CD01
LI3	C202	C302	CD02
LI4	C203	C303	CD03
LI5	C204	C304	CD04
LI6	C205	C305	CD05
-	C206	C306	CD06
-	C207	C307	CD07
-	C208	C308	CD08
-	C209	C309	CD09
-	C210	C310	CD10
-	C211	C311	CD11
-	C212	C312	CD12
-	C213	C313	CD13
-	C214	C314	CD14
-	C215	C315	CD15

1) If **[2/3 wire control]** (tCC) = **[3 wire control]** (3C) cannot be accessed on LI2, C201 and C301 .

2.8.10.9 Assignment conditions for the logic inputs and control bits

The following elements are available for every command or function that can be assigned to a logic input or a control bit:

Logic input / control bit	Description
[LI1] (LI1) - **[LI6]** (LI6)	Drive with or without option
[C101] (C101) - **[C110]** (C110)	Not applicable
[C111] (C111) - **[C115]** (C115)	Not applicable
[C201] (C201) - **[C210]** (C210)	With built-in communication interface in the configuration **[profile I/O]** (IO)
[C211] (C211) - **[C215]** (C215)	With integrated communication interface, regardless of configuration
[C301] (C301) - **[C310]** (C310)	With communication card in the configuration **[profile I/O]** (IO)
[C311] (C311) - **[C315]** (C315)	With a communication card regardless of profile
[CD00] (Cd00) - **[CD10]** (Cd10)	In the configuration **[profile I/O]** (IO)
[CD11] (Cd11) - **[CD15]** (Cd15)	Regardless of configuration

Note:

In the configuration [profile I/O] (IO) there is no access to LI1 and if [2/3 wire control] (tCC), see "Input and output parameters (tCC - rr5)" on page 166 = [3wire control] (3C) there is also no access to LI2, C201 and C301.

Warning!

ACCIDENTAL OPERATION OF DEVICE

Inactive command channels are not monitored (no fault triggering due to a failure of the communication bus). Make absolutely sure that the commands and functions assigned to bits C101 to C315 will not pose a risk in the event of a failure of the associated communication bus.

Failure to follow these instructions will result in death or serious injury.

Control parameters

Code	Name/Description	Factory settings
Fr1	[Ref.1 channel]	[AI1] (AI1)
AI1	[AI1] (AI1): Analog input	
AI2	[AI2] (AI2): Analog input	
LCC	[HMI] (LCC): Graphics terminal	
Mdb	[Modbus] (Mdb): Not usable	
CAn	[CANopen] (CAn): Integrated bus interface	
nEt	[Com. Card] (nEt): Communication card, if present	
PG	[Encoder] (PG): Encoder input, if encoder card present	
rIn	[RV Inhibition]	[No] (nO)
nO	[No] (nO)	
YES	[Yes] (YES) Blocking in the reverse direction, with the exception of a direction requested by logic inputs. • Reverse run requested by logic input is taken into account. • Reverse run requested by graphic display terminal is not taken into account. • Reverse run requested via the control is not taken into account. • Each inverted speed reference output from PID, from the reference summation, etc. is regarded as a zero reference (0 Hz).	
PSt	[Stop Key priority]	[Yes] (YES)
nO	[No] (nO)	
YES	[Yes] (YES): Gives priority to the STOP key on the graphic display terminal when the graphic display terminal is not enabled as the command channel. For the recording of all changes made to an assignment of [priority STOP] (PSt) , the ENT key must be pressed for two seconds. This stop is one that stops in freewheel stop. If the active command channel is the graphic display terminal, then this stop is done in accordance with [STOP MODE] (Stt) regardless of configuration of [priority STOP] (PSt).	
CHCF	[Profile]	[together] (SIM)
SE8	[Series 8] (SE8): Not applicable	
SIM	[together] (SIM): Reference and control command not separate.	
SEP	[separate] (SIM): Reference and control command are separate. The access to this assignment is not possible in the [I/O profile](IO).	
I/O	[Profile I/O] (IO): I/O Profile If [Series 8] (SE8) is selected and [Profile I/O] (IO) is deselected, then the return to factory setting is mandatory and is carried out automatically. This factory setting only affects the menu [DRIVE MENU] without [COMMUNICATION] and without [MENU PROG. CARD]. • A screen for the execution of this function is shown on the graphic display terminal. Follow the instructions on the screen. • Hold the ENT key for two seconds at the integrated display terminal. This stores the selection and resets it to the factory setting.	

1) With the use of POWERLINK the standard setting is automatically changed to [CANopen] (CAN) if the "download parameters" in the I/O configuration are set to [Yes] (YES).

Code	Name/Description	Factory settings
CCS	**[Cmd switching]**	**[Unlimited]** (Cd1)
	The parameter can be accessed if **[Profile]** (CHCF) = **[separated]** (SEP) or **[Profile I/O]** (IO).	
Cd1	**[Unlimited]** (Cd1): **[config. channel 1]** (Cd1) active (no switchover)	
Cd2	**[config. channel 2]** (Cd2): **[config. channel 2]** (Cd2) active (no switchover)	
LI1	**[LI1]** (LI1)	
-	.	
-	.	
-	.	
	[...] (...): The assignment conditions (see "Assignment conditions for the logic inputs and control bits" on page 192) (not CDOO to CD14).	
	In state 0 of the input or the assigned bit the channel **[config. channel 1]** (Cd1) is active. In state 1 of the input or the assigned bit the channel **[config. channel 2]** (Cd2) is active.	
Cd1	**[Cmd channel 1]**	**[Terminals]** (tEr) 1)
tEr	**[Terminals]** (tEr): Terminals	
LCC	**[HMI]** (LCC): Graphics terminal	
Mdb	**[Modbus]** (Mdb): Not applicable	
CAn	**[CANopen]** (CAn): Integrated communication interface (POWERLINK)	
nEt	**[Com. Card]** (nEt): Communication card, if present	
	The parameter can be accessed if **[Profile]** (CHCF) = **[separated]** (SEP) or **[Profile I/O]** (IO).	
Cd2	**[Cmd channel 2]**	**[Modbus]** (Mdb) 2)
tEr	**[Terminals]** (tEr): Terminals	
LCC	**[HMI]** (LCC): Graphics terminal	
Mdb	**[Modbus]** (Mdb): Not applicable	
CAn	**[CANopen]** (CAn): Integrated communication interface (POWERLINK)	
nEt	**[Com. Card]** (nEt): Communication card, if present	
	The parameter can be accessed if **[Profile]** (CHCF) = **[separated]** (SEP) or **[Profile I/O]** (IO).	
rFC	**[Ref. 2 switching]**	**[Unlimited]** (Fr1)
Fr1	**[Unlimited]** (Fr1): No switchover, **[ref.1 channel]** (Fr1) active	
Fr2	**[Config channel 2]** (Fr2): No switchover, **[ref.2 channel]** (Fr2) active	
LI1	**[LI1]** (LI1)	
-	.	
-	.	
-	.	
	[...] (...): See the assignment conditions, except CDOO to CD14.	
	In state 0 of the input or the assigned bit the channel **[channel ref1]** (Fr1) is active. In state 1 of the input or the assigned bit the channel **[channel ref2]** (Fr2) is active.	
Fr2	**[Ref.2 channel]**	**[No]** (nO)
nO	**[No]** (nO): Not active. If **[Profile]** (CHCF) = **[together]** (SIM), the control command via the terminals has the reference zero. If **[Profile]** (CHCF) = **[separated]** (SEP) or **[Profile I/O]** (IO), the reference is zero.	
AI1	**[AI1]** (AI1): Analog input	
AI2	**[AI2]** (AI2): Analog input	
UPdt	**[+/- speed]** (UPdt): Control ± speed	
LCC	**[HMI]** (LCC): Graphics terminal	
Mdb	**[Modbus]** (Mdb): Not usable	
CAn	**[CANopen]** (CAn): Integrated bus interface	
nEt	**[Com. Card]** (nEt): Communication card, if present	
PG	**[Encoder]** (PG): Encoder input, if encoder card present	

1) With the use of POWERLINK the standard setting is automatically changed to **[CANopen]** (CAN) if the "download parameters" in the I/O configuration are set to **[Yes]** (YES).

2) With the use of POWERLINK the standard setting is automatically changed to **[terminals]** (tEr).

Code	Name/Description	Factory settings
COP	**[Copy channel 1 <> 2]**	**[No]** (nO)
	Can be used to copy the reference and/or the current command by means of switching, in order to avoid speed surges, for example. If **[Profile]** (CHCF) = **[together]** (SIM) or **[separated]** (SEP), the copy is only made from channel 1 to channel 2. If **[Profile]** (CHCF) = **[Profile I/O]** (IO), the copy can be done in both directions.	
nO	**[No]** (nO): No copy	
SP	**[Reference]** (SP): Copy of the reference	
Cd	**[Control]** (Cd): Copy of the control	
ALL	**[Control]** (Cd): Copy of the control	
	[Contr. and ref] (ALL): Copy of the control and the reference	
	• A reference or a command cannot be copied to a channel on the terminals. • The copied reference is FrH (before ramp), except if the reference of the target channel is given via the ± speed. In this case the reference rFr (after ramp) is copied.	
	Warning! **ACCIDENTAL OPERATION OF DEVICE** **Copying the command and/or reference can change the direction of rotation. Check that this is safe.** **Failure to follow these instructions will result in death or serious injury.**	

As the graphic display terminal may be selected as the command and/or reference channel, its action modes can be configured.

The parameters on this page can only be accessed on the graphic display terminal, and not on the integrated display terminal.

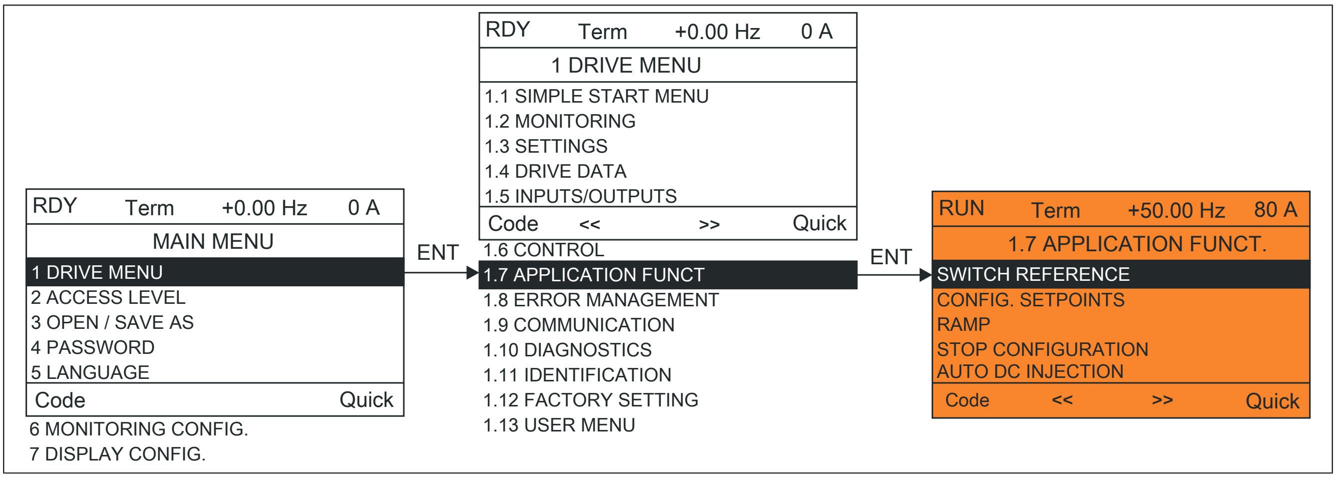
Information:

- **The command and/or the reference of the operator terminal is only active when the command and/or reference channels are also active via the terminal, with the exception of [T/K] (command via the operator terminal), which has priority on these channels. By pressing the key [T/K] (command via the operator terminal), the control is transferred back to the selected channel again.**
- **Command and reference via the display terminal are impossible if the latter is connected to more than one inverter.**
- **The functions JOG, preset frequencies and ± speed are only accessible if [Profile] (CHCF) is set to [together] (SIM) .**
- **The functions for the predefined PID reference are only accessible if [Profile] (CHCF) is set to [together] (SIM), or [separated] (SEP)**
- **The function [T/K] (command via the operator terminal) is accessible, regardless of the setting in the [Profile] (CHCF) .**

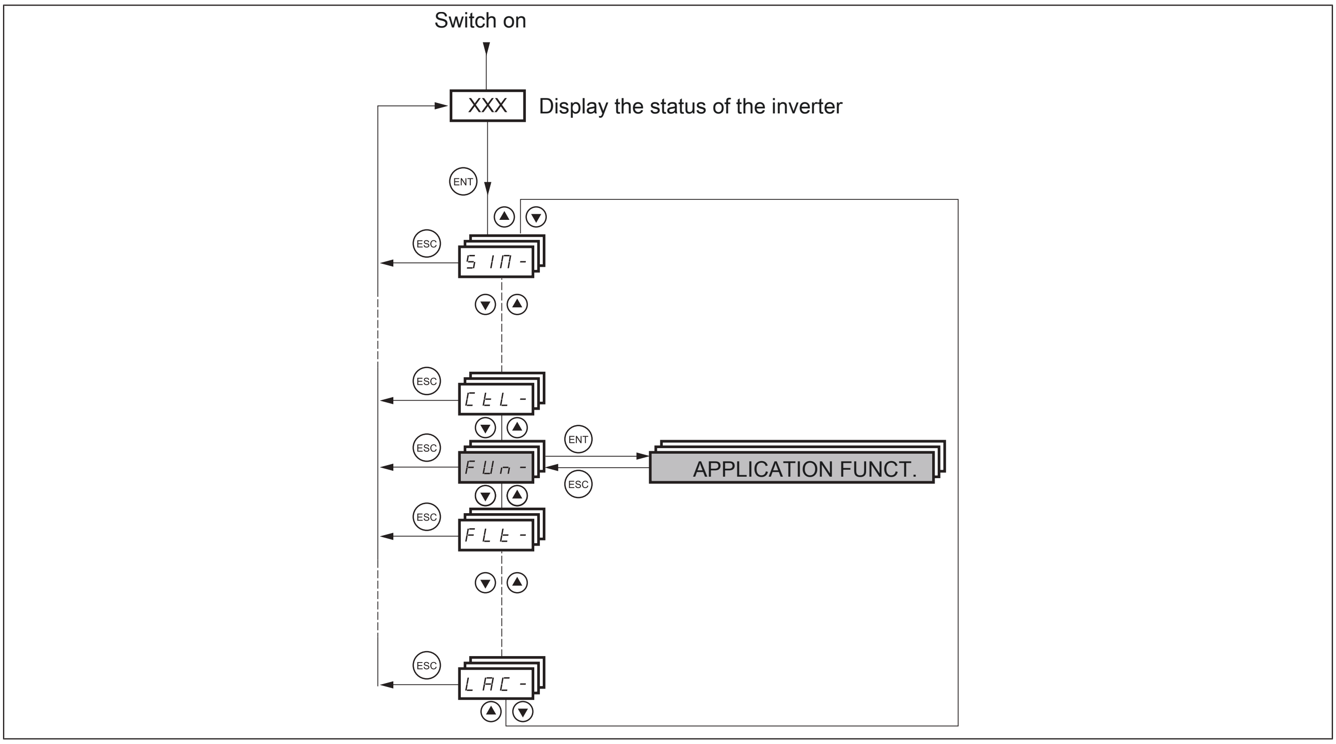
Name/Description	Factory settings
[F1 key assignment] [No]: Not active [Jog]: JOG step mode [Prefix v2]: By pressing a button, the inverter is preset with the second frequency [2nd preset frequency] (SP2) . Press STOP to stop the frequency inverter. [Prefix v3]: By pressing a button, the inverter is preset with the third frequency [3rd preset frequency] (SP3) . Press STOP to stop the frequency inverter. [Ref PID 2]: Provides a PID reference that is equal to the second pre-selected reference of the PID [2nd preset PID ref.] (rP2) without a run command. Only executable if [channel ref.1] (Fr1) = [HMI] (LCC). Not functional with [T/K]. [Ref PID3]: Provides a PID reference that is equal to the third pre-selected reference of the PID [3rd preset PID ref.] (rP3) without a run command. Only executable if [channel ref.1] (Fr1) = [HMI] (LCC). Not functional with [T/K]. [+ speed]: + speed; only executable if [channel ref.2] (Fr2) = [HMI] (LCC). Press the key to control the inverter and increase the speed. Press STOP to stop the frequency inverter. [- speed]: - speed; only executable if [channel ref2] (Fr2) = [HMI] (LCC) and if [+ speed] is assigned to another key. Press the key to control the inverter and decrease the speed. Press STOP to stop the frequency inverter. [T/K]: Command via the terminal, takes priority over [Cmd switching](CCS) and [Ref. 2 switching](rFC).	[No]
[F2 key assignment] Identical to [F1 key assign].	[No]
[F3 key assignment] Identical to [F1 key assign].	[No]
[F4 key assignment] Identical to [F1 key assign].	[No]
[HMI cmd.] If the function [T/K] is associated with a key and is active, this parameter defines the behavior for the point in time at which the graphic display terminal or the external operator terminal takes back the control. [Stop]: Stops the inverter (although the controlled direction of operation and reference of the previous channel are copied (to be taken into account on the next RUN command)). [Copy done]: Does not stop the inverter (the controlled direction of operation and the reference of the previous channel are copied).	[Stop]

2.8.11 [APPLICATION FUNCT.] (FUn-)

2.8.11.1 With graphic display terminal:



2.8.11.2 With integrated display terminal:



2.8.11.3 Overview of functions:

Code	Name	Page
rEF-	[REFERENCE SWITCH.]	see "REFERENCE SWITCH. (rEF-)" on page 202
OAI-	[REF. OPERATIONS]	see "CONFIG REF (OAI-)" on page 203
rPt-	[RAMP]	see "RAMP TYPE (rPt-)" on page 204
Stt-	[STOP CONFIGURATION]	see "STOP MODE (Stt-)" on page 206
AdC-	[Auto DC injection]	see "[Auto DC injection] AdC-" on page 208
JOG-	[JOG]	see "JOG (JOG-)" on page 209
PSS-	[PRESET SPEEDS]	see "PRESET SPEEDS (PSS-)" on page 211
UPd-	[+/- speed]	see "+/- speed (UPd-)" on page 213
SrE-	[+/- SPEED BY REFERENCE]	see "+/- SPEED BY REFERENCE (SrE-)" on page 215
SPM-	[SAVE REFERENCE]	see "Save reference" on page 217
FLI-	[FLUXING BY LI]	see "FLUXING BY LI (FLI-)" on page 217
LSt-	[LIMIT SWITCH MANAGEMENT]	see "LIMIT SWITCH MANAGEMENT" on page 219
bLC-	[BRAKE LOGIC CONTROL]	see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223
ELM-	[EXTERNAL LOAD MEAS.]	see "EXTERNAL LOAD MEASUREMENT (ELM-)" on page 228
HSH-	[HIGH SPEED HOISTING]	see "HIGH-SPEED HOISTING (HSH-)" on page 233
PId-	[PID REGULATOR]	see "PID CONTROLLER (PId-)" on page 239
Pr1-	[PRESET PID REF]	see "PRESET PID REF (PrI-)" on page 241
tOr-	[TORQUE CONTROL]	see "TORQUE CONTROL (tOr-)" on page 256
tOL-	[TORQUE LIMITATION]	see "LIM. TORQUE (tOL-)" on page 258
CLI-	[CURRENT LIMIT.]	see "CURRENT LIMIT (CLI-)" on page 259
LLC-	[Input contactor assign]	see "START LINE CONTACT (LLC-)" on page 261
OCC-	[Motor cont.]	see "START MOTOR CONTACTOR (OCC-)" on page 263
LPO-	[POSITIONING BY SENSORS]	see "POSITIONING VIA LIMIT SWITCH (LPO-)" on page 268
MLP-	[PARAM. SET SWITCHING]	see "PARAMETER SWITCH (MLP-)" on page 270
MMC-	[MULTIMOTORS/CONFIG.]	see "MULTIMOTOR CONFIG (MMC-) AND AUTOTUNING VIA LI (tnL-)" on page 275
tnL-	[AUTO-TUNING VIA LI]	
trO-	[TRAVERSE CONTROL]	see "TRAVERSE CONTROL (trO-)" on page 282
rFt-	[EMERGENCY POWER SUPPLY]	see "Evacuation function" on page 284
HFF-	[INTERIM LEVEL]	see "Interim level" on page 285
dCO-	[POWER SUPPLY DC BUS]	see "Direct power supply via the DC bus" on page 286

The parameters in the menu [APPLICATION FCT.] (Fun-) can only be changed if the inverter has been stopped and no run command is present. Parameters with an arrow symbol in the "Code" column are exceptions. These parameters can be modified with the inverter running or stopped.

Note:

Compatibility of functions

The choice of application functions may be limited by the number of I/Os and by the fact that some functions are incompatible with one another. Functions that are not listed in the table below are fully compatible.

In the event of an incompatibility, the function configured first prevents the configuration of additional functions.

Each of the functions on the following pages can be assigned to one of the inputs or outputs.

A single input can activate several functions at the same time (e.g. reverse run and 2nd ramp). **You must therefore ensure that all these functions can be used at the same time**. The assignment of an input to several functions is possible only on the levels **[advanced]** (AdU) and **[expert]** (EPr).

Before assigning a command, reference or function to an input or output, the user must make sure that this input or output has not already been assigned and that another input or output has not been assigned to an incompatible function.

The factory setting of the inverter or the macro configurations automatically configure functions, **which in turn can prohibit the assignment of other functions.**

It may be necessary to remove one or more functions from the configuration in order to be able to enable another.

Check the compatibility table below.

2.8.11.4 Compatibility table

	Reference configurations	+/- speed (3)	Limit switch management	Preset speeds	PID controllers	Adjustment track control	Step mode	Brake logic control	Catch on the fly	DC injection stop	Fast stop	Freewheel stop	+/- speed on reference	High-speed hoisting	Torque control	Load distribution	Positioning via limit switch
Reference configurations				↑	• 4)		↑								• 1)		
+/- speed 3)						•	•								• 1)		
Limit switch management					•												
Preset frequencies	←						↑								• 1)		
PID controllers	• 4)		•			•	•	•					•	•	• 1)	•	•
Traverse control		•			•		•						•	•	• 1)		
JOG operation	←	•		←	•	•		•					•	•	• 1)		
Brake logic					•		•		•	•					•		
Catch on the fly								•							• 1)		
DC injection stop								•			• 2)	↑					
Fast stop										• 2)		↑					
Freewheel stop										←	←						
+/- speed on reference					•	•	•								• 1)		
High-speed hoisting					•	•	•								•		
Torque control	• 1)	• 1)		• 1)	• 1)	• 1)	• 1)	•	• 1)				• 1)	•		•	• 1)
Load distribution					•										•		
Positioning via limit switch					•										• 1)		

1) The torque control and these functions are only incompatible when the torque control is active.
2) Priority is given to the first of these two stop modes to be activated.
3) An exception is the use of the reference channel FR2.
4) Only the multiplier reference is incompatible with the PID regulator.

• Incompatible functions

Compatible functions

Not applicable

Priority functions (functions, which cannot be active at the same time):

← ↑ The function indicated by an arrow has priority over the other function.

The stop functions have priority over the run commands.
Speed references via logic command have priority over analog references.

Note:

This compatibility table does not affect the control commands for which the keys of the graphic terminals can be used.

2.8.11.5 Incompatible functions

The following functions are not available or are deactivated in the cases described below:

Automatic restart

This function is only possible for the following types of control: **[2/3 wire control]** (tCC) = **[2wire control]** (2C) and **[type 2 wire control]** (tCt) = **[level]** (LEL) or **[Prio forward]** (PFO).

Catch on the fly

This function is only possible for the following types of control: **[2/3 wire control]** (tCC) = **[2wire control]** (2C) and **[type 2 wire control]** (tCt) = **[level]** (LEL) or **[Prio forward]** (PFO).
This function is disabled if the automatic activation on holding **[Auto DC injection]** (AdC) = **[permanent]** (Ct).

Via the monitoring menu SUP- (see "[MONITOR] (SUP-)" on page 131), the compatibility of the functions assigned to each input can be displayed for checking the compatibility.

When a function is assigned, a tick appears on the graphic display terminal, as illustrated in the example below:

```
RDY     Term     +0.00 Hz     0 A
     1.7 APPLICATION FUNCT.
REFERENCE SWITCH.
CONFIG REF
RAMP                          ✓
STOP CONFIGURATION
AUTO DC INJECTION
Code      <<       >>      Quick
JOG
```

If you attempt to assign a function that is incompatible with another function that has already been assigned, an alarm message will appear:

With the graphic display terminal:

```
RDY     Term     +0.00 Hz     0 A
        INCOMPATIBILITY
The function cannot be
assigned,
because an incompatible
function is already selected. See
programming manual.
ENT or ESC to continue
(in Automation Studio).
```

With integrated display terminal:

COMP flashes until ENT or ESC is pressed.

When you assign a logic input, an analog input, a reference channel or a bit to a function, pressing the HELP button will display the functions that may already have been activated by this input, bit or channel.

When a logic input, an analog input, a reference channel or a bit that has already been assigned is assigned to another function, the following screens appear:

With the graphic display terminal:

```
RUN   +50.00 Hz    1,250A   +50.00 Hz
    WARNING - ASSIGNED TO
Switch ref. channel



ENT-> Continue       ESC > Cancel
```

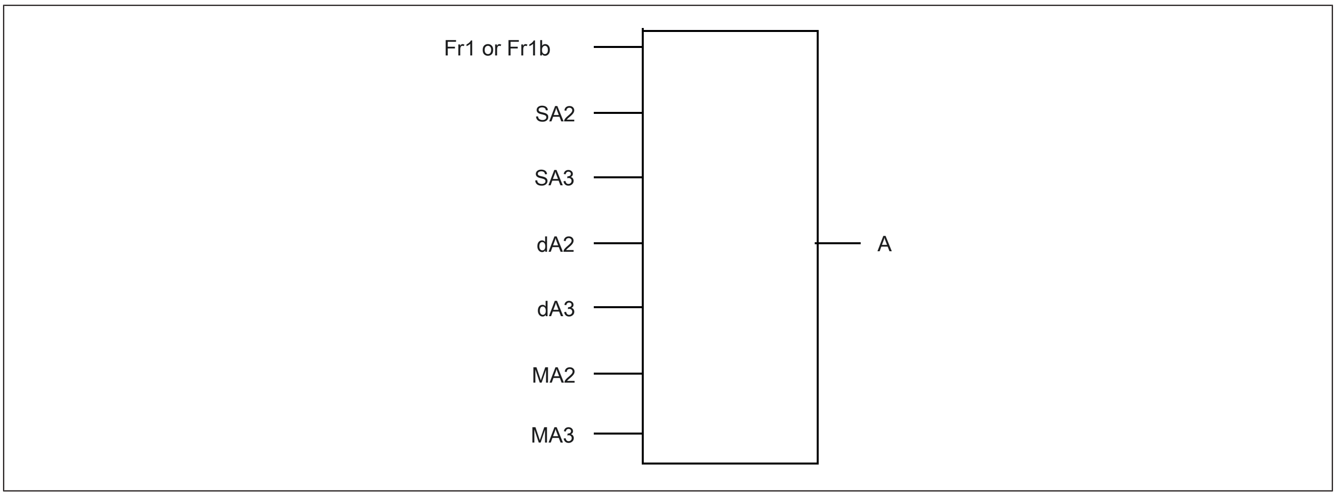
If the access level permits this new assignment, pressing ENT confirms the assignment.
If the access level does not permit this new assignment, pressing ENT results in the following display:

```
RUN   +50.00 Hz    1,250 A  +50.00 Hz
    ASSIGNMENT FORBIDDEN
Remove the present
functions
from the configuration or choose
access level "Advanced"
```

With integrated display terminal:

The code for the first function, which is already assigned, is displayed blinking.
If the access level permits this new assignment, pressing ENT confirms the assignment.
If the access level does not permit this new assignment, pressing ENT has no effect, and the message continues to flash.
It is only possible to exit by pressing ESC.

2.8.11.6 Summing input / Subtracting input / Multiplier



A = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3

- If SA2, SA3, dA2, dA3 are not used, they are set to 0.
- If MA2, MA3 are not used, they are set to 1.
- A is limited by parameters "Low speed" LSP and "High speed" HSP.
- In the multiplication the signal at MA2 or MA3 in % is captured. 100% corresponds to the maximum value of the corresponding input. If MA2 or MA3 are sent by the communication bus or the graphic display terminal, a multiplication variable MFr (see "With graphics terminal: Internal inverter states and values" on page 136) must be sent via the bus or the graphic display terminal.
- The inversion of the direction of rotation in the case of a negative result can be locked (see "Control parameters (Fr1 - CHCF)" on page 192)

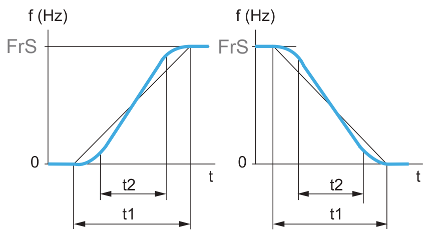
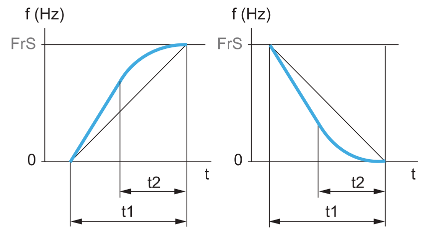
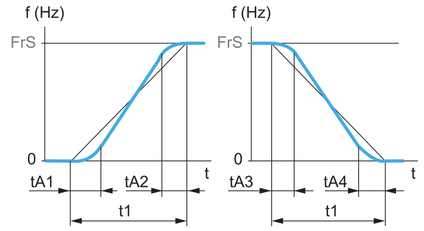
[REFERENCE SWITCH.] (rEF-)

Code	Name/Description	Factory settings
rEF-	[REFERENCE SWITCH.]	
rCb	[Ref 1B switching]	[Unlimited] (Fr1)
Fr1	[Unlimited] (Fr1): No switchover, [ref.1 channel] (Fr1) active	
Fr1b	[Unlimited] (Fr1): No switchover, [channel1B act] (Fr1b) active	
LI1	[LI1] (LI1)	
-	.	
-	.	
-	.	
	[...] (...): See the assignment conditions, except CDOO to CD14. In state 0 of the input or the assigned bit [channel ref1] (Fr1) is active. In state 1 of the input or the assigned bit [Kanal1B act] (Fr1b) is active. [Switch ref 1B] (rCb) is forced to [unlimited] (Fr1) if [Profile] (CHCF) = [together] (SIM) and [channel ref1] (Fr1) is assigned to the terminal strip (analog inputs, encoder, frequency input "pulse input")	
	[Channel 1B act]	[No] (nO)
nO	[No] (nO): Not active	
AI1	[AI1] (AI1): Analog input	
AI2	[AI2] (AI2): Analog input	
LCC	[HMI] (LCC): Graphics terminal	
Mdb	[Modbus] (Mdb): Not usable	
CAn	[CANopen] (CAn): Integrated bus interface	
nEt	[Com. Card] (nEt): Communication card, if present	
PG	[Encoder] (PG): Encoder input, if encoder card present	
	Note: **In the following cases, assignments are only possible via the terminals:** • **[Profile] (CHCF) = [together] (SIM) and [channel ref1] (Fr1) is assigned via the terminals (analog inputs, encoder, pulse input)** • **PID is configured with PID reference values via the terminals**	

[REF. OPERATIONS] (OAI-)

Code	Name/Description	Factory settings
OAI-	[REF. OPERATIONS] Reference = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3. **Note:** **This function cannot be used with certain other functions. Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.**	
SA2	[Summing ref. 2] Selection of a reference to be added to [channel ref1] (Fr1) or [channel1B act] (Fr1b).	[No] (nO)
nO	[No] (nO): No source assigned.	
AI1	[AI1] (AI1): Analog input	
AI2	[AI2] (AI2): Analog input	
LCC	[HMI] (LCC): Graphics terminal	
Mdb	[Modbus] (Mdb): Not applicable	
CAn	[CANopen] (CAn): Integrated communication interface (POWERLINK)	
nEt	[Com. Card] (nEt): Communication card, if present	
PG	[Encoder] (PG): Encoder input, if encoder card present	
AIU1	[AI virt com] (AIU1): Virtual input via the communication bus, which is configured via [AI1 communication] (AIC1). **Warning!** **ACCIDENTAL OPERATION OF DEVICE** **If the equipment is switched to forced local mode (see "COMM. CARD and FORCED LOCAL (LCF-)" on page 310), the virtual input used in the current configuration remains fixed at the last value transmitted. The virtual input and mode "Forced local" are not permitted to be used in the same configuration.** **Failure to follow these instructions will result in death or serious injury.**	
SA3	[Summing ref. 3] Selection of a reference to be added to [channel ref1] (Fr1) or [channel1B act] (Fr1b). • Possible assignments are identical to [ref. Tot. E2] (SA2) above.	[No] (nO)
dA2	[Subtract ref. 2] Selection of a reference to be subtracted from [channel ref1] (Fr1) or [channel1B act] (Fr1b). • Possible assignments are identical to [ref. Tot. E2] (SA2) above.	[No] (nO)
dA3	[Subtract ref. 3] Selection of a reference to be subtracted from [channel ref1] (Fr1) or [channel1B act] (Fr1b). • Possible assignments are identical to [ref. Tot. E2] (SA2) above.	[No] (nO)
MA2	[Multiplier ref. 2] Selection of a reference to be multiplied by [channel ref1] (Fr1) or [channel1B act] (Fr1b). • Possible assignments are identical to [ref. Tot. E2] (SA2) above.	[No] (nO)
MA3	[Multiplier ref. 3] Selection of a reference to be multiplied by [channel ref1] (Fr1) or [channel1B act] (Fr1b). • Possible assignments are identical to [ref. Tot. E2] (SA2) above.	[No] (nO)

[RAMP] (rPt-)

Code	Name/Description	Setting range	Factory settings
rPt-	[RAMP]		
rPt LIn S U CUS	[Ramp type] [Linear] (LIn) [S ramp] (S) [U ramp] (U) [customer-spec] (CUS) S-ramps  The rounding coefficient is constant, where t2 = 0.6 x t1 and t1 = set ramp time. U ramps  The rounding coefficient is constant, where t2 = 0.5 x t1 and t1 = set ramp time. Customized ramps  tA1: Can be set between 0 and 100% tA2: Can be set between 0 and (100%- tA1) tA3: Can be set between 0 and 100% tA4: Can be set between 0 and (100%- tA3) As a percentage of t1, where t1 = set ramp time		[Linear] (LIn)
Inr 0.01 0.1 1	[Ramp increment][1)] [0.01]: Accelerate until 99.99 seconds [0.1]: Accelerate until 999.9 seconds [1]: Accelerate until 6000 seconds This parameter is used for [acceleration time] (ACC), [deceleration time] (dEC), [acceleration time 2] (AC2) and [deceleration time2] (dE2).		[0.1] (0.1)
ACC	[Acceleration][1)] Time for the ramp-up from 0 to [Rated motor frequency] (FrS). Make sure that this value is compatible with the frequency inverter's moment of inertia.	0.01 to 6000 s [2)]	3 s
dEC	[Deceleration][1)] Time for the deceleration of the [rated motor frequency] (FrS) until 0. Make sure that this value is compatible with the frequency inverter's moment of inertia.	0.01 to 6000 s [2)]	3 s
tA1	[Begin Acc round][1)] • Rounding of the start of the acceleration in % of the acceleration time [acceleration time] (ACC) or [acceleration time 2] (AC2). • Can be set between 0 and 100% • The parameter is accessible if [Ramp Type] (rPt) is [customer spec] (CUS) type.	0 to 100%	10%
tA2	[End Acc round] [1)] • Rounding of the end of the acceleration in % of the acceleration time [acceleration time] (ACC) or [acceleration time 2] (AC2). • Can be set from 0 to (100% to [Round Start ACC] (tA1)). • The parameter is accessible if [Ramp Type] (rPt) is [customer spec] (CUS) type.		10%
tA3	[Begin Dec round][1)] • Rounding of the start of the deceleration in % of the deceleration time [deceleration time] (dEC) or [deceleration time 2] (dE2). • Can be set between 0 and 100% • The parameter is accessible if [Ramp Type] (rPt) is [customer spec] (CUS) type.	0 to 100%	10%
tA4	[End Dec round] [1)] • Rounding of the end of the deceleration in % of the deceleration time [deceleration time] (dEC) or [deceleration time 2] (dE2). • Can be set from 0 to (100% to [Round DEC Start] (tA3)). • The parameter is accessible if [Ramp Type] (rPt) is [customer spec] (CUS) type.		10%

Code	Name/Description	Setting range	Factory settings
Frt	[F Ramp 2 threshold]	0 to 599 Hz	0 Hz
	Ramp switching threshold. Switching the 2nd Ramp when Frt is not equal to 0 (a value of 0 corresponds to the non-active function) and the output frequency exceeds Frt. The switchover of the ramp by the threshold can be used together with the switchover [switch ramp] (rPS) as follows:		

LI or bit	Frequency	Ramp
0	<Frt	ACC, dEC
0	>Frt	AC2, dE2
1	<Frt	AC2, dE2
1	>Frt	AC2, dE2

Code	Name/Description	Setting range	Factory settings
rPS	[Switch ramp]		[No] (nO)
nO	[No] (nO): Not active		
LI1	[LI1] (LI1)		
-	.		
-	.		
-	.		
	[...] (...): See the assignment conditions • ACC and dEC are activated if the assigned input or bit is at 0. • AC2 and dE2 are activated if the assigned input or bit is at 1.		
AC2	[Acceleration 2] 1)	0.01 to 6000 s 2)	5 s
	Time for the acceleration from 0 to [rated motor frequency] (FrS). Make sure that this value is compatible with the frequency inverter's moment of inertia. The parameter is accessible if [F thresh ramp 2] (Frt) >0 or [Switch ramp] (rPS) is assigned.		
dE2	[Deceleration 2] 1)	0.01 to 6000 s 2)	5 s
	Time for the deceleration of the [rated motor frequency] (FrS) until 0. Make sure that this value is compatible with the frequency inverter's moment of inertia. The parameter is accessible if [F thresh ramp 2] (Frt) >0 or [Switch ramp] (rPS) is assigned.		

1) This parameter can also be accessed via the [SETTINGS] (SEt-) menu.
2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 9999 s in accordance with [ramp increment] (Inr).

Parameter that can be modified during operation or when stopped.

Code	Name/Description	Factory settings
brA	[Dec ramp adapt.]	[Yes] (YES)
	Activating this function automatically adapts the deceleration ramp, if this has been set at too low a value with respect to the inertia of the load, which can cause an overvoltage fault.	
nO	[No] (nO): Function not active.	
YES	[Yes] (YES): Function active, for applications that do not require high deceleration time. Depending on the size of the inverter and [motor control type] (CTT), the following parameters with which a higher deceleration time can be achieved than with the parameter [Yes] are displayed. Use comparative testing to determine your selection. If [adj. decel ramp] (brA) is configured to [brake mot x] (dYnx), the dynamic powers for brakes are improved by adding a current flow component. The aim is to increase the iron loss and magnetic energy stored in the motor.	
dYnA	[brake mot A] (dYnA): Addition of a constant current flow component.	
dYnb	[brake mot B] (dYnb): Addition of a constant current flow component, with 100 Hz oscillating.	
dYnC	[brake mot C] (dYnC): Addition of a constant current flow component, with 200 Hz oscillating but higher amplitude. [Adj decel ramp] (brA) is forced to [No] (nO) if brake controller [BRAKE LOGIC] (bLC) is assigned and if [Control Braking perf.] (bbA) = [Yes] (YES). The factory setting for certain models becomes [Brake Mot A] (dYnA) if [Sine wave filter] (OFI) = [Yes] (YES). The function is incompatible with applications requiring: • Positioning on a ramp • Use of a braking resistor (this would not preserve its function) The function does not apply if the parameter DCF = 0 is set.	

[STOP CONFIGURATION] (Stt-)

Code	Name/Description	Setting range	Factory settings
Stt-	[STOP CONFIGURATION] **Note:** **Some types of stop cannot be used with all other functions. Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.**		
Stt rMP FSt nSt dCI	[STOP CONFIGURATION] Stop mode when resetting the travel command or when setting a stop command. [StopRamp] (rMP): Stopping via ramp. [Quick stop] (FSt): Quick stop [freewheel stop] (nSt): Freewheel stop [DC brak.] (dCI): Stop by DC injection **Note:** **If the function "brake logic" is released or if [operating hours for LSP] (tLS) does not equal 0, only "stop via ramp" can be configured.**		[Ramp stop] (rMP)
FFt	[Freewheel stop Thd.][1] This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. The parameter is accessible if [STOP MODE] (Stt) = [Fast stop] (FSt) or [ramp stop] (rMP)). 0.0: No transition into freewheel stop. 0.1 to 599 Hz: Speed threshold at which the motor switches into freewheel stop.	0 to 599 Hz	0 Hz
nSt nO LI1 C101 - - Cd00 -	[Freewheel] [No] (nO): Not active [LI1] (LI1) to [LI6] (LI6) [C101] (C101) to [C115] (C115): Not applicable [C201] (C201) to [C215] (C215): With built-in communication interface in [I/O profile] (IO) [C301] (C301) to [C315] (C315): With a communication card and [I/O profile] (IO) [CD00] (Cd00) to [CD13] (Cd13): With [I/O profile] (IO) switchable, with logic inputs [CD14] (Cd14) to [CD15] (Cd15): With [I/O profile] (IO) switchable, without logic inputs This stop is activated when the input or bit change to 0. If the input switches back into the status 1 and the run command is still active, then the motor runs only if [2/3 wire control] (tCC) = [2wire control] (2C) and [Type 2wire control] (tCt) = [Level] (LEL) or [Prio forward] (PFO). Otherwise, a new move command is required.		[No] (nO)
FSt nO LI1 - - -	[Fast stop] **Note:** **This function cannot be used with certain other functions. Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.** [No] (nO): Not active [LI1] (LI1) . . . [...] (...): See the assignment conditions The stop is activated if the input is set to 0 or the bit changes to 1 (state 0 bits in [Profile I/O] (IO)). If the input switches back into the status 1 and the run command is still active, then the motor runs only if [2/3 wire control] (tCC) = [2wire control] (2C) and [Type 2wire control] (tCt) = [Level] (LEL) or [Prio forward] (PFO). Otherwise, a new move command is required.		[No] (nO)
dCF	[Ramp divider][1] The parameter is accessible for [STOP MODE] (Stt) = [Fast stop] (FSt) and [Fast stop] (FSt) other than [No] (nO). The activated ramp (dEC or dE2) is then divided by this coefficient in the sending of stop commands. Value 0 corresponds to a minimum ramp time.	0 to 10	4
dCI nO LI1 - - -	[DC Injection] **Note:** **This function cannot be used with certain other functions. Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.** [No] (nO): Not active [LI1] (LI1) . . . [...] (...): See the assignment conditions DC injection braking is initiated when the assigned input or bit changes to state 1. If the input switches back to status 1 and the run command is still active, then the motor runs only if [2/3-wire control] (tCC) = [2wire control] (2C) and [Type 2wire control] (tCt) = [Level] (LEL) or [Prio Right] (PFO). Otherwise, a new move command is required.		[No] (nO)
IdC	[DC inject. level 1][1][3]	0.1 to 1.41 In [2]	0.64 In [2]

Code	Name/Description	Setting range	Factory settings
	Level of DC injection braking current activated via logic input or selected as stop mode. The parameter is accessible if **[STOP MODE]** (Stt) = **[DC Brak.]** (dCI) or if **[DC Brak.]** (dCI) is not equal to **[No]** (nO) . **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**		
tdI	**[DC injection time 1]** [1][3] Maximum duration of current injection **[Current DC brake 1]** (IdC). After this time has expired, the DC connection becomes **[DC current brake 2]** (IdC2). The parameter is accessible if **[STOP MODE]** (Stt) = **[DC Brak.]** (dCI) or if **[DC Brak.]** (dCI) is not equal to **[No]** (nO) .	0.1 to 30 s	0.5 s
IdC2	**[DC inject. level 2]**[1][3] The braking current is activated by the logic input or as a stop mode is selected, once the time span **[DC injection time 1]** (tdI) has expired. The parameter is accessible if **[STOP MODE]** (Stt) = **[DC Brak.]** (dCI) or if **[DC Brak.]** (dCI) is not equal to **[No]** (nO) . **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0.1 In [2] to **[DC current brak. 1]** (IdC)	0.5 In [2]
tdC	**[DC injection time 2]**[1][3] Maximum braking time **[DC current brak. 2]** (IdC2) for the DC injection, only selected as stop mode. Parameters accessible if **[STOP MODE]** (Stt) = **[DC brak.]** (dCI).	0.1 to 30 s	0.5 s

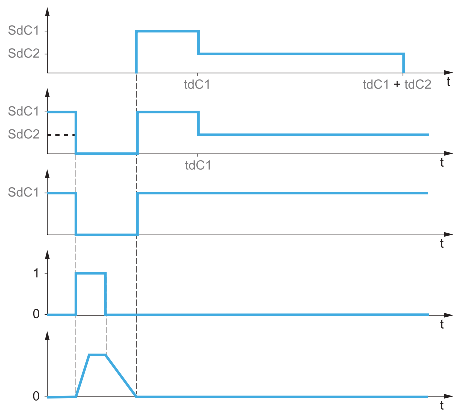
1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.
2) In corresponds to the rated inverter current indicated in the Installation Manual and on the inverter nameplate.
3) Warning: These settings are independent of the function **[Auto DC injection]** (AdC-).

Parameter that can be modified during operation or when stopped.

[Auto DC injection] (AdC-)

Code	Name/Description	Setting range	Factory settings
AdC-	[Auto DC injection]		
AdC	[Auto DC injection] Automatic current injection on stopping (at the end of the ramp)		[Yes] (YES)
nO	[No] (nO): No activation.		
YES	[YES] (YES): Activation with adjustable duration		
Ct	[permanent] (Ct): Continuous activation at standstill. **Warning!** **This function blocks the function [Magnet Mot] (FLU) (see "FLUXING BY LI (FLI-)" on page 217). If [Magnet Mot] (FLU) is set to [permanent] (FCt), [Auto DC injection] (AdC) must be set to [No] (nO) .** **Note:** **This parameter gives rise to the injection of current even if a run command has not been sent. It can be accessed with the frequency inverter running.**		
SdC1	[Auto DC inj. level 1][1] Height of the DC connection at standstill [Auto DC injection] (AdC) is not set to [No] (nO) . For this parameter, the value 0 will be forced if [Motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) = [Sync. Motor.] (SYn). **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.2 In [2]	0.7 In [2]
tdC1	[Auto DC inj. time 1][1] Standstill injection time. The parameter can be activated if [Auto DC injection] (AdC) is not set to [No] (nO). If [Typ Motor control] (Ctt) (see "Drive parameters (Ctt)" on page 153) is set to [FVC] (FUC) or [Sync. Motor] (Syn), this time is the hold time at zero speed.	0.1 to 30 s	0.5 s
SdC2	[Auto DC inj. level 2][1] 2nd level of standstill DC injection current. The parameter can be activated if [Auto DC injection] (AdC) is not set to [No] (nO). For this parameter, the value 0 will be forced if [Motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) = [Sync. Motor.] (SYn). **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.2 In [2]	0.5 In [2]
tdC2	[Auto DC inj. time 2][1] 2nd standstill injection time. The parameter can be activated if [Auto DC injection] (AdC) is not set to [Yes] (YES).	0 to 30 s	0 s

AdC	SdC2	Function
YES	x	
Ct	≠ 0	
Ct	= 0	
Movement command		
Frequency		



Note:

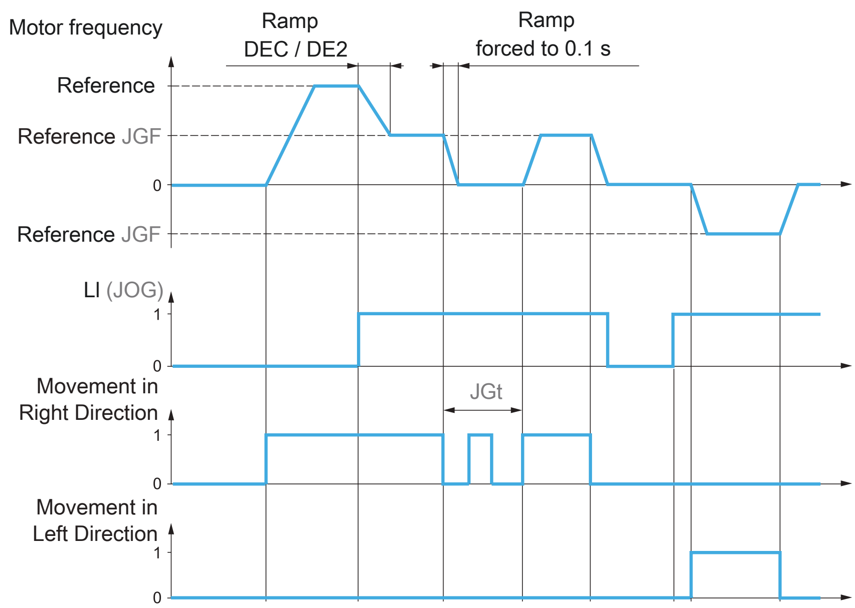
If [Motor control type] (Ctt) is set to [FVC] (FUC): [I DC-Auto braking 1] (SdC1), [I DC-Auto braking 2] (SdC2) and [time aut. DC brake2] (tdC2) cannot be activated. Only [time aut. DC brake 1] (tdC1) can be activated. This is then a hold time at zero speed.

1) This parameter can also be accessed via the [SETTINGS] (SEt-) menu.
2) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

Parameter that can be modified during operation or when stopped.

[JOG] (JOG-)

Code	Name/Description	Setting range	Factory settings
JOG-	**[JOG]** **Note:** **This function cannot be used with certain other functions.** **Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.**		
JOG	**[Jog frequency]** Pulse operation. **The JOG function is only active if the command channel and the reference channels are on the terminals.** Selecting the assigned logic input or bit activates the function.		**[No]** (nO)
nO	**[No]** (nO): Not assigned		
LI1	**[LI1]** (LI1) to **[LI6]** (LI6)		
C101	**[C101]** (C101) to **[C115]** (C115): Not applicable		
-	**[C201]** (C201) to **[C215]** (C215): With built-in communication interface in **[I/O profile]** (IO)		
-	**[C301]** (C301) to **[C315]** (C315): With communication card in **[I/O profile]** (IO)		
Cd00	**[CD00]** (Cd00) to **[CD13]** (Cd13): In **[I/O profile]** (IO) the switchover is possible with logic inputs		
-	**[CD14]** (Cd14) to **[CD15]** (Cd15): In **[I/O profile]** (IO) the switchover is possible with logic inputs Function active if the assigned input or bit is at 1. Example: 2-wire control operation (tCC = 2C)		



Code	Name/Description	Setting range	Factory settings
JGF	**[Setpoint step mode]** 1) This parameter can be accessed if **[JOG]** (JOG) is not set to **[No]** (nO). Reference in jog operation	0 to 10 Hz	10 Hz
JGt	**[Jog delay]** 1) This parameter can be accessed if **[JOG]** (JOG) is not set to **[No]** (nO). Anti-repeat delay between 2 consecutive jog operations.	0 to 2 s	0.5 s

1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.

Parameter that can be modified during operation or when stopped.

2.8.11.7 Preset frequencies

2, 4, 8 or 16 frequencies can be preset, in which case 1, 2, 3 or 4 logic inputs will be required.

Note:

You must configure 2 and 4 frequencies in order to obtain 4 frequencies.

You must configure 2, 4 and 8 frequencies in order to obtain 8 frequencies.

You must configure 2, 4, 8 and 16 frequencies in order to obtain 16 frequencies.

16 frequencies LI (PS16)	8 frequencies LI (PS8)	4 frequencies LI (PS4)	2 frequencies LI (PS2)	Frequency reference
0	0	0	0	Reference (1)
0	0	0	1	SP2
0	0	1	0	SP3
0	0	1	1	SP4
0	1	0	0	SP5
0	1	0	1	SP6
0	1	1	0	SP7
0	1	1	1	SP8
1	0	0	0	SP9
1	0	0	1	SP10
1	0	1	0	SP11
1	0	1	1	SP12
1	1	0	0	SP13
1	1	0	1	SP14
1	1	1	0	SP15
1	1	1	1	SP16

(1) see "Reference channel design 1" on page 186: Reference 1 = (SP1).

[PRESET SPEEDS] (PSS-)

Code	Name/Description	Setting range	Factory settings
PSS-	[PRESET SPEEDS] **Note:** **This function cannot be used with certain other functions. Follow the instructions in** see "APPLICATION FUNCT. FUn-" on page 197.		
PS2 nO LI1 - 	[2 preset speeds] [No] (nO): Function not active [LI1] (LI1) . [...] (...): See the assignment conditions		[No] (nO)
PS4 nO LI1 - 	[4 preset speeds] [No] (nO): Function not active [LI1] (LI1) . [...] (...): See the assignment conditions. In order to obtain 4 speeds, 2 speeds must also be configured.		[No] (nO)
PS8 nO LI1 - 	[8 preset speeds] [No] (nO): Function not active [LI1] (LI1) . [...] (...): See the assignment conditions. In order to obtain 8 speeds, 2 and 4 speeds must also be configured.		[No] (nO)
PS16 nO LI1 - 	[16 preset speeds] [No] (nO): Function not active [LI1] (LI1) . [...] (...): See the assignment conditions. In order to obtain 16 speeds, 2, 4 and 8 speeds must also be configured.		[No] (nO)
SP2	[Preset speed 2] 1)	0 to 599 Hz	10 Hz
SP3	[Preset speed 3] 1)	0 to 599 Hz	15 Hz
SP4	[Preset speed 4] 1)	0 to 599 Hz	20 Hz
SP5	[Preset speed 5] 1)	0 to 599 Hz	25 Hz
SP6	[Preset speed 6] 1)	0 to 599 Hz	30 Hz
SP7	[Preset speed 7] 1)	0 to 599 Hz	35 Hz
SP8	[Preset speed 8] 1)	0 to 599 Hz	40 Hz
SP9	[Preset speed 9] 1)	0 to 599 Hz	45 Hz
SP10	[Preset speed 10] 1)	0 to 599 Hz	50 Hz
SP11	[Preset speed 11] 1)	0 to 599 Hz	55 Hz
SP12	[Preset speed 12] 1)	0 to 599 Hz	60 Hz
SP13	[Preset speed 13] 1)	0 to 599 Hz	70 Hz
SP14	[Preset speed 14] 1)	0 to 599 Hz	80 Hz
SP15	[Preset speed 15] 1)	0 to 599 Hz	90 Hz
SP16	[Preset speed 16] 1) The display of this parameter [x. preset speed] (SPx) is based on the number of configured speeds.	0 to 599 Hz	100 Hz

1) This parameter can also be accessed via the [SETTINGS] (SEt-) menu.

Parameter that can be modified during operation or when stopped.

2.8.11.8 +/- speed

Two types of operation are available.

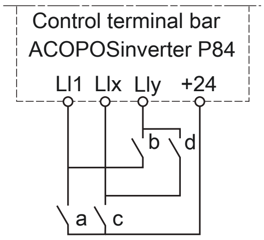
1. **Use of single action pushbuttons:** Two logic inputs are required in addition to rotational direction(s). The input set to "+ speed" increases the speed, and the input set to "- speed" reduces the speed.
2. **Use of dual action pushbuttons:** Only one logic input, that is assigned to "+ speed", is required.

+/- speed with dual-action buttons:

Description: 1 button that can be pressed twice (2 steps) for each direction of rotation. A contact closes each time the button is pressed.

	Released: (- Speed)	**1. Press (Speed maintained)**	**2. Press (faster)**
Forward button	–	a	a and b
Reverse button	–	c	c and d

Connection example:



LI1: Forward
LIx: Reverse
LIy: + Speed

Do not use this "+/-speed" type with 3-wire control.

In both cases, the maximum speed is specified by [high speed] (HSP).

> ## Note:
> **In the event of a reference changeover by rFC from any reference channel to a different reference channel with "+/- Speed" the value of the reference [Motor speed] (rFr) (after ramp) can be copied at the same time in accordance with the parameter [channel copy 1 → 2] (COP). The value of the reference rFr (after ramp) copied.**

This prevents the speed being incorrectly reset to zero when switching takes place.

[+/- speed] (UPd-)

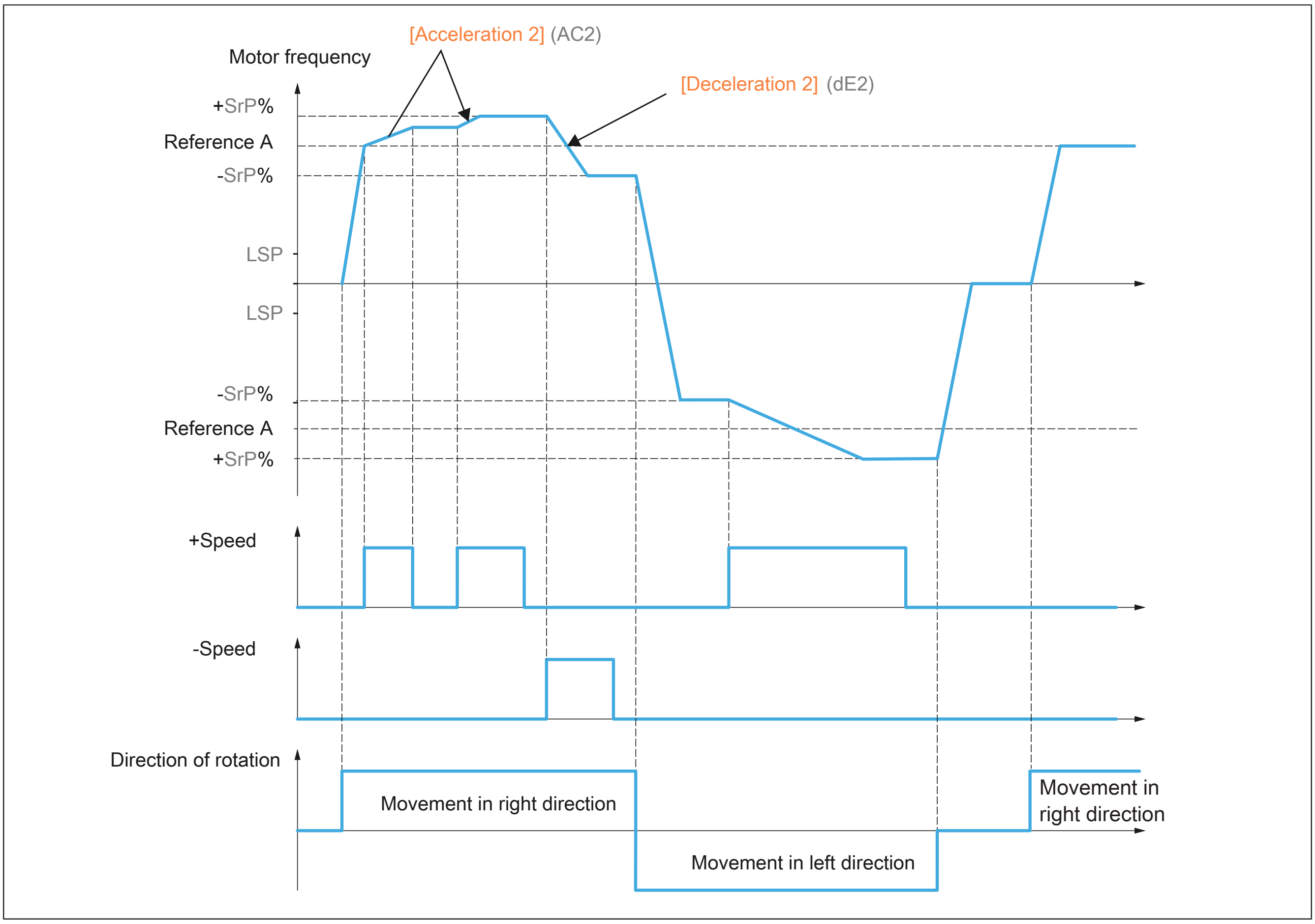
Code	Name/Description	Factory settings
UPd-	**[+/- speed]** This function is accessible if the reference channel **[channel ref2]** (Fr2) is set to **[+/- speed]** (UPdt), see "Control parameters (CC5 - Fr2)" on page 193. **Note:** **This function cannot be used with certain other functions. Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.**	
USP	**[Assign. + SPEED]**	**[No]** (nO)
nO	**[No]** (nO): Function not active	
LI1	**[LI1]** (LI1) to **[LI6]** (LI6)	
C101	**[C101]** (C101) to **[C115]** (C115): Not applicable	
-	**[C201]** (C201) to **[C215]** (C215): With built-in communication interface in **[I/O profile]** (IO)	
-	**[C301]** (C301) to **[C315]** (C315): With a communication card in **[I/O profile]** (IO)	
Cd00	**[CD00]** (Cd00) to **[CD13]** (Cd13): In **[I/O profile]** (IO) the switchover is possible with logic inputs	
-	**[CD14]** (Cd14) to **[CD15]** (Cd15): In **[I/O profile]** (IO) the switchover is possible with logic inputs Function active if the assigned input or bit is at 1.	
dSP	**[-Speed assignment]**	**[No]** (nO)
nO	**[No]** (nO): Function not active	
LI1	**[LI1]** (LI1) to **[LI6]** (LI6)	
C101	**[C101]** (C101) to **[C115]** (C115): Not applicable	
-	**[C201]** (C201) to **[C215]** (C215): With built-in communication interface in **[I/O profile]** (IO)	
-	**[C301]** (C301) to **[C315]** (C315): With communication card in **[I/O profile]** (IO)	
Cd00	**[CD00]** (Cd00) to **[CD13]** (Cd13): In **[I/O profile]** (IO) the switchover is possible with logic inputs	
-	**[CD14]** (Cd14) to **[CD15]** (Cd15): In **[I/O profile]** (IO) the switchover is possible with logic inputs Function active if the assigned input or bit is at 1.	
Str	**[Reference saved]** This parameter, when assigned to the +/- speed function, can be used to save the reference: • If the move commands disappear (saved to RAM). • When the line supply is severed or the run commands disappear (saved to EEPROM). Therefore, the next time the frequency inverter starts up, the speed reference is the last reference saved.	**[No]** (nO)
nO	**[No]** (nO): No saving (at the next start-up the speed reference is **[low speed]** (LSP))	
rAM	**[RAM]** (rAM): Saving in the RAM	
EEP	**[EEPROM]** (EEP): Saving in the EEPROM	

2.8.11.8.1 +/- speed of reference range

The reference is supplied by Fr1 or Fr1b; if necessary with the functions summation/subtraction/multiplication and the preset frequencies (see "Reference channel design 1" on page 186). For the sake of simplicity, this will hereinafter be called Reference A. The action of the + speed and - speed keys can be set to a percentage of Reference A. On stopping, the reference (A ± speed) is not saved. The inverter then runs with only one reference A+.

The maximum total reference value is limited by **[high speed]** (HSP) and the minimum reference by **[low speed]** (LSP) (see "Parameters that can be modified during operation or when the motor is stopped." on page 130).

Example of 2-wire control:



[+/- SPEED BY REFERENCE] (SrE-)

Code	Name/Description	Setting range	Factory settings
SrE-	**[+/- SPEED BY REFERENCE]** This function is accessible for the reference channel **[ref1 channel]** (Fr1) . **Note:** **This function cannot be used with certain other functions. Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.**		
USI nO LI1 - - -	**[Assign. + SPEED]** **[No]** (nO): Function not active **[LI1]** (LI1) . . . **[...]** (...): See the assignment conditions Function active if the assigned input or bit is at 1.		**[No]** (nO)
dSI nO LI1 - - -	**[-Speed assignment]** **[No]** (nO): Function not active **[LI1]** (LI1) . . . **[...]** (...): See the assignment conditions Function active if the assigned input or bit is at 1.		**[No]** (nO)
SrP	**[+/-Speed limitation]** This parameter limits the variation range with +/- speed as a % of the reference. The ramps used with this function are **[Acceleration time 2]** (AC2) and **[Deceleration time 2]** (dE2). Parameter is accessible when ± Speed is assigned.	0 to 50%	10%
AC2	**[Acceleration 2]** 1) Time till acceleration from 0 to **[Rated motor frequency]** (FrS). Make sure that this value is compatible with the moment of inertia of the frequency inverter load. This parameter is accessible when ± Speed is assigned.	0.01 to 6000 s 2)	5 s
dE2	**[Deceleration 2]** 1) Time till acceleration from 0 to **[Rated motor frequency]** (FrS). Make sure that this value is compatible with the moment of inertia of the frequency inverter load. This parameter is accessible when ± Speed is assigned.	0.01 to 6000 s 2)	5 s

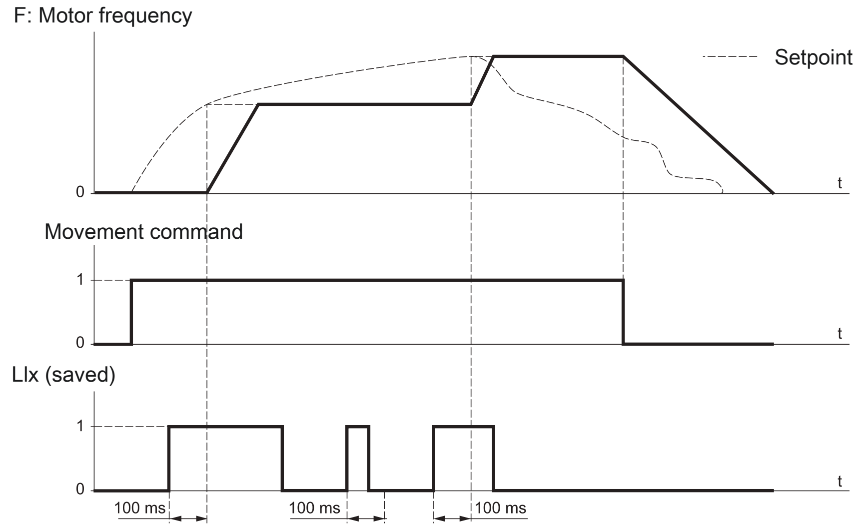
1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.
2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 9999 s in accordance with **[ramp increment]** (Inr).

Parameter that can be modified during operation or when stopped.

2.8.11.9 Save reference

Saving a frequency reference value using a logic input command lasting longer than 0.1 s.

- This function is used to control the speed of several inverters alternately via a single analog reference and one logic input for each inverter.
- It is also used to confirm a line reference (communication bus or network) on several inverters via a logic input. This allows movements to be synchronized by getting rid of variations when the reference is set.
- The reference is acquired 100 ms after the rising edge of the request. A new reference is not then acquired until a new request is made.



[SAVE REFERENCE] (SPM-)

Code	Name/Description	Factory settings
SPM-	[SAVE REFERENCE]	
SPM	[Save reference]	[No] (nO)
nO	[No] (nO): Function not active	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	Assignment to a logic input	
LI6	Function active if the assigned input is at 1.	

[FLUXING BY LI] (FLI-)

Code	Name/Description	Factory settings
FLI-	[FLUXING BY LI]	
FLU	[Motor fluxing][1]	[No] (FnO)
FnC	[not perm.] (FnC): Non-permanent mode.	
FCt	[permanent] (FCt): Permanent mode. This option is not possible if [Auto DC injection] (AdC) (see "[Auto DC injection] AdC-" on page 208) is set to [Yes] (YES) or if [STOP MODE] (Stt) (see "STOP MODE (Stt-)" on page 206) has been set to [freewheel stop](nSt).	
FnO	[No] (FnO): Function not active. This option is not possible if [Motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) is set to [SVC I] (CUC) or [FVC] (FUC). If [Motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) is set to [SVC I] (CUC)[FVC] (FUC) or [Sync. Motor] (SYn) the factory setting is replaced by [not perm.] (FnC). In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor. • In the mode [permanent] (FCt) the inverter automatically creates the magnetic flux at its start. • In the mode [not perm.] (FnC) the magnetization occurs when the motor has started. The magnetic flux current is greater than the [rated motor current] (nCr) (configured rated current of the motor), if the magnetization has been established. After this, the flux current will be adjusted to the motor's magnetizing current. **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.** If [motor control type] (Ctt) (see "Drive parameters (Ctt)" on page 153) = [Sync. Motor] (SYn) is set, the parameter [Magnet Mot] (FLU) results in the assignment of the rotor and not of the magnetization. If [BRAKE LOGIC] (bLC) (see "[BRAKE LOGIC CONTROL] (bLC-)" on page 223) is not [No] (nO), the parameter [Magnet Mot] (FLU) has no effect.	
FLI	[Fluxing assignment]	[No] (nO)
nO	[No] (nO): Function not active.	
Li1	[LI1] (LI1)	
-	.	
-	.	
-	. [...](...): See the assignment conditions The assignment is only possible if [Magnet Mot] (FLU) = [not perm.] (FnC). • If an LI or a bit is assigned to the motor fluxing command, flux is built up when the assigned input or bit is at 1. • If an LI or a bit has not been assigned, or if the assigned LI or bit is at 0 when a run command is sent, fluxing occurs when the motor starts.	

1) This parameter can also be accessed via the [SETTINGS] (SEt-) menu.

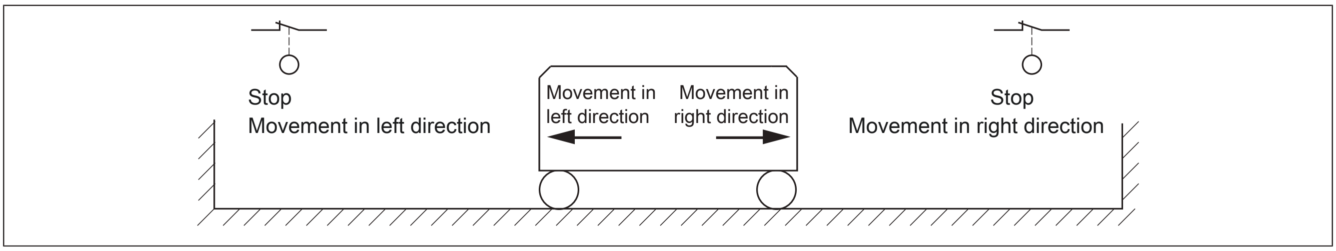
Parameter that can be modified during operation or when stopped.

2.8.11.10 Limit switch management

This function can be used to manage train control limits with limit switches.

The stop mode can be configured. If the stop contact is activated, the start in the other direction is authorized.

Example:



The stop is activated when the input is at 0 (open contact).

[LIMIT SWITCH MANAGEMENT] (LSt-)

Code	Name/Description	Factory settings
LSt-	**[LIMIT SWITCH MANAGEMENT]** **Note:** **This function cannot be used with certain other functions. Follow the instructions in** see "APPLICATION FUNCT. FUn-" on page 197.	
LAF nO LI1 C101 - - Cd00 -	**[Stop FW limit sw.]** **[No]** (nO): Function not active **[LI1]** (LI1) to **[LI6]** (LI6) **[C101]** (C101) to **[C115]**(C115): Not applicable **[C201]** (C201) to **[C215]**(C215): With built-in communication interface in **[I/O profile]** (IO) **[C301]** (C301) to **[C315]** (C315): With communication card in **[I/O profile]** (IO) **[CD00]** (Cd00) to **[CD13]** (Cd13): In **[I/O profile]** (IO) the switchover is possible with logic inputs **[CD14]** (Cd14) to **[CD15]** (Cd15): In **[I/O profile]** (IO) the switchover is possible with logic inputs	**[No]** (nO)
LAr	**[RWStop.]** The same assignments are possible as for **[Pos forw. stop]** (LAF) (see below).	**[No]** (nO)
LAS rMP FSt nSt	**[STOP CONFIGURATION]** **[Ramp stop]** (rMP) **[Fast stop]** (FSt) **[freewheel stop]**(nSt) If the assigned input becomes 0, the stop is controlled according to the selected type. After the motor stops, a restart is only authorized for the other direction. If the two inputs **[Pos forw. stop]** (LAF) and **[RWStop.]** (LAr) are assigned and in state 0, a restart is impossible. This parameter can be accessed if **[Pos forw. stop]** (LAF) or **[RWStop.]** (LAr) is assigned.	**[freewheel stop]** (nSt)

2.8.11.11 Brake logic

Used to control an electromagnetic brake by the inverter, for horizontal and vertical hoisting applications, and for unbalanced machines.

Principle:

Vertical hoisting movement:

Maintains the increase in motor torque during the brake engagement and release phases, for holding the load and for smooth starting when the brake is released and for smooth stopping when the brake is engaged.

Horizontal hoisting movement:

Synchronize brake release with the build-up of torque during startup and with the brake engagement at zero frequency on stopping, to prevent jolting.

Recommended settings for brake logic control for a vertical hoisting application:

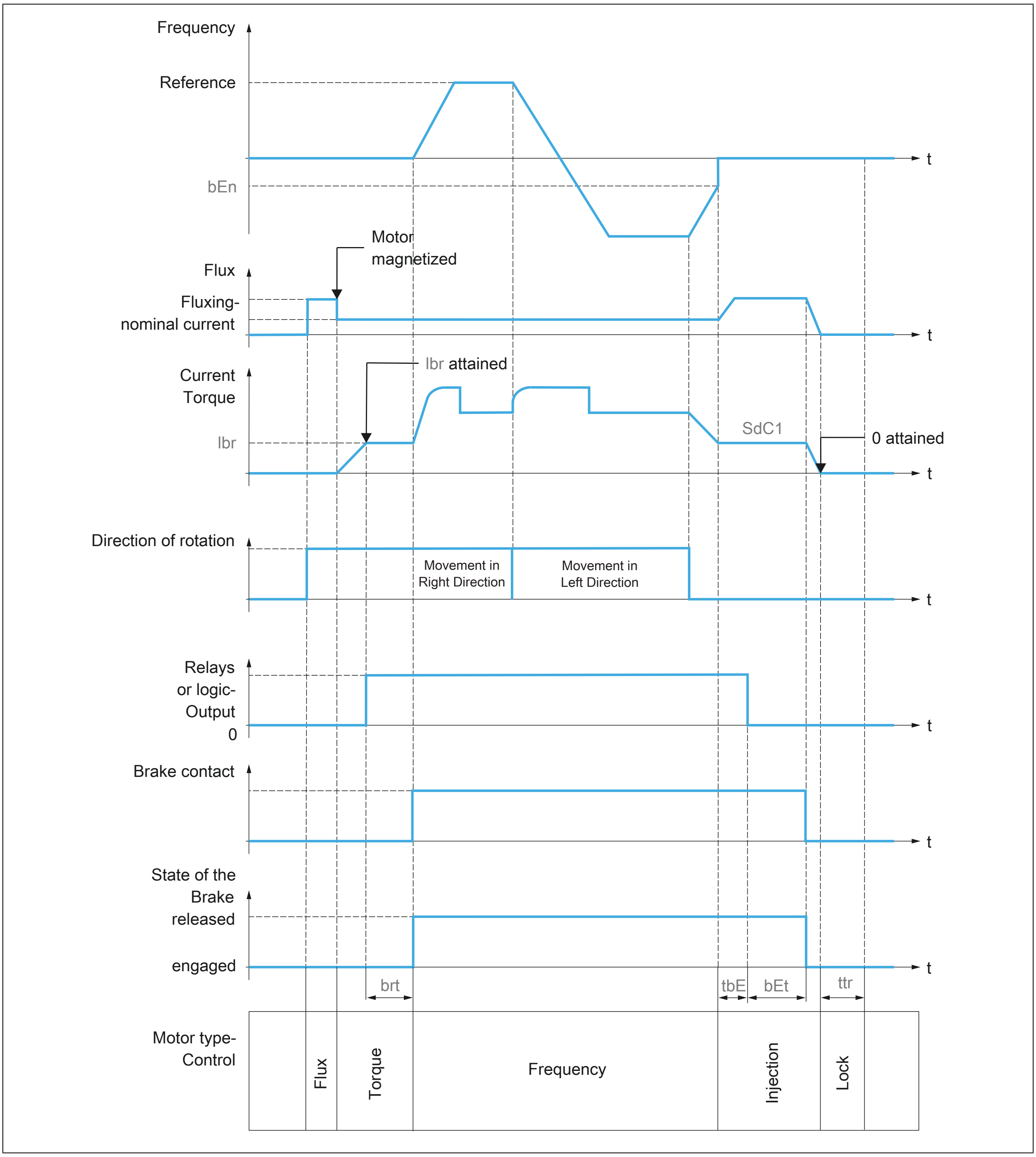
> **Warning!**
>
> **ACCIDENTAL OPERATION OF DEVICE**
>
> **Check that the selected settings and configurations will not result in the dropping or loss of control of the load being lifted.**
>
> **Failure to follow these instructions will result in death or serious injury.**

1. Brake impulse (bIP): YES. Make sure that the forward direction of operation corresponds to hoisting the load. For applications in which the lowered load differs very much from the raised load, set bIP = 2 Ibr (Example: Always lift with a load and lower in the empty state).
2. Brake opening current (Ibr and Ird if bIP = 2 Ibr): Set the brake release current to the rated current according to the nameplate of the motor.
   When testing, adjust the brake release current to achieve slip-free holding of the load
3. Acceleration time: For hoisting applications it is advisable to set the acceleration ramps to at least 0.5 seconds. Check that the inverter does not go into current limit mode.
   The same recommendation also applies to deceleration.
   Please note: For a hoisting movement, a braking resistor must be used.
4. Brake release delay (brt): Set this value depending on the type of brake. This is the time required for the mechanical brake to release.
5. Brake engage rate (blr) only in the open control loop: Leave in **[Auto]** mode and align if necessary.
6. Brake release rate (bEn): leave in **[Auto]** mode and align if necessary.
7. Brake release time (bEt): Set this value depending on the type of brake. It is the time required for the mechanical brake to engage.

Recommended settings for brake logic control for a horizontal hoisting application:

1. Brake impulse (bIP): No.
2. Brake engage current (Ibr): Set to 0.
3. Brake engage time (brt): Set this value depending on the type of brake. This is the time required for the mechanical brake to release.
4. Brake release rate (bEn) only in the open control loop: Leave in **[Auto]** mode and align if necessary.
5. Brake release time (bEt): Set this value depending on the type of brake. It is the time required for the mechanical brake to engage.

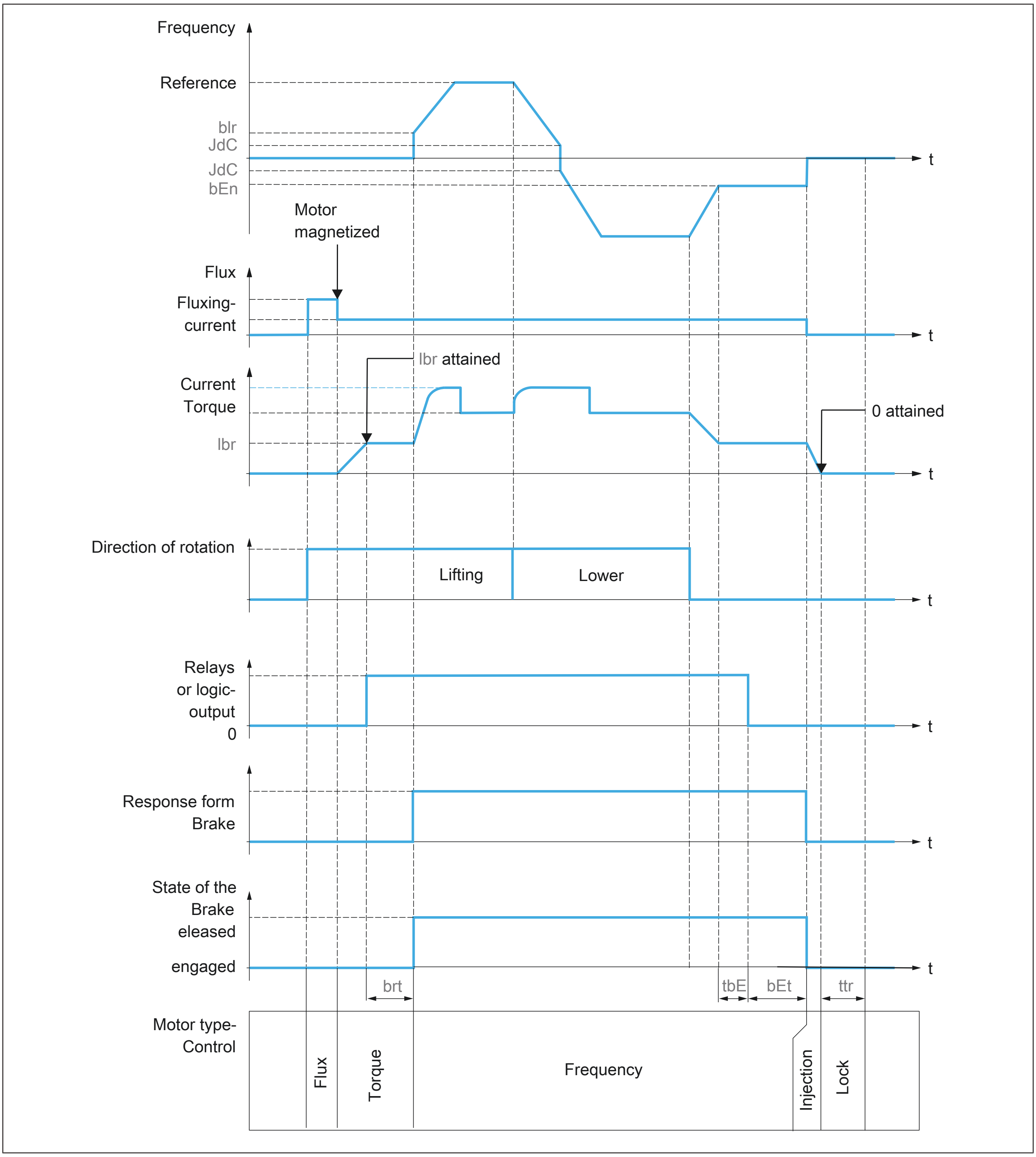
2.8.11.11.1 Brake logic control, horizontal movement in open-loop mode



Legend:

- (bEn): **[Brake engage freq.]**
- (bEt): **[Brake engage time]**
- (brt): **[Brake Release time]**
- (Ibr): **[Brake engage current]**
- (SdC1): **[Auto DC inj. level 1]**
- (tbE): **[Brake release delay]**
- (ttr): **[Time to restart]**

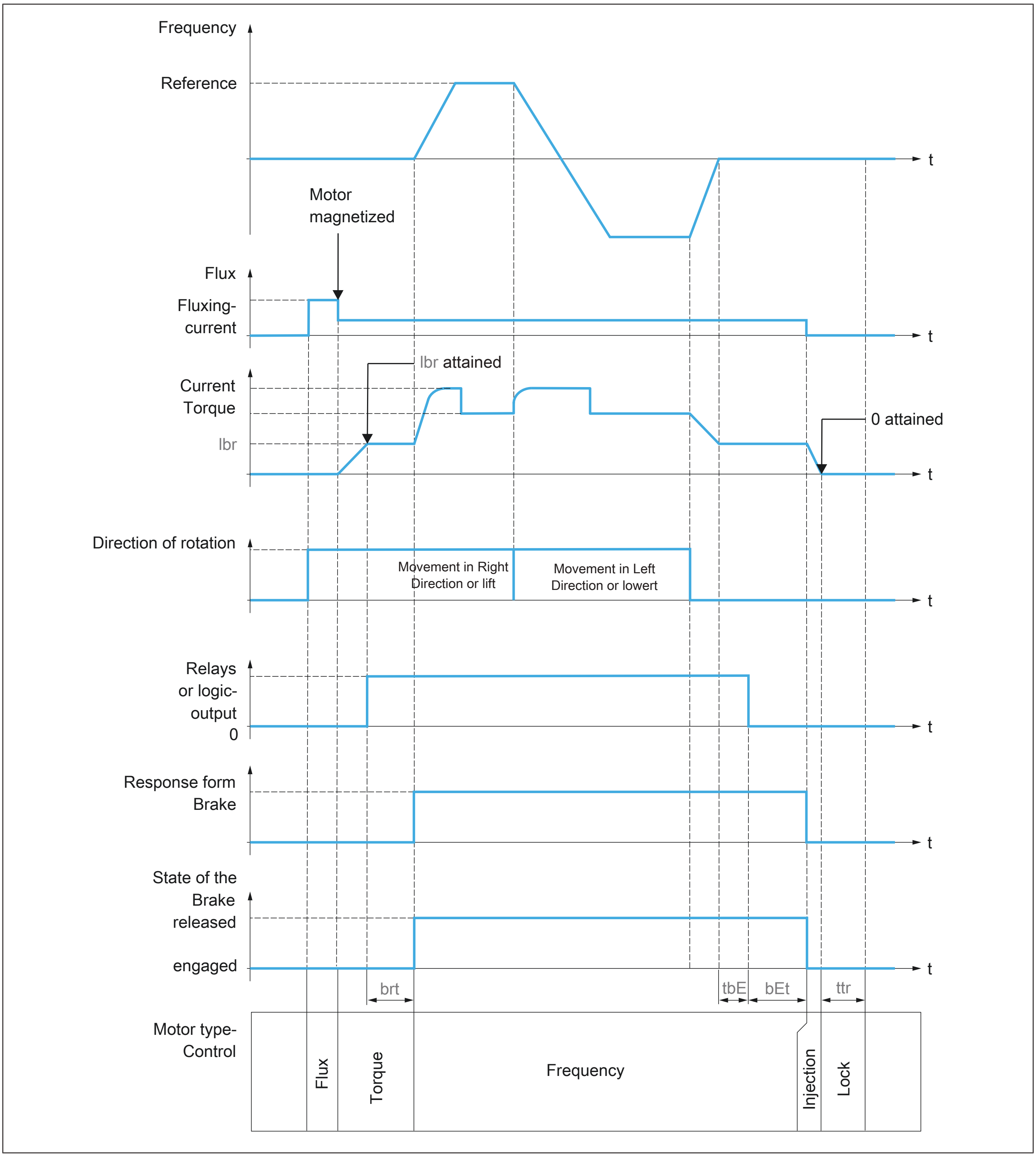
2.8.11.11.2 Brake logic control, vertical movement in open-loop mode



Legend:

- (bEn): **[Brake engage freq.]**
- (bEt): **[Brake engage time]**
- (blr): **[Brake release freq.]**
- (brt): **[Brake Release time]**
- (Ibr): **[Brake engage current]**
- (JdC): **[Jump at reversal]**
- (tbE):**[Brake engage delay]**
- (ttr): **[Time to restart]**

2.8.11.11.3 Brake logic control, vertical or horizontal movement in closed-loop mode



Legend:

- (bEt): **[Brake engage time]**
- (brt): **[Brake Release time]**
- (Ibr): **[Brake engage current]**
- (tbE):**[Brake engage delay]**
- (ttr): **[Time to restart]**

[BRAKE LOGIC CONTROL] (bLC-)

Code	Name/Description	Setting range	Factory settings
bLC-	**[BRAKE LOGIC CONTROL]** **Note:** **This function cannot be used with certain other functions. Follow the instructions in** see "APPLICATION FUNCT. FUn-" on page 197.		
bLC nO r2 dO1	**[BRAKE LOGIC CONTROL]** **Note:** **If the brake is assigned, only a ramp stop is possible.** **Check the parameter [STOP MODE] (Stt) (**see "STOP MODE (Stt-)" on page 206**).** The brake logic control can only be assigned if [Motor control type] (Ctt) = [SVC U] (UUC), [SVC I] (CUC) or [FVC] (FUC), or if [Motor control type] (Ctt) = [V/f Reg 2P] (UF2). Logic output or control relay [No] (nO): Function not assigned (in this case, none of the functions can be accessed). [CONFIGURATION R2] (r2) [DO1] (dO1): Analog output AO, which can be used as logic output. The parameter is accessible when [CONFIGURATION AO1] (AO1) = [No] (nO).		[No] (nO)
bSt HOr UEr	**[Movement type]** [Horizontal] (HOr): Resistive-load movement (translational motion of overhead crane, for example). **Note:** **If [Motor control type] (Ctt) = [V/f Reg 2P] (UF2), [Type of movement] (bSt) is forced to [Translation] (HOr) .** [Hoist] (UEr): Driving-load movement (hoisting winch, for example). If [ext. sensor] (PES) does not equal [No] (nO) , [Type of movement] (bSt) is forced to [Hoist] (UEr).		[Hoist] (UEr)
bCI nO LI1 - - -	**[Brake contact]** If the brake has a monitoring contact (closed for released brake). [No] (nO): Function not active. [LI1] (LI1) . . . [...] (...): See the assignment conditions		[No] (nO)
bIP nO YES 2Ibr	**[Brake impulse]** The parameter is accessible if [ext. sensor] (PES) = [No] (nO) and if [type of movement] (bSt) = [Hoist] (UEr). [No] (nO): The motor torque is specified in the required direction with current (Ibr). [Yes] (YES): The Motor torque is always in the forward direction (make sure that this direction corresponds to the lifting operation), in the case of braking current (Ibr). [2 IBR poss.] (2Ibr): The motor torque has the required direction of rotation, with current (Ibr) for forward run and (Ird) for reverse run; for certain specific applications.		[No] (nO)
Ibr	**[Brake locked rotor current]** [1)] Brake release current threshold for ascending or forward movement. The parameter is accessible when [ext. sensor] (PES) = [No] (nO).	0 to 1.32 In [2)]	0
Ird	**[Brake release I Rev]** [1)] Brake release current threshold for descending or reverse movement. The parameter is accessible when [brake impulse] (bIP) = [2 IBR poss.] (2Ibr).	0 to 1.32 In [2)]	0
brt	**[Brake Release time]** [1)] Brake release time delay.	0 to 5 s	0
bIr AUtO -	**[Brake release freq.]** [1)] Brake release frequency threshold (initialization of acceleration ramp). The parameter is accessible if [Motor control type] (Ctt) does not equal [FVC] (FUC) and if [Bewegungsart] (bSt) is the same as [Hoist] (UEr). [Auto] (AUtO): The inverter takes a value equal to the rated slip of the motor, calculated using the inverter parameters. 0 to 10 Hz: Manual adjustment		[Auto] (AUtO)
bEn AUtO -	**[Brake engage freq.]** [1)] Threshold of the braking torque frequency. The parameter is not accessible if [Motor control type] (Ctt) is not [FVC] (FUC). [Auto] (AUtO): The inverter takes a value equal to the rated slip of the motor, calculated using the inverter parameters. 0 to 10 Hz: Manual adjustment		[Auto] (AUtO)
bECd nO -	**[Brake sl. at 0]** Brake is engaged at a controlled speed zero. The parameter is not accessible if [Motor control type] (Ctt) = [FVC] (FUC). Can be used to engage the brake in the closed control loop with speed control at zero speed. This parameter can be used to adjust the brake delay after reaching the zero speed. If a different speed than zero is required, after the application of the torque the command for releasing the brake is sent. [No] (nO): Brake is not engaged at a controlled speed zero. 0.0 to 30.0 s: Brake engaging delay after reaching the zero speed.		[No] (nO)
tbE	**[Brake engage delay]** [1)] Time delay before request to engage brake. To delay the engaging of the brake if the brake is applied as soon as the inverter is completely stopped.	0 to 5 s	0
bEt	**[Brake engage time]** [1)] Brake engage time (brake response time)	0 to 5 s	0
SdC1	**[Auto DC inj. level 1]** [1)]	0 to 1.2 In [2)]	0.7 In [2)]

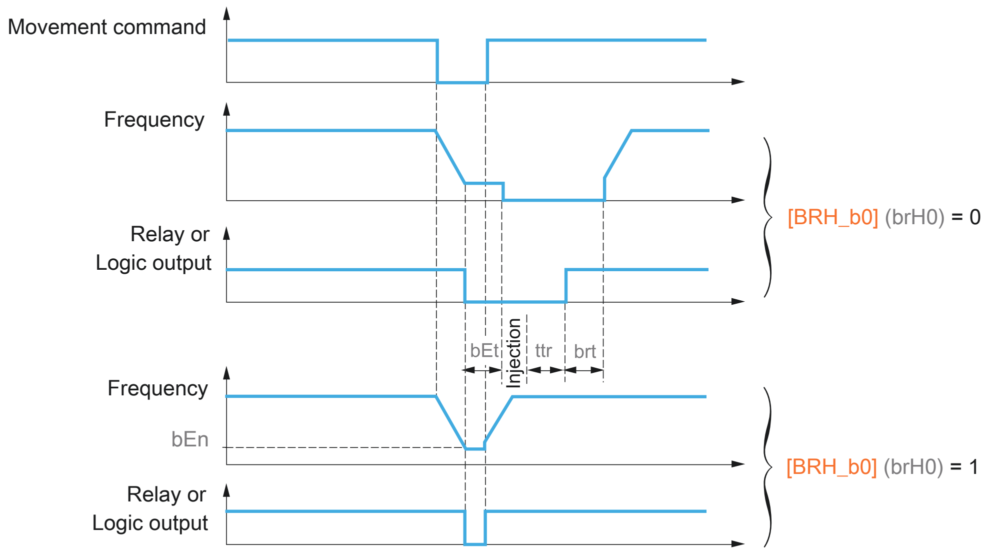
Code	Name/Description	Setting range	Factory settings
	Level of standstill DC injection current. **Note:** **The parameter is accessible if [Motor control type] (Ctt) does not equal [FVC] (FUC) and if [Type of movement] (bSt) is the same as [Translation] (HOr).** **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**		
bEd nO YES	**[Engage at reversal]** **[No]** (nO): The brake does not engage. **[Yes]** (YES): The brake does engage. This parameter can be used to select whether or not the brake engages on transition to zero speed when the operating direction is reversed.		**[No]** (nO)
JdC AUtO -	**[Jump at reversal]**[1] The parameter is accessible if **[Motor control type]** (Ctt) does not equal **[FVC]** (FUC) and if **[Bewegungsart]** (bSt) is the same as **[Hoist]** (UEr). **[Auto]** (AUtO): The inverter takes a value equal to the rated slip of the motor, calculated using the inverter parameters. **0 to 10 Hz**: Manual adjustment When the reference direction is reversed, this parameter can be used to avoid loss of torque (and consequential release of load) on transition to zero speed. The parameter is irrelevant if **[Brake rot. rev.]** (bEd) = **[Yes]** (YES).	0 to 10 Hz	**[Auto]** (AUtO)
ttr	**[Time to restart]**[1] Time between the end of a brake engage sequence and the start of a brake release sequence	0 to 15 s	0

1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.
2) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

Parameter that can be modified during operation or when stopped.

2.8.11.11.4.1 Brake control logic expert parameters

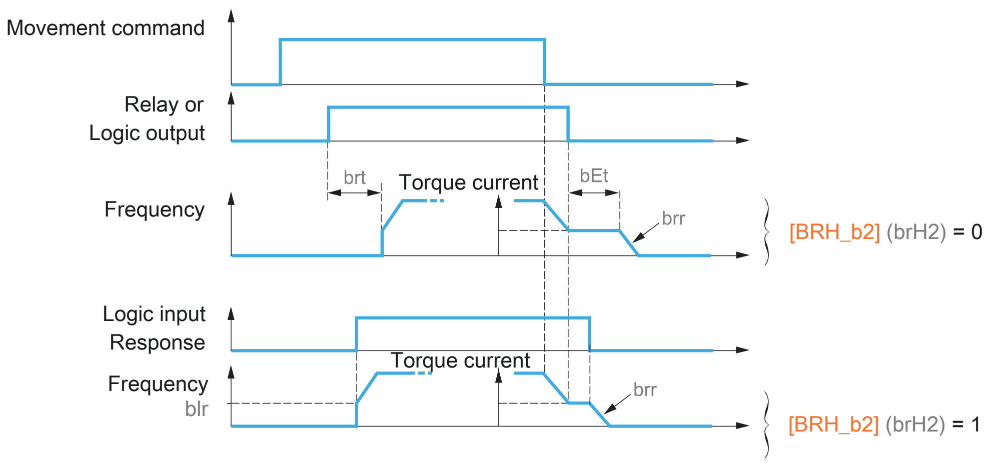
<table>
<tr><th>Code</th><th>Name/Description</th><th>Factory settings</th></tr>
<tr><td>brH0

0
1</td><td>[BRH_b0]
Selection of the brake restart sequence if a run command is repeated while the brake is engaging.
[0] (0): The brake engaging/brake release sequence is executed completely.
[1] (1): The brake is immediately reopened.
Use in the open and closed-loop control
• A run command may be requested during the brake release phase. Whether the sequence for the new brake engaging is executed, depends on the value selected for [BRH b0] (brH0).


Note:
If a run command is requested during the "ttr" phase, the complete brake control sequence is initialized.</td><td>0</td></tr>
<tr><td>brH1

0

1</td><td>[BRH b1]
Deactivation of the brake contact fault in the set mode.
[0] (0): The "brake feedback" fault is active in steady state (fault if the contact is open during operation). The brake contact fault brF is monitored in all operating phases.
[1] (1): The "brake feedback" fault is not active in steady state. The brake contact error brF is only monitored during brake release and engaging phases.</td><td>0</td></tr>
</table>

Code	Name/Description	Setting range	Factory settings
brH2	**[BRH b2]**		0
	Taking the brake feedback into account for the brake control sequence.		
0	**[0]** (0): The brake contact remains unconsidered.		
1	**[1]** (1): The brake contact is considered.		
	Use in the open and closed-loop control • If a logic input is assigned to the brake contact. **[BRH b2]** (brH2) = 0: During the brake release sequence, the reference is unlocked after the end of the **[brake engage time]** (brt). During the brake engaging sequence, the current switches to 0 in accordance with the ramp **[current ramp time]** (brr) after the expiry of the time **[brake engage time]** (bEt). **[BRH b2]** (brH2) = 1: When the brakes are released, the reference is unlocked when the logic input changes to 1. On closing, in accordance with **[current ramp time]** (brr), the current switches to 0 if the logic input changes to 0.  		
brH3	**[BRH b3]**		0
	Only available in the closed control loop. Management of missing brake contact response, if assigned.		
0	**[0]** (0): During the brake engaging sequence, the brake contact must be opened before the end of the **[brake engaging current]** (bEt), or the inverter will be locked in an A brake contact fault brF.		
1	**[1]** (1): During the brake engaging sequence, the brake contact must be opened before the end of the **[brake engaging current]** (bEt), or a bCA brake contact alarm will be triggered and zero speed will be maintained.		
brH4	**[BRH b4]**		0
	Only available in the closed control loop. Activation of the speed controller at zero when a motion occurs for which no command has been issued (when measuring a speed over a fixed minimum threshold).		
0	**[0]** (0): No action if a movement occurs for which no command has been issued.		
1	**[1]** (1): If a movement occurs for which no command has been issued, the inverter shuts down to zero speed control without brake release command and a bSA alarm is triggered.		
brr	**[Current ramp time]**	0 to 5 s	0 s
	Time of the ramp for the torque current (increase and decrease) for a current change that corresponds to the value **[I brake engaging upw.]** (Ibr).		

Parameter that can be modified during operation or when stopped.

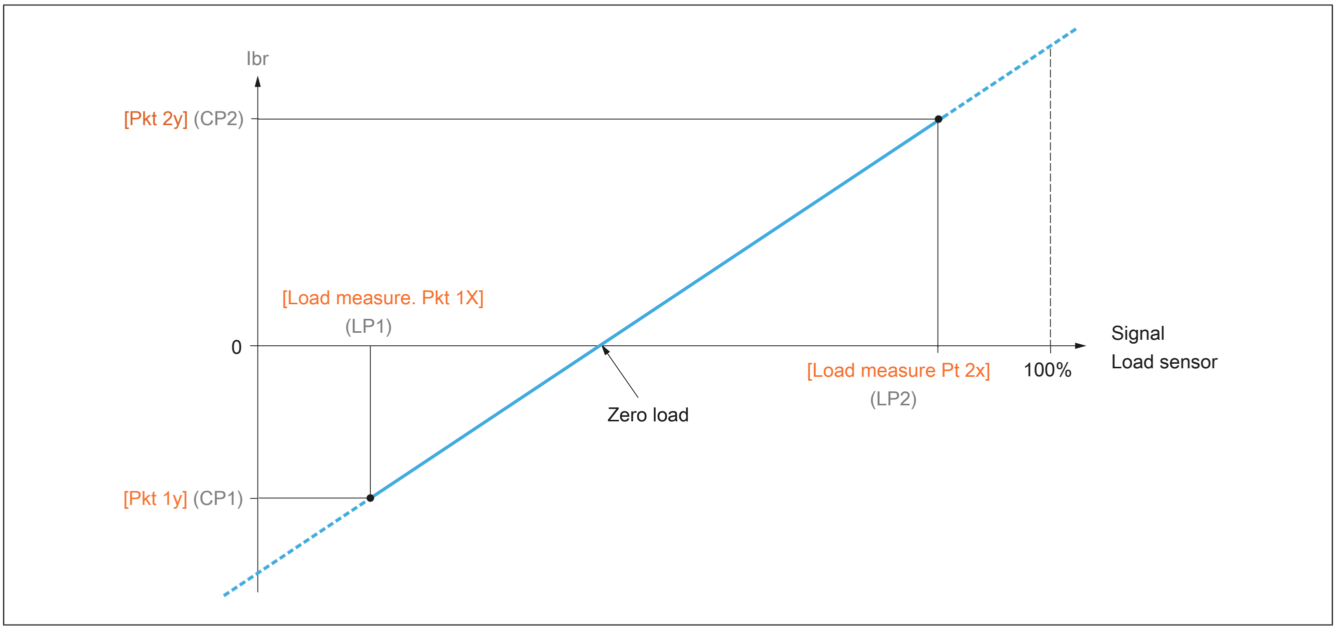
2.8.11.12 Load measurement

Based on the information of a load sensor, this function adapts to the current **[brake engaging current]** (Ibr) of the function **[BRAKE LOGIC]** (bLC-). The signal from the load sensor can be assigned to an analog input (usually a 4 - 20 mA signal) or to the encoder input, according to the type of load sensor.

Examples:

- Measurement of the total weight of a hoisting winch and its load
- Measurement of the total weight of the elevator gear units, the cab and the counterweight.

The current **[brake engaging current]** (Ibr) is adjusted according to the following characteristic.



This curve can represent a load sensor on an elevator gear unit for which the motor load zero occurs when the load in the cab is not zero.

[EXTERNAL LOAD MEAS.] (ELM-)

Code	Name/Description	Setting range	Factory settings
ELM-	[EXTERNAL LOAD MEAS.]		
PES	[ext. sensor] The function can be accessed if the brake logic is assigned. If [ext. sensor] (PES) is not [No] (nO) , [Type of movement] (bSt) is forced to [Hoist] (UEr).		[No] (nO)
nO	[No] (nO): Function not active		
AI1	[AI1] (AI1): Analog input		
AI2	[AI2] (AI2): Analog input		
PG	[Encoder] (PG): Encoder input if encoder card has been inserted		
AIU1	[AI virt com] (AIU1): Virtual input via the communication bus, which is configured via [AI1 communication] (AIC1) . **Warning!** **ACCIDENTAL OPERATION OF DEVICE** **If the equipment is switched to forced local mode (see "COMM. CARD and FORCED LOCAL (LCF-)" on page 310), the virtual input used in the current configuration remains fixed at the last value transmitted.** **The virtual input and mode "Forced local" are not permitted to be used in the same configuration.** **Failure to follow these instructions will result in death or serious injury.**		
LP1	[Load measure Pt 1x] 0 to 99.99% of signal on assigned input. [Load measurement Pt 1x] (LP1) must be less than [load measurement Pt 2x] (LP2). The parameter is accessible when [ext. sensor] (PES) is assigned.	0 to 99.99%	0
CP1	[Pt 1y] Current that corresponds with the load [load measurement Pt 1x] (LP1); in A. The parameter is accessible when [ext. sensor] (PES) is assigned.	-1.36 to 1.36 In 1)	- In
LP2	[Load measure Pt 2x] 0.01 to 100% of signal on assigned input. [Load measurement Pt 2x] (LP2) must be greater than [load measurement Pt 1x] (LP1). The parameter is accessible when [ext. sensor] (PES) is assigned.	0.01 to 100%	50%
CP2	[Pt 2y] Current that corresponds with the load [load measurement Pt 2x] (LP2); in A. The parameter is accessible when [ext. sensor] (PES) is assigned.	-1.36 to 1.36 In 1)	0
IbrA	[Ibr 4-20 mA loss] Brake release current in the event of the loss of the load sensor information. This parameter can be accessed if the load sensor is assigned to an analog current input and the 4-20 mA loss fault is deactivated. Recommended settings: • 0 for elevators • Rated motor current for a hoisting application	0 to 1.36 In 1)	0

1) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

Parameter that can be modified during operation or when stopped.

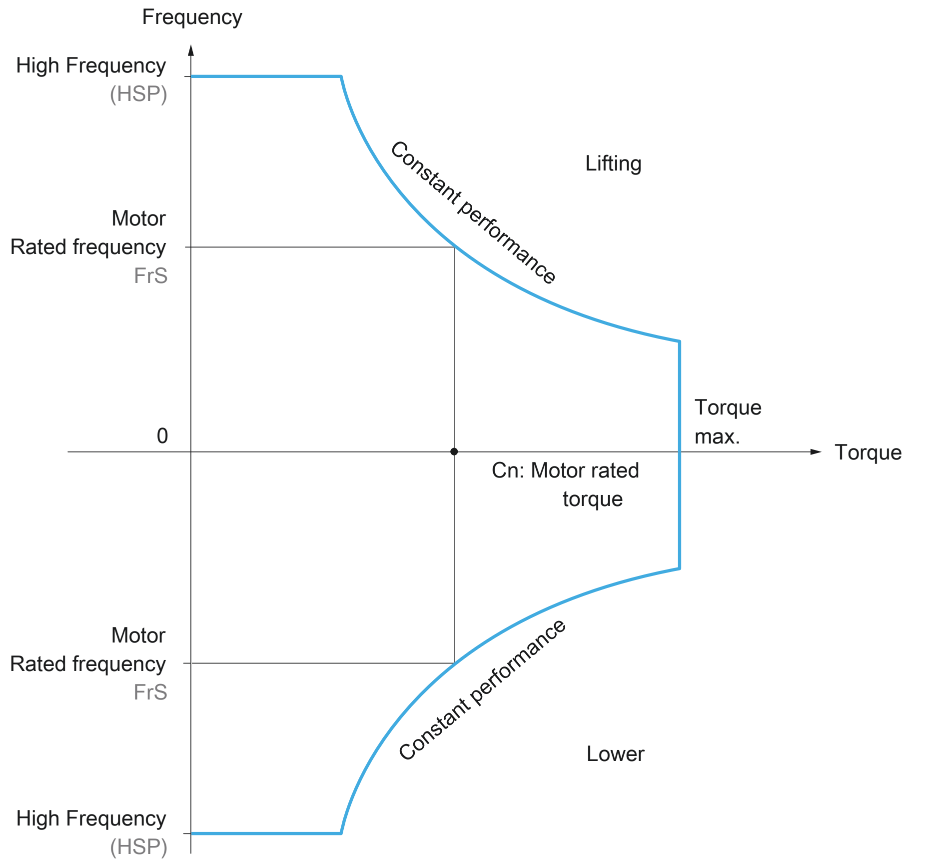
2.8.11.13 High-speed hoisting

This function can be used to optimize the cycle times for hoisting movements for zero or lightweight loads. It authorizes operation at constant power in order to reach a speed greater than the rated speed without exceeding the rated motor current.

The speed is limited by the parameter **[high speed]** (HSP), see "Parameters that can be modified during operation or when the motor is stopped." on page 130.

The function acts on the speed reference limitation and not on the reference itself.

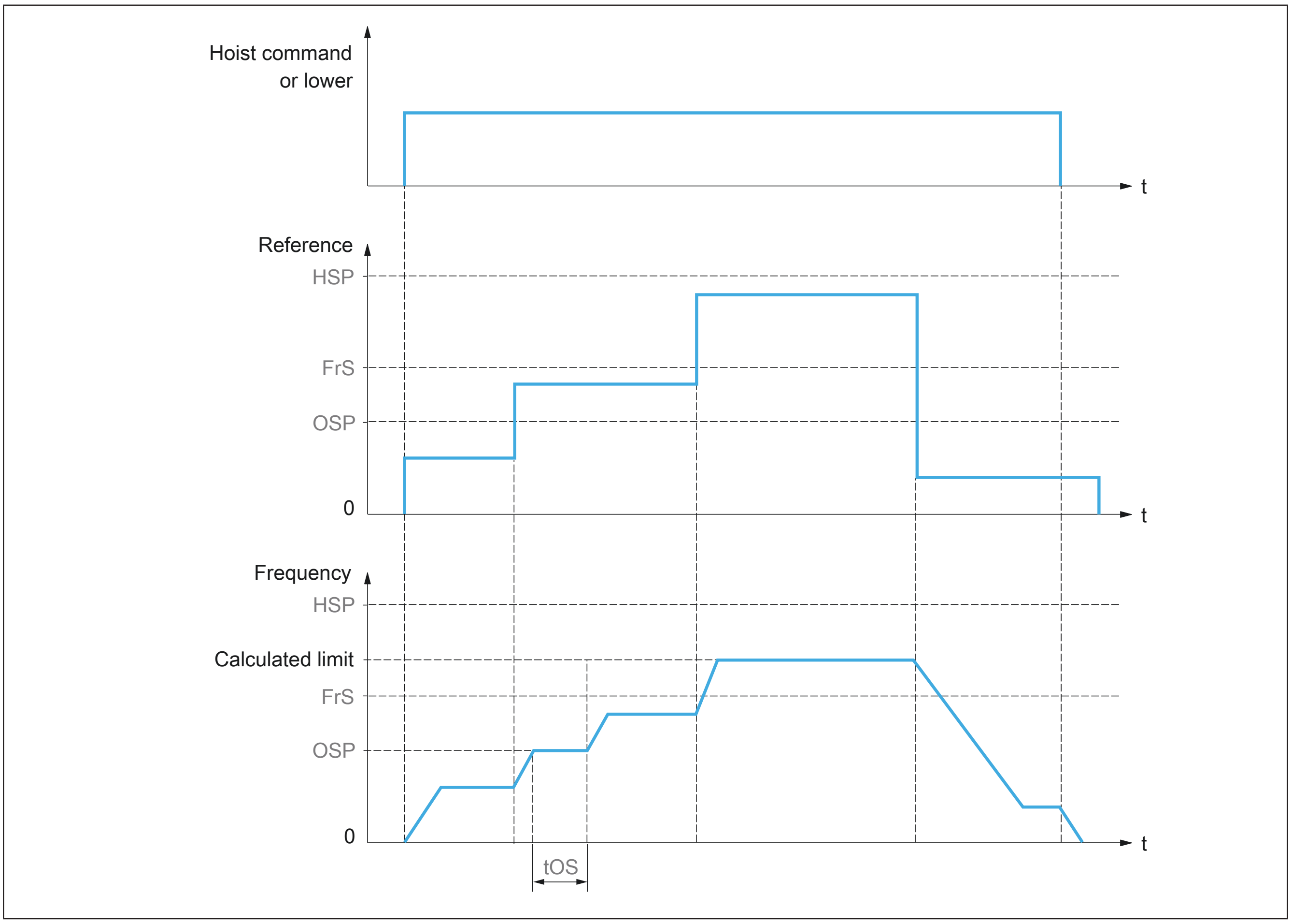
Principle:



There are 2 possible operating modes:

- "Speed reference" mode: The maximum permissible speed is calculated by the inverter during a speed step that is set so that the inverter can measure the load.
- "Current limiting" mode: The maximum permissible speed is the speed that supports current limiting in motor mode, in the "hoisting" direction only. For the "Lowering" direction, operation is always in "Speed reference" mode.

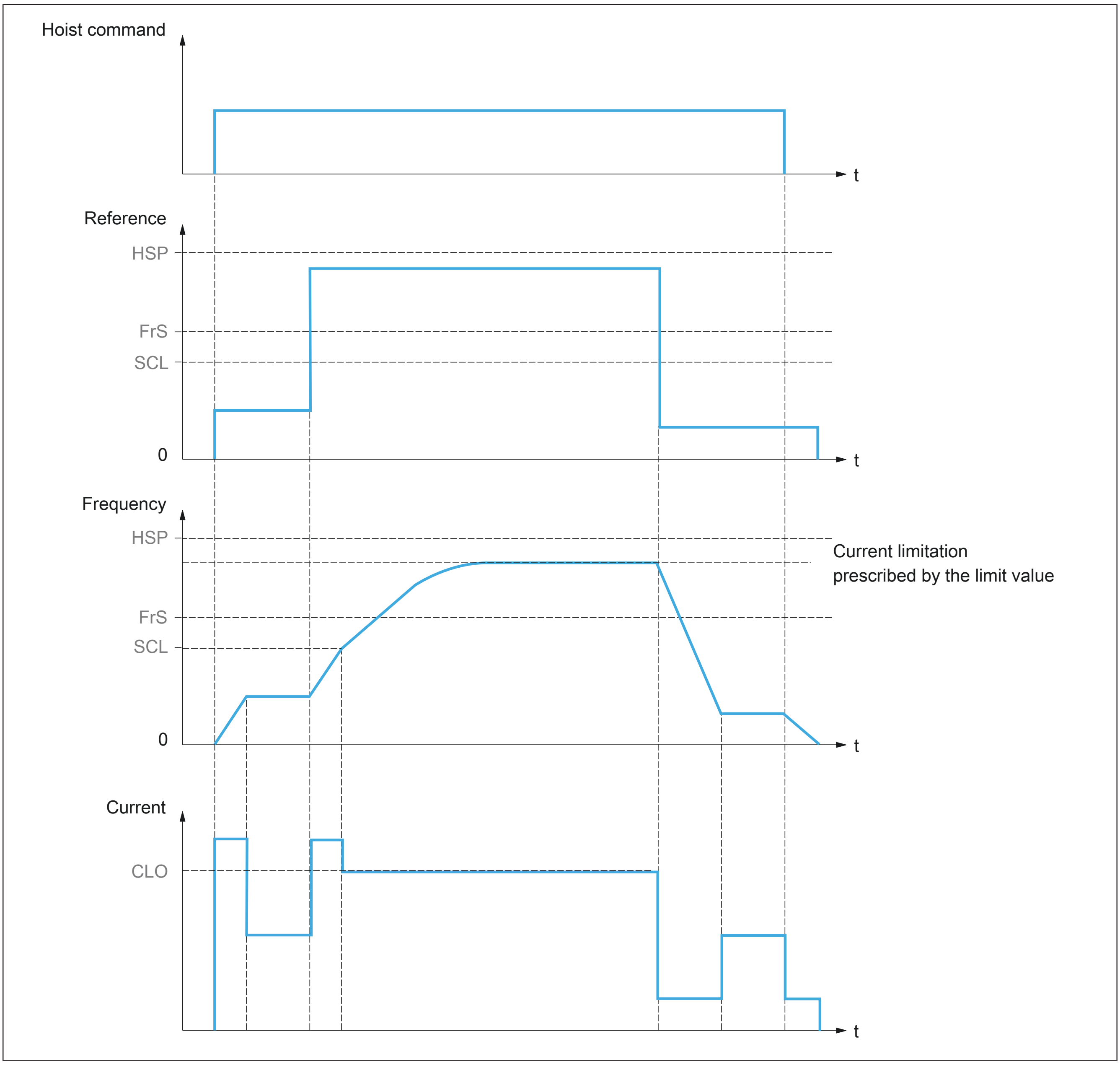
2.8.11.14 "Speed reference" mode:



OSP: Adjustable frequency step for load measurement
tOS: Load measuring time

Two parameters are used to reduce the speed calculated by the inverter, for the ascending and descending directions.

2.8.11.15 "Current limiting" mode



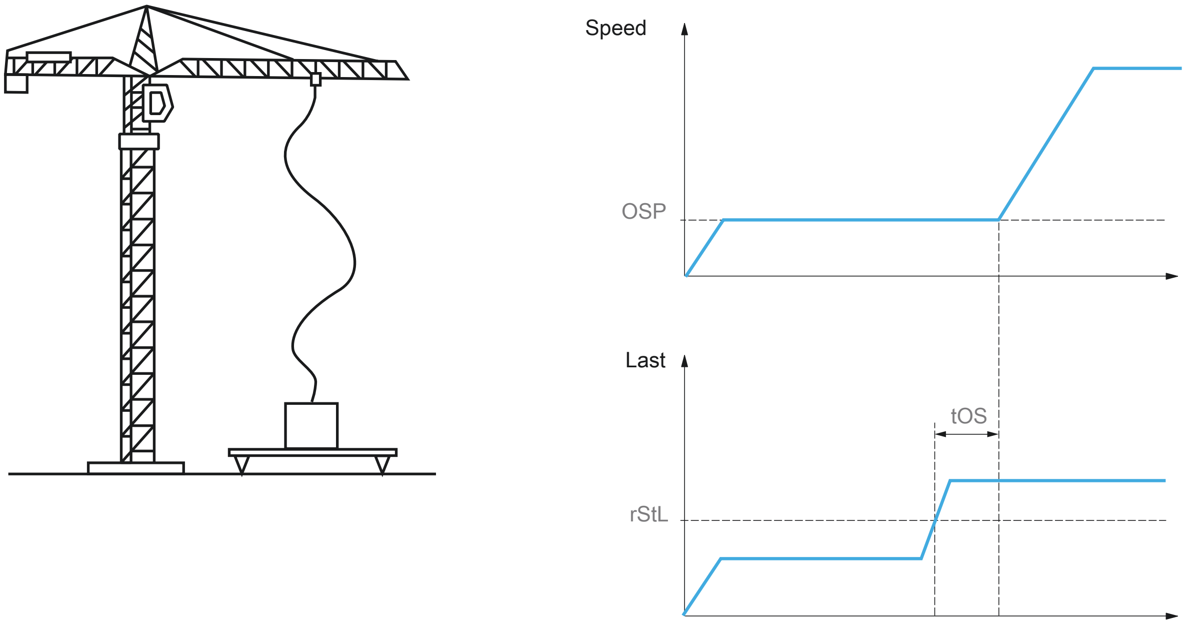
SCL: Adjustable frequency threshold, above which current limiting is active
CLO: Current limiting for HSP function, large frequency

Note:

The speed reached for a specific current will be lower in case of network undervoltage in comparison with nominal network voltage.

2.8.11.16 Rope slack

The "rope slack" function can be used to prevent starting up at high speed when a load has been set down ready for lifting but the rope is still slack (as illustrated below).



The described frequency level (parameter OSP) is used for measuring the load. As long as this has not reached the adjustable threshold rStL, which corresponds with the weight of the load hook, the effective measuring cycle (parameters OSP and tOS) is not triggered.

Via the menu **[INPUTS/ OUTPUTS]** (I-O-) the display of the status "Slack rope" can be assigned to a logic output or relay.

[HIGH SPEED HOISTING] (HSH-)

Code	Name/Description	Setting range	Factory settings
HSH-	[HIGH SPEED HOISTING] **Note:** **This function cannot be used with certain other functions. Follow the instructions** see "APPLICATION FUNCT. FUn-" on page 197.		
HSO nO SSO CSO	[High speed hoisting optim] [No] (nO): Function not active [F- reference] (SSO): Mode "Frequency reference" [Current limiting] (CSO): Mode: "Current limiting"		[No] (nO)
COF	[Motor speed coeff.] Frequency reduction coefficient calculated by the inverter for the lifting direction. The parameter can be accessed if [optim HSP hoist] (HSO) = [F- reference] (SSO).	0 to 100%	100%
COr	[Speed corr coeff] Frequency reduction coefficient calculated by the inverter for descending direction. The parameter is accessible if [optim HSP hoist] (HSO) is not equal to [No] (nO).	0 to 100%	50%
tOS	[Load Measurement time] Duration of frequency step for measurement. The parameter is accessible if [optim HSP hoist] (HSO) is not equal to [No] (nO).	0.1 s to 65 s	0.5 s
OSP	[Measurement spd] Speed stabilized for measurement. The parameter is accessible if [optim HSP hoist] (HSO) is not equal to [No] (nO).	0 to [Rated motor frequency] (FrS)	40 Hz
CLO	[High speed I Limit] HSP limitation current. The parameter is accessible if [optim HSP hoist] (HSO) is equal to [Current limiting] (CSO). The adjustment range is limited to 1.36 In if [Switch frequency] (SFr) is under 2 kHz. **Note:** **If the setting is below 0.25 in, then there is a confirmation of the risk of locking with the fault [output phase loss] (OPF).**	0 to 1.65 In [1]	In
SCL	[Current limit] Frequency threshold, above which the high-speed limitation current is active. The parameter is accessible if [optim HSP hoist] (HSO) is equal to [Current limiting] (CSO).	0 to 599 Hz	40 Hz
rSd nO drI PES	[Rope slack config.] "Rope slack" function. The parameter is accessible if [optim HSP hoist](HSO) is not equal to [No] (nO). [No] (nO): Function not active. [Calc FU] (drI): External load measurement by an estimate of the inverter torque. [ext. sensor] (PES): External load measurement by measuring encoder; Assignment is only possible if [ext. sensor] (PES) is not equal to [No] (nO).		[No] (nO)
rStL	[Rope slack trq level] Adjustment threshold corresponding to a load weighing slightly less than the hook when off-load, as a % of the rated load. The parameter is accessible when [config. slack rope] (rSd) is assigned.	0 to 100%	0%

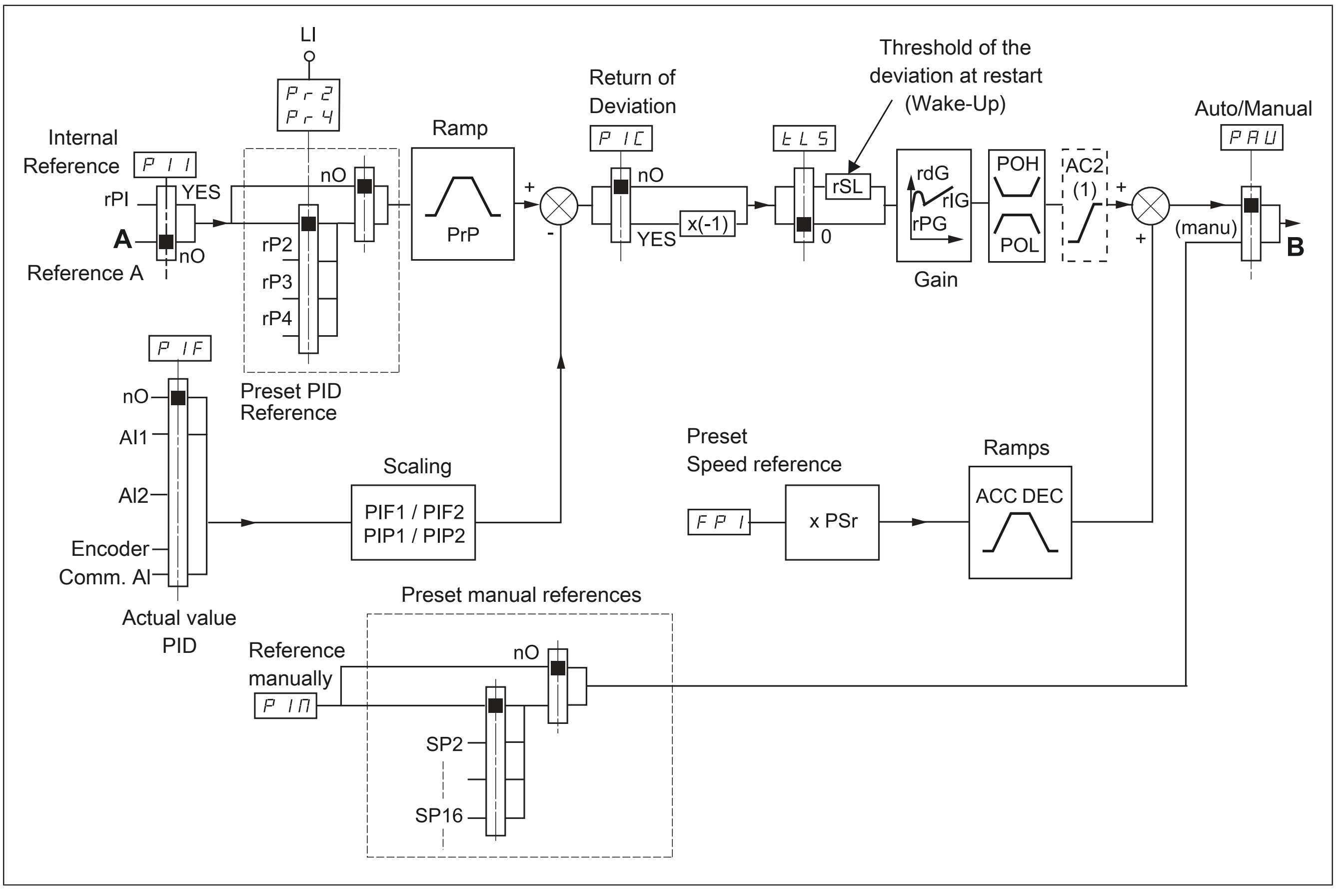
1) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

Parameter that can be modified during operation or when stopped.

2.8.11.17 PID controllers

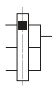
2.8.11.17.1 Overview

The function is activated by assigning an analog input to the PID feedback (measurement).



1) Ramp AC2 is only active when the PID function starts up and during PID wake-ups.

Legend:



Parameters: The black rectangle corresponds to the factory setting.

PID- feedback:

The PID feedback must be assigned to one of the analog inputs AI1, AI2 or to the encoder.

PID reference:

The PID reference must be assigned to the following parameters:

- Preselected reference values via logic inputs (rP2, rP3, rP4)
- In accordance with the configuration of **[PID initial ref]** (PII)
  - Internal reference (rPI) or
  - Reference A (Fr1 or Fr1b)

Combination table for preset PID references:

LI (Pr4)	LI (Pr2)	Pr2 = (nO)	Setpoint
			rPI or A
0	0		rPI or A
0	1		rP2
1	0		rP3
1	1		rP4

A predictive speed reference can be used to initialize the speed on restarting the process.

Scaling of feedback and references:

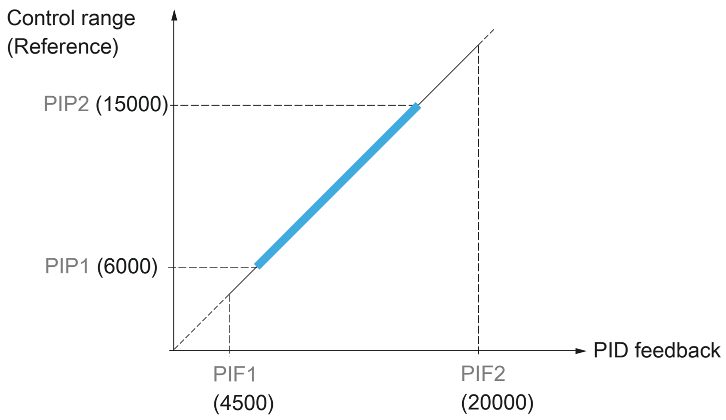
- **Parameters PIF1, PIF2**
  Can be used to scale the PID actual value (sensor area).
  This scaling absolutely must be retained for all further parameters.
- **Parameter PIP1, PIP2**
  Can be used to scale the adjustment range, i.e. the reference.
  The control range must be within the sensor range.

The maximum scaling parameter value is 32767. To simplify the start-up process, it is recommended that you use values as close to this maximum value as possible, while still staying within a power of 10 of the real values.

Example (see curve below): Adjustment of the volume in a tank, between 6 m^3 and 15 m^3.

- Used 4-20 mA sensor, 4.5 m^3 for 4 mA, 20 m^3 for 20 mA, where PIF1 = 4500 and PIF2 = 20000.
- Control range 6 to 15 m^3, where PIP1 = 6000 (min. reference) and PIP2 = 15000 (max. reference).
- Example references:
  - rP1 (internal reference) = 9500
  - rP2 (preset reference) = 6500
  - rP3 (preset reference) = 8000
  - rP4 (preset reference) = 11200

The menu [DISPLAY CONFIG.] enables a user-specific adaptation of the name of the displayed unit and its format.



Additional parameters:

- rSL:
  In this way, the threshold value of the PID deviation from which the PID controller is reactivated (wake-up) after a stop as a result of the exceeding of a time threshold of the low frequency (tLS) can be determined.
- Inverted offset direction (PIC): If PIC = nO, with a positive deviation, the motor speed increases
  Example: Pressure control with a compressor. If PIC = YES, with a positive deviation the motor speed drops
  Example: Temperature control using a cooling fan.
- The integral gain may be short-circuited by a logic input.
- An alarm on the PID feedback may be configured and indicated by a logic output.
- An alarm on the PID error may be configured and indicated by a logic output.

2.8.11.17.2 "Manual - Automatic" operation with PID

This function combines the PID regulator, the preset frequencies and a manual reference. Depending on the state of the logic input, the frequency reference is given by the preset frequencies or by a manual reference input via the PID function.

Manual reference (PIM)

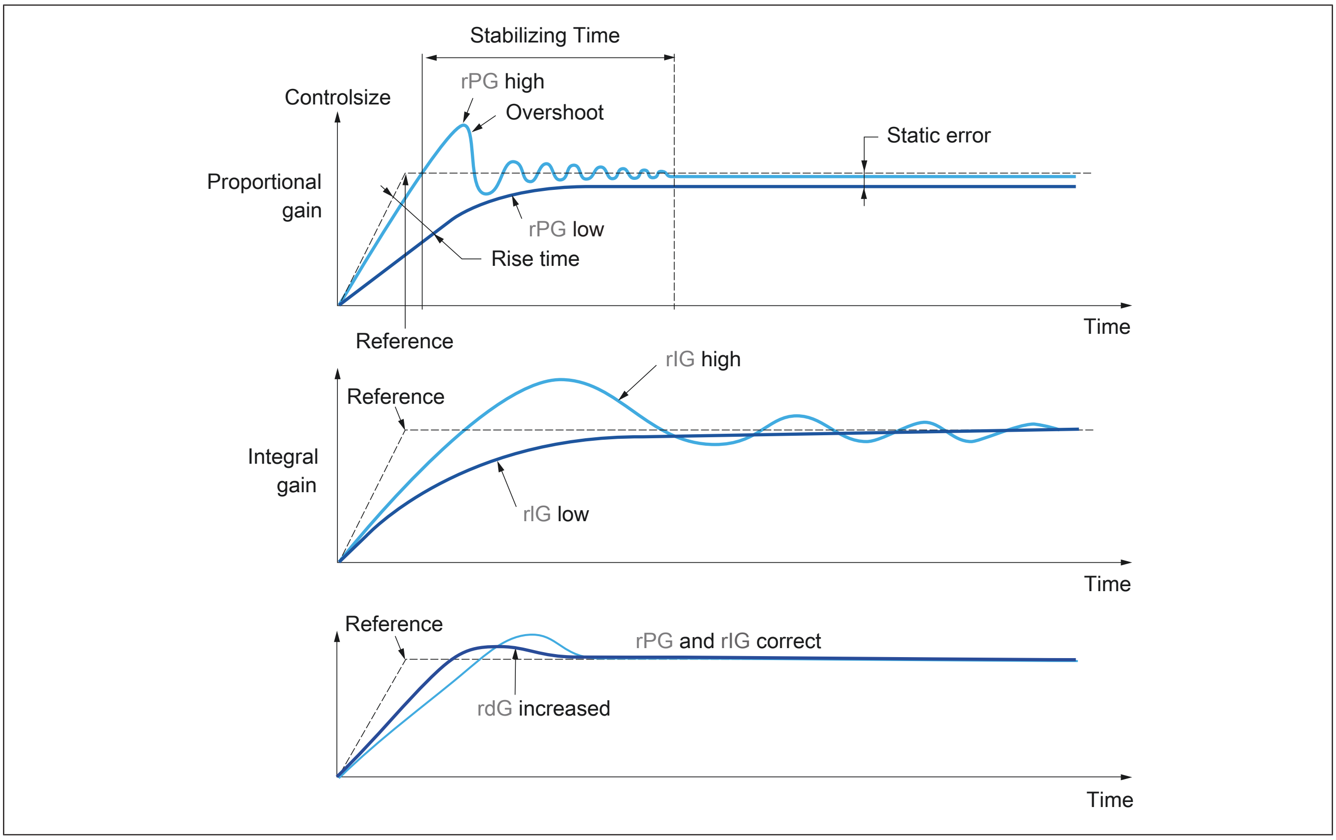
- Analog inputs AI1 or AI2
- Encoder

Specification of speed reference (FPI)

- **[AI1]** (AI1): Analog input
- **[AI2]** (AI2): Analog input
- **[Encoder]** (PG): Encoder input if encoder card has been inserted
- **[HMI]** (LCC): Graphics terminal
- **[Modbus]** (Mdb): Not applicable
- **[CANopen]** (CAn): Integrated communication interface (POWERLINK)
- **[Com. Card]** (nEt): Communication card (if present)

2.8.11.17.3 Setting up the PID regulator

1. **Configuring the PID mode**
   Chart see "Overview" on page 235.
2. **Start a test in the factory setting (this measure is sufficient in most cases).**
   For optimization of the inverter, align (rPG) or (rIG) step-by-step and independently of each other and monitor the effect on the PID feedback in relation to the reference.
3. **If the factory settings are unstable or the reference is not met**
   - Test the frequency range of the system under load with a reference value under manual operation (without PID controls):
     - Speed must remain stable in steady state, and correspond to the reference; the PID feedback value must remain stable.
     - In temporary operation, the speed must follow the ramp and stabilize quickly; the PID feedback value must track with the speed.
       Perform other tests to check inverter settings and/or sensor signals and wiring.
   - Switch to PID mode and set
   - Set brA to nO (no self-alignment of the ramp).
   - Set the PID ramp (PrP) to the permissible minimum value for the machine, without triggering the fault ObF.
   - Set the integral gain (rIG) to minimum.
   - Leave the differential gain (rdG) at 0.
   - Observe the PID feedback and the reference.
   - Switch the frequency inverter ON/OFF a number of times or vary the load or reference rapidly a number of times.
   - Set the P-component (rPG) so that the best compromise between response time and stability during the temporary phases is found (slight overshoot and 1 to 2 vibrations prior to stability).
   - If the reference value is not complied with in the steady-state condition, increase the I-integral (rIG) progressively and reduce the P-component (rPG) on instability. Achieve a compromise between response time and precision (see diagram).
   - Finally, with the D component, overshoot can be reduced and response time improved, with a stability compromise as compensation that is not easy to achieve because it depends on three gain factors.
   - Follow these production-related tests for the complete reference range.



The oscillation frequency depends on the system kinematics.

Parameter	Rise time	Overshoot	Stabilizing time	Static error
rPG ↗	↘↘	↗	=	↘
rIG ↗	↘	↗↗	↗	↘↘
rdG ↗	=	↘	↘	=

[PID REGULATOR] (PId-)

Code	Name/Description	Setting range	Factory settings
PId-	**[PID REGULATOR]** **Note:** **This function cannot be used with certain other functions. Follow the instructions in** see "APPLICATION FUNCT. FUn-" on page 197.		
PIF nO AI1 AI2 PG AIU1	**[PID feedback]** **[No]** (nO): Not assigned (function not active). All parameters of this function are inaccessible. **[AI1]** (AI1): Analog input **[AI2]**(AI2): Analog input **[Encoder]** (PG): Encoder input if encoder card has been inserted **[AI virt com]** (AIU1): Virtual input via the communication bus **Note:** **If the equipment is switched to forced local mode (**see "COMM. CARD and FORCED LOCAL (LCF-)" on page 310**), the virtual input used in the current configuration remains fixed at the last value transmitted.**		**[No]** (nO)
AIC1 nO Mdb CAn nEt	**[AI1 communication]** The parameter is accessible if **[PID feedback]** (PIF) = **[AI virt com]** (AIU1). This parameter can also be activated via the menu **[INPUTS/OUTPUTS]** (I-O-). **[No]** (nO): Not active **[Modbus]** (Mdb): Not applicable **[CANopen]** (CAn): Integrated communication interface (POWERLINK) **[Com. Card]** (nEt): Communication card (if present)		**[No]** (nO)
PIF1	**[Min PID feedback]** 1) Value for minimum feedback. Setting range from 0 to **[PID max feedback]** (PIF2)2).		100
PIF2	**[Max PID feedback]**1) Value for maximum feedback. Setting range from **[PID min feedback]** (PIF1) to 32767 2).		1000
PIP1	**[Min PID reference]**1) Minimum process value. Control range of **[PID min feedback]** (PIF1) to **[max PID reference]** (PIP2)2).		150
PIP2	**[Max PID reference]** 1) Maximum process value. Control range from **[min PID ref]** (PIP1) to **[PID max feedback]** (PIF2) 2).		900
PII nO YES	**[Act. internal PID ref.]** Internal PID regulator reference **[No]** (nO): The reference of the PID controller is supplied by Fr1 or Fr1b; possibly with the summation / subtraction / multiplication functions. **[Yes]** (YES): The reference of the PID controller is an internal reference due to the parameter rPI.		**[No]** (nO)
rPI	**[Int. Ref. PID]** Internal reference of the PID controller. This parameter can also be activated via the menu **[MONITORING]** (SUP-). Setting range from **[min PID ref]** (PIP1) to **[max Ref. PID feedback]** (PIF2) 2).		150
rPG	**[PID prop. gain]** Proportional amplifier	0.01 to 100	1
rIG	**[PID integral gain]** Integral gain	0.01 to 100	1
rdG	**[PID derivative gain]** Derivative gain	0 to 100	0
PrP	**[PID ramp]**1) Ramp-up/down ramp of the PID, which is set for a range of **[min PID ref]** (PIP1) to **[max PID ref]** (PIP2) or vice versa.	0 to 99.9 s	0 s
PIC nO YES	**[PID correct. reverse]** **[No]** (nO) **[Yes]** (YES) Inverted offset direction (PIC): If PIC = nO, with a positive deviation the motor speed increases. Example: Pressure control with a compressor. If PIC = YES, with a positive deviation the motor speed drops Example: Temperature control using a cooling fan.		**[No]** (nO)
POL	**[Min PID output]** 1) Minimum value of regulator output in Hz.	0 to 599 Hz	0 Hz
POH	**[Max PID output]** 1) Maximum value of regulator output in Hz.	0 to 599 Hz	60 Hz
PAL	**[Min fbk alarm]** 1) Minimum monitoring threshold for regulator feedback. Control range from **[min PID feedback]** (PIF1) to **[PID max feedback]** (PIF2) 2).		100
PAH	**[Max fbk alarm]** 1) Maximum monitoring threshold for regulator feedback. Control range from **[min PID feedback]** (PIF1) to **[PID max feedback]** (PIF2) 2).		1000
PEr	**[PID error Alarm]** 1) Regulator error monitoring threshold.	0 to 65535 2)	100
PIS nO LI1 - 	**[PID integral reset]** **[No]** (nO): Function not active. **[LI1]** (LI1) . **[...]** (...): See the assignment conditions If the assigned input or bit is at 0, the function is inactive (the PID integral is enabled). If the assigned input or bit is at 1, the function is active (the PID integral is blocked).		**[No]** (nO)
FPI	**[Speed ref. assign.]**		**[No]** (nO)

Code	Name/Description	Setting range	Factory settings
	PID controller specified speed input		
nO	[No] (nO): Not assigned (function not active)		
AI1	[AI1](AI1): Analog input		
AI2	[AI2] (AI2): Analog input		
LCC	[HMI] (LCC): Graphics terminal		
Mdb	[Modbus] (Mdb): Not applicable		
CAn	[CANopen] (CAn): Integrated communication interface (POWERLINK)		
nEt	[Com. Card] (nEt): Communication card (if present)		
PG	[Encoder] (PG): Encoder input if encoder card has been inserted		
PSr	[Speed input %] 1) Multiplying coefficient for predictive speed input. The parameter is accessible when [assign ref of PID] (PES) = [No] (nO).	1 to 100%	100%
PAU	[Auto/Manual assign]		[No] (nO)
nO	[No] (nO): The PID is always active.		
LI1	[LI1] (LI1)		
-	. [...](...): See the assignment conditions In state 0 of the input or the assigned bit, the PID controller is active. In state 1 of the input or the assigned bit, the manual operation is active.		
AC2	[Acceleration 2] 1) Time till acceleration from 0 to [Rated motor frequency] (FrS). Make sure that this value is compatible with the frequency inverter's moment of inertia. Ramp AC2 is only active when the PID function starts up and during PID wake-ups.	0.01 to 6000 s 3)	5 s
PIM	[Manual reference] Manual speed input. This parameter can be activated if [assign. auto/manual] (PAU) is not equal to [No] (nO) .		[No] (nO)
nO	[No] (nO): Not assigned (function not active)		
AI1	[AI1] (AI1): Analog input		
AI2	[AI2] (AI2): Analog input		
PG	[Encoder] (PG): Encoder input, if encoder card present The preset speeds are active on the manual reference if they have been configured.		
tLS	[Low speed time out] 1) Maximum operating time with [low speed] (LSP). Following operation at LSP for a defined period, a motor stop is requested automatically. The motor restarts when the reference is greater than LSP and if a run command is still present. **Caution!** **A value of 0 indicates an unlimited period of time.** **Note:** **If [operating hours for LSP] (tLS) is not equal to 0, the parameter [STOP MODE] (Stt)(see "STOP MODE (Stt-)" on page 206) is forced to [stop ramp] (rMP) (only if stop can be configured via ramp).**	0 to 999.9 s	0 s
rSL	[PID wake up thresh.] If the functions "PID" and "Duration of operation at low speed" (tLS) are configured at the same time, the PID controller may attempt to set a lower speed than LSP. This results in unsatisfactory operation, which consists of starting, operating at LSP then stopping, and so on… With the parameter rSL (threshold value of the deviation at restart), a minimum threshold of the PID deviation can be set for the restart after a standstill in the event of lengthy operation with low speed LSP. The function is inactive if tLS = 0 or if rSL = 0. **Warning!** **ACCIDENTAL OPERATION OF DEVICE** **Check that an unexpected restart will not present any danger.** **Failure to follow these instructions will result in death or serious injury.**	0 to 100	0

1) This parameter can also be accessed via the [SETTINGS] (SEt-) menu.
2) If there is no graphic display terminal, then on the four-digit display the values over 9999 are shown with one point after the thousands unit, for example, 15.65 for 15650.
3) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 9999 s in accordance with [ramp increment] (Inr).

Parameter that can be modified during operation or when stopped.

[PRESET PID REF] (PrI-)

Code	Name/Description	Factory settings
Pr1-	**[PRESET PID REF]** The function is accessible if **[PID feedback]** (PIF) is assigned.	
Pr2 nO LI1 - 	**[Assign 2 PID ref.]** **[No]** (nO): Function not active **[LI1]** (LI1) . **[...]** (...): See the assignment conditions In state 0 of the input or the assigned bit, the function is not active. In state 1 of the input or the assigned bit, the function is active.	**[No]** (nO)
Pr4 nO LI1 -	**[Assign 4 PID ref.]** Make sure that **[assign 2 PID ref]** (Pr2) has been assigned before you assign this function. **[No]** (nO): Function not active **[LI1]** (LI1) . **[...]** (...): See the assignment conditions In state 0 of the input or the assigned bit, the function is not active. In state 1 of the input or the assigned bit, the function is active.	**[No]** (nO)
rP2	**[Preset ref. PID 2]** 1) The parameter is accessible when **[assign 2 PID ref]** (Pr2) is assigned. Setting range from **[min PID ref]** (PIP1) to **[max Ref. PID]** (PIF2) 2).	300
rP3	**[Preset ref. PID 3]** 1) The parameter is accessible when **[assign 4 PID ref]**(Pr4) is assigned. Setting range from **[min PID ref]** (PIP1) to **[max Ref. PID]** (PIF2) 2).	600
rP4	**[Preset ref. PID 4]** 1) The parameter is accessible when **[assign 4 PID ref]** (Pr4) is assigned. Setting range from **[min PID ref]** (PIP1) to **[max Ref. PID]** (PIF2) 2).	900

1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.
2) If there is no graphic display terminal, then on the four-digit display the values over 9999 are shown with one point after the thousands unit. For example, 15.65 for 15650.

Parameter that can be modified during operation or when stopped.

2.8.11.17.4 PID management

Description of the problem

A position reference is sent to the inverter (PISP parameter).

An analog potentiometer that is read in AI1 (PIF is set to AI1) is used as a feedback value.

If the stop command (CMDD bit 8) is now triggered, the PISP parameter changes and the stop command is released. In this case the control does not compensate for the full difference between the position reference and the actual position.

The movement only occurs for a certain distance, resulting in a difference between the position reference and the actual value.

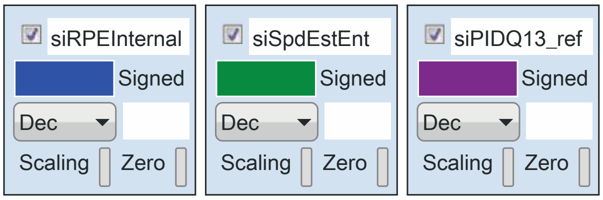
If the stop command is now triggered again and then removed, the delay fault is compensated and the motor moves into the correct position (it is really only the stop command that is triggered and reset - there is no other control - and the PID of the inverter compensates for the difference between the reference and the actual position).

Test case 1: The PID response corresponds to the response time of the PID feedback.

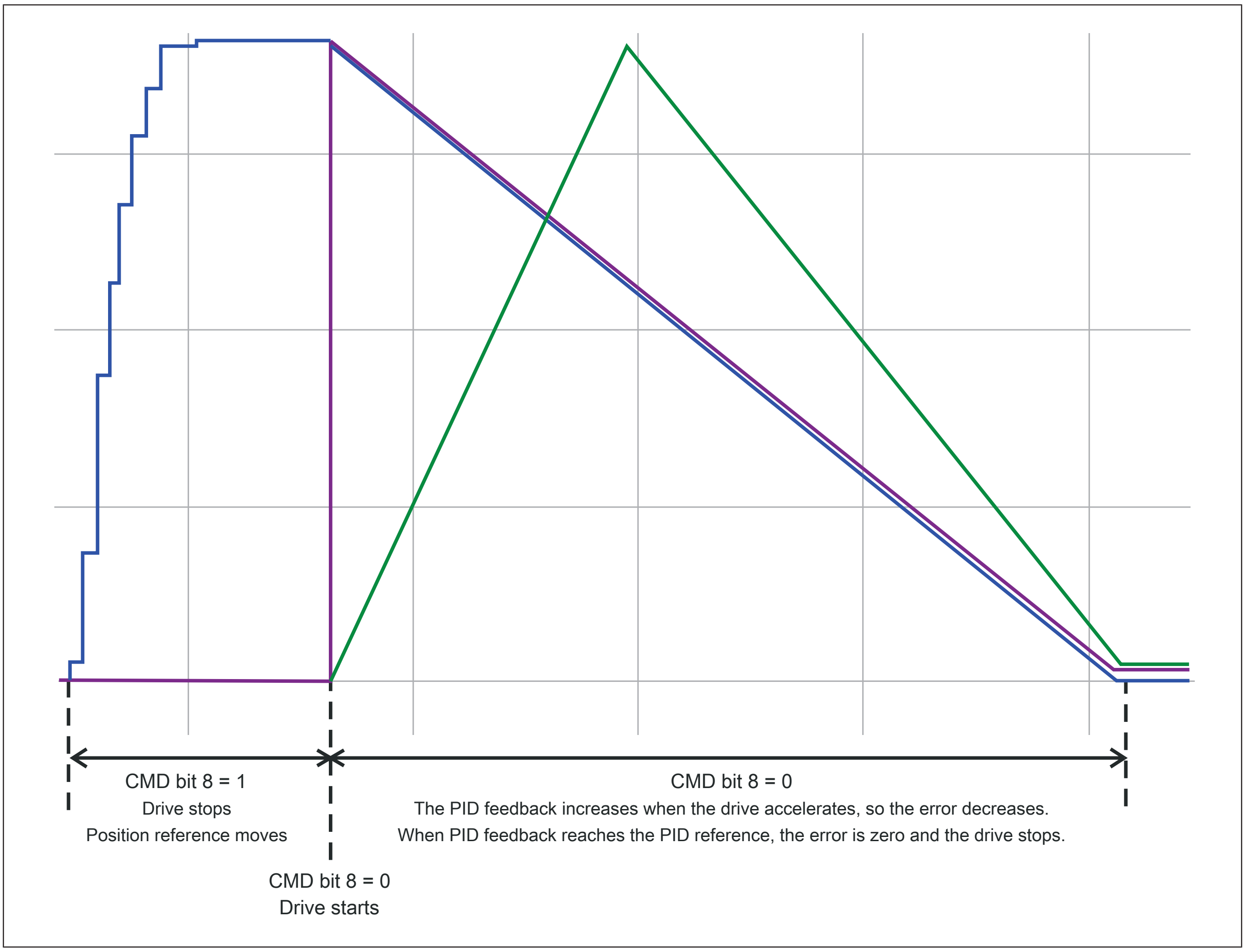
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	1.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	30
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



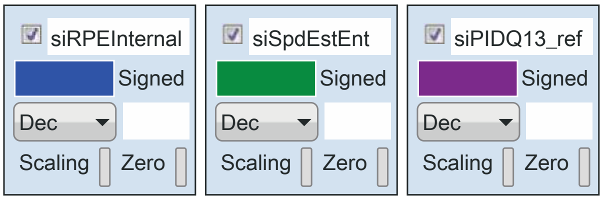
This is the expected behavior. The fault remains positive, the inverter accelerates. As a result, the PID feedback increases (the fault decreases), so the PID reference size is reached. The motor is in the run mode, but with a speed of 0.

Test case 2: The PID response is faster than the response time of the PID feedback.

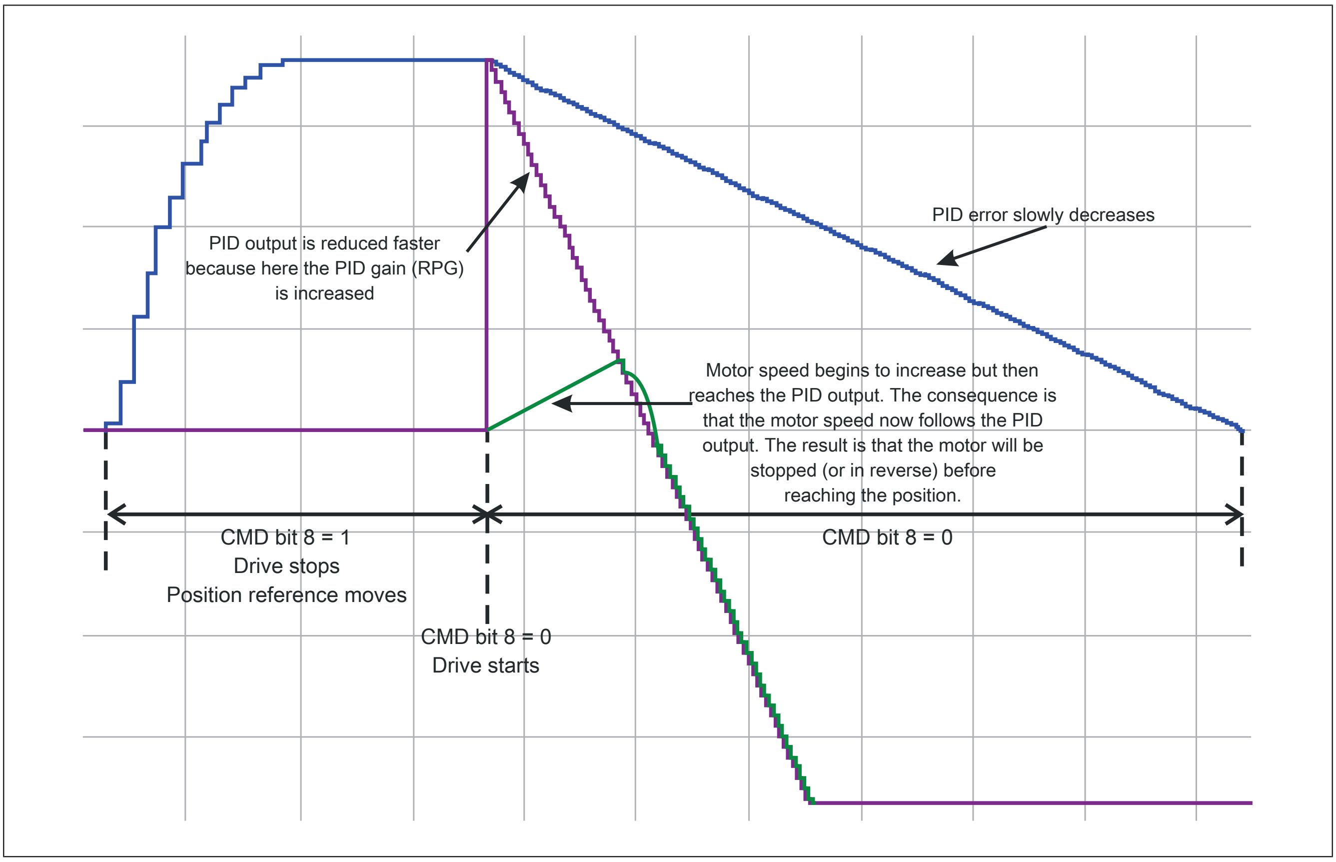
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	30
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



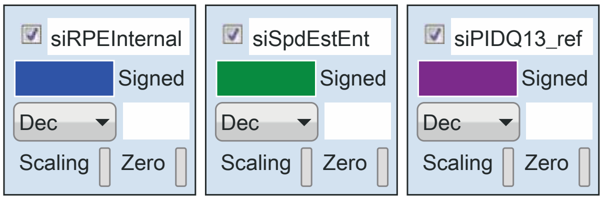
In this case the PID gain (RPG) is set to a higher value to obtain a higher PID responsiveness. With this setting the PID output reacts faster in comparison to the motor speed and the PID feedback. The motor speed is therefore reaches the PID output, which has already reduced before reaching the position. This leads to a positioning fault.

Test case 3: PID response to STOP with stop bit.

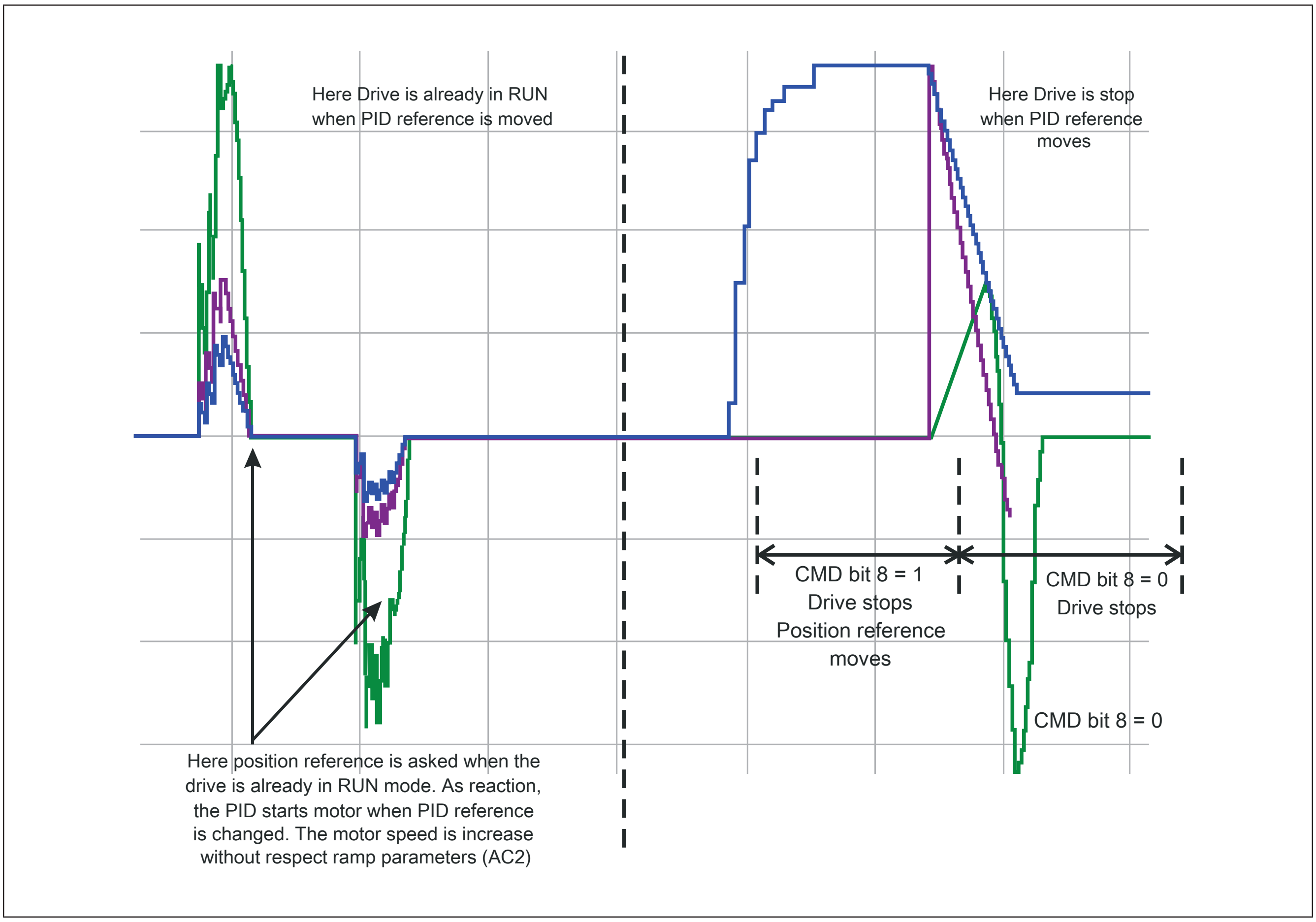
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	30
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



If the inverter is already in the RUN mode if the PID reference variable is changed, the motor responds without subsequent gain. The response is immediate.

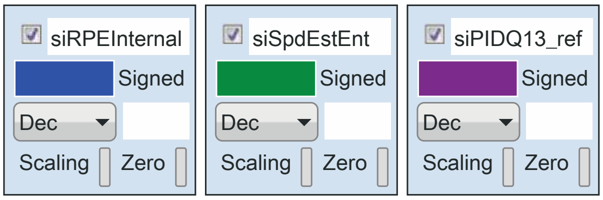
If the inverter stops (e.g. by CMD-bit 8), the motor responds, but accelerates on the basis of the AC2 parameter. The result would be that the motor physically reaches the PID output via the tracking of the AC2 ramp and loses time during this. This results in a positioning error compared to the start without AC2 tracking.

Test case 4: Reset time

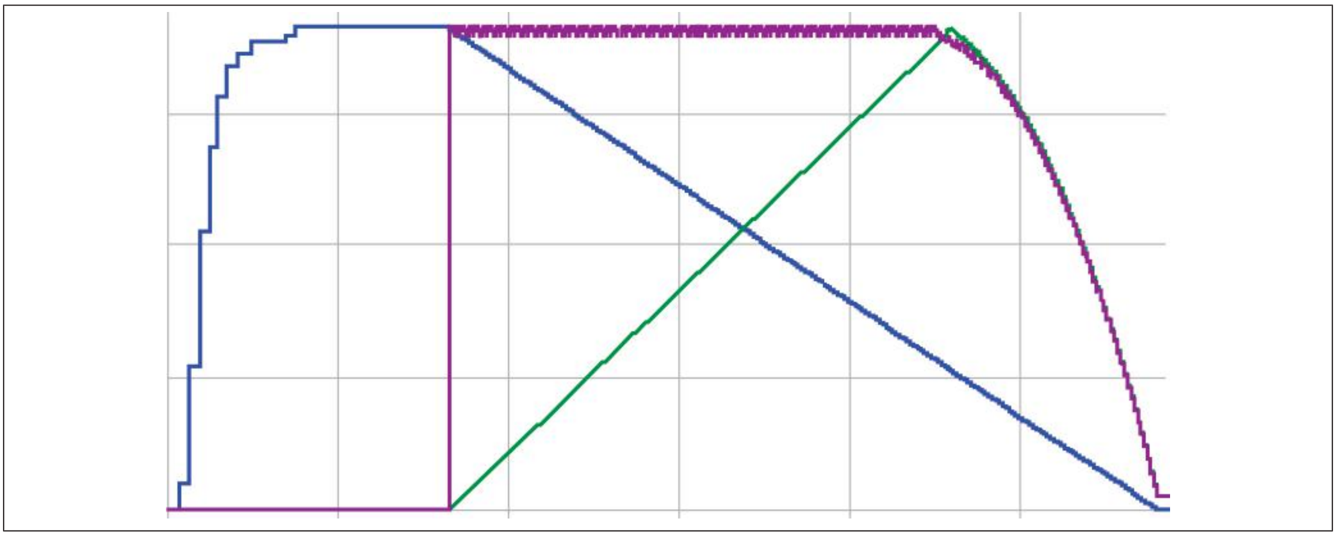
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	5.00	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	30
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



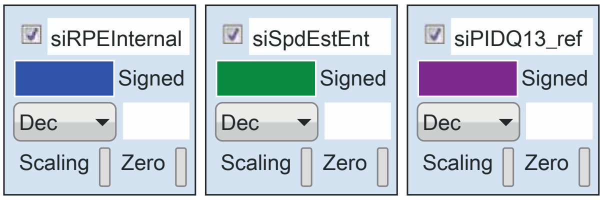
If the PID reference variable has been moved, the inverter is stopped (CMD bit 8 = 1). The AC2 parameter has the same effect as previously when starting in this example. For this reason, the motor speed will be adapted according to the ramp so that the PID output is achieved. This integral intervention allows the generation of the average value for the PID fault and then adds it to the PID output. This produces a PID output that does not only follow a linear ramp.

Test case 5: Reset time + AC2 ramp reduction

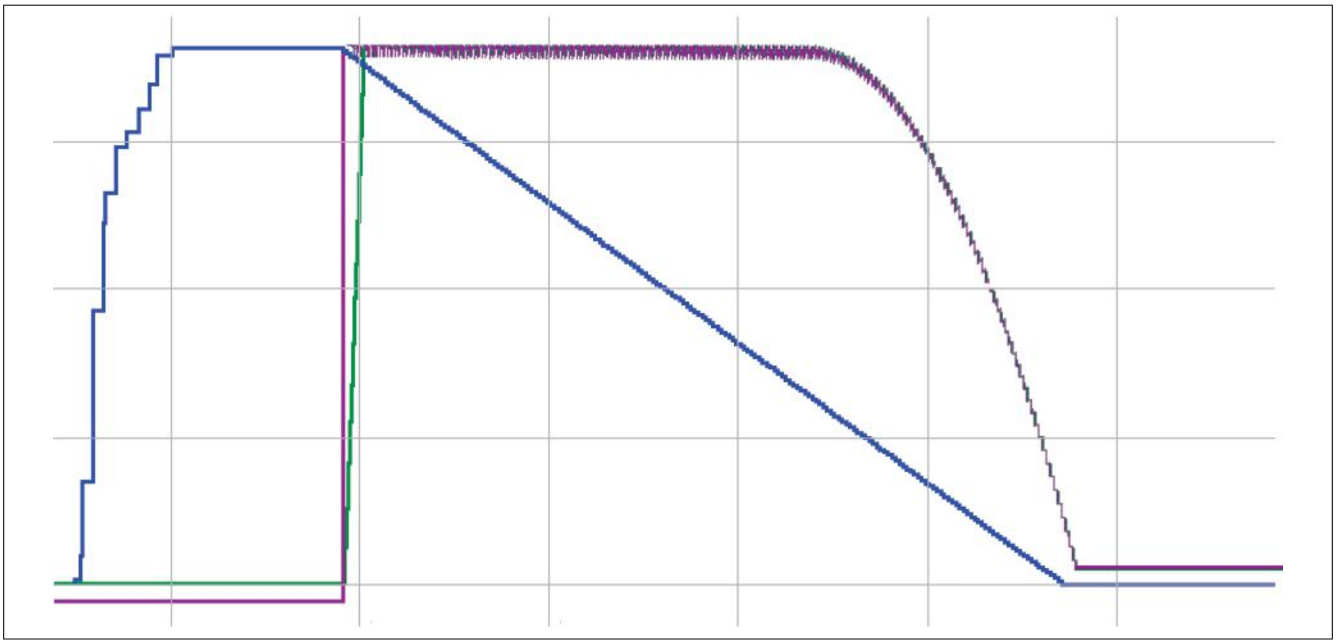
ACOPOSinverter PID configuration:

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	5.00	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	1
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

Test results:



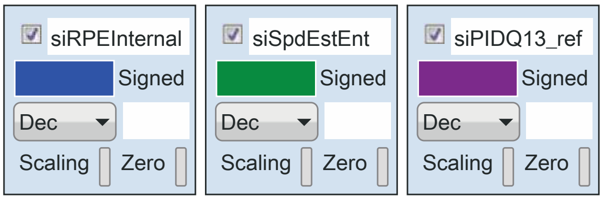
siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



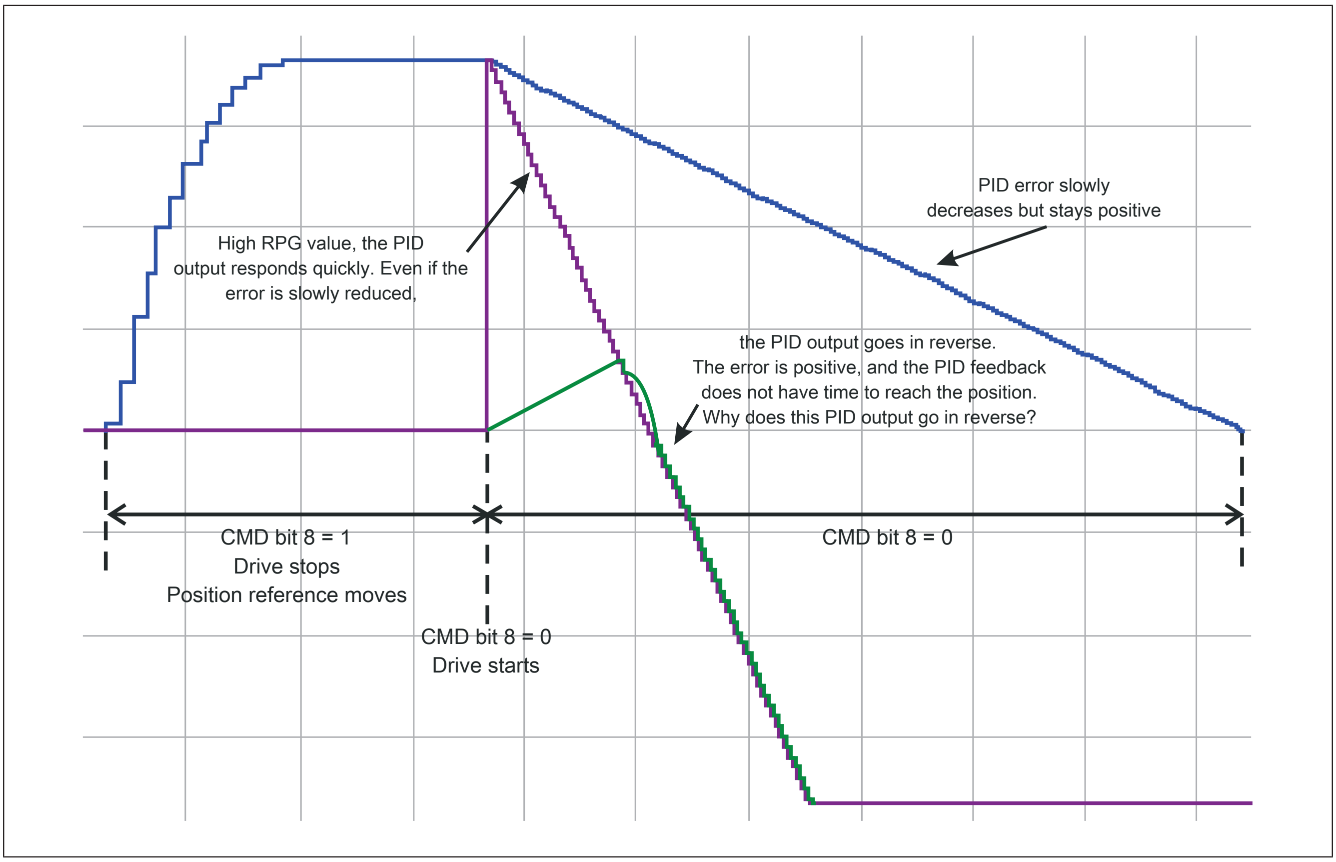
If the PID reference variable has been moved, the inverter is stopped (CMD bit 8 = 1). The AC2 parameter has the same effect as previously when starting in this example. With AC2 = 0.1 s, the PID output is reached more quickly. This reset time allows the generation of the average value for the PID fault and then adds it to the PID output. This produces a PID output that does not only follow a linear ramp.

What results in a falling ramp (with reversing direction) with proportional gain and a continually positive error?

This needs to be studied.



siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



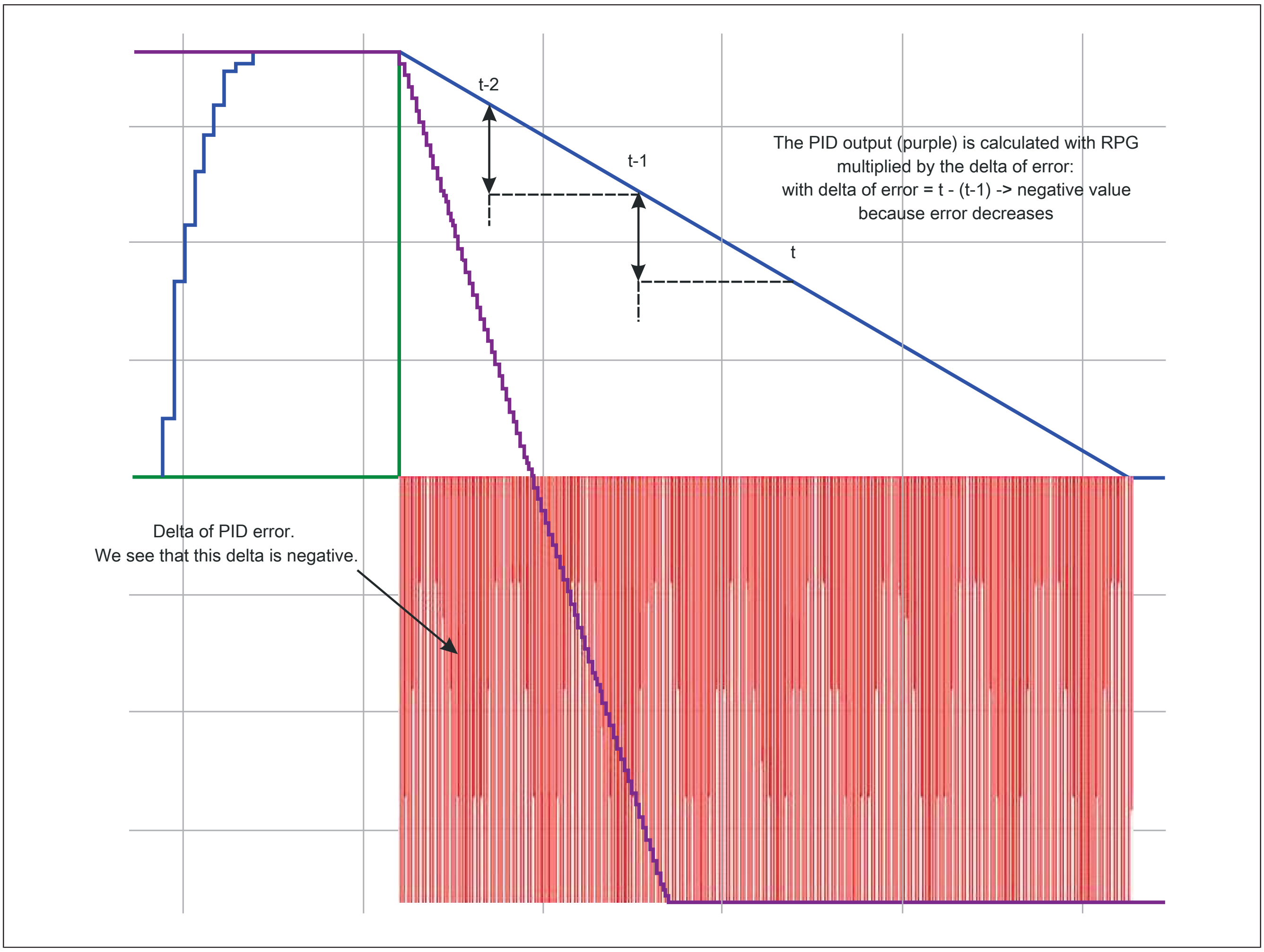
In the case of a high RPG-value the PID output responds more rapidly. This PID output is even reversed in the case of a positive fault. The PID Feedback does not have enough time to reach the PID reference variable, but the inverter turns round. In practical use, this means that this position is never reached.

The behavior is also similar to when the inverter is in RUN mode and the PID reference variable changes.

Explanation:

Taking into account the inverter settings.

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	1
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

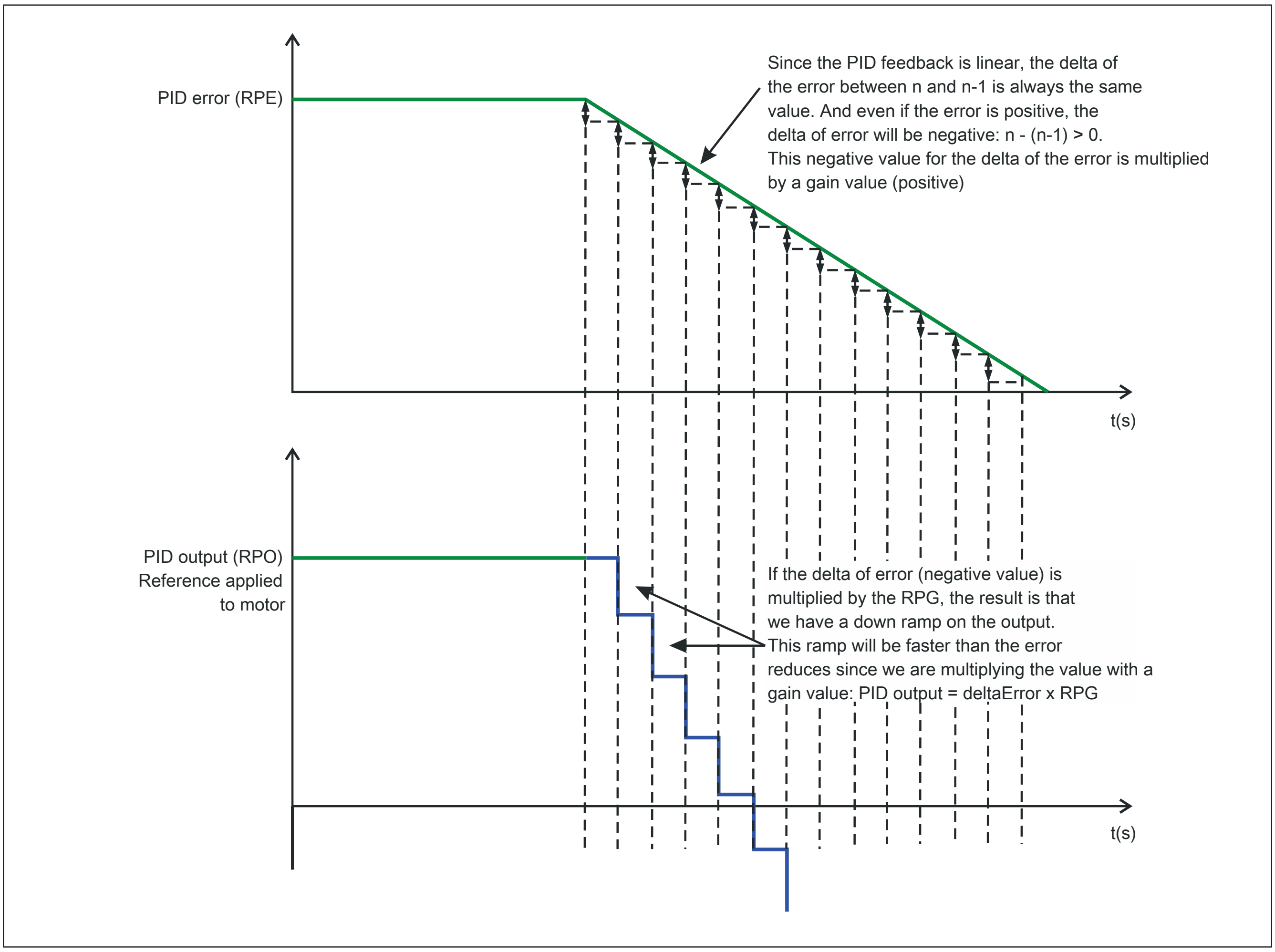


In our inverters PID output is calculated by multiplying the RPG-value (gain) with the delta of the error. Since the PID feedback is linear, the delta value for the fault between t and t-1 will always be the same value. And even in the case of a positive error, the delta value of the error is negative: t-(t-1) < 0. This negative delta value of the error is multiplied by a gain (positive) value.

The result: The error is positive, but the delta value of the error is negative. Multiplied by the gain, the PID output decreases.

If POL = 0, the PID output is limited to 0. If POL permits a negative value, the PID output is negative and the motor can be run in reverse.

Diagram



Conclusion and recommendation

- In our inverters PID output is calculated by multiplying the RPG-value (gain) with the delta value of the error. Even in the case of a positive error, the delta value of the error is negative if this error reduces. The delta value of the error is multiplied by the RPG-value. For this reason with a high RPG-value the PID output is a falling ramp up to 0 (or reversal operation at POL < 0).
- If the motor has also been stopped in the event of a change of the PID reference, the motor starts, but follows the AC2 parameters. This is not the case if the inverter is in RUN mode and the PID reference variable is moved.
- For correct behavior, the PID must be adjusted. Proportional gain cannot be used alone. The same applies for the integral gain - it cannot be completely suppressed. You can have a minimum value of 0.01 for it, but it is always present.

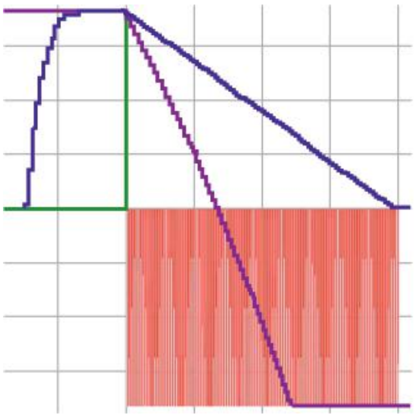
The points 1 and/or 2 may be the result of a poor positioning at the customer site.

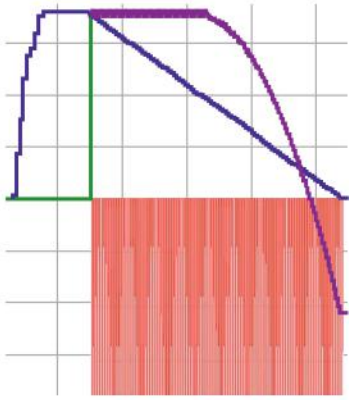
Our recommendation:

- **In the first step, the AC2 value should be reduced to a minimum.** This reduces the difference in behavior when starting of the motor when the inverter is already in the RUN mode and the motor is started at the stopping of the inverter.
- **Adjust the PID values RPG and RIG in the second step** (and, if possible, also RDG). The objective is to find the best compromise of dynamics and precision at the stop.

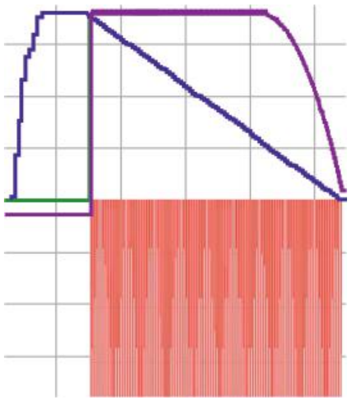
RPG:	7.00
RIG:	1.00
RDG:	0.00
PRP:	0.0 s

RPG:	7.00
RIG:	3.00
RDG:	0.00
PRP:	0.0 s





RPG:	7.00
RIG:	5.00
RDG:	0.00
PRP:	0.0 s



- The specified reference must be used in the third step. Using the specified reference, a reference speed can be sent directly to the output of the PID controller.

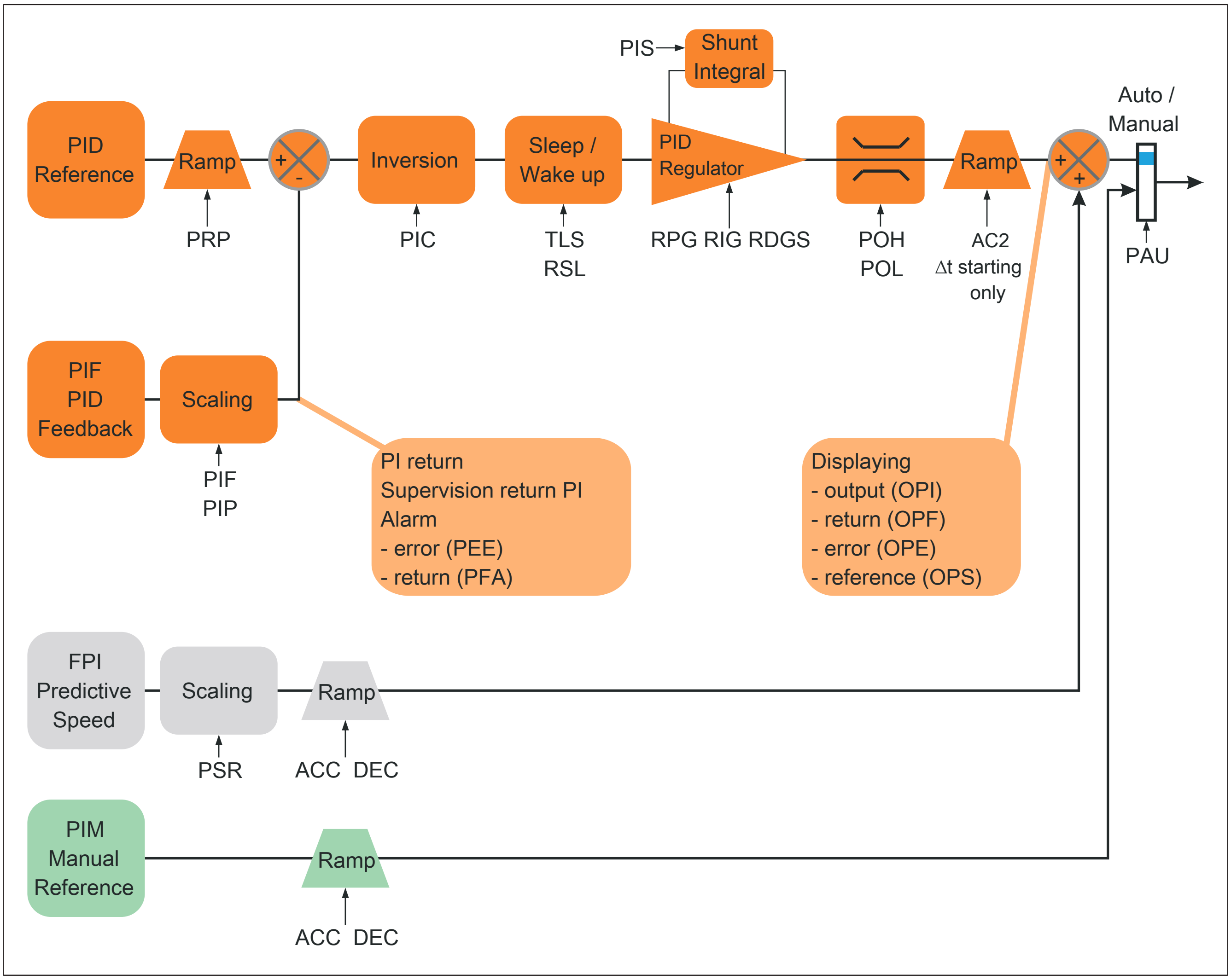
The parameters described below are accessed as follows: DRI- > COnF > FULL > FUn- > PId-			
Code	**Description**	**Setting range**	**Factory settings**
PId-	**[PID REGULATOR]**		
FPI	**[PID ref. assign.]** PID controller specified speed input		
nO	Not assigned (function inactive)		
AI1	Analog input		
AI2	Analog input		
AI3	Analog input		
AI4	Analog input		
LCC	Graphic display terminal		
Mdb	Integrated Modbus		
CAn	Integrated CANopen		
nEt	POWERLINK communication card (if used)		
APP	Integrated control card (if used)		
PI	Frequency input		
PSr	**[Speed input %]** Multiplication factor for the specified frequency input. The parameter is not accessible when **[Speed ref. assign.]** (FPI) = **[No]** (nO).	1 to 100%	100%

Parameter that can be modified during operation or when stopped.

In order to use the FPI, this must be configured on the reference channel and the PSR value defined.

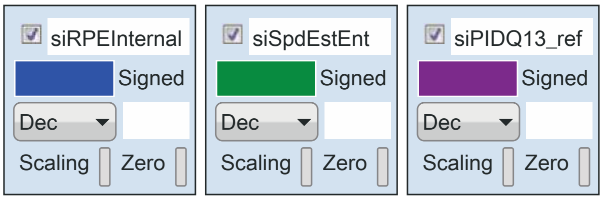
Send the target speed for the speed specification via the configured channel.

With the reference for the speed specification, you can add a frequency reference to this PID output.



Programming guidelines

Below you will find a configuration example for the given reference.

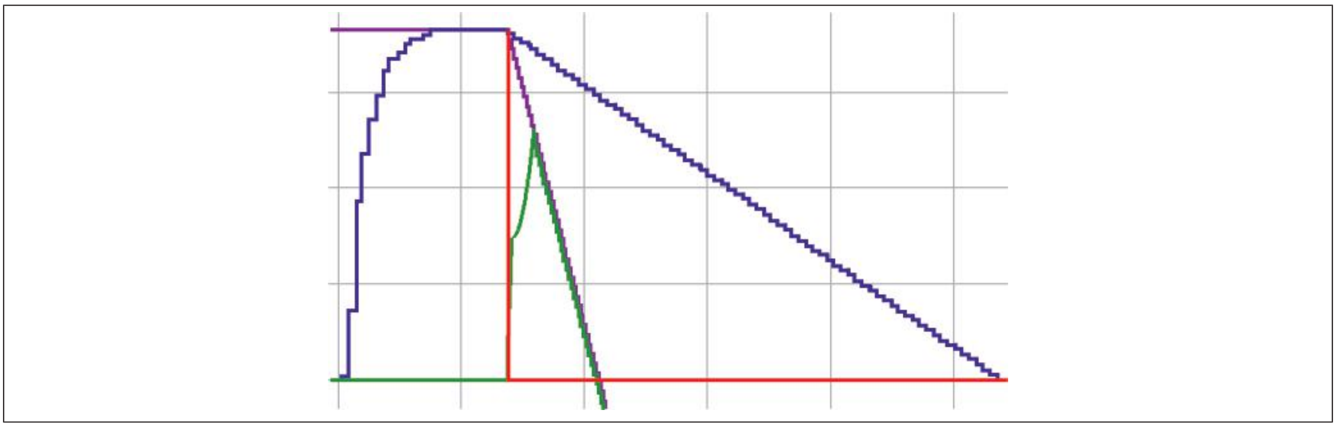


siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output

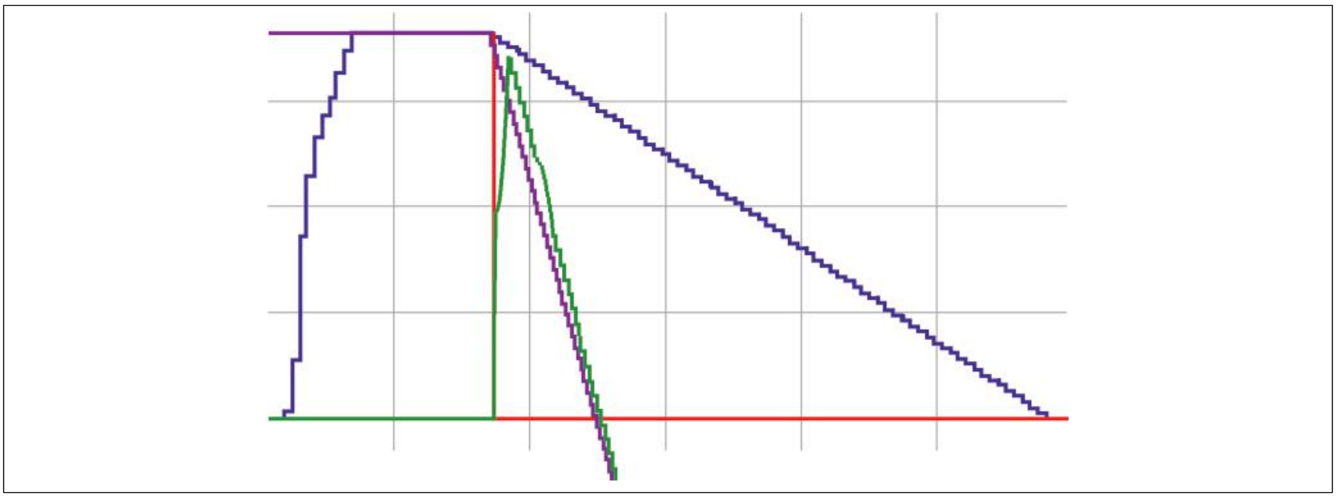
Drive configuration

ACC:	1			PIF1:	0	RPG:	7.00	POL:	-500
DEC:	1	PIF:	AIV1	PIF2:	8192	RIG:	0.01	POH:	500
HSP:	50.0 Hz	AIC1:	CAN	PIP1:	0	RDG:	0.00	AC2:	1
LSP:	0.0 Hz	AIV1:	0	PIP2:	8192	PRP:	0.0 s	DE2:	30

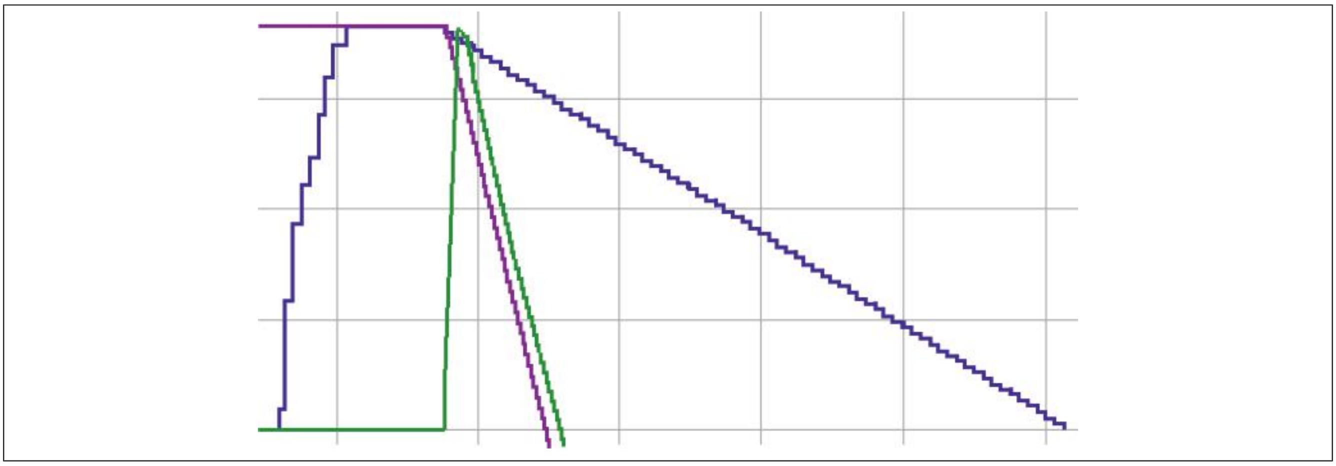
PSR = 1% - Target speed 0 rpm



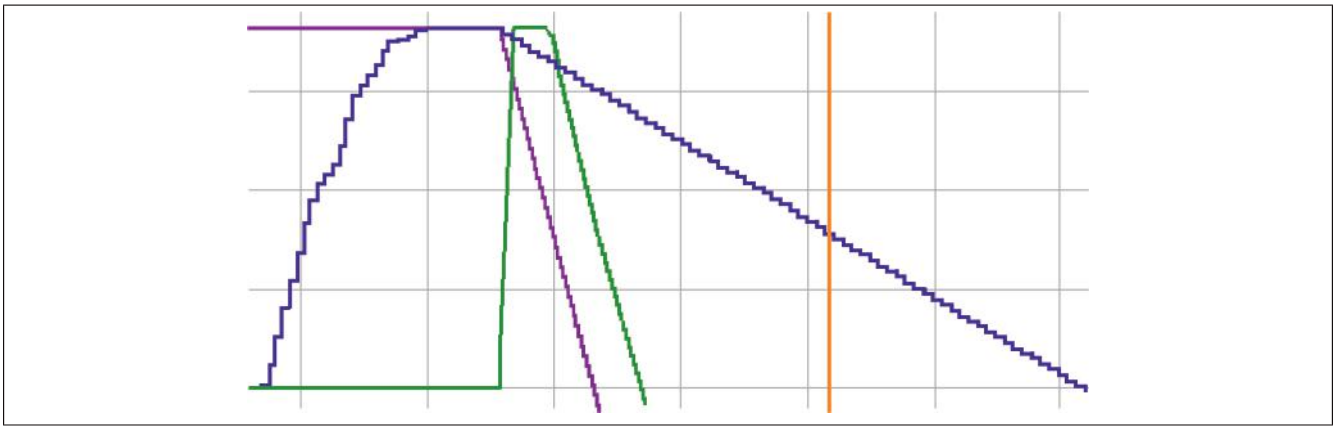
PSR = 1% - Target speed 1500 rpm



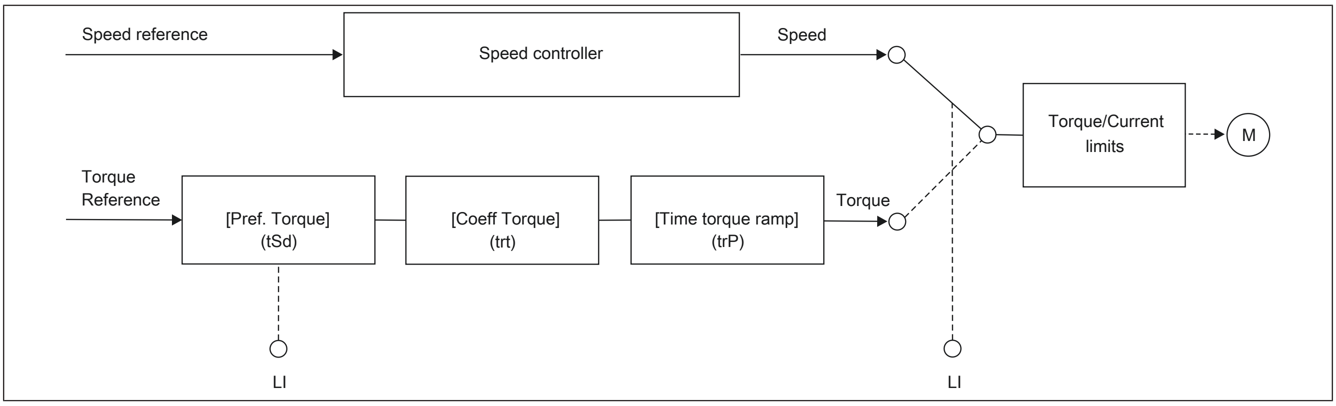
PSR = 10% - Target speed 1500 rpm



PSR = 50% - Target speed 1500 rpm



2.8.11.18 Torque control



The function can be used to switch between the operation in speed-controlled mode and in torque-controlled mode.

In torque-controlled mode, the speed can vary within a configurable "dead band". If it has reached a lower or upper limit value, the inverter automatically falls back into the speed-controlled mode (fallback) and maintains the speed limit. The controlled torque is then no longer maintained so that two scenarios can occur.

- If the torque reaches the required value again, the inverter returns to torque-controlled mode.
- If the torque does not reach the required value within a configurable period of time, the inverter goes into fault or alarm mode.

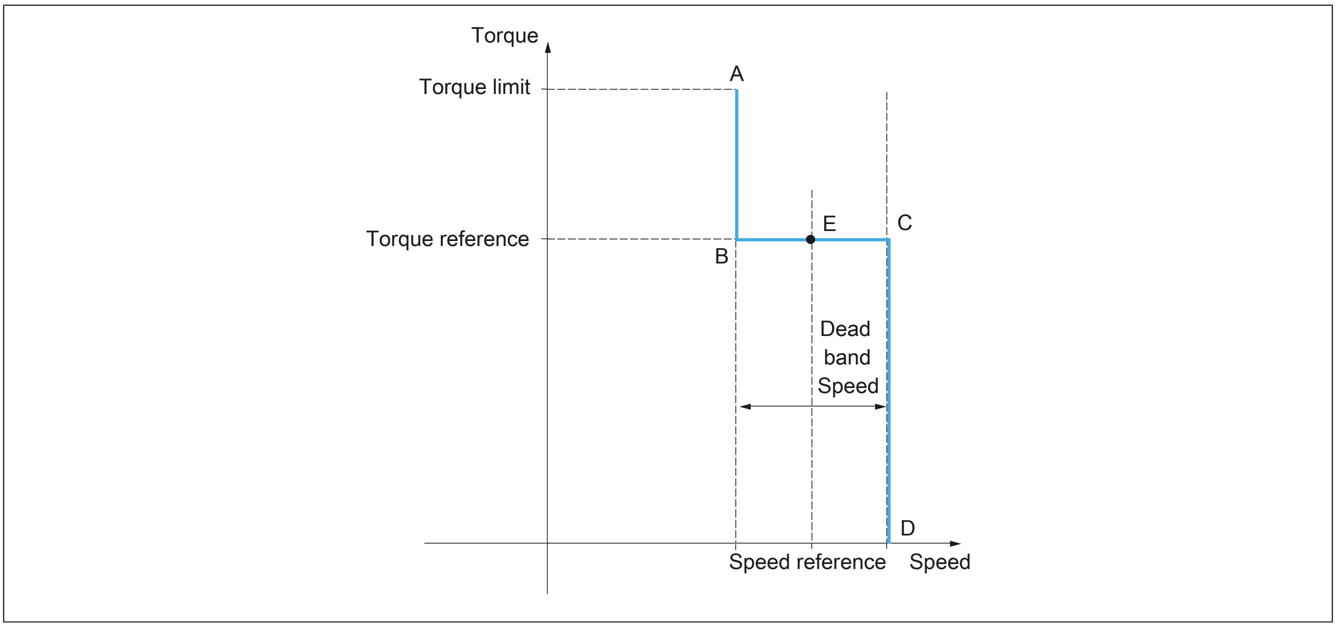
Warning!

ACCIDENTAL OPERATION OF DEVICE

Make sure that changes to settings during operation do not cause any hazards.

Failure to follow these instructions will result in death or serious injury.

– AB and CD: "Fallback" in the case of speed control
– BC: Torque control range
– E: Ideal operating value



The sign and the value of the torque can be transferred via a logic output and an analog output.

[TORQUE CONTROL] (tOr-)

Code	Name/Description	Setting range	Factory settings
tOr-	**[TORQUE CONTROL]** This function is only accessible if **[Type motor control]** (Ctt) = **[SVC I]** (CUC) or **[FVC]** (FUC). **Note:** **This function cannot be used with certain other functions. Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.** **Note:** **This function is not compatible with the fault management of [load relax fault] (AnF) .**		
tSS nO YES LI1 - - -	**[Alt Torque / v]** **[No]** (nO): Function not active. The other parameters are then not accessible. **[Yes]** (YES): Permanent torque limitation **[LI1]** (LI1) . . . **[...]** (...): See the assignment conditions In state 1 of the input or of the associated bit: Torque control In state 0 of the input or of the associated bit: Speed control		**[No]** (nO)
tr1 nO AI1 AI2 LCC Mdb CAn nEt PG	**[Ref. Torq.]** **[No]** (nO): Not assigned (Zero torque reference). **[AI1]** (AI1): Analog input **[AI2]** (AI2): Analog input **[HMI]** (LCC): Graphics terminal **[Modbus]** (Mdb): Not applicable **[CANopen]** (CAn): Integrated communication interface (POWERLINK) **[Com. Card]** (nEt): Communication card (if present) **[Encoder]** (PG): Encoder input if encoder card has been inserted 100% of the reference corresponds to 300% of the rated torque.		**[No]** (nO)
tSd nO LI1 - - -	**[Pref. Torque]** **[No]** (nO): Function not active **[LI1]** (LI1) . . . **[...]**(...): See the assignment conditions With state 0 of the assigned input or bit, the prefix of the torque corresponds to the that of the reference. With state 1 of the assigned input or bit, the torque has the opposite prefix to that of the reference.		**[No]** (nO)
trt	**[Torque coeff]** Coefficient applied to **[Ref. torque]** (tr1)	0 to 1000%	100%
trP	**[Time torque ramp]** Rise and fall times for a variation of 100% of the rated torque.	0 to 99.99 s	3 s
tSt SPd YES SPn	**[Type Stop M Contr.]** **[speed]** (SPd): Speed control stop according to the normal stop configuration (see "STOP MODE (Stt-)" on page 206) **[freewheel stop]** (YES): Freewheel stop **[M at 0]** (SPn): Zero torque stop, magnetization in the motor is maintained, however. This type of function is only possible if **[Motor control type]** (Ctt) =**[FVC]** (FUC).		**[Speed.]** (SPd)
SPt	**[time stop magmot]** The parameter is accessible if **[Type Stop M Contr.]** (tSt) = **[M at 0]** (SPn). Rotation time after a stop, important for fast restart.	0 to 3600 s	1
dbp	**[M. ctrl. pos bandw.]** Positive deadband. Value added algebraically to the frequency reference. Example for dbp = 10: • If reference = 50 Hz: 50 + 10 = 60 • If reference = -50 Hz: - 50 + 10 = - 40	0 to 2x **[Max. output freq.]** (tFr)	10 Hz
dbn	**[M. ctrl. neg. bandw.]** Negative deadband. Value subtracted algebraically from the frequency reference. Example for dbn = 10: • If reference = 50 Hz: 50 - 10 = 40 • If reference = -50 Hz: - 50 - 10 = - 60	0 to 2x **[Max. output freq.]** (tFr)	10 Hz
rtO	**[M ctrl timeout]** Period of time after the automatic stop of the torque-controlled mode in the event of a fault or alarm.	0 to 999.9 s	60
tOb ALrM FLt	**[M ctrl mgt]** Response of the inverter after the expiry of the time **[M ctrl Timeout]** (rtO). **[Alarm]** (ALrM) **[Fault]** (FLt): Fault when stopping in freewheel stop.		**[Alarm]** (ALrM)

Parameter that can be modified during operation or when stopped.

Note:

If the motor is aligned with an encoder that is assigned to the speed feedback value, the torque control function trips a fault [Load relax.] (AnF). One of the following solutions should be used:

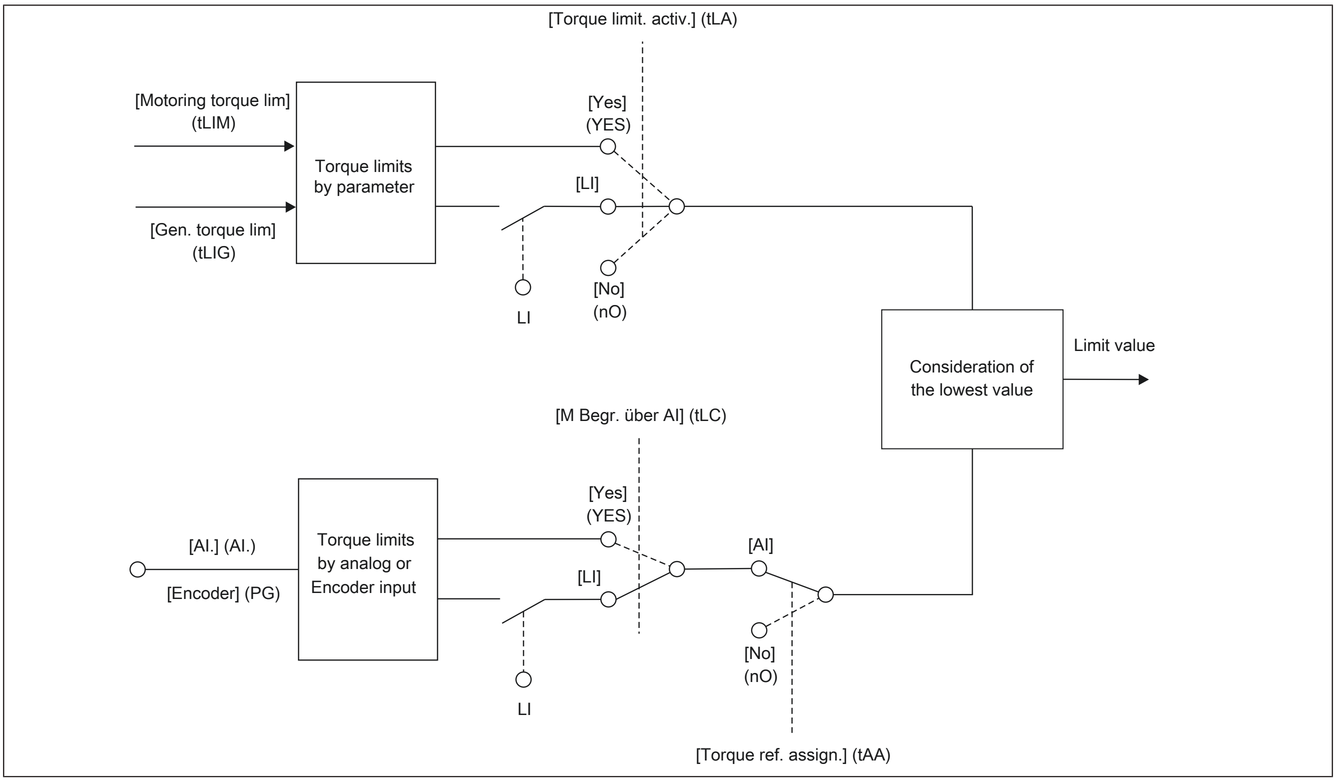
- **Configuration of [Load slip detection] (Sdd) = [No] (nO).**
- **Setting of [M. ctrl. pos bandw] (dbP) and [M. ctrl. neg bandw] (dbn) each to a value below 10% of the rated motor frequency.**

2.8.11.19 Torque limiting

Two types of torque limitation are possible:

- With a value that is fixed by a parameter
- With a value that is set by an analog input (AI or encoder)

If both types are enabled, the lowest value is taken into account. The two types of limitation can be configured or switched remotely using a logic input or via the communication bus.



[TORQUE LIMITATION] (tOL-)

Code	Name/Description	Setting range	Factory settings
tOL-	[TORQUE LIMITATION] This function cannot be activated in V/F-profile mode.		
tLA nO YES LI1 - - -	[Torque limit. activ.] [No] (nO): Function not active [Yes](YES): Function permanently active. [LI1] (LI1) . . . [...] (...): See the assignment conditions In state 0 of the input or the assigned bit, the function is not active. In state 1 of the input or the assigned bit, the function is active.		[No] (nO)
IntP 0.1 1	[Torque increment] The parameter is not accessible when [activation m limit] (tLA)= [No] (nO). Selection of the unit of the parameter [Motor torque limit] (tLIM) and [Generator torque limit] (tLIG). [0.1%] (0.1): Unit 0.1%. [1%] (1): Unit 1%.		[1%] (1)
tLIM	[Motoring torque lim] 1) The parameter is not accessible when [activation m limit] (tLA)= [No] (nO). Torque limiting for generator operation in percent or 0.1% of the rated torque in accordance with the parameter [Torque increment] (IntP).	0 to 300%	100%
tLIG	[Gen. torque lim] 1) The parameter is not accessible when [activation m limit] (tLA)= [No] (nO). Torque limiting for generator operation in percent or 0.1% of the rated torque in accordance with the parameter [Torque increment] (IntP).	0 to 300%	100%
tAA nO AI1 AI2 PG AIU1	[Torque ref. assign.] If the function is assigned, the limitation varies between 0 and 300% of the rated torque on the basis of the 0 to 100% signal applied to the assigned input. Examples: • 12 mA on a 4 to 20 mA input results in limitation of 150% of the rated torque. • 2.5 V on a 10 V input results in 75% of the rated torque. [No] (nO): Not assigned (function not active) [AI1] (AI1) [AI2] (AI2) [Encoder] (PG): Encoder input, if encoder card present [AI virt com] (AIU1): Virtual input via the communication bus, which is configured via [AI1 communication] (AIC1). **Warning!** **ACCIDENTAL OPERATION OF DEVICE** **If the equipment is switched to forced local mode (see "COMM. CARD and FORCED LOCAL (LCF-)" on page 310), the virtual input used in the current configuration remains fixed at the last value transmitted. The virtual input and mode "Forced local" are not permitted to be used in the same configuration.** **Failure to follow these instructions will result in death or serious injury.**		[No] (nO)
tLC YES LI1 - - -	[Analog limit. act.] The parameter is accessible if [Assign ref. M] (tAA) is not equal to [No] (nO). [Yes] (YES): The limit depends on the input occupied by [Torque ref. assign] (tAA). [LI1] (LI1) . . . [...] (...): See the assignment conditions In state 0 of the input or of the associated bit: • The limit is provided by the parameters [Motor torque lim] (tLIM) and [Generator torque lim] (tLIG) if [Torque limit. activ.] (tLA) is not [No] (nO). • No limit if [Torque limit activ.] (tLA) = [No] (nO). In state 1 of the input or of the associated bit: • [The limit depends on the input occupied by [Torque ref. assign] (tAA). **Note:** **If [Torque Limit] (tLA) and [Torque ref. assign] (tAA) are released at the same time, the lowest value is taken into account.**		[Yes] (YES)

1) This parameter can also be accessed via the [SETTINGS] (SEt-) menu.

Parameter that can be modified during operation or when stopped.

[CURRENT LIMIT] (CLI-)

Code	Name/Description	Setting range	Factory settings
CLI-	[CURRENT LIMIT.]		
LC2 nO LI1 - - -	[Current limit 2] [No] (nO): Function not active [LI1] (LI1) . . . [...] (...): See the assignment conditions In state 0 of the input or the assigned bit, the first current limiting is active. In state 1 of the input or the assigned bit, the second current limiting is active.		[No] (nO)
CL2	[2nd current limit] 1) Second current limiting This parameter can be activated if [2nd current limit] (LC2) is not equal to [No] (nO) . The adjustment range is limited to 1.36 In if [Switch frequency] (SFr) is under 2 kHz. **Note:** **If the setting is less than 0.25 In, the inverter can remain in error mode [output phase loss] (OPF), if this has been enabled, see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292. If it is below the no-load current of the motor, the limitation has no effect.** **Caution!** **Make sure that the motor is designed to this current, since these are susceptible to a demagnetization.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.65 In 2)	1.5 In 2)
CLI	[CURRENT LIMIT.] 1) First current limiting. The adjustment range is limited to 1.36 In if [Switch frequency] (SFr) is under 2 kHz. **Note:** **If the setting is less than 0.25 In, the inverter can remain in error mode [output phase loss] (OPF), if this has been enabled, see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292. If it is below the no-load current of the motor, the limitation has no effect.** **Caution!** **Make sure that the motor is designed to this current, since these are susceptible to a demagnetization.** **Failure to follow this instruction can result in equipment damage.**	0 to 1.65 In 2)	1.5 In 2)

1) This parameter can also be accessed via the [SETTINGS] (SEt-) menu.
2) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.

Parameter that can be modified during operation or when stopped.

2.8.11.20 Control of a line contactor

The line contactor closes every time a run command (forward or reverse) is sent and opens after every stop, as soon as the inverter is locked. For example, if the stop mode is stop on ramp, the contactor will open when the motor reaches zero speed.

> **Note:**
>
> **The inverter control must be supplied by an external 24 V power source.**

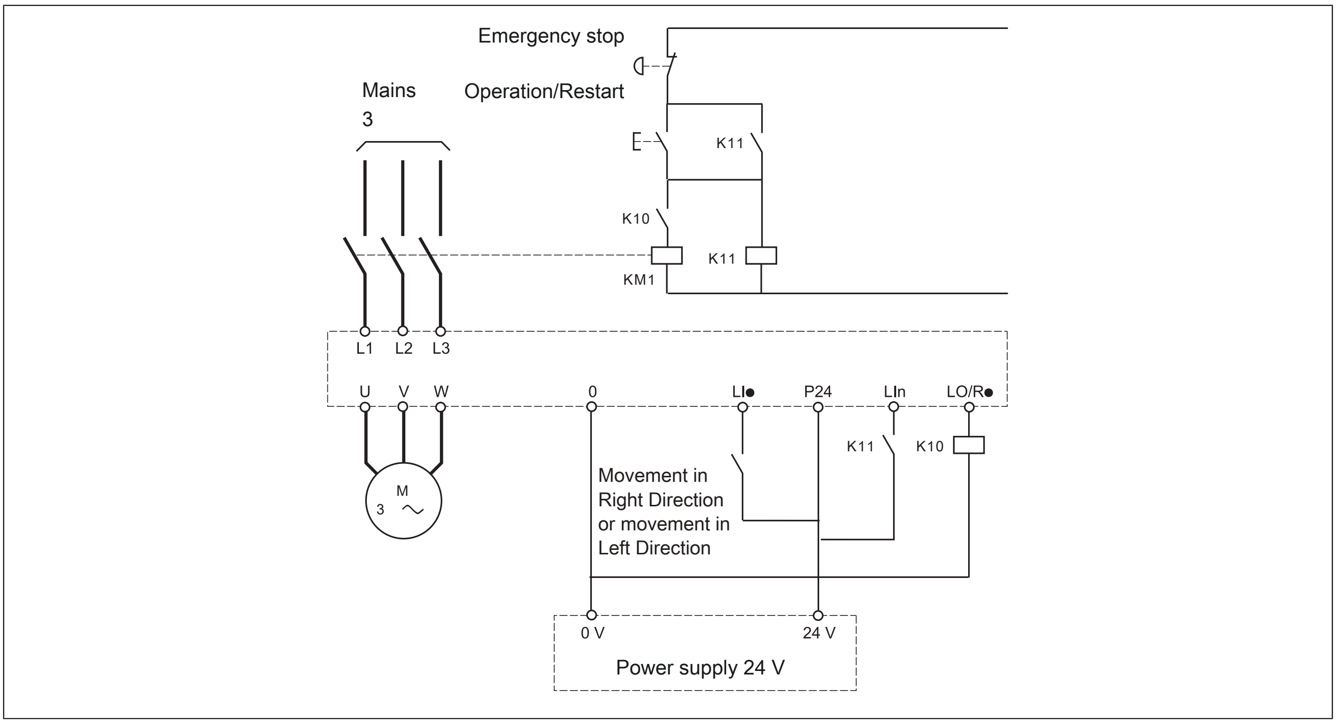
Wiring example:

> **Note:**
>
> **After enabling "Emergency switch-off", it is necessary to enable "Run/reset".**

LI• = Run command **[Forward run]** or **[Reverse run]**

LO/R• =**[Line cont assign]**(LLC)

LIn =**[Lock assign]** (LES)



> **Caution!**
>
> **This function can only be used for a small number of consecutive operations with a cycle time longer than 60 s (in order to avoid premature aging of the filter capacitor charging circuit).**
>
> **Failure to follow this instruction can result in equipment damage.**

[Line cont assign] (LLC-)

Code	Name/Description	Setting range	Factory settings
LLC-	[Input contactor assign]		
LLC	[Input contactor assign] Logic output or control relay		[No] (nO)
nO	[No] (nO): Function not assigned (in this case, none of the function parameters can be accessed)		
r2	[CONFIGURATION R2] (r2)		
dO1	[DO1] (dO1): Analog output AO, which can be used as logic output. The parameter is accessible when [CONFIGURATION AO1] (AO1) = [No] (nO).		
LES	[Lock]		[No] (nO)
nO	[No] (nO): Function not active		
LI1	[LI1] (LI1)		
-	.		
-	.		
-	.		
	[...] (...): See the assignment conditions The inverter locks when the assigned input or bit changes to 0.		
LCt	[Mains V. time out] Monitoring time for closing of line contactor. If there is no voltage in the power circuit of the inverter after this time, this is locked with the fault [Assign line cont] (LCF).	5 to 999 s	5 s

2.8.11.21 Motor protection command

This allows the inverter to control a contactor located between the inverter and the motor. The request for the contactor to close is made when a run command is sent. The request for the contactor to open is made when there is no longer any current in the motor.

Caution!

If a DC injection braking function has been configured, it should not be left operating too long in stop mode, as the contactor only opens at the end of braking.

Failure to follow this instruction can result in equipment damage.

2.8.11.21.1 Output contactor feedback

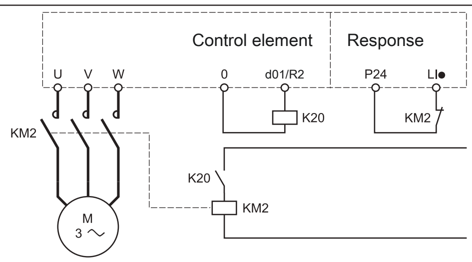
The corresponding logic input should be at 1 when there is no run command and at 0 during operation.

In the event of an inconsistency, the inverter trips on an FCF2 fault if the output contactor fails to close (LIx at 1) and on an FCF1 fault if it is stuck (LIx at 0).

With the parameter **[Delay start Mot.cont.]** (dbS) the triggering of the fault can be delayed in the case of a run command and the parameter **[Time delay motor contact]** (dAS) delays the fault in the even of a stop command.

Note:

The fault FCF2 (the contactor does not close) can be switched on again by a change from 1 to 0 of the run command (0 → 1 → 0 with a 3-wire control).



Functions **[Out. contact.]**(OCC) and **[Output contact. fdbk]**(rCA) can be used individually or at the same time.

[Motor cont.] (OCC-)

Code	Name/Description	Setting range	Factory settings
OCC-	[Motor cont.]		
OCC	[Motor cont.] Logic output or control relay		[No] (nO)
nO	[No] (nO): Function not assigned (in this case, none of the functions can be accessed).		
r2	[CONFIGURATION R2] (r2)		
dO1	[DO1] (dO1): Analog output AO, which can be used as logic output. The parameter is accessible when [CONFIGURATION AO1] (AO1) = [No] (nO).		
rCA	[Output contact. fdbk]		[No] (nO)
nO	[No] (nO): Function not active		
LI1	[LI1] (LI1)		
-	.		
-	.		
-	.		
	[...] (...): See the assignment conditions The motor starts up when the assigned input or bit changes to 0.		
dbS	[Delay start out. contact.] Time delay for: • Motor control following the sending of a run command • Output contactor fault monitoring, if the feedback is assigned. If the contactor fails to close at the end of the set time, the frequency inverter will lock in FCF2 fault mode. This parameter is accessible if [Out. contact.](OCC) or [Output contact. fdbk](rCA) are assigned. The time delay must be greater than the closing time of the output contactor.	0.05 to 60 s	0.15
dAS	[Delay to open cont.] Time delay for monitoring the motor contactor drop following motor stop. This parameter is accessible if [Output contact. fdbk](rCA) is assigned. The time delay must be greater than the opening time of the output contactor. If it is set to 0, the fault will not be monitored. If the contactor fails to open at the end of the set time, the frequency inverter will lock in FCF1 fault mode.	0 to 50 s	0.1

Parameter that can be modified during operation or when stopped.

2.8.11.21.2 Switching of a motor at the inverter output

Switching in the output is possible at any time. When switching on the running motor (inverter released), the motor is captured in its current speed and brought back to the desired speed in accordance with the ramp-up time.

For this application, function "Capture in run" (see "CATCH ON THE FLY (FLr-)" on page 290) must be configured and the function for managing an existing motor protection must be enabled.

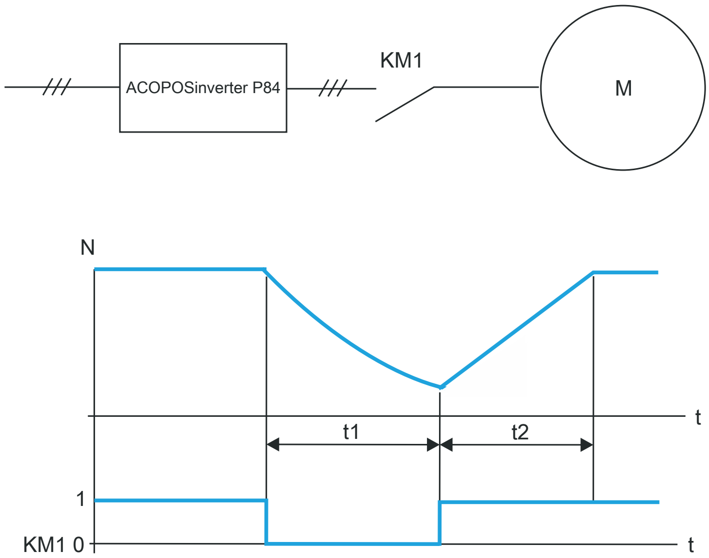
Typical applications:

- Safety shutdown at the inverter output
- Bypass function
- Operation motors connected parallel

For new installations it is recommended to use the safety function "power removal".

Note:

- **The control of the motor protection must be synchronized with a stop command in the freewheel stop of the converter on e.g. a logic input/ POWERLINK.**
- **Set the parameter [Output phase loss] (OPL) to [Outp. switch] (OAC), if you are using an output contactor.**



T1: Opening time of the KM1 (motor in freewheel stop)
t2: Ramp-up according to ramp
N: Speed

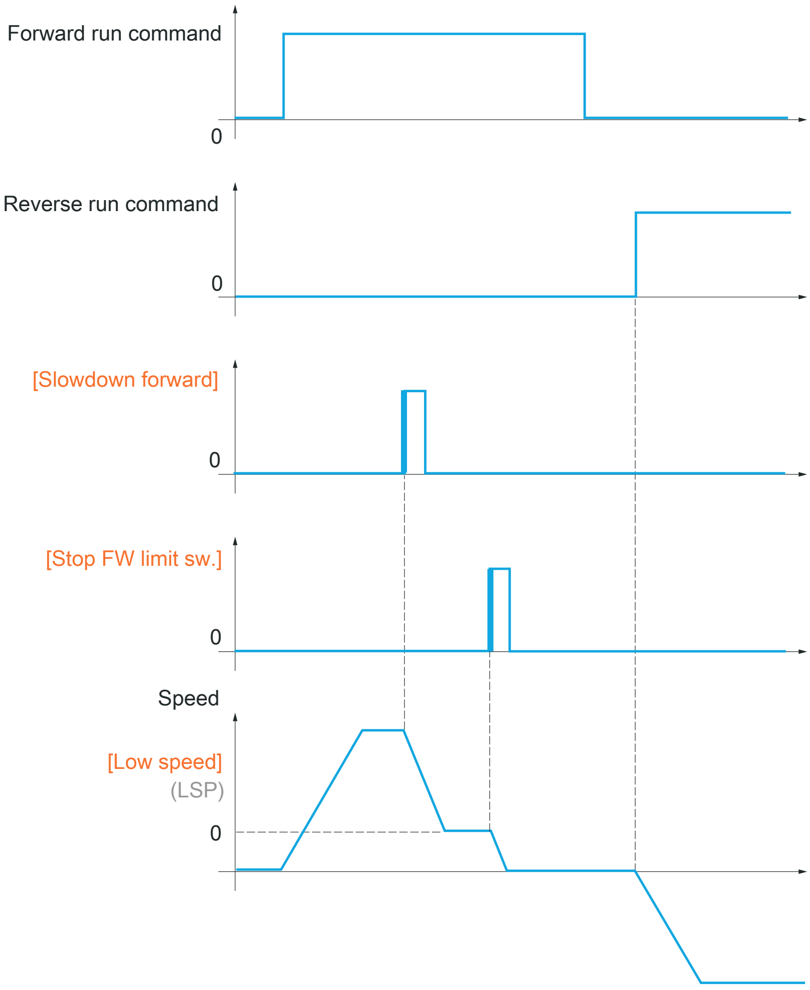
Example: Loss of output protection

2.8.11.22 Positioning via sensor or limit switch

This function is used for managing positioning using position sensors or limit switches linked to logic inputs or using control word bits:

- Braking
- Stop

The action logic for the inputs and bits can be configured on a rising edge (change from 0 to 1) or a falling edge (change from 1 to 0). The example below has been configured on a rising edge:



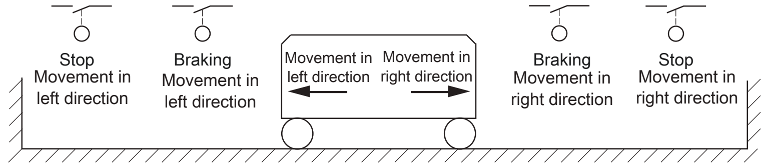
The slowdown mode and stop mode can be configured.

The operation is identical for both directions of operation. Slowdown and stopping operate according to the same logic, described below.

Example: Forward slowdown on rising edge

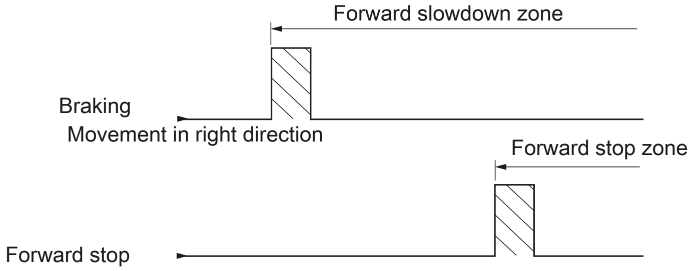
- Forward slowdown takes place on a rising edge (change from 0 to 1) of the input or bit assigned to forward slowdown if this rising edge occurs in forward operation. The slowdown command is then memorized, even in the event of a power outage. Operation in the opposite direction is authorized at high frequency. The slowdown command is deleted on a falling edge (change from 1 to 0) of the input or bit assigned to forward slowdown if this falling edge occurs in reverse operation.
- A bit or a logic input can be assigned to disable this function.
- Although forward slowdown is disabled while the disable input or bit is at 1, sensor changes continue to be monitored and saved.

Example: Positioning of limit switch on rising edge



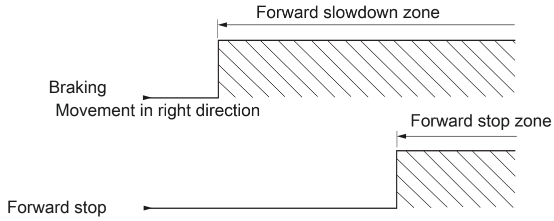
Operation with short cams:

In this instance, when operating for the first time or after restoring the factory settings, the inverter must initially be started outside the slowdown and stop zones in order to initialize the function.



Operation with long cams:

In this instance, there is no restriction, which means that the function is initialized across the whole trajectory.



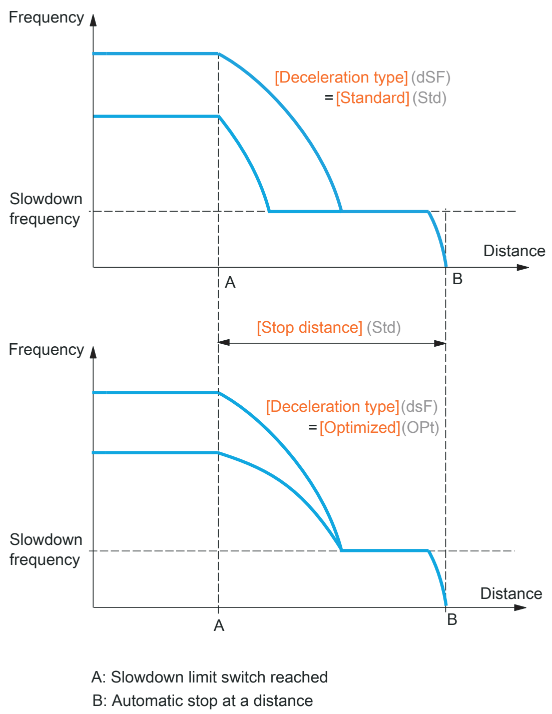
2.8.11.22.1 Calculated stopping distance (remote stop) after deceleration limit switch

This function can be used to control the stopping of the moving part automatically once a preset distance has been traveled after the slowdown limit switch.

On the basis of the rated linear speed and the speed estimated by the inverter when the slowdown limit switch is tripped, the inverter will induce the stop at the configured distance.

This function is useful in applications where one shared limit switch (for violations) with manual restart is shared for both directions. It will then only respond to ensure safety if the distance is exceeded. The stop limit switch retains priority in respect of the function.

Depending on the parameter **[Deceleration ramp type]** (dSF), one of the following two modes of operation is achieved:



Note:

- **If the deceleration ramp is modified while stopping at a distance is in progress, this distance will not be observed.**
- **If the direction is modified while stopping at a distance is in progress, this distance will not be observed.**

Danger!

ACCIDENTAL OPERATION OF DEVICE

- **Check that the parameters configured are consistent (in particular, you should check that the required distance is possible).**
- **This function does not replace the stop limit switch required for safety.**

Failure to follow these instructions will result in death or serious injury.

[POSITIONING BY LIMIT SWITCH] (LPO-)

Code	Name/Description	Setting range	Factory settings
LPO-	[POSITIONING BY SENSORS] **Note:** **This function cannot be used with certain other functions. Follow the instructions in** **see "APPLICATION FUNCT. FUn-" on page 197****.**		
SAF nO LI1 C101 - - Cd00 -	[Stop FW limit sw.] [No] (nO): Not active [LI1] (LI1) to [LI6] (LI6) [C101] (C101) to [C115] (C115): Not applicable [C201] (C201) to [C215] (C215): With built-in communication interface in [I/O profile] (IO) [C301] (C301) to [C315] (C315): With communication card in [I/O profile] (IO) [CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) the switchover is possible with logic inputs [CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) the switchover is possible with logic inputs		[No] (nO)
SAr	[Stop BW limit sw.] The same remarks apply as for [Pos forw. stop] (SAF) above.		[No] (nO)
SAL LO HIG	[Stop limit config.] This parameter can be accessed if at least one limit switch or one stop sensor has been assigned. It is used to define the positive or negative logic of the bits or inputs assigned to the stop. [Active low] (LO): Stop controlled on a falling edge (change from 1 to 0) of the assigned bits or inputs. [Active low] (HIG): Stop controlled on a rising edge (change from 0 to 1) of the assigned bits or inputs.		[Active high] (HIG)
dAF	[Slowdown forward] The same remarks apply as for [Pos forw. stop] (SAF) above.		[No] (nO)
dAr	[Slowdown reverse] The same remarks apply as for [Pos forw. stop] (SAF) above.		[No] (nO)
dAL LO HIG	[Slowdown limit cfg.] This parameter can be accessed if at least one limit switch or one slowdown sensor has been assigned. It is used to define the positive or negative logic of the bits or inputs assigned to the braking. [Active low] (LO): Braking controlled on a falling edge (change from 1 to 0) of the assigned bits or inputs. [Active low] (HIG): Braking controlled on a rising edge (change from 0 to 1) of the assigned bits or inputs.		[Active high] (HIG)
CLS nO LI1 -	[Disable limit sw.] The parameter can be accessed if at least one limit switch or one sensor has been assigned. [No] (nO): Not active [LI1] (LI1) . [...] (...): See the assignment conditions When the assigned bit or input is in state 1, the action of the limit switch is deactivated. If the inverter was presently being slowed down or stopped by the limit switch, it will now continue running until it attains its reference speed.		[No] (nO)
PAS rMP FSt YES	[STOP CONFIGURATION] The parameter can be accessed if at least one limit switch or one sensor has been assigned. [StopRamp] (rMP): On ramp [Fast stop] (FSt): Fast stop (ramp shortened by [coeff. fast stop] (dCF)) [freewheel stop] (YES): Freewheel stop		[Ramp stop] (rMP)
dSF Std OPt	[Deceleration type] The parameter can be accessed if at least one limit switch or one sensor has been assigned. [Standard] (Std): Uses the valid ramp [deceleration time] (dEC) or [deceleration time 2] (dE2). [Optimized] (OPt): The ramp time is calculated on the basis of the actual speed when the slowdown contact switches, in order to limit the operating time at low speed (optimization of the cycle time: The braking time is constant, regardless of the output speed).		[Standard] (Std)
Std nO -	[Stop distance] The parameter can be accessed if at least one limit switch or one sensor has been assigned. Activation and adjustment of the "Stop at distance calculated after the slowdown limit switch" function. [No] (nO): Function inactive (the next two parameters will, therefore, be inaccessible). 0.01 m to 10.00 m: Setting the stopping distance in meters.		[No] (nO)
nLS	[Rated linear speed] The parameter can be accessed if at least one limit switch or one sensor has been assigned. Rated linear speed in meters/second.	0.2 to 5 m/s	1 m/s
SFd	[Stop corrector] The parameter can be accessed if at least one limit switch or one sensor has been assigned. Scaling factor applied to the stop distance to compensate, for example, a non-linear ramp.	50 to 200%	100%

2.8.11.23 Parameter switching [PARAMETER SWITCHING]

There is the possibility of selecting a set of 1 to 15 parameters of the [SETTINGS] (SEt-) menu. These parameters can be assigned to 2 or 3 different values and the 2 or 3 value groups can be switched by 1 or 2 logic inputs or control word bits. This switching can be performed during operation (motor running).

	Values 1	Values 2	Values 3
Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15	Parameter 1 Parameter 2 Parameter 3 Parameter 4 Parameter 5 Parameter 6 Parameter 7 Parameter 8 Parameter 9 Parameter 10 Parameter 11 Parameter 12 Parameter 13 Parameter 14 Parameter 15
LI input or bit	0	1	0 or 1
LI input or bit	0	0	1

Note:

Do not change these parameters in the [SETTINGS] (SEt-) menu, as any change in the latter menu is lost during the next switch on. They can be set in operation via the menu [PARAMETER SWITCH.] (MLP-) in the active configuration.

Note:

Parameter set switching cannot be configured from the integrated display terminal.

Parameters can only be adjusted on the integrated display terminal if the function has been configured previously via the graphic display terminal or via the bus or communication network. If the function has not been configured MLP- and the submenus PS1-, PS2-, PS3- are not displayed.

[PARAM. SET SWITCHING] (MLP-)

Code	Name/Description	Factory settings
MLP-	[PARAM. SET SWITCHING]	
CHA1 nO FtA F2A LI1 -	[2 parameter sets] [No] (nO): Function not active. [Thresh. Freq. err.] (FtA): Switching via [F.-Thresh. Mot] (Ftd)) [Thresh. Freq. 2 err.] (F2A): Switching via [F.-Thresh. 2] (F2d)) [LI1] (LI1) . [...] (...): See the assignment conditions Switching 2 parameter sets	[No] (nO)
CHA2 nO FtA F2A LI1 -	[3 parameter sets] [No] (nO): Function not active. [Thresh. Freq. err.] (FtA): Switching via [F.-Thresh. Mot] (Ftd). [Thresh. Freq. 2 err.] (F2A): Switching via [F.-Thresh. 2] (F2d)) [LI1] (LI1) . [...] (...): See the assignment conditions Switching 3 parameter sets **Note:** **To obtain 3 parameter sets, [2 param. sets] must also be configured.**	[No] (nO)
	[PARAMETER SELECTION] This parameter is only accessible on the graphic display terminal if [2 param. sets] is not at [No] (nO). Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed. Select 1 to 15 parameters with the ENT key (a check mark appears by your selections) or cancel the parameter selection with ESC. Example: SELECTED PARAMETERS 1.3 SETTINGS Ramp increment ✓ - ✓	
PS1-	[SET 1] The parameter is accessible if at least 1 parameter in the [SELECTED. PARAMETERS] has been selected. Making an entry in this parameter opens a settings window containing the selected parameters **in the order in which they were selected**. With the graphic display terminal: RDY Term +0.00 Hz 0 A SET1 Start up: 9.51 s Deceleration: 9.67 s Acceleration 2: 12.58 s Deceleration 2: 13.45 s Begin Acc round: 2.3 s Code << >> Quick ENT RDY Term +0.00 Hz 0 A Startup time 9.51 s Min = 0.1 Max = 999.9 << >> Quick With integrated display terminal: Proceed as in the Settings menu using the parameters that appear.	
PS2-	[SET 2] The parameter is accessible if at least 1 parameter in the [SELECTED. PARAMETERS] has been selected. Procedure identical to [PARAMETER SET 1] (PS1-).	
PS3-	[SET 3] The parameter is accessible if [3 parameter set] is not [No] (nO) and if at least 1 parameter has been selected in [SELECT. PARAMETER]. Procedure identical to [PARAMETER SET 1] (PS1-).	

Note:

We recommend that a parameter set switching test is carried out while stopped and a check is made to ensure that it has been performed correctly. Some parameters are interdependent and in this case may be restricted at the time of switching.

The mutual dependency of parameters must be taken into account, even between different sets.

Example: The highest [low frequency] (LSP) must be lower than the lowest [high frequency] (HSP).

2.8.11.24 Switching motors/configuration [MULTIMOT/CONFIGURATION]

The inverter can contain up to 3 configurations that can be saved via the **[FACTORY SETTING]** (FCS-) menu.

Each of these configurations can be activated remotely, enabling adaptation to:

- 2 or 3 different motors or mechanisms (multimotor mode)
- 2 or 3 different configurations for a single motor (multiconfiguration mode)

The two switching modes cannot be combined.

Note:

The following conditions MUST be observed:

- **Switching may only take place when stopped (inverter locked). If a switching request is sent during operation, it will not be executed until the next stop.**
- **In the event of motor switching, the following additional conditions apply:**
  - **When the motors are switched, the power and control terminals concerned must also be switched as appropriate.**
  - **The maximum power of the inverter must not be exceeded by any of the motors.**
- **All the configurations to be switched must be set and saved in advance in the same hardware configuration, this being the definitive configuration (option and communication cards). In the event of non-compliance with this provision, there is the danger that the inverter will be locked with the fault [incorrect config.] (CFF) .**

2.8.11.25 Menu and parameters that can be switched in multimotor mode

- **[SETTINGS]** (SEt-)
- **[DRIVE DATA]** (drC-)
- **[INPUTS/ OUTPUTS]** (I-O-)
- **[CONTROL]** (CtL-)
- **[APPLICATIONS-FCT.]** (FUn-) with the exception of the function **[MULTIMOTOR CONFIG]** (only configure once)
- **[FAULT MANAGEMENT]** (FLt)
- **[USER MENU]**
- **[USER CONF.]**: The name of the configuration specified by the user in the menu **[FACTORY SETTING]** (FCS-)

2.8.11.26 Menu and parameters that can be switched in multiconfiguration mode

As in multimotor mode, except for the motor parameters that are common to the three configurations:

- Nominal current
- Thermal current
- Nominal voltage
- Rated frequency
- Nominal speed
- Nominal power
- IR compensation
- Slip compensation
- Type of thermal protection
- Thermal state
- The autotuning parameters and motor parameters that can be accessed in expert mode
- Type of motor control

> **Note:**
>
> **No other menus or parameters can be switched.**

2.8.11.27 Transfer of configurations

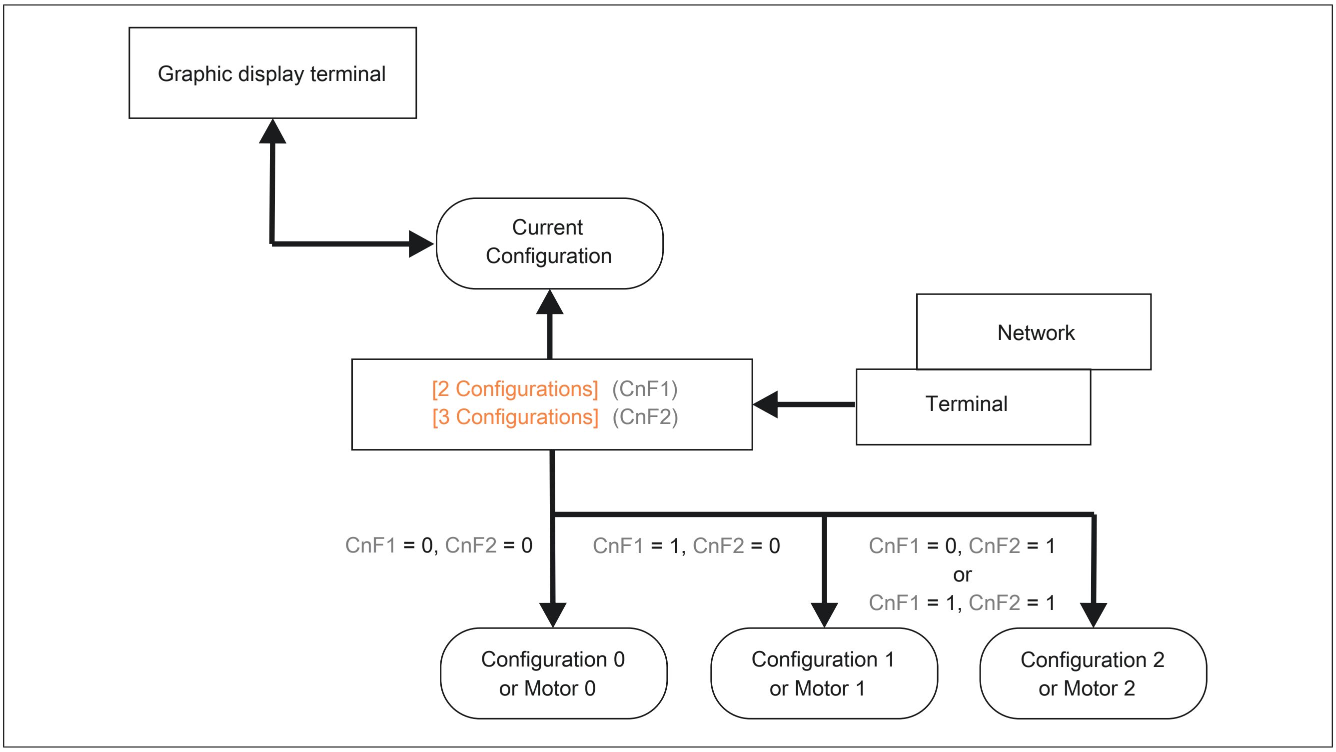
Transfer of configurations to other inverter when using [MULTIMOTOR CONFIG.]

Example: A is the source, B is the target. In this example, configuration switching occurs via the logic input.

1. Connect the graphic display with inverter A
2. Set LI (**[config.1]** (CnF1)) and LI (**[config. 2]** (CnF2)) to 0.
3. Download configuration 0 in a file of the graphic terminals (Example: File 1 of the graphic terminals).
4. Set LI (**[config.1]** (CnF1)) to 1 and leave LI (**[config. 2]** (CnF2)) at 0.
5. Download configuration 1 in a file of the graphic terminals (Example: File 2 of the graphic terminals).
6. Set LI (**[config. 2]** (CnF2)) to 1 and leave LI (**[config. 1]** (CnF1)) at 1.
7. Download configuration 2 in a file of the graphic terminals (Example: File 3 of the graphic terminals).
8. Connect the graphic display with inverter B
9. Set LI (**[config.1]** (CnF1)) and LI (**[config. 2]** (CnF2)) to 0.
10. Set inverter B to the factory setting.
11. Upload the configuration file 0 onto the inverter (file 1 of graphic display terminal in this example).
12. Set LI (**[config.1]** (CnF1)) to 1 and leave LI (**[config. 2]** (CnF2)) at 0.
13. Upload the configuration file 1 onto the inverter (file 2 of graphic display terminal in this example).
14. Set LI (**[config. 2]** (CnF2)) to 1 and leave LI (**[config. 1]** (CnF1)) at 1.
15. Upload the configuration file 2 onto the inverter (file 3 of graphic display terminal in this example).

Note:

Steps 6, 7, 14 and 15 are only required if the function [MULTIMOTOR CONFIG] is used with three configurations or three motors.

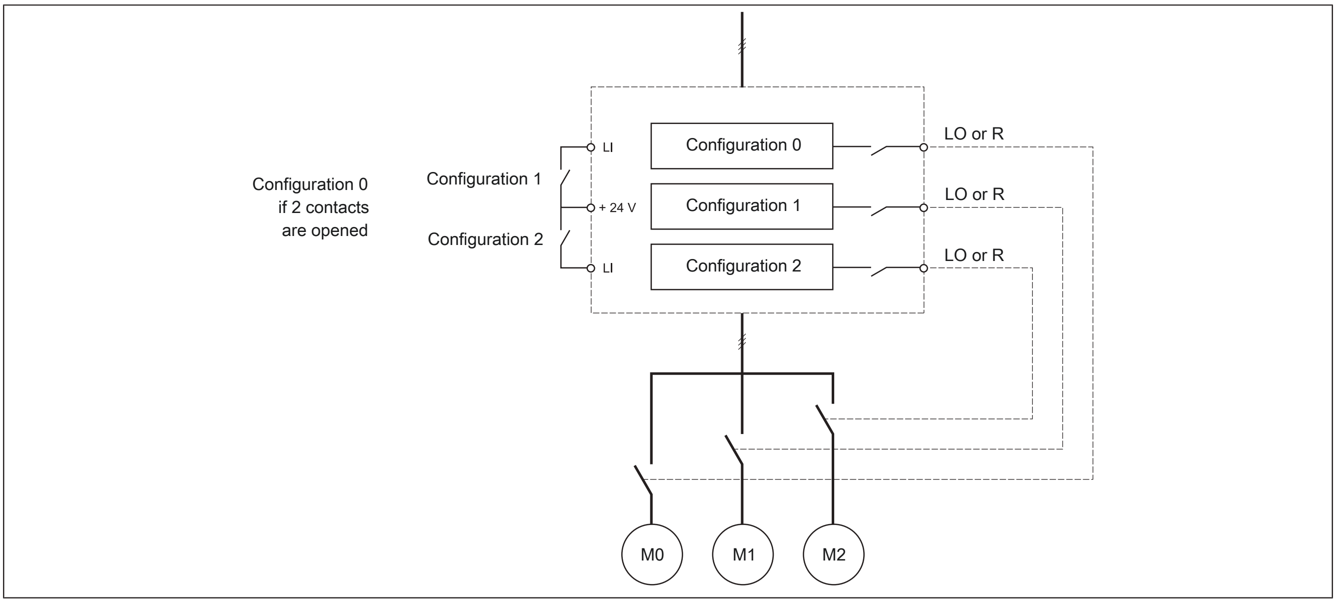


2.8.11.28 Switching command

Depending on the number of motors or selected configuration (2 or 3), the switching command is sent using one or two logic inputs. The table below lists the possible combinations.

LI2 Motors or configurations	LI3 Motors or configurations	Number of the configuration or active motor
0	0	0
1	0	1
0	1	2
1	1	2

Schematic diagram for "multimotor" mode



2.8.11.29 Autotuning in multimotor mode

This autotuning can be performed:

- Manually using a logic input when the motor changes
- Automatically on each first activation of the motor after the inverter is switched on if the parameter **[autom aut-tuning]** (AUt) = **[Yes]** (YES).

2.8.11.29.1 Motor thermal states in multimotor mode:

The inverter protects each of the three motors separately in that it observes all thermal states and all stop times, including the switch-off time of the inverter itself.

It is therefore not required to carry out a motor measurement each time the unit is switched on. It is sufficient if at least one autotuning is performed for each motor.

2.8.11.30 Configuration information output

Via the menu **[INPUTS/ OUTPUTS]** (I-O-) any configuration or any motor (2 or 3) can be assigned to a logic output in order to transfer information remotely.

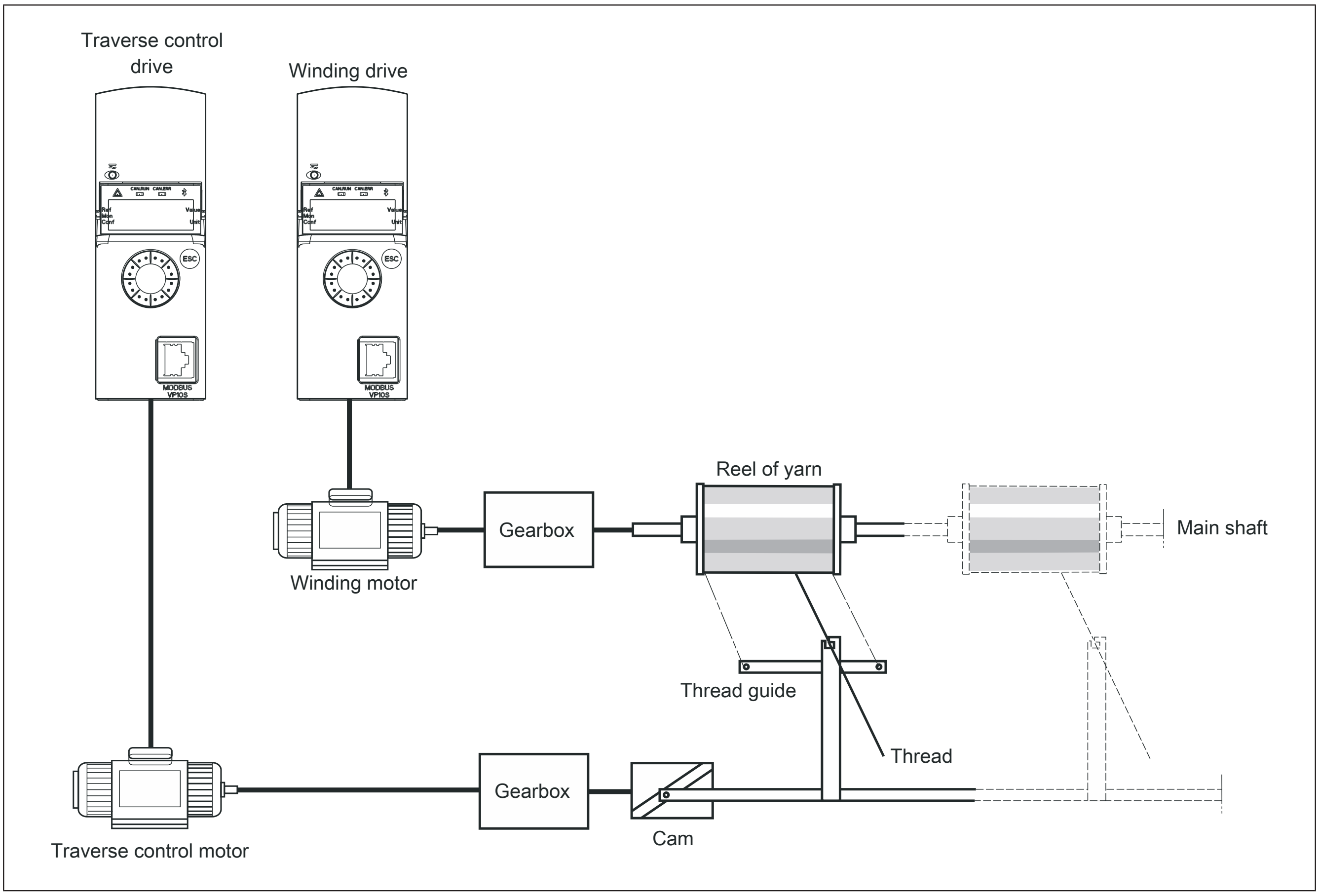
> ## Note:
>
> **Due to the changeover of the menu [INPUTS/ OUTPUTS] (I-O-), these outputs must be assigned in all configurations, if the information is necessary.**

[MULTIMOTOR CONFIG] (MMC-) AND [AUTOTUNING VIA LI] (tnL-)

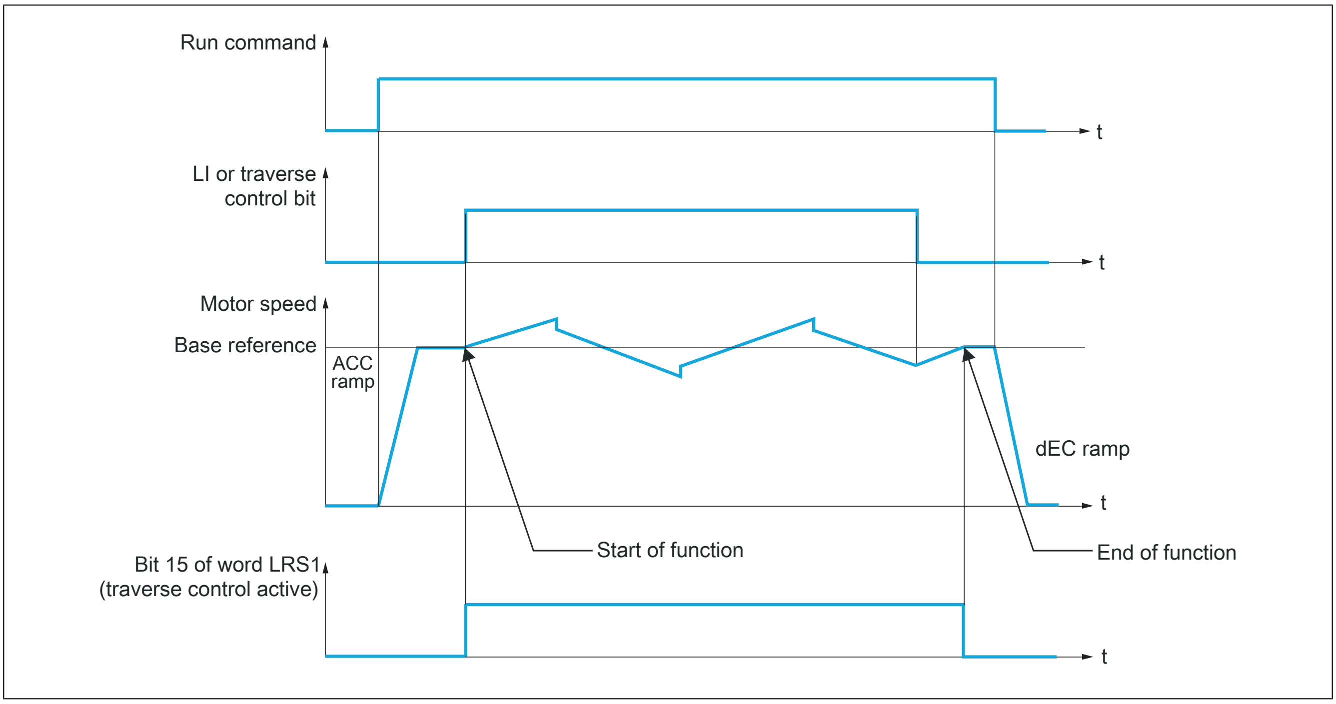
Code	Name/Description	Factory settings
MMC-	[MULTIMOTORS/CONFIG.]	
CHM	[Multimotors]	[No] (nO)
nO	[No] (nO): Several possible configurations	
YES	[Yes] (YES): Several possible motors	
CnF1	[CONFIGURATION 1]	[No] (nO)
nO	[No] (nO): No changeover.	
LI1	[LI1] (LI1) to [LI6] (LI6)	
C111	[C111] (C111) to [C115] (C115): Not applicable	
-	[C211] (C211) to [C215] (C215): With built-in communication interface	
-	[C311] (C311) to [C315] (C315): With communication card Switching of 2 motors or 2 configurations	
CnF2	[Config 2]	[No] (nO)
nO	[No] (nO): No changeover.	
LI1	[LI1] (LI1) to [LI6] (LI6)	
C111	[C111] (C111) to [C115] (C115): Not applicable	
-	[C211] (C211) to [C215] (C215): With built-in communication interface	
-	[C311] (C311) to [C315] (C315): With communication card Switching of 3 motors or 3 configurations **Note:** **To obtain 3 motors or 3 configurations, [config.1] (CnF1) must also be configured.**	
tnL-	[AUTO-TUNING VIA LI]	
tUL	[Auto-tune assign.]	[No] (nO)
nO	[No] (nO): Not active	
LI1	[LI1] (LI1)	
-	. [...] (...): See the assignment conditions Autotuning is performed when the assigned input or bit changes to 1. **Note:** **The motor is placed under voltage by the autotuning.**	

2.8.11.31 Traverse control

Winding reels of yarn (in textile applications)



The speed of rotation of the cam must follow a precise profile to ensure that the reel is steady, compact and linear:

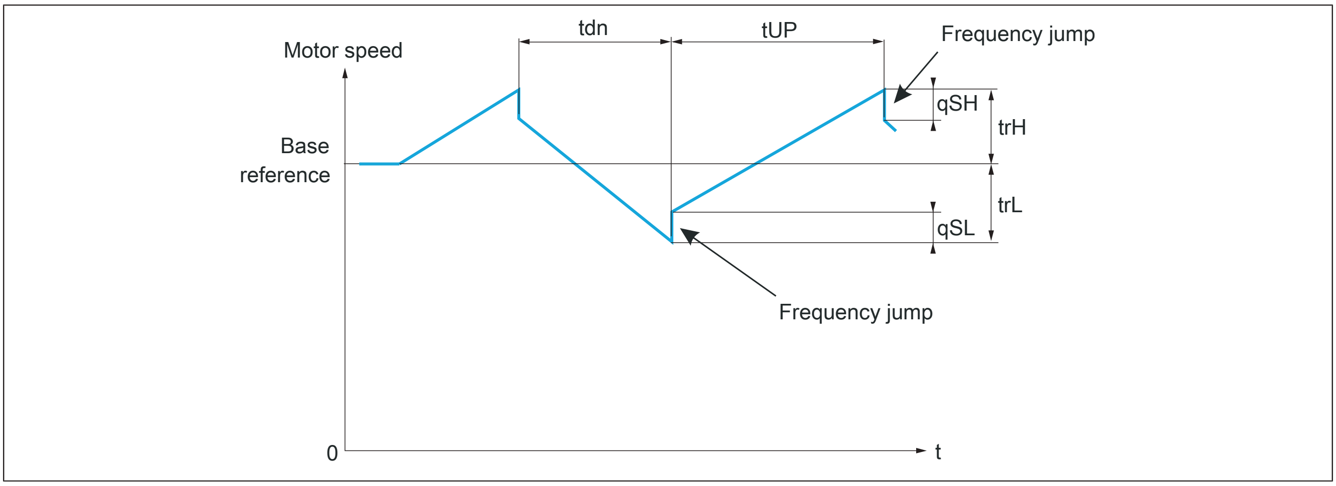


The function starts when the inverter has reached its base reference and the traverse control command has been enabled.

When the traverse control command is disabled, the inverter returns to its base reference, following the ramp determined by the traverse control function. The function then stops, as soon as it has returned to this reference. Bit 15 of word LRS1 is at 1 while the function is active.

Function parameters:

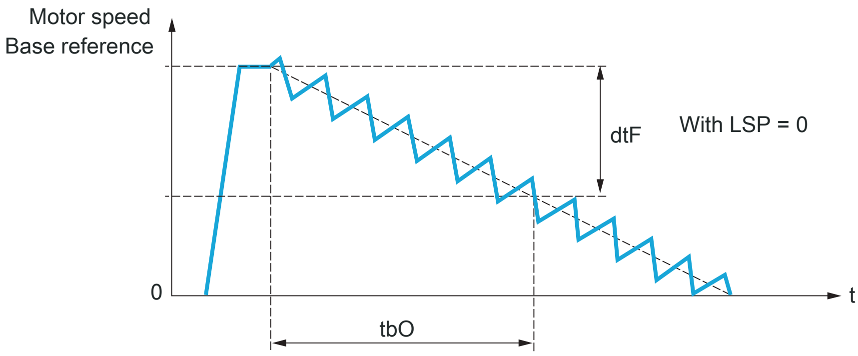
These define the cycle of frequency variations around the base reference, as shown in the diagram below:

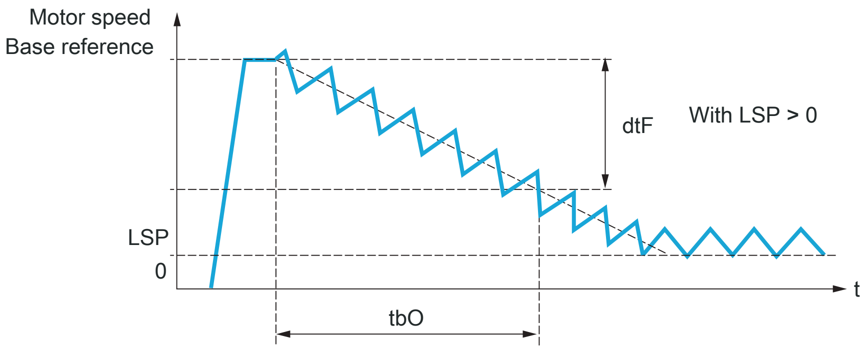


- trC: **[Yarn control]**: Assignment of the traverse control command to a logic input or to a communication bus control word bit
- tdn: Time of the deceleration ramp **[DEC Traverse Cont]** in seconds
- tUP: Time of the acceleration ramp **[ACC Traverse Ctrl]** in seconds
- trH: **[Traverse HSP]** in Hertz
- trL: **[Traverse LSP]** in Hertz
- qSH: **[Quick step high]** in Hertz
- qSL: **[Quick step low]** in Hertz

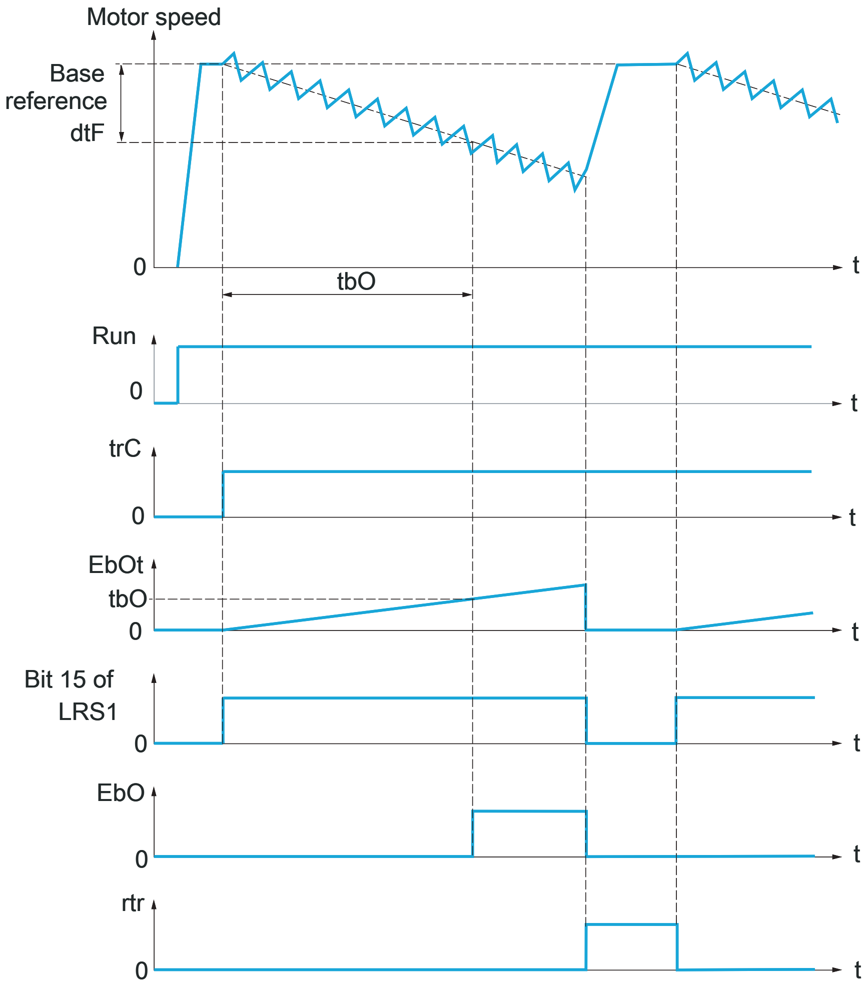
Reel parameters:

- tbO: **[Reel time]**: Time to wind a reel in minutes.
  This parameter displays the end of the winding. If the operating time in the mode "Traverse Control" with the control command trC reaches the value of tbO, the logic output or one of the relays in the status 1 switches if the corresponding function has been assigned to EbO.
  The EbOt operation time in "traverse control" mode can be monitored online via a communication bus and in the monitoring menu.
- dtF: **[Reference difference]**: Reduction of the basic reference.
  In certain cases, the base reference has to be reduced as the reel increases in size. The dtF value corresponds to the time tbO. Once this time has elapsed, the reference continues to fall, following the same ramp.
  If the low speed LSP is at 0 and the frequency of 0 Hz is reached, then the inverter stops and must be switched on again by a new run command.
  If the low speed LSP is not 0, the "traverse control" continues to be carried out above LSP.

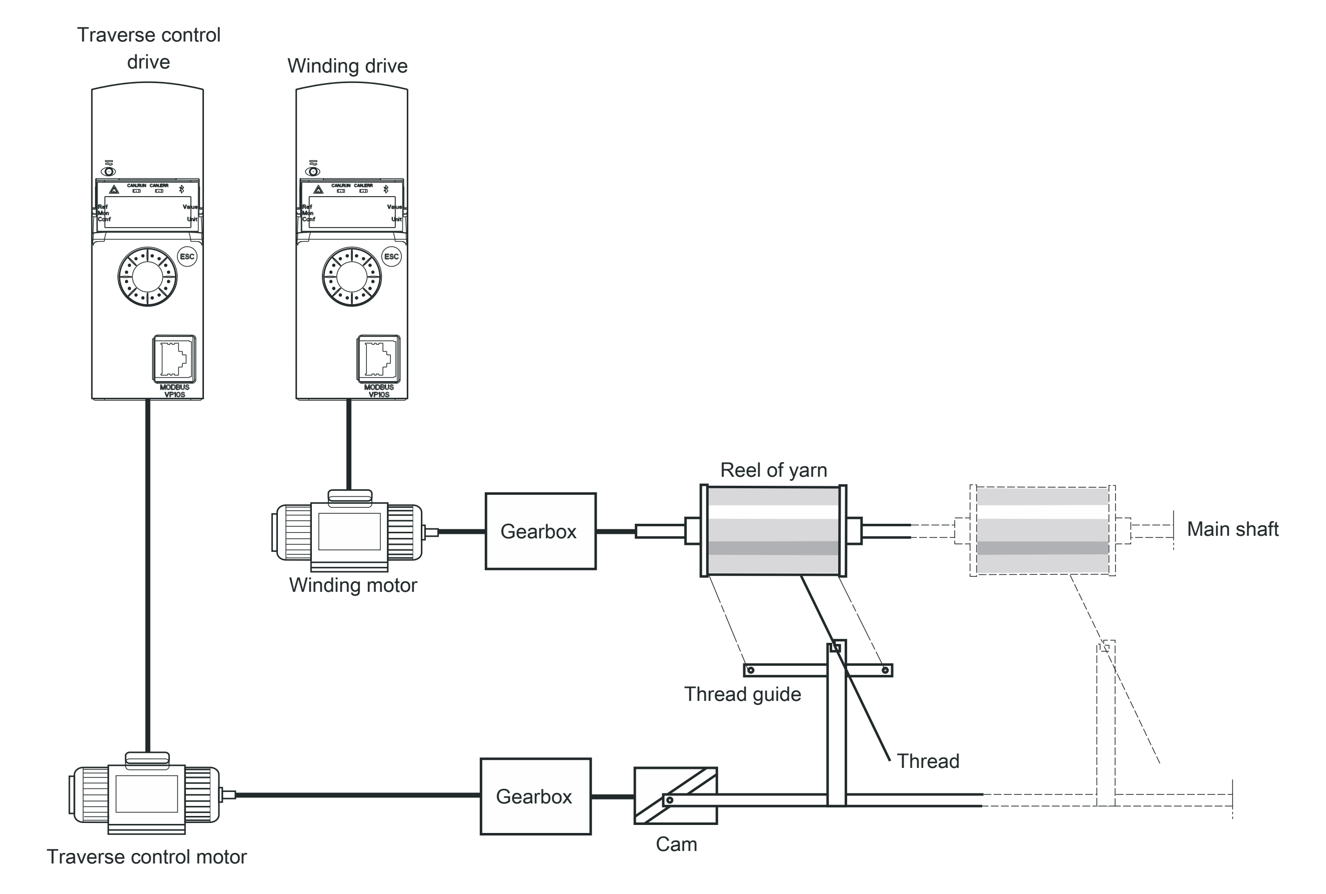




- rtr: **[Init Trav Contr]**: Reinitialization of traverse control.
  This control command can be assigned to a logic input or to a bit of a communication bus's control word. It sets the alarm EbO and the operating time EbOt back to zero and initializes the reference again with the basic reference. As long as rtr remains at 1, the function "traverse control" is locked and the frequency remains the same as the base reference.
  This control command is used especially when changing reels.


Motor speed
Base reference
dtF
0
t
tbO
Run
0
t
trC
0
t
EbOt
tbO
0
t
Bit 15 of LRS1
0
t
EbO
0
t
rtr
0
t

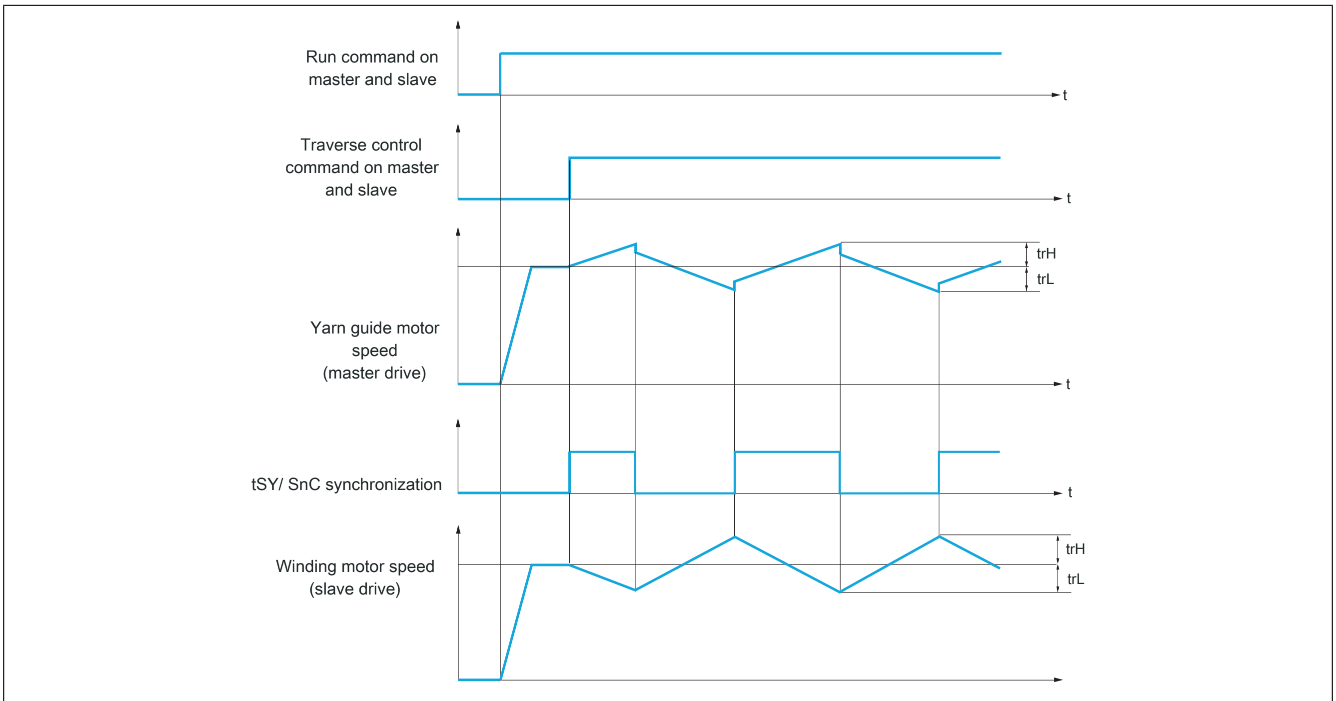
2.8.11.32 Counter wobble



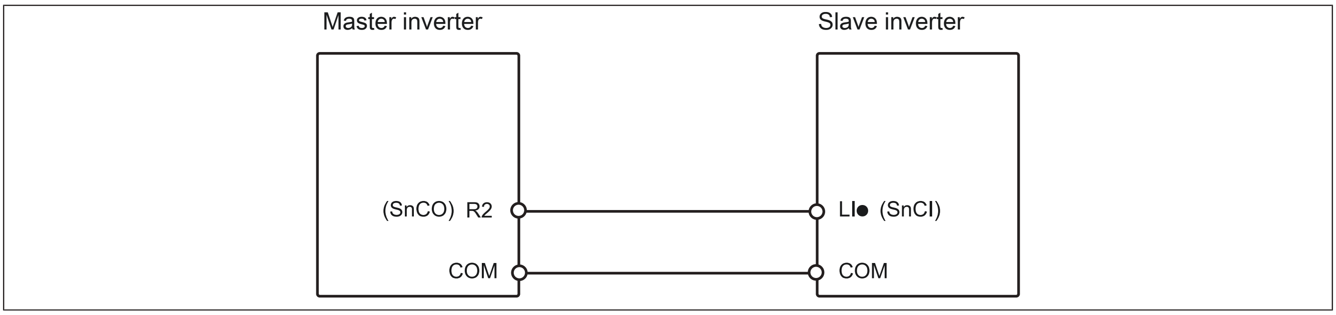
The function "Counter wobble" is used for some applications to attain a constant voltage of the yarn as the function "Traverse control" results in too heavy frequency fluctuations of the motor of the thread guide (trH and trL).

Two motors must be used (one master and one slave).

The master controls the speed (frequency) of the yarn guide, the slave controls the winding speed (winding frequency). The function returns a setpoint correction to the slave in the opposite direction to the master. This means that synchronization is then required using one of the master's logic outputs and one of the slave's logic inputs.



2.8.11.33 Connection of synchronization I/O



The starting conditions for the function are:

- Base frequencies reached on both inverters
- Input [thread control] (trC) activates
- Synchronization signal present

Note:

On the slave inverter, the parameters [Quick step high] (qSH) and [Quick step low] (qSL) should generally be left at zero.

[TRAVERSE CONTROL] (trO-)

Code	Name/Description	Setting range	Factory settings
trO-	**[TRAVERSE CONTROL]** **Note:** **This function cannot be used with certain other functions. Follow the instructions in** **see "APPLICATION FUNCT. FUn-" on page 197****.**		
trC nO LI1 - - -	**[Yarn control]** **[No]** (nO): Function not active. The other parameters are then not accessible. **[LI1]** (LI1) . . . **[...]** (...): See the assignment conditions The "traverse control" cycle starts when the assigned input or bit changes to 1 and stops when it changes to 0.		**[No]** (nO)
trH	**[Traverse freq. high]** 1)	0 to 10 Hz	4 Hz
trL	**[Traverse freq. low]** 1)	0 to 10 Hz	4 Hz
qSH	**[Quick step High]** 1)	0 to **[Traverse HSP]** (trH)	0 Hz
qSL	**[Quick step Low]** 1)	0 to **[Traverse LSP]** (trL)	0 Hz
tUP	**[Traverse ctrl. accel.]**	0.1 to 999.9 s	4 s
tdn	**[Traverse ctrl. decel]**	0.1 to 999.9 s	4 s
tbO	**[Reel time]** Time needed to process a reel.	0 to 9999 minutes	0 minutes
EbO nO r2 dO1	**[End reel]** **[No]** (nO): Function not assigned. **[CONFIGURATION R2]** (r2) **[DO1]** (dO1): Analog output AO, which can be used as logic output. The parameter is accessible when **[CONFIGURATION AO1]** (AO1) = **[No]** (nO). The output or relay changes to state 1 when the traverse control operating time reaches the **[reel time]** (tbO) .		**[No]** (nO)
SnC nO LI1 - - -	**[Counter wobble]** **[No]** (nO): Function not assigned **[LI1]** (LI1) . . . **[...]** (...): See the assignment conditions Synchronization input. To be configured on the winding inverter (slave) only.		**[No]** (nO)
tSY nO r2 dO1	**[Sync. wobble]** **[No]** (nO): Function not assigned. **[CONFIGURATION R2]** (r2) **[DO1]** (dO1): Analog output AO, which can be used as logic output. The parameter is accessible when **[CONFIGURATION AO1]** (AO1) = **[No]** (nO). To be configured on the yarn guide inverter (master) only.		**[No]** (nO)
dtF	**[Decrease ref. speed]** Decrease in the base reference during the traverse control cycle.	0 to 599 Hz	0 Hz
rtr nO LI1 - - -	**[Init. traverse ctrl]** **[No]** (nO): Function not assigned. **[LI1]** (LI1) . . . **[...]** (...): See the assignment conditions In state 1 of the input or of the assigned bits, the operating time in "traverse control" mode and **[reference difference]** (dtF) is set to zero.		**[No]** (nO)

1) This parameter can also be accessed via the **[SETTINGS]** (SEt-) menu.

Parameter that can be modified during operation or when stopped.

2.8.11.34 Evacuation function

The evacuation function is for elevator applications. It is only available for inverters 8I84T400075.01P-1 to 8I84T407500.01P-1.

If a lift is stuck between 2 floors due to a power failure, it must be possible to evacuate its occupants within a reasonable period of time.

For this function, a back-up power supply must be connected to the inverter.

This power supply is provided with a lower voltage and allows the operating only outside the nominal values at reduced speed, but with full torque.

The function requires:

- A logic input to control the evacuation function
- A reduction of the monitoring threshold for voltage
- A suitable reference value for the low speed

After a power failure, the inverter can be restarted without switching into the fault mode [UNDERVOLT. FAULT] (USF) if the logic input is at 1 at the same time.

Caution!

- **This input is not permitted to be at 1 if the inverter is connected to the power network. To guarantee this and to avoid short circuits, changeover contactors must be used.**
- **Set this input to 0 before connecting the emergency power supply.**

Failure to observe these instructions can result in damage to property.

[EMERGENCY POWER SUPPLY] (rFt-)

Code	Name/Description	Setting range	Factory settings
rFt-	[EMERGENCY POWER SUPPLY] Function is only available for the inverters 8I84T400075.01P-1 to 8I84T407500.01P-1.		
rFt nO LI1 - LI6	[Emergency power supply] [No] (nO): Function not assigned [LI1] (LI1) to [LI6] (LI6) The emergency power supply is blocked in state 1 of the input or of the associated bit. The emergency power supply is triggered in state 0 of the input or of the associated bit.		[No] (nO)
rSU	[Emergency power supply volt.] Permissible minimum value of the AC voltage of the emergency power supply. The parameter is accessible if [emergency power supply] (rFt) is not equal to [No] (nO). 8I84T4*****.01P-1: Range from 220 to 320 V, Factory setting 220 V.	220 to 230 V	220 V
rSP	[Emergency power supply freq.] Frequency reference of the mode "Emergency power supply" The parameter is accessible if [emergency power supply] (rFt) is not equal to [No] (nO). The adjustment range is determined by the parameters [low frequency] (LSP), [rated motor frequency.] (FrS) and, as described above, [Mot. rated voltage] (UnS) and [Emergency power supply volt.] (rSU). • If LSP < (Frs x rSU/UnS): rSP min. = LSP, rSP max. = (Frs x rSU/UnS) • If LSP ≥ (Frs x rSU/UnS): rSP = (Frs x rSU/UnS)		5 Hz

Parameter that can be modified during operation or when stopped.

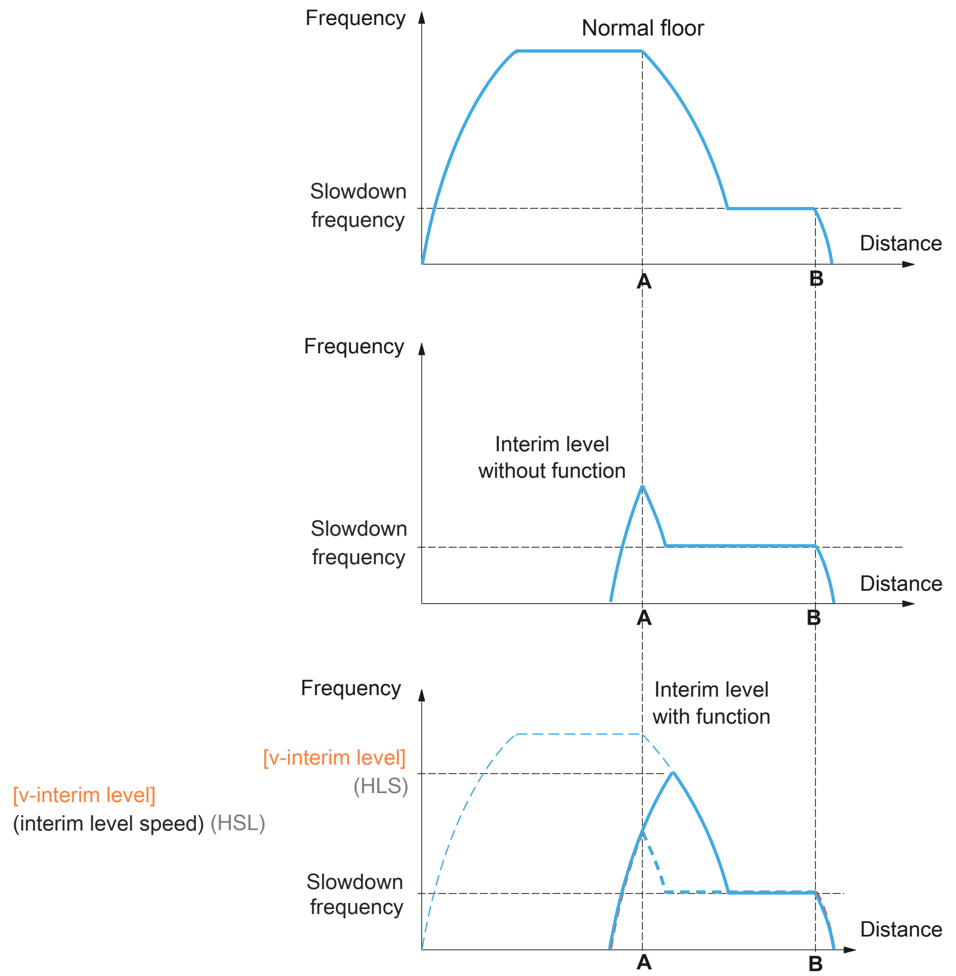
2.8.11.35 Interim level

The "interim level" function is for elevator applications.

If an elevator travels between floors and interim levels, the cycle time for interim levels may be too long if the elevator has no time to reach the full speed before passing the braking limit switch. This leads to an unnecessarily long braking time.

The "interim level" function can be used to compensate for this by no braking being triggered before the speed reaches a preset threshold **[v- interim level]** (HLS) so that the last part of the journey is the same as for a standard floor.

The following diagrams illustrate the various operating scenarios with and without the function:



The function is only activated if the braking limit switch is triggered and the motor frequency remains under the value **[v-interim level]** (HLS). The acceleration is carried out before the braking until this value is attained. The last part of the journey is identical to that of the standard floor.

[INTERIM LEVEL] (HFF-)

Code	Name/Description	Factory settings
HFF-	**[INTERIM LEVEL]**	
HLS	**[v-interim level]** Activation and adjustment of the "interim level" function. This function has priority over all frequency reference functions (for example preset frequencies) with the exception of functions generated via faults (for example, fallback frequency).	**[No]** (nO)
nO	**[No]** (nO): Function not active.	
-	**0.1 Hz to 500.0 Hz**: Activation of the function by setting the motor frequency to be achieved before the braking.	

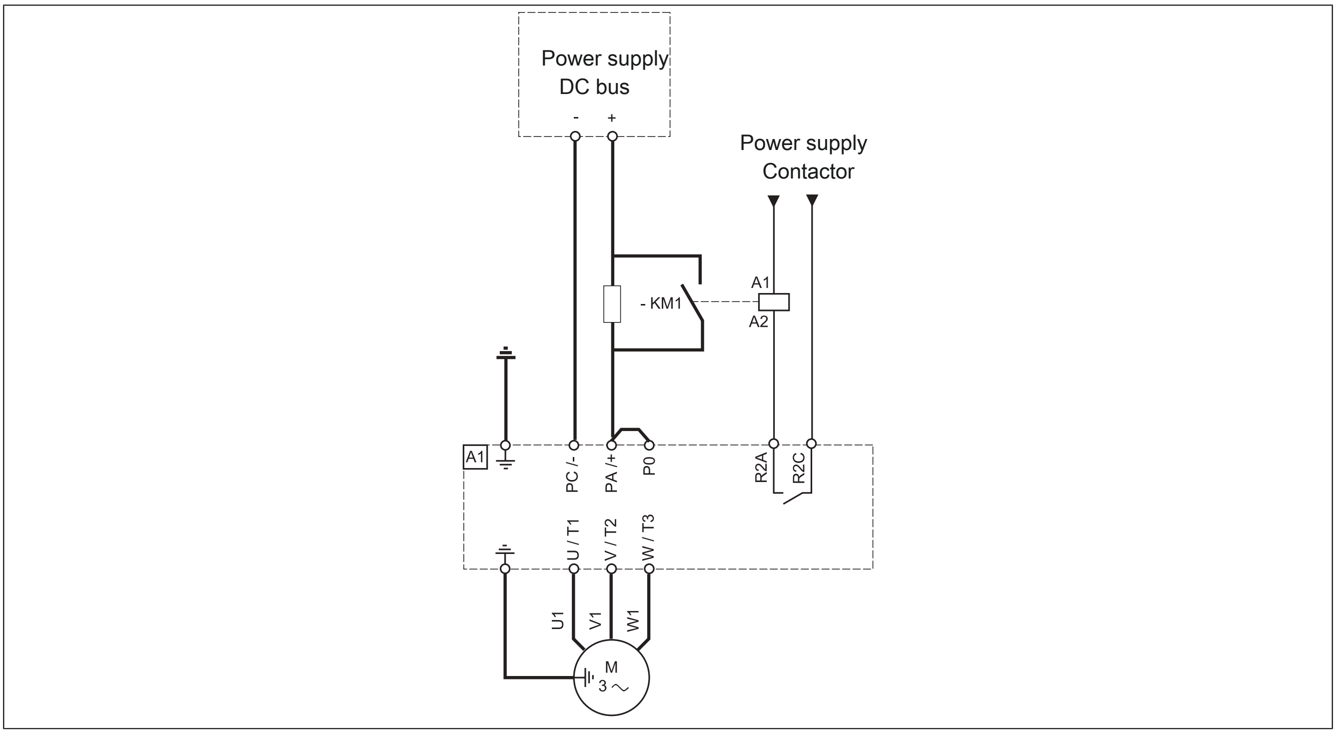
2.8.11.36 Direct power supply via the DC bus

This function is only available for inverters with nominal power ≥18.5 kW.

The direct power supply via the DC bus requires a protected direct current source with appropriate strength and voltage as well as a suitably sized resistor and capacitor precharge contactor. Information on the data for these components can be obtained from B&R.

The function "direct power supply via the DC bus" can be used to control the pre-charging contactor via a relay or a logic input on the inverter.

Wiring example with R2 relay:

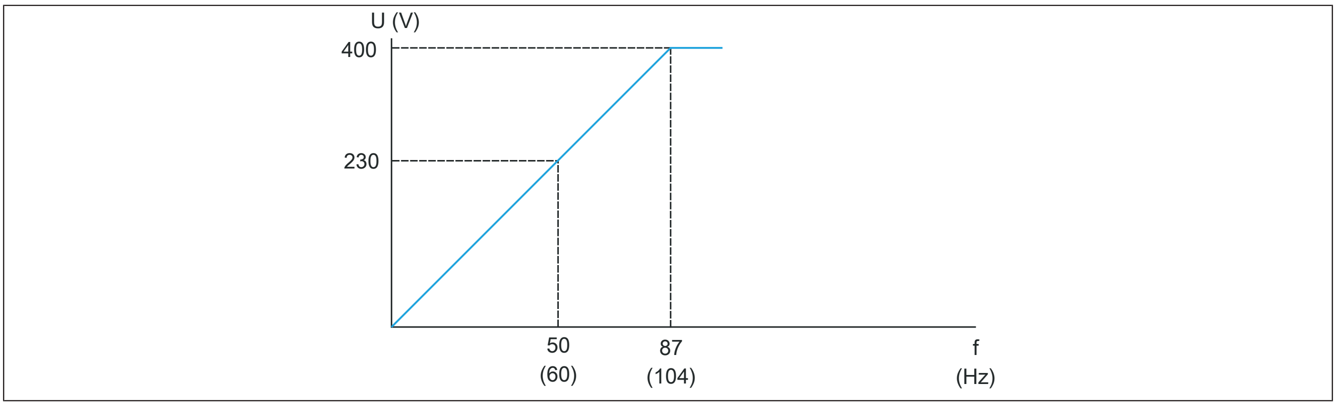


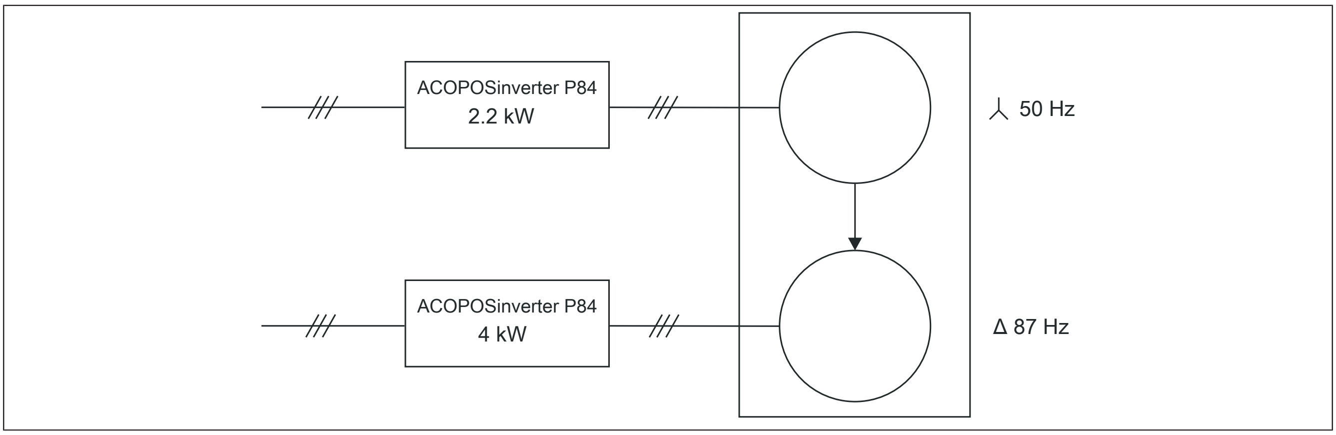
[POWER SUPPLY DC BUS] (dCO-)

Code	Name/Description	Factory settings
dCO-	**[POWER SUPPLY DC BUS]** This function is only available for inverters with nominal power ≥ 18.5 kW.	
dCO	**[Assign. charge ZK]** Logic output or control relay	**[No]** (nO)
nO	**[No]** (nO): Function not assigned.	
r2	**[CONFIGURATION R2]** (r2)	
dO1	**[DO1]** (dO1): Analog output AO, which can be used as logic output. The parameter is accessible when **[CONFIGURATION AO1]** (AO1) = **[No]** (nO).	

2.8.11.37 87 Hz operation

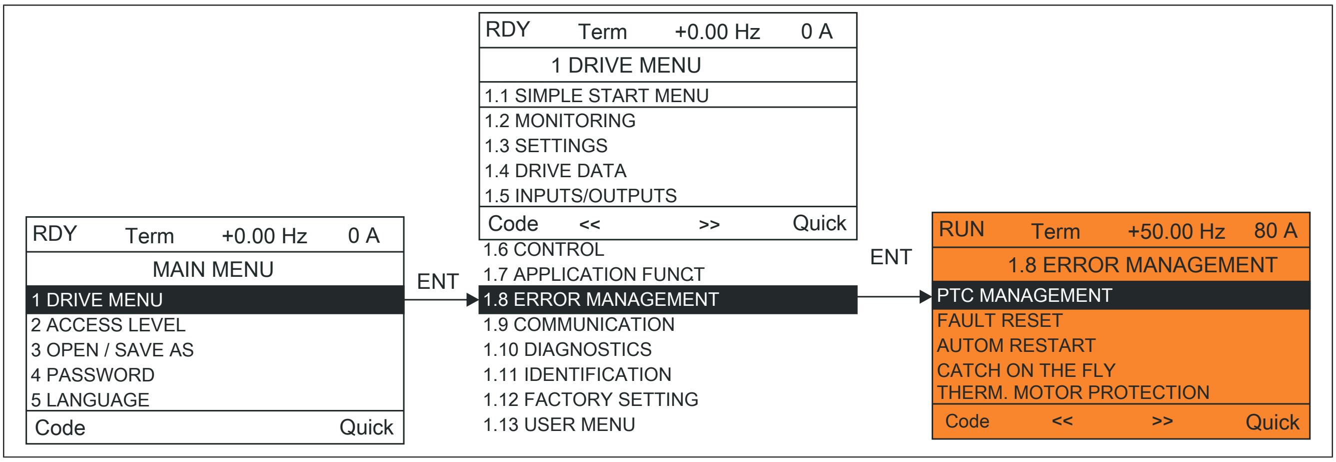
- Constant torque of up to 87 Hz. (104 Hz with 60 Hz motor)
- In this mode the initial power of the motor is multiplied by √3. Therefore, an ACOPOSinverter that can withstand the power must also be selected.
    – Example: A 2.2 kW, 50 Hz motor star-wired thus reaches a nominal power of 3.8 kW at 87 Hz if the motor is delta-wired.
- The motor data must be configured for the delta wiring.



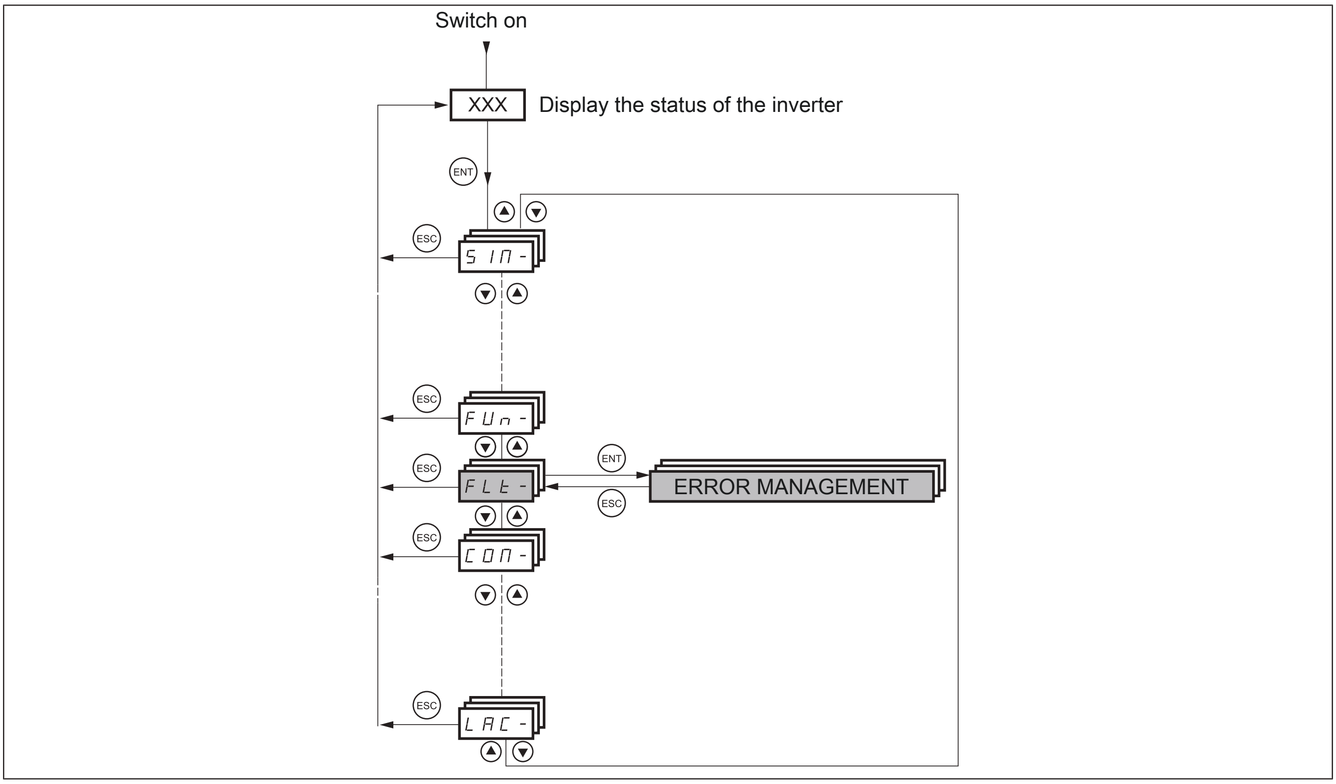


2.8.12 [FAULT MANAGEMENT] (FLt-)

2.8.12.1 With graphic display terminal:



2.8.12.2 With integrated display terminal:



2.8.12.3 Overview of functions:

Code	Name	Page
PtC-	[PTC MANAGEMENT]	see "PTC MANAGEMENT (PtC-)" on page 289
rSt-	[FAULT RESET]	see "FAULT RESET (rSt-)" on page 289
Atr-	[Automatic restart]	see "AUTOMATIC RESTART (Atr-)" on page 290
FLr-	[CATCH ON THE FLY]	see "CATCH ON THE FLY (FLr-)" on page 290
tHt-	[MOTOR THERMAL PROT.]	see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292
OPL-	[Output Phase Loss]	see "THERM. MOTOR PROTECTION (tHt) and LOSS OF MOTOR PHASE (OPL)" on page 292
IPL-	[Input phase loss]	see "LOSS LINE PHASE (IPL-) AND OVERTEMP. DRIVE (OHL-)" on page 294
OHL-	[DRIVE OVERHEAT]	see "LOSS LINE PHASE (IPL-) AND OVERTEMP. DRIVE (OHL-)" on page 294
SAt-	[THERMAL ALARM STOP]	see "Delayed stop at a thermal overload alarm" on page 296
EtF-	[External fault]	see "EXTERNAL FAULT (EtF-)" on page 296
USb-	[UnderV. fault mgt]	see "UNDERVOLTAGE MGT. (USb-)" on page 297
tlt-	[IGBT test]	see "MGT. UNDERVOLTAGE (USB-) AND IGBT TEST (TLT-)" on page 298
LFL-	[4-20 mA LOSS]	see "4-20 mA LOSS (LFL-)" on page 299
InH-	[Fault inhibit assign.]	see "INHIBIT FAULT (InH-)" on page 299
CLL-	[COMM FAULT MGT]	see "NETWORK FAULT MGT. (CLL-)" on page 300
Sdd-	[ENCODER FAULT]	see "ENCODER FAULT (Sdd-) and LIMIT. CURRENT - TORQUE. (tld-)" on page 301
tld-	[TORQUE/CURRENT LIM .]	see "ENCODER FAULT (Sdd-) and LIMIT. CURRENT - TORQUE. (tld-)" on page 301
dLd-	[DYNAMIC LOAD DETECT.]	see "DYNAMIC LOAD DETECT. (dLd-)" on page 303
brP-	[BRAKE RESIST PROTECTION]	see "BRAKE RESIST PROTECTION (brP-) and AUTO-TUNE FAULT (tnF-)" on page 304
tnF-	[AUTO TUNING FAULT]	see "BRAKE RESIST PROTECTION (brP-) and AUTO-TUNE FAULT (tnF-)" on page 304
PPI-	[CARDS PAIRING]	see "Cards pairing" on page 306
LFF-	[FALLBACK SPEED]	see "FALLBACK SPEED (LFF-), FAST STOP (FSt-) and DC INJECT. (dCI)" on page 306
FSt-	[FAST STOP]	see "FALLBACK SPEED (LFF-), FAST STOP (FSt-) and DC INJECT. (dCI)" on page 306
dCI-	[DC Injection]	see "FALLBACK SPEED (LFF-), FAST STOP (FSt-) and DC INJECT. (dCI)" on page 306

The parameters of the menu **[FAULT MANAGEMENT]** (FLt-) can only be changed in the stopped state without run command. Parameters with an arrow symbol in the "Code column are exceptions to this rule. These parameters can be changed during operation and in stop mode.

2.8.12.4 PTC sensor

The inverter can manage 3 sets of PTC probes in order to protect the motors:

- One PTC probe on logic input LI6. Activation takes place via switch "**SW1** and **SW2**" on the control card.

Each of these sets of PTC sensors is monitored for the following faults:

- Overtemperature on the motor
- Sensor break fault
- Sensor short-circuit fault

Protection via PTC probes does not disable protection via I^2t calculation performed by the inverter. The two types of protection can be combined.

[PTC MANAGEMENT] (PtC-)

Code	Name/Description	Factory settings
PtC-	[PTC MANAGEMENT]	
PtCL	[LI6 = PTC probe] Access is possible when control card switch **SW1** and **SW2** is set to PTC.	[No] (nO)
nO	[No] (nO): Not used.	
AS	[Always] (AS): PTC probe faults are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply).	
rdS	[Switch on] (rdS): "PTC probe" faults are monitored while the inverter power supply is connected.	
rS	[Motor on] (rS): The PTC probes are monitored while the motor is switched on.	

[FAULT RESET] (rSt-)

Code	Name/Description	Factory settings
rSt-	[FAULT RESET]	
rSF	[Fault reset configuration]	[No] (nO)
	Manual fault reset	
nO	[No] (nO): Function not active	
LI1	[LI1] (LI1) to [LI6] (LI6)	
C101	[C101] (C101) to [C115] (C115): Not applicable	
-	[C201] (C201) to [C215] (C215): With built-in communication interface in [I/O profile] (IO)	
-	[C301] (C301) to [C315] (C315): With communication card in [I/O profile] (IO)	
Cd00	[CD00] (Cd00) to [CD13] (Cd13): In [I/O profile] (IO) the switchover is possible with logic inputs	
-	[CD14] (Cd14) to [CD15] (Cd15): In [I/O profile] (IO) the switchover is possible with logic inputs	
	Errors are reset when the state of the assigned input or bit changes to 1, provided that the cause of the error has been resolved. The STOP/RESET button on the operator terminal fulfills the same function. A list of the errors that can be reset manually, see "Fault - Causes - Measures" on page 335.	
rP	[Product reset]	[No] (nO)
	Only callable parameters in the mode [ACCESS LEVEL] = [Expert]. Inverter reinitialization. Can be used to reset all faults without having to disconnect the inverter from the power supply.	
nO	[No] (nO): Function not active.	
YES	[Yes] (YES): Reinitialization. Hold the ENT key for two seconds. The parameter changes automatically to [No] (nO) when the process is completed. The inverter can only be reinitialized when locked.	
	Caution! **Before the reinitialization, ensure that the error that led to locking of the inverter is resolved.** **Failure to follow this instruction can result in equipment damage.**	
rPA	[Product reset assig.]	[No] (nO)
	Only callable parameters in the mode [ACCESS LEVEL] = [Expert]. Inverter reinitialization via logic input. Can be used to reset all faults without having to disconnect the inverter from the power supply. The frequency inverter is reinitialized on a rising edge (change from 0 to 1) of the assigned input. The inverter can only be reinitialized when locked.	
nO	[No] (nO): Function not active.	
LI1	[LI1] (LI1) to [LI6] (LI6)	
-	To assign the reinitialization, press and hold the ENT key for 2 seconds.	
LI6	**Caution!** **Before the reinitialization, ensure that the error that led to locking of the inverter is resolved.** **Failure to follow this instruction can result in equipment damage.**	

[AUt. restart] (Atr-)

Code	Name/Description	Factory settings
Atr-	[Automatic restart]	
Atr	[Automatic restart]	[No] (nO)
nO	[No] (nO): Function not active.	
YES	[Yes]: Automatic restart after locking due to an error if the cause of the error has been corrected and the rest of the operating conditions allow the restart. The restart is performed by a series of automatic attempts in lengthening intervals: 1 s, 5 s, 10 s, then 1 minute between the subsequent attempts. The inverter fault relay remains activated when this function is active. The frequency reference and the direction of operation must be maintained. Use the 2-wire control ([2/3-wire control] (tCC) = [2wire ctrl] (2C) and [Type 2-wire ctrl.] (tCt) = [Level] (LEL)).	
	Warning! **ACCIDENTAL OPERATION OF DEVICE** **Check that an automatic restart will not endanger personnel or equipment in any way.** **Failure to follow these instructions will result in death or serious injury.**	
	If after the configurable time interval tAr, the inverter still does not restart, the process is ended and the inverter remains locked until it is switched off and back on again. For the errors that allow this function, see "Faults that allow an automatic restart after eliminating the cause" on page 337.	
tAr	[Max. restart duration]	[5 min] (5)
5	[5 min] (5): 5 minutes	
10	[10 min] (10): 10 minutes	
30	[30 min] (30): 30 minutes	
1h	[1 h] (1h): 1 hour	
2h	[2 h] (2h): 2 hours	
3h	[3 h] (3h): 3 hours	
Ct	[Unlimited] (Ct): Unlimited	
	The parameter is accessible if [Aut. restart] (Atr) = [Yes] (YES). The function can be used to limit the number of subsequent re-starts with a recurring fault.	

[CATCH ON THE FLY] (FLr-)

Code	Name/Description	Setting range	Factory settings
FLr-	[CATCH ON THE FLY] **Note:** **This function cannot be used with certain other functions. Follow the instructions in see "APPLICATION FUNCT. FUn-" on page 197.**		
FLr	[Catch on the fly] Used to enable a smooth restart if the run command is maintained after the following events: • Loss of line supply or disconnection • Reset of current fault or automatic restart • Freewheel stop. The speed given by the inverter resumes from the estimated speed of the motor at the time of the restart, then follows the ramp to the reference frequency. This function requires 2-wire level control.		[No] (nO)
nO	[No] (nO): Function not active		
YES	[Yes] (YES): Function active When the function is operational, it activates at each run command, resulting in a slight delay of the current (0.5 s max.). [CATCH ON THE FLY] (FLr) is forced to [No] (nO) if the braking command [BRAKE LOGIC] (bLC) is assigned, is [Type Motor control] (Ctt) = [FVC] (FUC) is or, if in the open control loop, [Auto DC injection] (AdC) = [permanent] (Ct).		

Parameter that can be modified during operation or when stopped.

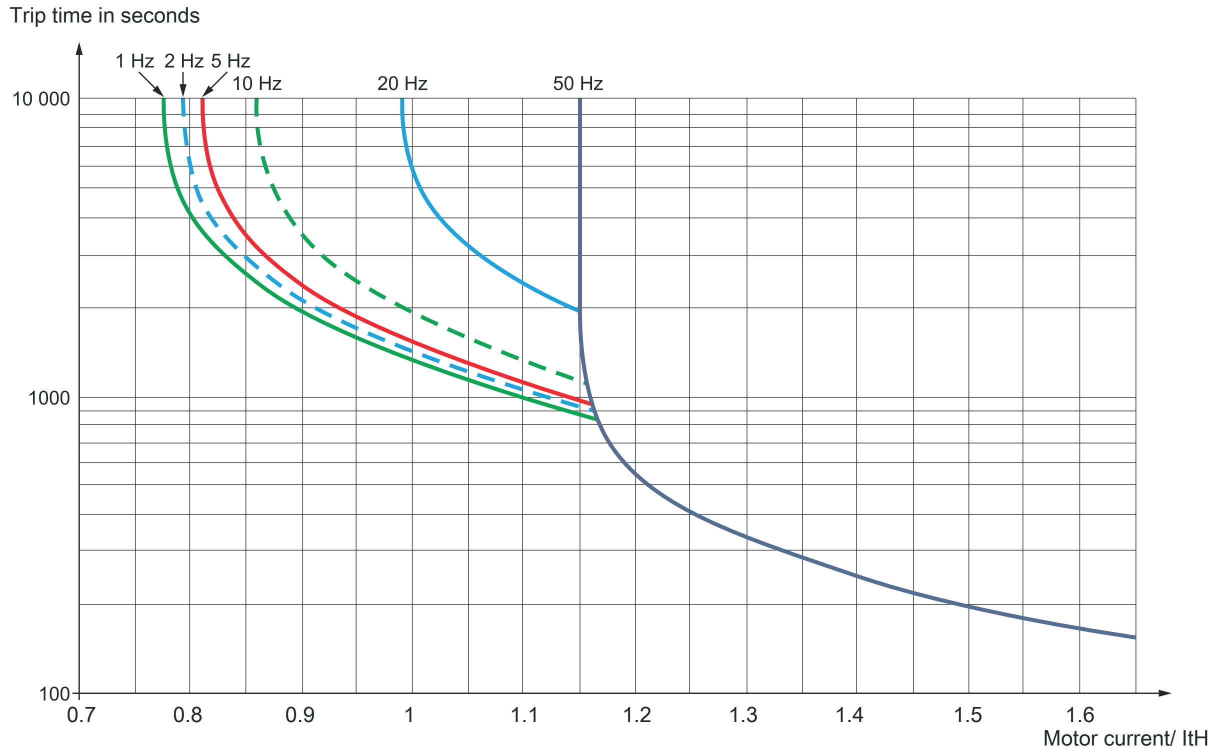
2.8.12.5 Thermal motor protection

Function:

Thermal protection through calculation of I^2t.

> **Note:**
>
> **The motor thermal state is saved when the inverter is switched off. The shutdown time is used to calculate the thermal state the next time the inverter is switched on.**

- Self-cooling motors:
  The tripping curves depend on the motor frequency.
- Force-cooled motors:
  Regardless of motor frequency, only the 50 Hz tripping curve needs to be observed.



[THERM. MOTOR PROTECTION] (tHt) and [LOSS OF MOTOR PHASE] (OPL)

Code	Name/Description	Setting range	Factory settings
tHt-	[MOTOR THERMAL PROT.]		
tHt nO ACL FCL	[MOTOR THERMAL PROT.] [No] (nO): No protection [Self cooled] (ACL): For self-cooling motors [Forced-air cooling] (FCL): For forced-air cooled motors **Note:** **A fault trip will occur when the thermal state reaches 118% of the rated state and reactivation will occur when the state falls back below 100%.**		[Self-cooling] (ACL)
ttd	[Motor therm. level] 1) Trip threshold for motor thermal alarm (logic output or relay)	0 to 118%	100%
ttd2	[Motor2 therm. level] Trip threshold for motor 2 thermal alarm (logic output or relay)	0 to 118%	100%
ttd3	[Motor3 therm. level] Trip threshold for motor 3 thermal alarm (logic output or relay)	0 to 118%	100%
OLL nO YES Stt LFF rLS rMP FSt dCI	[Overload fault mgt] Type of stop in the event of a motor thermal fault. [No] (nO): Fault ignored [freewheel stop] (YES): Freewheel stop [Type stop] (Stt): Stop in accordance with the configuration of [STOP MODE] (Stt) without triggering a fault. In this case, the alarm relay does not drop off and once the fault disappears the inverter is ready for operation in accordance with the starting conditions of the active command channel (for example according to [2/3-wire ctrl] (tCC) and [2wire ctrl] (tCt), if the control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. [FALLBACK SPEED] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed 2). [Hold freq.] (rLS): The inverter maintains the frequency being applied when the fault occurred, as long as the fault is present and the run command has not been removed 2). [StopRamp] (rMP): Stopping via ramp. [Fast stop] (FSt): Fast stop [DC injection] (dCI): Stop via DC injection: This function type cannot be set in combination with certain other functions.		[freewheel stop](YES)
OPL-	[Output Phase Loss]		
OPL nO YES OAC	[Output Phase Loss] [No] (nO): Function not active. [Yes] (YES): Triggering the fault mode OPF with stop in freewheel stop. [Switch outp] (OAC): No fault tripped, but management of the output voltage in order to avoid an overcurrent when the link with the motor is re-established and catch on the fly performed (even if this function has not been configured). **Note:** **[Output phase loss] (OPL) is forced to [No] (nO) if [Motor control type] (Ctt) = [Sync. Motor] (SYn). For the other configurations of the type [Motor control type] (Ctt), [Output phase loss] (OPL) is forced to [Yes] (YES) if the braking command is configured.** **Note:** **Set the parameter [Output phase loss] (OPL) to [Outp. switch] (OAC), if you are using an output contactor.**		[Yes] (YES)
Odt	[OutPh time detect] Delay in taking into account the recorded fault [Output phase loss] (OPL).	0.5 to 10 s	0.5 s

1) This parameter can also be accessed via the [SETTINGS] (SEt-) menu.
2) Since the fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

Parameter that can be modified during operation or when stopped.

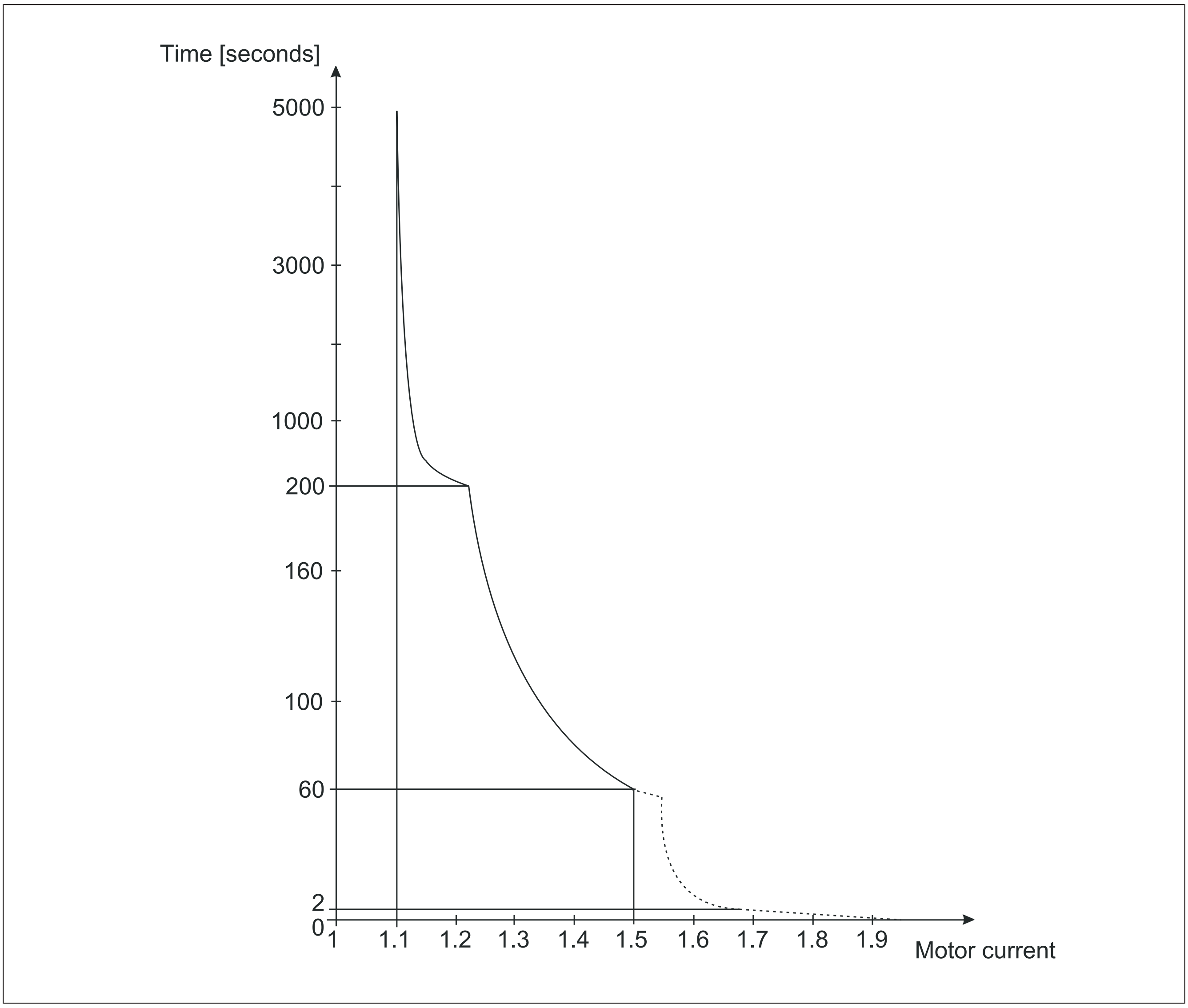
Function

The thermal protection is guaranteed with the aid of a PTC sensor on the heat sink or in the motor/power module. The ACOPOSinverter P84 is indirectly protected against overloading by tripping of a fault in the case of overcurrent.

Typical tripping values:

Motor current = 185% of the rated inverter current: 2 seconds

Motor current = 150% of the rated inverter current: 60 seconds



Inverter ventilation:

The fan starts when the inverter is switched on. If no run command is received within 10 seconds, the inverter ramps down.

The fan is automatically controlled if the inverter is unlocked (direction + reference).

If the inverter is locked, the fan turns off after a few seconds (motor speed <0.2 Hz and braking completed).

[LOSS LINE PHASE] (IPL-) AND [OVERTEMP. DRIVE] (OHL-)

Code	Name/Description	Setting range	Factory settings
IPL-	**[Input phase loss]**		
IPL	**[Input phase fault]**		According to inverter performance
nO	**[No.]** (nO): Fault ignored; to be used when the inverter is supplied via a single phase supply or by the DC bus.		
YES	**[freewheel stop]** (YES): Fault with freewheel stop. In the case of loss of one phase the inverter switches to the fault mode **[Loss Power Phase]** (IPL); in the event of the loss of two or three phases, the inverter continues operating until it trips due to undervoltage. Factory setting: **[No]** (nO) für 8I84T200037.01P-1 to 8I84T200300.01P-1, **[freewheel stop]** (YES) for all others.		
OHL-	**[DRIVE OVERHEAT]**		
OHL	**[DRIVE OVERHEAT]** **Caution!** **RISK OF DAMAGE TO THE SYSTEM** **The inverter is not protected when faults are inhibited. This invalidates the warranty. Check that the possible consequences do not present any risk.** **Failure to observe these instructions can result in damage to property.** **Behavior in the event of the inverter overheating.**		**[freewheel stop]**(YES)
nO	**[No]** (nO): Fault is ignored.		
YES	**[freewheel stop]** (YES): Freewheel stop		
Stt	**[in accordance with STT]** (Stt): Stop in accordance with the configuration of **[STOP MODE]** (Stt), see "STOP MODE (Stt-)" on page 206, without fault tripping. In this case, the alarm relay does not open and once the fault disappears the inverter is ready for operation in accordance with the restarting conditions of the active command channel (for example according to **[2/3-wire ctrl]** (tCC) and **[Type 2-wire ctrl]** (tCt), see "Input and output parameters (tCC - rr5)" on page 166, if the control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	**[FALLBACK SPEED]** (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed [1].		
rLS	**[Hold freq.]** (rLS): The inverter maintains the frequency being applied when the fault occurred, as long as the fault is present and the run command has not been removed [1].		
rMP	**[StopRamp]** (rMP): Stopping via ramp.		
FSt	**[Quick stop]** (FSt): Quick stop		
dCI	**[DC brak.]** (dCI): Stop by DC injection This normal hold cannot be used with certain other functions. see "APPLICATION FUNCT. FUn-" on page 197. **Note:** **A fault trip will occur when the thermal state reaches 118% of the rated state and reactivation will occur when the state falls back below 90%.**		
tHA	**[Drv therm. state al]** Trip threshold for inverter thermal alarm (logic output or relay)	0 to 118%	100%

1) Since the fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

Parameter that can be modified during operation or when stopped.

2.8.12.6 Delayed stop at a thermal overload alarm

This function is particularly for elevator applications. This function prevents the inverter from stopping between two floors if the inverter or motor overheats, by authorizing operation until the next stop. At the next stop, the inverter is locked until the thermal state falls back to a value, which undershoots the set threshold by 20%.

Example: A trip threshold set at 80% enables reactivation at 60%.

One thermal state threshold must be defined for the inverter, and one thermal state threshold for the motor(s), which will trip the deferred stop.

[THERMAL ALARM STOP] (SAt-)

Code	Name/Description	Setting range	Factory settings
SAt-	**[THERMAL ALARM STOP]**		
SAt nO YES	**[THERMAL ALARM STOP]** **[No]** (nO): Function inactive (in this case, the following parameters cannot be accessed) **[Yes]** (YES): Freewheel stop due to inverter or motor thermal alarm **Caution!** **The inverter and the motor are no longer protected at stops due to thermal alarm. This invalidates the warranty. Check that the possible consequences do not present any risk.** **Failure to follow this instruction can result in equipment damage.**		**[No]** (nO)
tHA	**[Drv therm. state al]** Thermal state threshold of the inverter tripping a deferred stop.	0 to 118%	100%
ttd	**[Motor therm. level]** Thermal state threshold of the motor tripping a deferred stop.	0 to 118%	100%
ttd2	**[Motor2 therm. level]** Thermal state threshold of motor 2 tripping a deferred stop.	0 to 118%	100%
ttd3	**[Motor3 therm. level]** Thermal state threshold of motor 3 tripping a deferred stop.	0 to 118%	100%

Parameter that can be modified during operation or when stopped.

[External fault] (EtF-)

Code	Name/Description	Factory settings
EtF-	[External fault]	
EtF	[External fault]	[No] (nO)
nO	[No] (nO): Function not active.	
LI1	[LI1] (LI1)	
-	.	
	[...] (...): See the assignment conditions	
	If the assigned bit is at 0, there is no external fault. If the assigned bit is at 1, there is an external fault. The logic is configurable via [External fault config] (LEt), if a logic input is assigned.	
LEt	[External fault config]	[Active high] (HIG)
	Parameter can be accessed if the external fault has been assigned to a logic input. It defines the positive or negative logic of the input assigned to the fault.	
LO	[Active low] (nO): Fault on falling edge (change from 1 to 0) of the assigned input.	
HIG	[Active high] (HIG): Fault on rising edge (change from 0 to 1) of the assigned input.	
EPL	[External fault mgt]	[freewheel stop](YES)
	Type of stop in the event of an external fault	
nO	[No] (nO): Fault is ignored.	
YES	[freewheel stop] (YES): Freewheel stop	
Stt	[in accordance with STT] (Stt): Stop in accordance with the configuration of [STOP MODE] (Stt), see "STOP MODE (Stt-)" on page 206, without fault tripping. In this case, the alarm relay does not open and once the fault disappears the inverter is ready for operation in accordance with the restarting conditions of the active command channel (for example according to [2/3-wire ctrl.] (tCC) and [Type 2-wire ctrl.] (tCt), see "Input and output parameters (tCC - rr5)" on page 166, if the control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[FALLBACK SPEED] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed [1].	
rLS	[Hold freq.] (rLS): The inverter maintains the frequency being applied when the fault occurred, as long as the fault is present and the run command has not been removed [1].	
rMP	[StopRamp] (rMP): Deceleration via ramp	
FSt	[Quick stop] (FSt): Quick stop	
dCI	[DC inj.] (dCI): Stop by DC injection. This function cannot be used with certain other functions.	

1) Since the fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

[UNDERVOLTAGE MGT.] (USb-)

Code	Name/Description	Setting range	Factory settings
USb-	[UnderV. fault mgt]		
USb	[Undervoltage]		[Flt&R1 open] (0)
	Behavior of the inverter in the event of an undervoltage		
0	[Flt&R1 open] (0): Fault and fault relay open.		
1	[Flt&R1close] (1): Alarm and fault relay closed.		
2	[Alarm] (2): Alarm and fault relay remains closed. The alarm can be assigned to a logic output or a relay.		
UrES	[Mains voltage]	Depending on the inverter voltage	Depending on the inverter voltage
	Rated voltage of the line supply in V.		
	For 8I84T2*****.01P-1:		
200	[200VAC] (200): 200 volts AC		
220	[220VAC] (220): 220 volts AC		
240	[240VAC] (240): 240 volts AC		
260	[260VAC](260): 260 volts AC (factory setting)		
	For 8I84T4*****.01P-1:		
380	[380VAC] (380): 380 volts AC		
400	[400VAC] (400): 400 volts AC		
440	[440VAC] (440): 440 volts AC		
460	[460VAC] (460): 460 volts AC		
480	[480VAC](480): 480 volts AC (factory setting)		
USL	[Undervoltage level]		
	Undervoltage fault trip level in V. The adjustment range and the factory setting are dependent on the rated voltage of the inverter as well as the value of the [mains voltage] (UrES).		
USt	[Undervolt. time out]	0.2 to 999.9 s	0.2 s
	Time delay for taking undervoltage fault into consideration		
StP	[UnderV. prevention]		[No] (nO)
	Behavior on reaching the switching point for undervoltage.		
nO	[No] (nO): No action.		
MMS	[SupplDC Bus] (MMS): This stop mode uses the inertia to maintain the DC bus voltage as long as possible.		
rMP	[StopRamp] (rMP): Stop according to a configurable ramp [max. stop time] (StM).		
LnF	[Lock.] (LnF): Locking (freewheel stop) without faults.		

[MGT. UNDERVOLTAGE] (USb-) (continuation) and [IGBT TEST] (tIt-)

Code	Name/Description	Setting range	Factory settings
USb-	**[UnderV. fault mgt]**		
tSM	**[UnderV. restart tm]** Time delay before a restart is permitted after a complete standstill for **[guided DEC USF]** (StP) = **[StopRamp]** (rMP), if the voltage has reached the normal value.	1 to 999.9 s	1 s
UPL	**[Prevention level]** Setting of the level for undervoltage prevention in V. Access is possible if **[guided DEC USF]** (StP) is not equal to **[No]** (nO). The adjustment range and the factory setting are dependent on the rated voltage of the inverter as well as the value of the **[mains voltage]** (UrES).		
StM	**[Max stop time]** Ramp up time if **[guided DEC USF]** (StP) = **[StopRamp]** (rMP).	0.01 to 60 s	1 s
tbS	**[DC bus maintain tm]** Stopping time of the DC bus if **[guided DEC USF]** (StP) = **[SupplDC Bus]** (rMP).	1 to 9999 s	9999 s
tIt-	**[IGBT test]**		
Strt nO YES	**[IGBT test]** **[No]** (nO): No test **[Yes]** (YES): The IGBTs are tested on power up and every time a run command is sent. These tests cause a slight delay (a few ms). In the event of a fault, the inverter will lock. The following faults can be detected: • Inverter output short circuit (terminals U-V-W): SCF displayed • IGBT faulty: xtF, where x indicates the number of the affected IGBT • IGBT short circuit: x2F, where x indicates the number of the affected IGBT		**[No]** (nO)

Parameter that can be modified during operation or when stopped.

[4-20 mA LOSS] (LFL-)

Code	Name/Description	Factory settings
LFL-	**[4-20 mA LOSS]**	
LFL2	**[4-20 mA loss AI2]**	**[ign fault]** (nO)
nO	**[ign fault]** (nO): Fault is ignored. This configuration is the only possible one if **[min. value AI2]** (CrL2), see "AI2 CONFIGURATION" on page 173, is not greater than 3 mA or if **[Typ AI2]** (AI2t), see "AI2 CONFIGURATION" on page 173 = **[voltage]** (10U).	
YES	**[freewheel stop]** (YES): Freewheel stop	
Stt	**[in accordance with STT]** (Stt): Stop in accordance with the configuration of **[STOP MODE]** (Stt), see "STOP MODE (Stt-)" on page 206, without fault tripping. In this case, the alarm relay does not open and once the fault disappears the inverter is ready for operation in accordance with the restarting conditions of the active command channel (for example according to **[2/3-wire ctrl.]** (tCC) and **[Type 2-wire ctrl.]** (tCt), see "Input and output parameters (tCC - rr5)" on page 166, if the control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	**[FALLBACK SPEED]** (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed[1)].	
rLS	**[Hold freq.]** (rLS): The inverter maintains the frequency being applied when the fault occurred, as long as the fault is present and the run command has not been removed [1)].	
rMP	**[StopRamp]** (rMP): Stopping via ramp.	
FSt	**[Quick stop]** (FSt): Quick stop	
dCI	**[DC brak.]** (dCI): Stop by DC injection This normal hold cannot be used with certain other functions. see "APPLICATION FUNCT. FUn-" on page 197.	

1) Since the fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

The parameter is accessible in the [expert] mode.

[Fault inhibit assign.] (InH-)

Code	Name/Description	Factory settings
InH-	[Fault inhibit assign.]	
InH	[Fault inhibit assign.] Hold the "ENT" button for two seconds for the assignment of the fault inhibition. **Caution!** **RISK OF DAMAGE TO THE SYSTEM** **The inverter is not protected when faults are inhibited. This invalidates the warranty. Check that the possible consequences do not present any risk.** **Failure to observe these instructions can result in damage to property.**	[No] (nO)
nO	[No] (nO): Function not active.	
LI1	[LI1] (LI1)	
InH	. [...] (...): See the assignment conditions If the assigned input or bit is at 0, fault monitoring is active. If the assigned input or bit is at 1, fault monitoring is inactive. Active faults are reset on a rising edge (change from 0 to 1) of the assigned input or bit. **Note:** **The "power removal" function is not affected by this function, and neither are the faults that would lead to a complete breakdown.** **A list of faults affected by this function** see "Fault - Causes - Measures" on page 335.	

[NETWORK FAULT MGT.] (CLL-)

Code	Name/Description	Factory settings
CLL-	[COMM FAULT MGT]	
CLL	[Network fault mgt]	[freewheel stop](YES)
	Behavior of the inverter in the event of a communication fault with a communication card	
nO	[No] (nO): Fault is ignored.	
YES	[freewheel stop] (YES): Freewheel stop	
Stt	[in accordance with STT] (Stt): Stop in accordance with the configuration of [STOP MODE] (Stt), see "STOP MODE (Stt-)" on page 206, without fault tripping. In this case, the alarm relay does not open and once the fault disappears the inverter is ready for operation in accordance with the restarting conditions of the active command channel (for example according to [2/3-wire ctrl] (tCC) and [Type 2-wire ctrl] (tCt), see "Input and output parameters (tCC - rr5)" on page 166, if the control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[FALLBACK SPEED] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed [1].	
rLS	[Hold freq.] (rLS): The inverter maintains the frequency being applied when the fault occurred, as long as the fault is present and the run command has not been removed [1].	
	Note: **The ACOPOSinverter P84 is reconfigured when the CPU is restarted. By configuring CLL = rLS, the CPU is not able to configure the inverter → this leads to an error (module OK = FALSE).** **Troubleshooting:** **Download parameter = 0 → With this configuration, the inverter will be configured when the CPU is restarted.**	
rMP	[StopRamp] (rMP): Stopping via ramp.	
FSt	[Quick stop] (FSt): Quick stop	
dCI	[DC brak.] (dCI): Stop by DC injection	
	This normal hold cannot be used with certain other functions. see "APPLICATION FUNCT. FUn-" on page 197.	
COL	[Mgt. faultCANopen]	[freewheel stop](YES)
	Behavior of the inverter in the event of a communication fault with an integrated bus connection.	
nO	[No] (nO): Fault is ignored.	
YES	[freewheel stop] (YES): Freewheel stop	
Stt	[in accordance with STT] (Stt): Stop in accordance with the configuration of [STOP MODE] (Stt), see "STOP MODE (Stt-)" on page 206, without fault tripping. In this case, the alarm relay does not open and once the fault disappears the inverter is ready for operation in accordance with the restarting conditions of the active command channel (for example according to [2/3-wire ctrl] (tCC) and [Type 2-wire ctrl] (tCt), see "Input and output parameters (tCC - rr5)" on page 166, if the control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.	
LFF	[FALLBACK SPEED] (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed [1].	
rLS	[Hold freq.] (rLS): The inverter maintains the frequency being applied when the fault occurred, as long as the fault is present and the run command has not been removed [1].	
rMP	[StopRamp] (rMP): Stopping via ramp.	
FSt	[Quick stop] (FSt): Quick stop	
dCI	[DC injection] (dCI): Stop via DC injection: This function type cannot be set in combination with certain other functions. see "APPLICATION FUNCT. FUn-" on page 197.	
SLL	[Modbus fault mgt]	[freewheel stop](YES)
	Not applicable	

1) Since the fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

[ENCODER FAULT] (Sdd-) and [LIMIT. CURRENT/TORQUE] (tld-)

Code	Name/Description	Setting range	Factory settings
Sdd-	**[ENCODER FAULT]** Can be activated if the encoder option card has been inserted and the encoder is used for the speed feedback (see "Drive parameters (EnC - EnU)" on page 157).		
Sdd nO YES	**[Load slip detection]** **[No]** (nO): Fault is not monitored. Only the alarm can be assigned to a logic output or a relay. **[Yes]** (YES): Monitored fault. **[Load slip detection]** (Sdd) is forced to **[Yes]** (YES) if **[Motor control type]** (Ctt) = **[FVC]** (FUC). The error is tripped by a comparison with the ramp output and the actual speed value and is only effective for speeds of more than 10% of the **[rated motor frequency]** (FrS) , see "Drive parameters (bFr - nSP)" on page 151. In the event of a fault the inverter switches off in a free run, and if the brake logic function has been configured, the braking command is set to 0.		**[No]** (nO)
ECC nO YES	**[Encoder coupling]** **[No]** (nO): Fault is not monitored. **[Yes]** (YES): Monitored fault. If the brake logic control function has been configured, the factory setting switches to **[Yes]** (YES). **[Encoder coupling]** (ECC) = **[Yes]** (YES) is only possible if **[load slip detection]** (Sdd) = **[Yes]** (YES), if **[Motor control type]** (Ctt) = **[FVC]** (FUC) and if **[BRAKE LOGIC]** (bLC) does not equal **[No]** (nO). The monitored fault is a break in the mechanical coupling of the encoder. In the event of a fault the inverter switches off in a free run, and if the brake logic function has been configured, the braking command is set to 0.		**[No]** (nO)
ECt	**[Encoder test time]** Filtering time of the encoder fault. The parameters can be activated if **[Encoder coupling]** (ECC) = **[Yes]** (YES).	2 to 10 s	2 s
tld-	**[TORQUE/CURRENT LIM .]**		
SSb nO YES Stt LFF rLS rMP FSt dCI	**[Trq/I limit. stop]** Behavior in the event of switching to torque or current limiting mode **[ign fault]** (nO): Fault is ignored. **[freewheel stop]** (YES): Freewheel stop **[in accordance with STT]** (Stt): Stop in accordance with the configuration of **[STOP MODE]** (Stt), see "STOP MODE (Stt-)" on page 206, without fault tripping. In this case, the alarm relay does not open and once the fault disappears the inverter is ready for operation in accordance with the restarting conditions of the active command channel (for example according to **[2/3-wire ctrl.]** (tCC) and **[Type 2-wire ctrl.]** (tCt), see "Input and output parameters (tCC - rr5)" on page 166, if the control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. **[FALLBACK SPEED]** (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed 1). **[Hold freq.]** (rLS): The inverter maintains the frequency being applied when the fault occurred, as long as the fault is present and the run command has not been removed 1). **[StopRamp]** (rMP): Deceleration via ramp **[Quick stop]** (FSt): Quick stop **[DC inj.]** (dCI): Stop by DC injection. This function cannot be used with certain other functions.		**[ign fault]** (nO)
StO	**[Trq/I limit. time out]** (If fault has been configured). Delay in the detection of the limit fault SSF.	0 to 9999 ms	1000 ms

1) Since the fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

Parameter that can be modified during operation or when stopped.

2.8.12.7 Load variation detection

This detection is only possible with the "high-speed hoisting" function. This function can be used to detect if an obstacle has been reached, triggering a sudden (upward) increase or (downward) decrease in the load.
The detection of the deviation of a load leads to a fault **[load variation fault]** (dLF). The behavior of the inverter during this fault can be configured via the parameter **[dynamic load mgt]** (dLb).
Load variation detection can simultaneously be assigned to a relay or a logic output.

Two types of detection are possible depending on the configuration of the lifting with high speed:

"Frequency reference" mode:

[HSP optim hoisting] (HSO) = **[F- reference]** (SSO).
Detection via torque variation

During high-speed operation, the load is compared to that measured during the frequency step. The permissible load variation and its duration can be configured. If exceeded, the inverter switches to fault mode.

"Current limiting" mode:

[HSP optim hoisting] (HSO) = **[current limit]** (CSO).

When hoisting at high operational speeds, a load increase results in a speed reduction. If the operation with high speed is activated, the inverter goes into the fault mode if the motor frequency is below the threshold value **[I limit]** (SCL). The function only recognizes an increase in the load in the "High speed range" (up to **[Current limit]** (SCL)). On lowering, the operation continues according to the frequency reference mode.

[DYNAMIC LOAD DETECT.] (dLd-)

Code	Name/Description	Setting range	Factory settings
dLd-	**[DYNAMIC LOAD DETECT.]** Load variation detection. The parameter is accessible if **[optim HSP hoist]** (HSO) is not equal to **[No]** (nO).		
tLd	**[Dynamic load time]**		**[No]** (nO)
	Activation of the detection of load variations and setting the delay of the fault acquisition **[Dynamic load fault]** (dLF).		
nO	**[No]** (nO): No detection of a dynamic load.		
-	**0.00 s to 10.00 s**: Sets the delay for the acquisition of the fault.		
dLd	**[Dynamic load threshold]**	1 to 100%	100%
	Adjustment of the trip threshold for load variation detection, as a % of the load measured during the frequency step.		
dLb	**[Dyn. load Mgt.]**		**[freewheel stop]**(YES)
	Behavior of the inverter in the event of a load variation fault.		
nO	**[No]** (nO): Fault is ignored.		
YES	**[freewheel stop]** (YES): Freewheel stop		
Stt	**[in accordance with STT]** (Stt): Stop in accordance with the configuration of **[STOP MODE]** (Stt), see "STOP MODE (Stt-)" on page 206, without fault tripping. In this case, the alarm relay does not open and once the fault disappears the inverter is ready for operation in accordance with the restarting conditions of the active command channel (for example according to **[2/3-wire ctrl]** (tCC) and **[Type 2-wire ctrl]** (tCt), see "Input and output parameters (tCC - rr5)" on page 166, if the control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop.		
LFF	**[FALLBACK SPEED]** (LFF): Change to fallback speed, maintained as long as the fault persists and the run command has not been removed [1].		
rLS	**[Hold freq.]** (rLS): The inverter maintains the speed being applied when the fault occurred, as long as the fault is present and the run command has not been removed [1].		
rMP	**[StopRamp]** (rMP): Deceleration via ramp		
FSt	**[Quick stop]** (FSt): Quick stop		

1) Since the fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

[BRAKE RESIST PROTECTION](brP-) and AUTO-TUNE FAULT] (tnF-)

Code	Name/Description	Setting range	Factory settings
brP-	[BRAKE RESIST PROTECTION]		
brO nO YES FLt	[Braking resistor protection response] [No] (nO): No braking resistor protection (this prevents access to the other parameters of the function). [Alarm] (YES): Alarm. The alarm can be assigned to a logic output or a relay. [Fault] (FLt): Change to the fault (bOF) with locking of the inverter (freewheel stop). **Note:** **The thermal state of the resistance can be displayed on the graphic display screen. It is calculated as long as the inverter control is connected to the power supply.**		[No] (nO)
brP	[Brake resistor power] This parameter can be activated if [Braking resistor response] (brO) is not equal to [No] (nO) . Nominal power of the resistance used.	0.1 to 1000 kW	0.1 kW
brU	[Brake resistor value] This parameter can be activated if [Braking resistor response] (brO) is not equal to [No] (nO) . Nominal value of the braking resistor in ohms.	0.1 to 200 Ω	0.1 Ω
tnF-	[AUTO TUNING FAULT]		
tnL nO YES	[Autotune fault mgt] [No] (nO): Fault is ignored. [freewheel stop] (YES): Freewheel stop		[freewheel stop](YES)

Parameter that can be modified during operation or when stopped.

2.8.12.8 Cards pairing

Function can only be activated in [expert] mode

This function is used to detect whenever a card has been replaced or the software has been modified in any way.

When a pairing password is entered, the parameters of the cards currently inserted are stored. At each subsequent start, the parameters are checked and if a deviation exists, the inverter locks with the HCF fault. For a restart, the initial situation must be restored or the joining code must be entered again.

The following parameters are verified:

- Card type: For all cards
- Software version: With the two control cards and the communication cards.
- Serial number: On the two control cards.

[CARDS PAIRING] (PPI-)

Code	Name/Description	Setting range	Factory settings
PPI-	**[CARDS PAIRING]**		
PPI	**[Pairing password]**	OFF to 9999	**[Off]** (OFF)
	The value **[Off]** (OFF) indicates that the card pairing function is not active. The value **[On]** (On) indicates that the card pairing is activated and an access code must be entered to release the inverter in the event of a pairing error. Once the code has been entered, the inverter is released and the code changes to **[On]** (On). • The PPI code is an unlock code known only to B&R Product Support.		

[FALLBACK SPEED] (LFF-), [FAST STOP] (FSt-) and [DC INJECT.] (dCI)

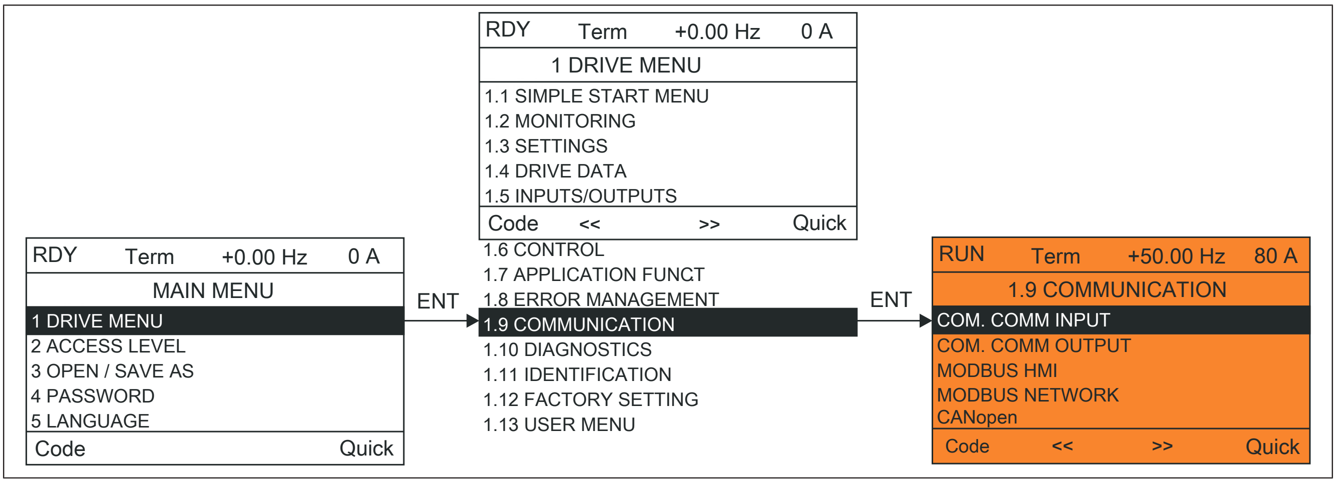
Code	Name/Description	Setting range	Factory settings
LFF-	[FALLBACK SPEED]		
LFF	[Fallback speed] Selection of the fallback speed	0 to 599 Hz	0 Hz
FSt-	[FAST STOP]		
dCF	[Ramp divider] 1) The activated ramp (dEC or dE2) is then divided by this coefficient in the sending of stop commands. Value 0 corresponds to a minimum ramp time.	0 to 10	4
dCI-	[DC Injection]		
IdC	[DC inject. level 1] 1)3) Level of DC injection braking current activated via logic input or selected as stop mode. **Note:** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0.1 to 1.41 In 2)	0.64 In 2)
tdI	[DC injection time 1] 1)3) Maximum duration of current injection [Current DC brake 1] (IdC). After this time has expired, the DC connection becomes [DC current brake 2] (IdC2).	0.1 to 30 s	0.5 s
IdC2	[DC inject. level 2] 1)3) The braking current is activated by the logic input or as a stop mode is selected, once the time span [DC injection time 1] (tdI) has expired. **Caution!** **Check that the motor will withstand this current without overheating.** **Failure to follow this instruction can result in equipment damage.**	0.1 In 2) to [DC current brake 1] (IdC)	0.5 In 2)
tdC	[DC injection time 2] 1)3) Maximum braking time [DC current brak. 2] (IdC2) for the DC injection, only selected as stop mode. (Accessible if [STOP MODE] (Stt) = [DC brak.] (dCI)).	0.1 to 30 s	0.5 s

1) Access to this parameter is also possible via the menu [SETTINGS] (SEt-) and [APPLICATION FCT.] (FUn-) .
2) In is the same as the rated current specified in the installation instructions and on the nameplate of the inverter.
3) Warning: These settings are independent of the function [Auto DC injection] (AdC-).

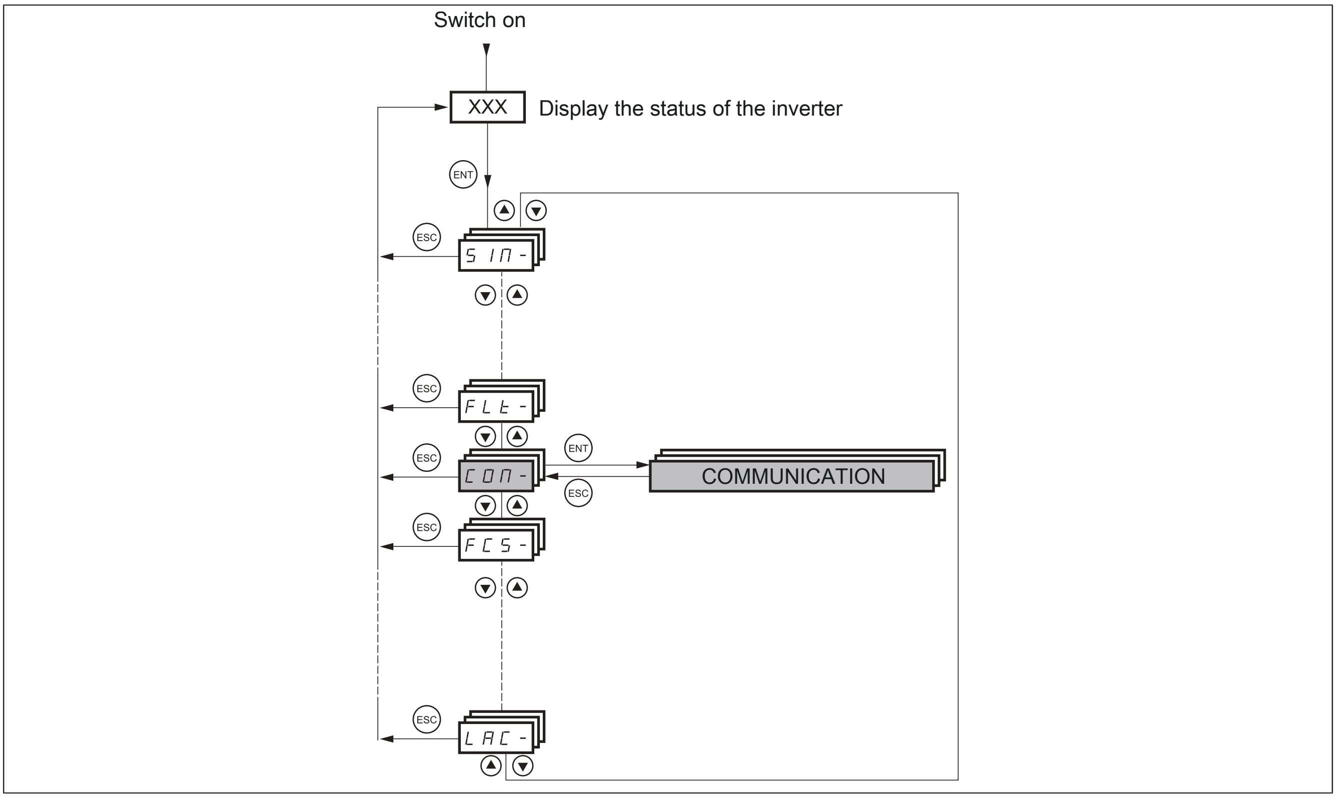
Parameter that can be modified during operation or when stopped.

2.8.13 [COMMUNICATION] (COM-)

2.8.13.1 With graphic display terminal:



2.8.13.2 With integrated display terminal:



[SCANNER COMM INPUT] (ICS) and [SCANNER COMM OUTPUT] (OCS)

Code	Name/Description	Factory settings
ICS	**[COM. SCANNER INPUT]** Only accessible via a graphic display terminal	
nMA1	**[Scan. IN1 address]** Address of the 1st input word	3201
nMA2	**[Scan. IN2 address]** Address of the 2nd input word	8604
nMA3	**[Scan. IN3 address]** Address of the 3rd input word	0
nMA4	**[Scan. IN4 address]** Address of the 4th input word	0
nMA5	**[Scan. IN5 address]** Address of the 5th input word	0
nMA6	**[Scan. IN6 address]** Address of the 6th input word	0
nMA7	**[Scan. IN7 address]** Address of the 7th input word	0
nMA8	**[Scan. IN8 address]** Address of the 8th input word	0
	[COM SCAN OUTPUT MAP] Only accessible via a graphic display terminal	
nCA1	**[Scan. Out1 address]** Address of the 1st output word	8501
nCA2	**[Scan.Out2 address]** Address of the 2nd output word	8602
nCA3	**[Scan.Out3 address]** Address of the 3rd output word	0
nCA4	**[Scan.Out4 address]** Address of the 4th output word	0
nCA5	**[Scan.Out5 address]** Address of the 5th output word	0
nCA6	**[Scan.Out6 address]** Address of the 6th output word	0
nCA7	**[Scan.Out7 address]** Address of the 7th output word	0
nCA8	**[Scan.Out8 address]** Address of the 8th output word	0

[MODBUS HMI] (Md2-), [MODBUS NETWORK] (MdI-) and [CANopen] (CnO-)

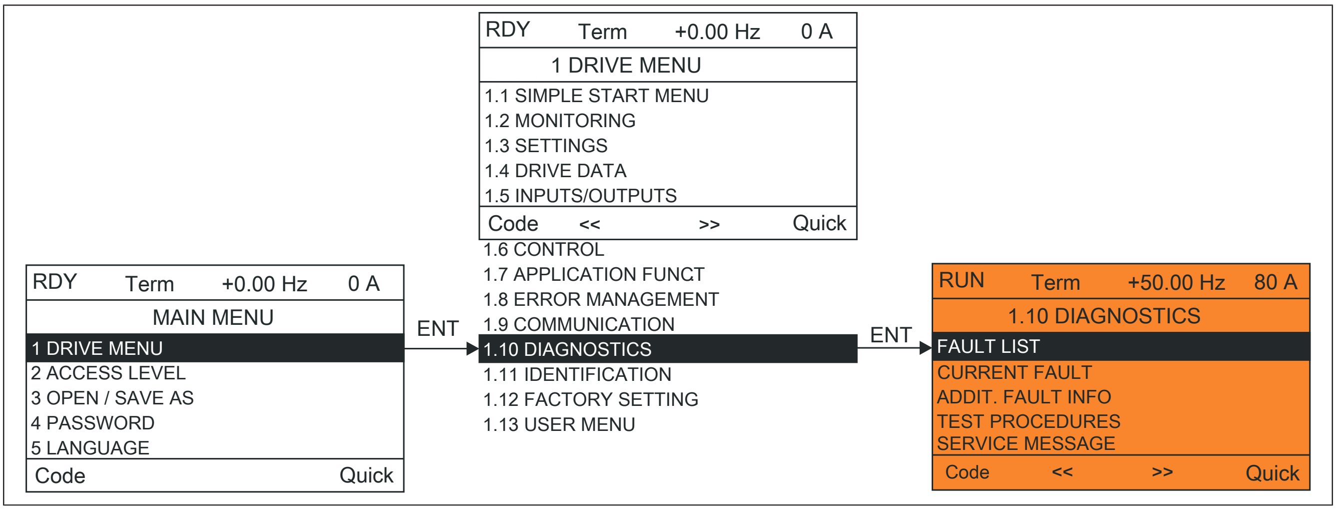
Code	Name/Description	Factory settings
Md2-	**[MODBUS HMI]** Communication with the graphic display terminal.	
tbr2	**[Baud rate HMI]** 9.6 or 19.2 kbit/s on the integrated display terminal. 9600 or 19200 baud on the graphic display terminal. The graphic display terminal only works if **[Baud rate HMI]** (tbr2) = 19200 Baud (19.2 kbit/s). To take changes in the assignment of **[Baud rate HMI]** (tbr2) into account, you must: • When using the graphic display terminal, confirm the changes in a confirmation window • When using the integrated display terminal, press the ENT key for 2 seconds	19.2 kbit/s
tFO2	**[Format HMI]** Read-only parameter, cannot be modified.	8E1
Md1-	**[MODBUS NETWORK]** Not applicable	
CnO-	**[CANopen com.]**	
AdCO	**[CANopen address]** OFF to 127	OFF
bdCO	**[CANopen bit rate]** 50 - 125 - 250 - 500 kbit/s - 1 Mbit/s	125 kbit/s
ErCO	**[Error code]** Read-only parameter, cannot be modified.	

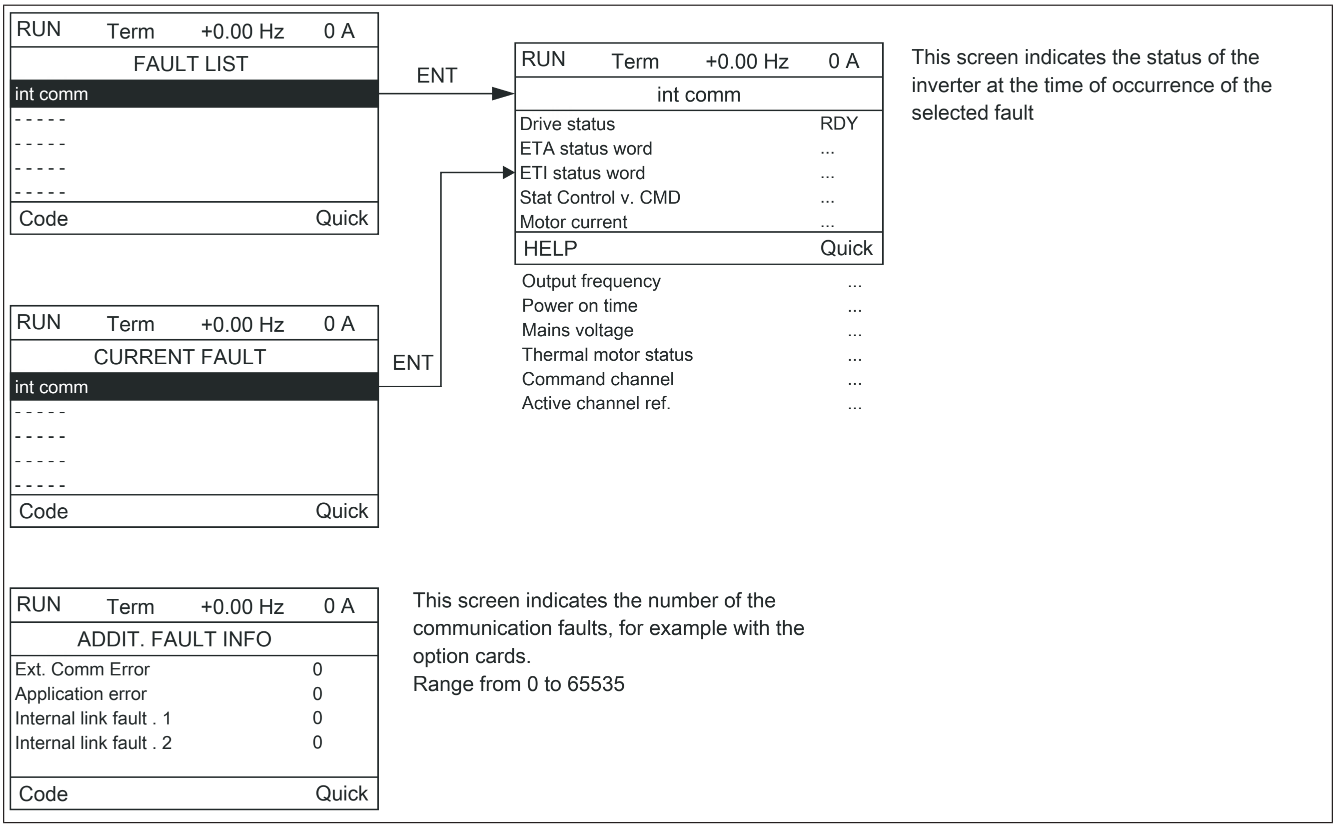
[COMM CARD] and [FORCED LOCAL] (LCF-)

Code	Name/Description	Factory settings
-	**[COMMUNICATION CARD]** You can find additional information in the documentation for the specific card.	
LCF-	**[Forced local]**	
FLO nO LI1 - LI6	**[Forced local]** **[No]** (nO): Function not active **[LI1]** (LI1) to **[LI6]** (LI6) The on-site operation is active in state 1 of the input. **[FORCED LOCAL]** (FLO) is forced to **[No]** (nO) if **[Profil]** (CHCF) = **[I/O profile]** (IO).	**[No]** (nO)
FLOC nO AI1 AI2 LCC PG	**[Forced local Ref.]** **[No]** (nO): Not assigned (control via the terminals with zero reference). **[AI1]** (AI1): Analog input **[AI2]** (AI2): Analog input **[HMI]** (LCC): Assignment of the reference and the control to the graphic display terminal. Reference: **[HMI Freq Ref.]** (LFr) Command: RUN/STOP FWD/REV buttons. **[Encoder]** (PG): Encoder input if encoder card has been inserted If the reference is assigned to an analog input or **[Encoder]** (PG) , the command is automatically assigned to the terminals as well as the logic inputs	**[No]** (nO)
FLOt	**[Time-out forc. local]** 0.1 to 30 s This parameter can be activated if **[FORCED LOCAL]** (FLO) is not equal to **[No]** (nO) . Time delay before communication monitoring is resumed on leaving forced local mode.	10 s

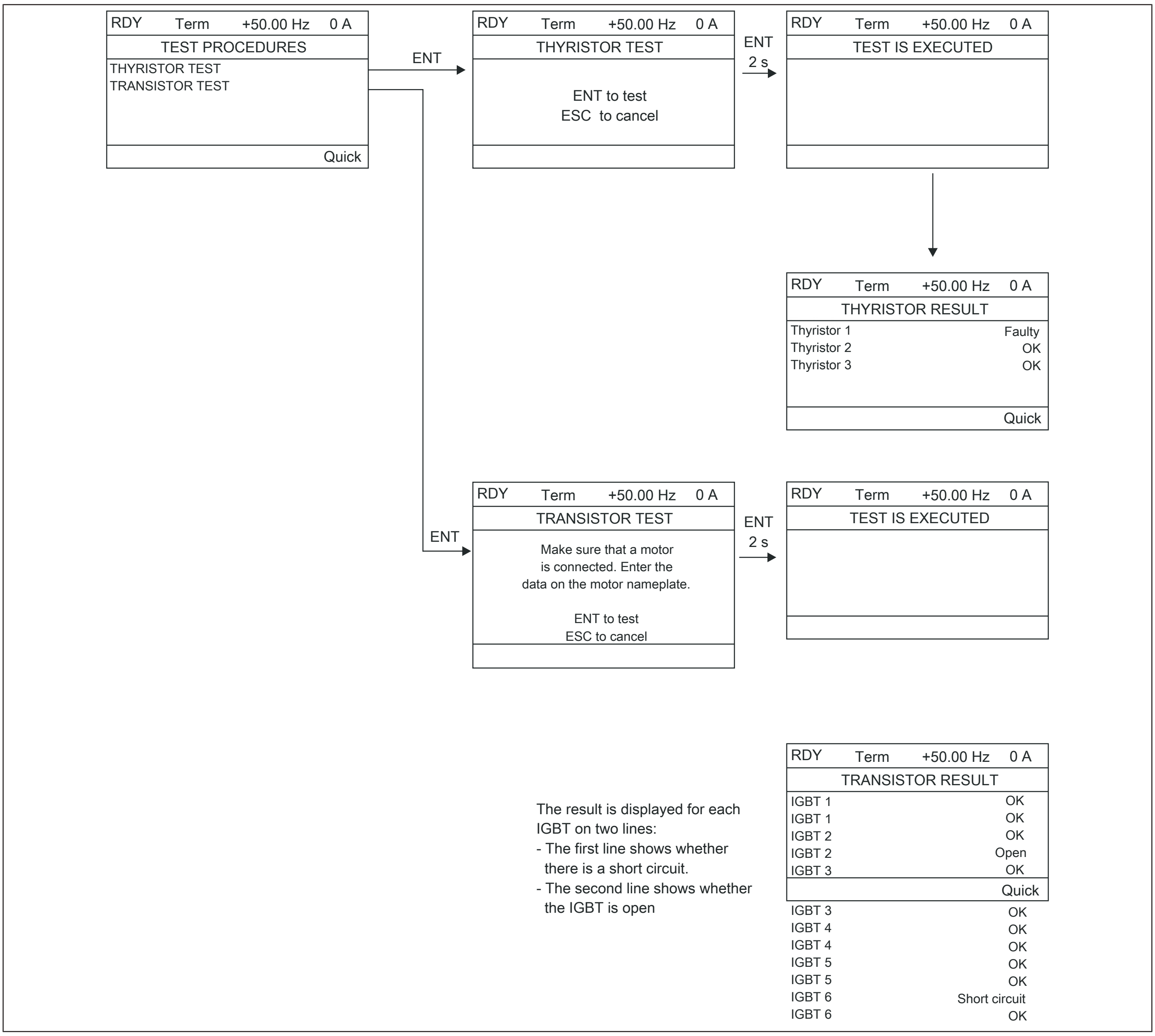
2.8.14 [DIAGNOSTICS]

This menu can only be accessed with the graphic display terminal.





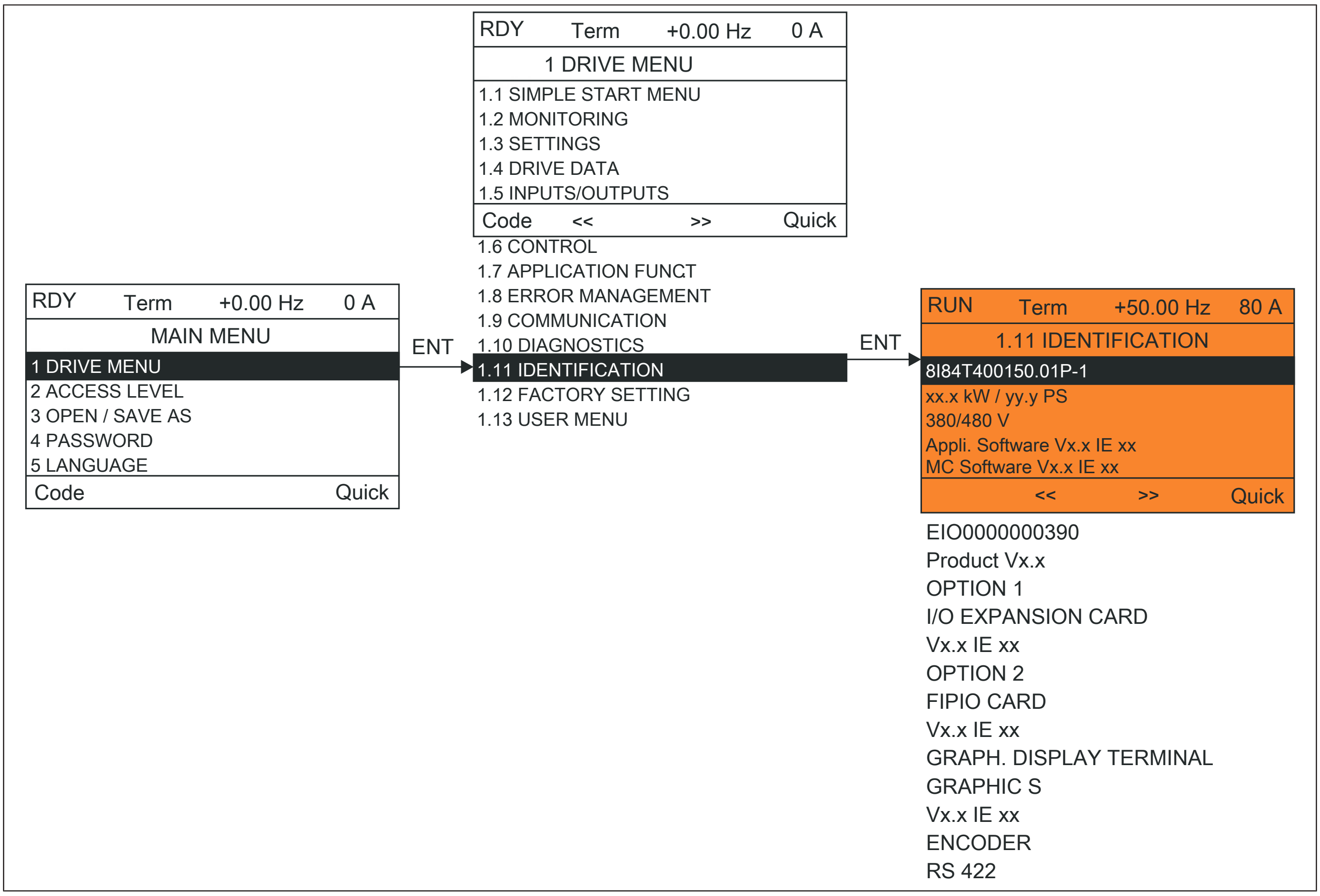
[THYRISTOR Test] is only available for inverters with a rated power ≥18.5 kW.



Note:

Press the ENT key to start the test for 2 seconds.

2.8.15 [IDENTIFICATION]

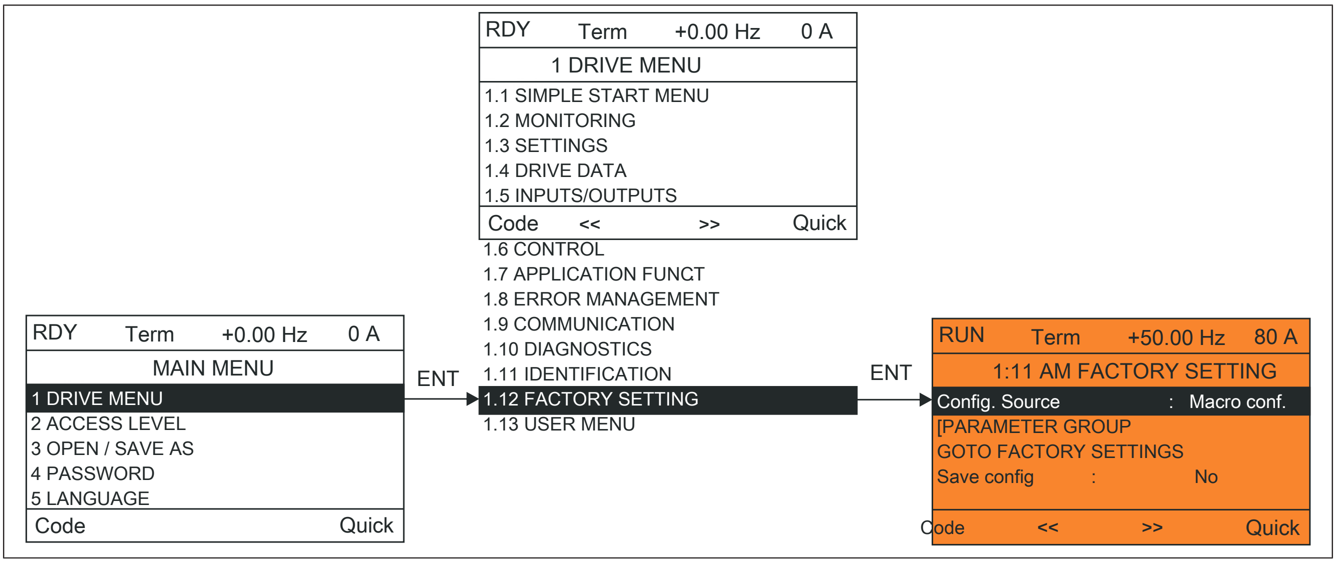


The **[IDENTIFICATION]** menu can only be accessed via the graphic display terminal.

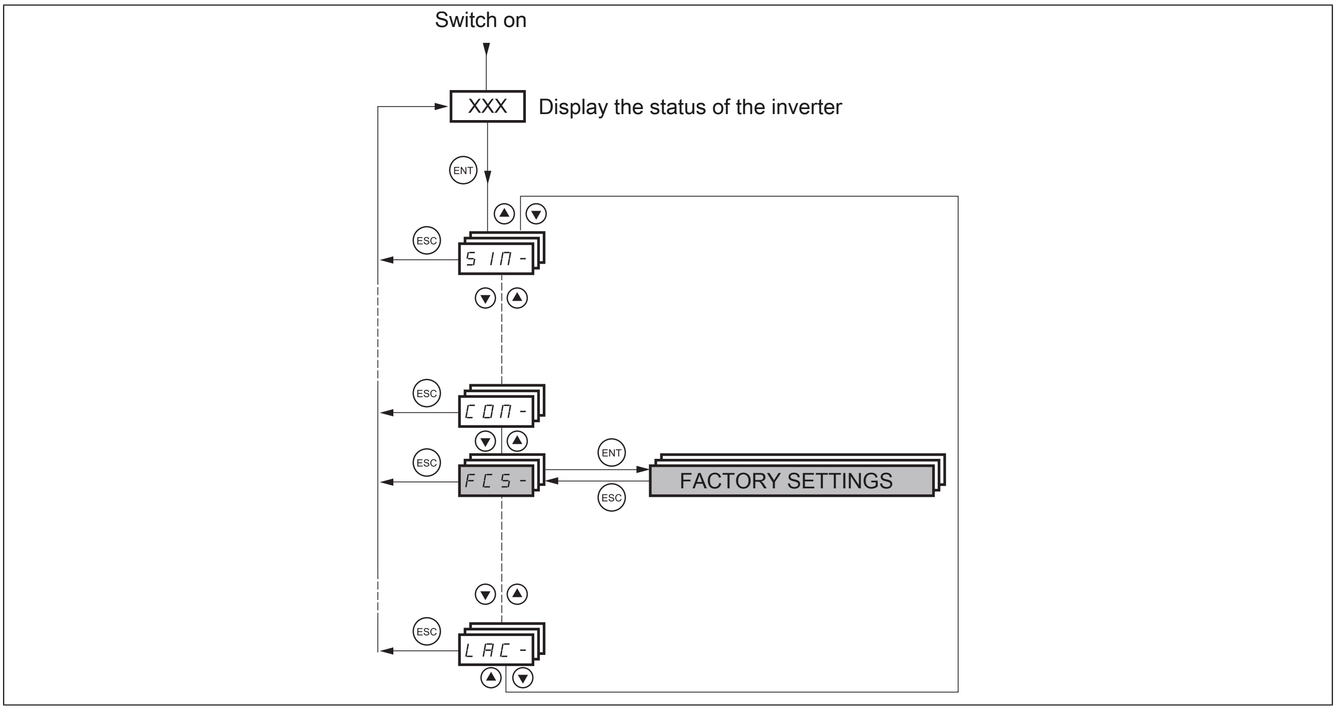
This is a read-only menu that cannot be configured.

2.8.16 [FACTORY SETTINGS] (FCS-)

2.8.16.1 With graphic display terminal:



2.8.16.2 With integrated display terminal:



The menu **[FACTORY SETTING]** (FCS-) is used for the following tasks:

- Replacing the current configuration with the factory configuration or a previously saved configuration. The current configuration can be replaced completely or partially: Select a group of parameters to define the menus with which the selected source configuration will be loaded.
- Save the current configuration in a file.

RUN Term 1,250A +50.00 Hz
1.12 FACTORY SETTING
Config. Source : Macro conf.
[PARAMETER GROUP
GOTO FACTORY SETTINGS
Save config : No
Code << >> Quick

RUN Term 1,250A +50.00 Hz
Config. Source
Macro conf ✓
Config 1
Config 2
Quick

Source configuration selection

RUN Term 1,250A +50.00 Hz
[PARAMETER GROUP
All ☑
Drive menu ☐
Settings ☐
Motor parameters ☐
Menu comm ☐
Code Quick

Selection of the menu to be replaced.

Note: If the factory configuration is selected and after restarting the factory setting [PARAMETER GROUP] is empt

RUN Term 1,250A +50.00 Hz
Goto FACTORY SETTINGS
CHECK THE
DRIVE WIRING
ESC=CANCEL ENT=validate

Command to reset to Factory settings

RUN Term 1,250A +50.00 Hz
Goto FACTORY SETTINGS
First select:
Parameter groups
Press ENT or ESC
to continue

This window is displayed if no parameter group is selected

RUN Term 1,250A +50.00 Hz
Save config
No
Config 0
Config 1
Config 2

Factory setting parameters

Code	Name/Description
FCSI	[Config. Source]
	Choice of source configuration.
InI	[Use macro conf]] (InI): Factory configuration; return to the selected macro configuration.
CFG1	[Config 1] (CFG1)
CFG2	[Config 2] (CFG2) If the function has been configured to a configuration change, [Config 1] (CFG1) and [Config 2] (CFG2) can no longer be accessed.
FrY-	[PARAMETER GROUP LIST]
	List of menus to be loaded
ALL	[All] (ALL): All parameters
drM	[Drive config] (drM): The menu [DRIVE MENU] without [COMMUNICATION]. In menu [DISPLAY CONFIG.], [Return std name] changes to [No].
SEt	[Settings] (SEt): The menu [SETTINGS] without the parameter [IR-compens.] (UFr), [slip comp.] (SLP) and [Therm. rated current] (ItH).
MOt	[Motor parameters] (MOt): Motor parameters, see list below. The following selection options are only available if [Selection config.] (FCSI) = [Macro config.] (InI):
COM	[COMMUNICATION] (COM): The menu [COMMUNICATION] without [Adr Scan In 1] (nMA1) to [Adr Scan In 8] (nMA8) and without [Adr. Scan Out1] (nCA1) to [Adr. Scan Out8] (nCA8).
MOn	[Menu display] (MOn): The menu [SELECT DISPLAY TYPE]
dIS	[MenU Display] (dIS): The menu [DISPLAY CONFIG.] **Note:** **If the factory configuration is selected and after restoring the factory setting [PARAMETER GROUP] is empty.**
GFS	[Goto FACTORY SETTINGS] It is only possible to revert to the factory settings if at least one group of parameters has previously been selected. With the integrated display terminal:
nO	No
YES	Yes: Hold the key for 2 seconds. The parameter changes automatically to (nO) when the process is complete. With graphics terminal: See previous page.
SCSI	[Save config]
nO	[No] (nO)
Str0	[Config 0] (Str0): Hold the ENT key for two seconds at the integrated display terminal.
Str1	[Config 1] (Str1): Hold the ENT key for two seconds at the integrated display terminal.
Str2	[Config 2] (Str2): Hold the ENT key for two seconds at the integrated display terminal. The active configuration to be saved does not appear for selection. If it is, for example, the configuration [Config 0] (Str0), then only [Config 1] (Str1) and [Config 2] (Str2) are displayed. The parameter changes automatically to [No] (nO) when the process is complete.

2.8.16.3 List of the motor parameters

Menu **[DRIVE DATA]**(drC-):

- **[Rated motor power]** (nPr)
- **[Rated motor voltage]** (UnS)
- **[Rated motor current]** (nCr)
- **[Rated motor frequency]** (FrS)
- **[Rated motor speed]** (nSP)
- **[AUTO-TUNE FAULT]** (tUn)
- **[Auto-tune state]** (tUS)
- **[U0]** (U0) to **[U5]** (U5)
- **[F1]** (F1) to **[F5]** (F5)
- **[Volt. const. power]** (UCP)
- **[Freq const power]** (FCP)
- **[Nom motor curr.synchr]** (nCrS)
- **[Nom motor spdsync]** (nSPS)
- **[Pole pairs]** (PPnS)
- **[EMC const syn mot]** (PHS)
- **[Main field induct]** (LdS)
- **[Stray field induct]** (LqS)
- **[R.Stat input synMot]** (rSAS)
- **[IR compens.]** (UFr)
- **[slip comp.]** (SLP)
- Motor parameters that can be accessed in the **[expert]** mode

Menu **[SETTINGS]**(SEt-):

- **[Mot. therm. current]** (ItH)

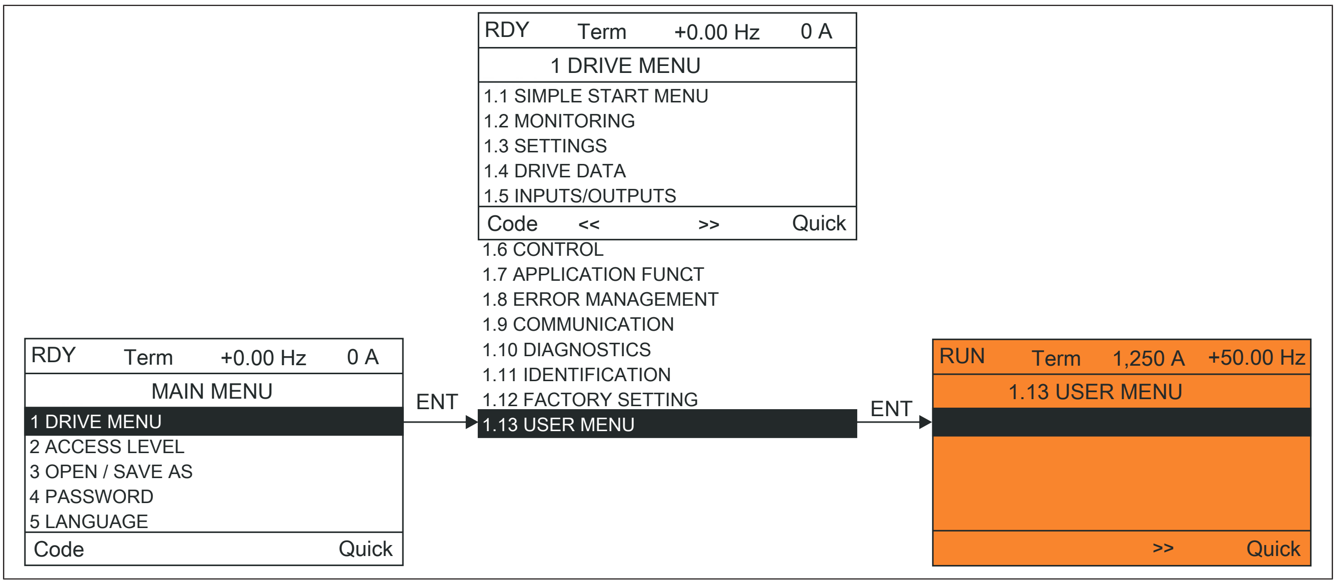
2.8.16.4 Example of total return to factory settings

1. **[Selection config.]** (FCSI) = **[Macro conf]** (InI)
2. **[PARAMETER GROUP]** (FrY-) = **[All]** (ALL)
3. **[GOTO FACTORY SETTINGS]** (GFS = YES)

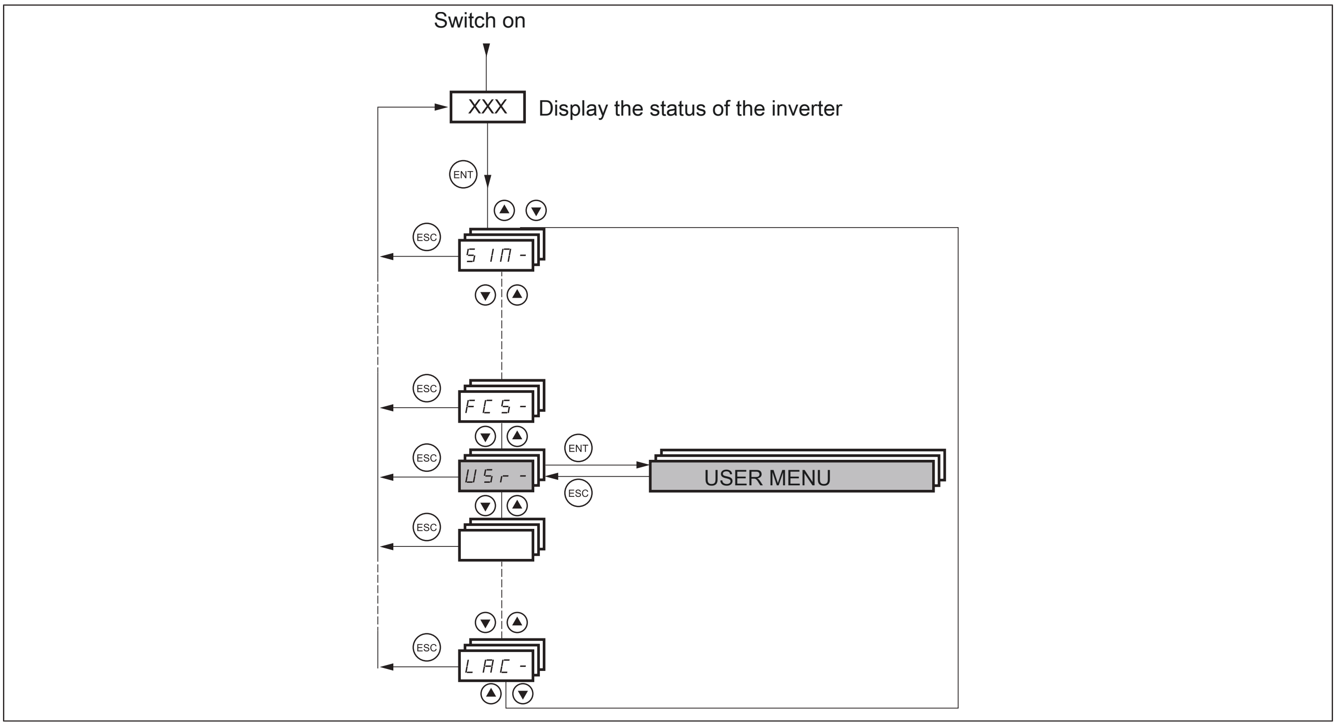
2.8.17 [USER MENU] (USr)

This menu contains the parameters selected in the [DISPLAY CONFIG.] menu.

2.8.17.1 With graphic display terminal:

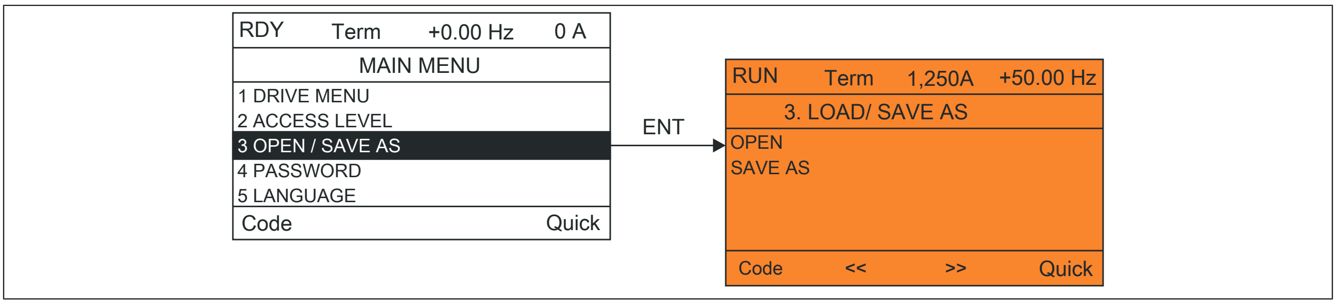


2.8.17.2 With integrated display terminal:



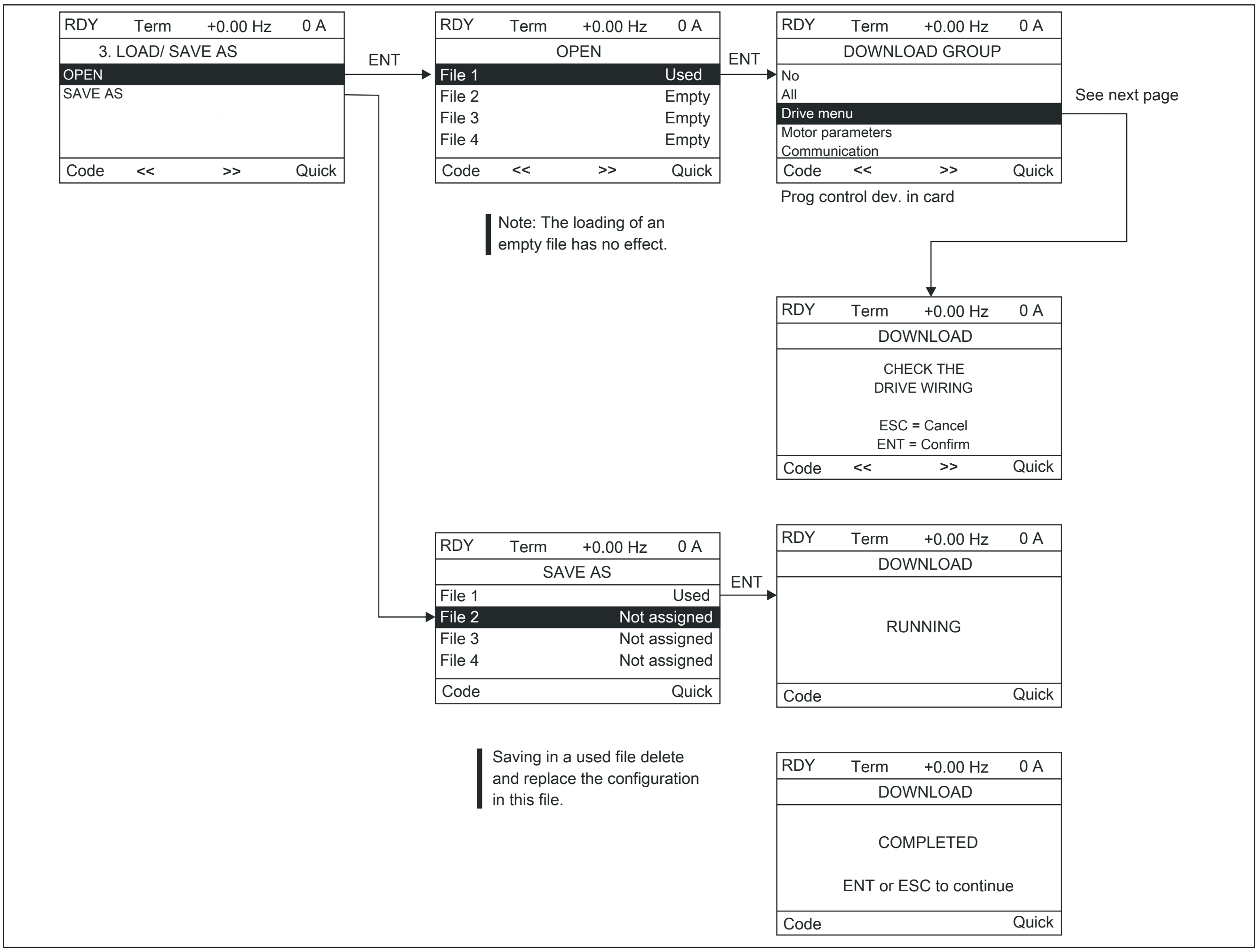
2.8.18 [LOAD / SAVE AS]

This menu can only be accessed with the graphic display terminal.



[Open]: To download one of the 4 files from the graphic display terminal to the inverter.

[SAVE AS]: To download the current inverter configuration to the graphic display terminal.



Various messages may appear when the download is requested:

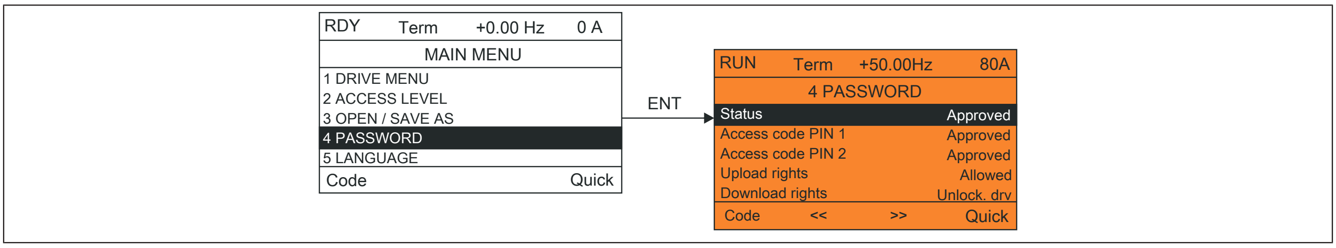
- **[RUNNING]**
- **[DOWNLOAD COMPLETE]**
- Error messages if download not possible
- **[Motor parameters are NOT COMPATIBLE. Proceed?]**: In this case the download is possible, but the parameters will be restricted.

2.8.18.1 [DOWNLOAD GROUP]

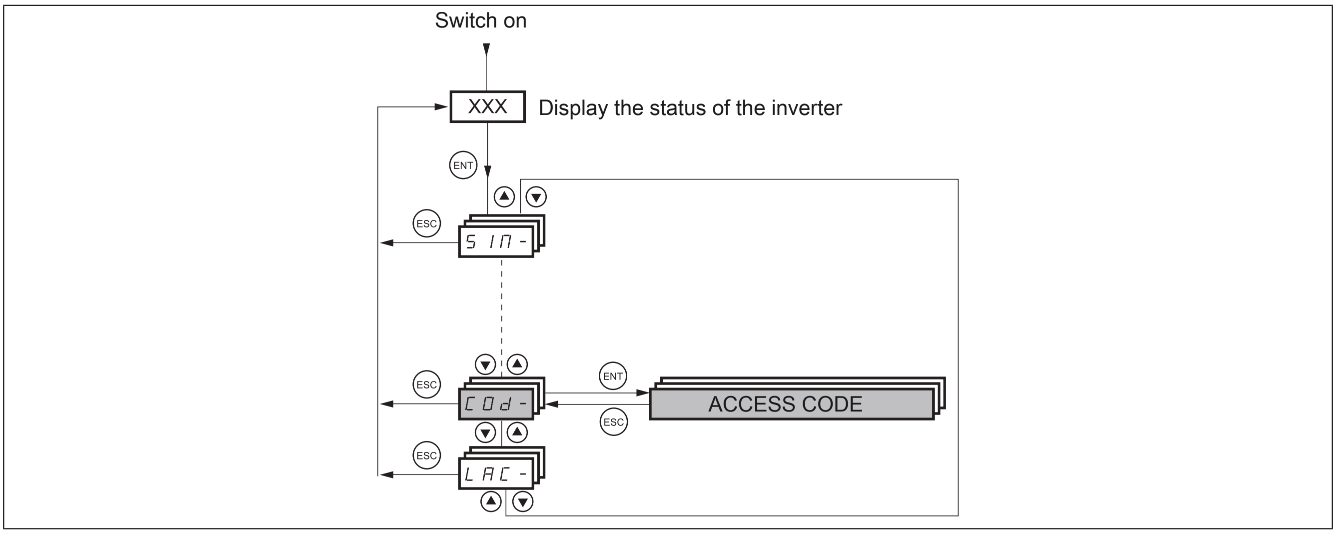
[No]:		No parameter
[All]:		All parameters in all menus
[config inverter]:		The entire menu **[DRIVE MENU]** without **[COMMUNICATION]**.
[Motor parameters]:	**[Rated motor power]** (nPr)	Of menu **[DRIVE DATA]** (drC-)
	[Rated motor voltage] (UnS)	
	[Rated motor current] (nCr)	
	[Rated motor frequency] (FrS)	
	[Rated motor speed] (nSP)	
	[AUTO-TUNE FAULT] (tUn)	
	[Auto-tune state] (tUS)	
	[U0] (U0) to **[U5]** (U5)	
	[F1] (F1) to **[F5]** (F5)	
	[Volt. const. power] (UCP)	
	[Freq const power] (FCP)	
	[Nom motor curr.synchr] (nCrS)	
	[Nom motor spdsync] (nSPS)	
	[Pole pairs] (PPnS)	
	[EMC const syn mot] (PHS)	
	[Main field induct] (LdS)	
	[Stray field induct] (LqS)	
	[R.Stat input synMot] (rSAS)	
	[IR compens.] (UFr)	
	[slip comp.] (SLP)	
	Motor parameters can only be activated in **[expert]** mode	
	[Mot. therm. current] (ItH)	of the menu **[SETTINGS]**(SEt-)
[Communication]:		All parameters of the menu **[COMMUNICATION]**

2.8.19 [Access code] (COd-)

2.8.19.1 With graphic display terminal:

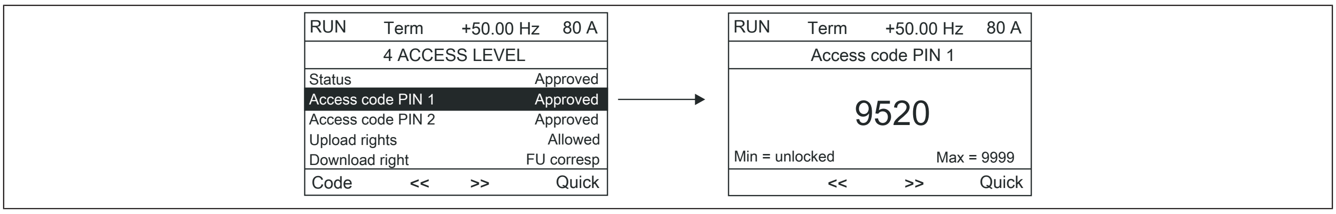


2.8.19.2 With integrated display terminal:



Enables the configuration to be protected with an access code or a password to be entered in order to access a protected configuration.

Example with graphic display terminal:



- The inverter is released when the access codes are set to **[released]** (OFF) (no access code), or if you have entered the correct code. All menus are visible.
- Before protecting the configuration with an access code, you must:
  - Define the **[Upload rights]** (ULr) and **[Download rights]** (DLr).
  - Make a careful note of the code and keep it in a safe place where you will always be able to find it.
- The inverter has 2 access codes, enabling 2 access levels to be set up.
  - PIN code 1 is a public unlock code: 6969.
  - PIN code 2 is an unlock code known only to B&R Product Support. It can only be activated in **[expert]** mode.
  - You can only specify one of the access code PIN1 orPIN2; the second must be in position **[Off]** (OFF).

Information:

When the unlock code is entered, the user access code appears.

The following items are access-protected:

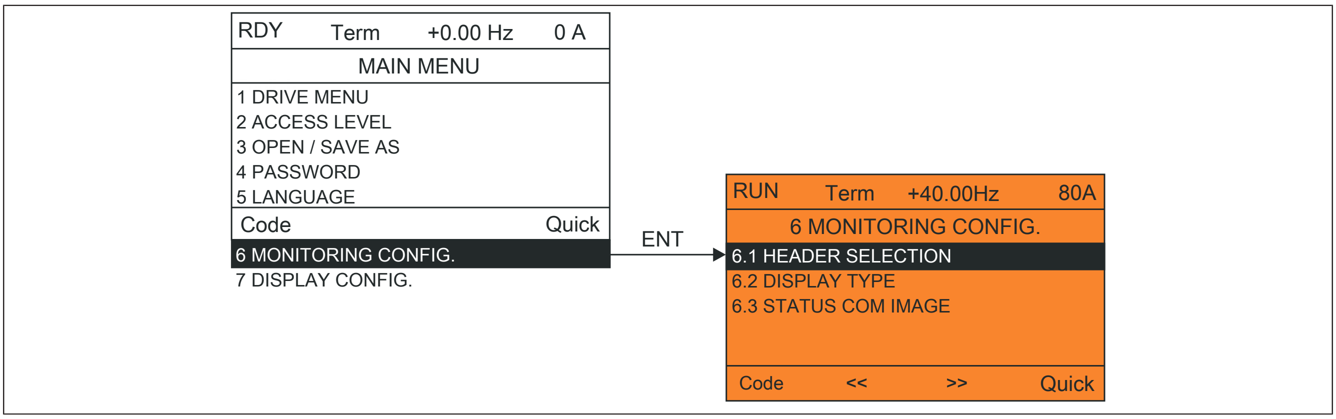
- Reset to factory settings (menu **[FACTORY SETTING]** (FCS-))
- The parameters and channels protected via the menu **[USER MENU]** and the menu itself
- The user-specific adaptation of the display (menu **[DISPLAY CONFIG.]**)

Parameter overview access code

Code	Name/Description	Setting range	Factory settings
CSt	**[State]** Information parameter, cannot be modified.		**[enabled]** (ULC)
LC	**[locked]** (LC): The inverter is locked by an access code.		
ULC	**[enabled]** (LC): The inverter is not locked by an access code.		
COd	**[PASSWORD]** 1st access code. The value **[Off]** (OFF) indicates that no access code has been set to [enabled]. The value **[On]** (On) indicates that the inverter is protected and an access code must be entered to enable it. Once the correct code has been entered, it remains on the display and the inverter is unlocked until the next time the power supply is disconnected. • PIN code 1 is a public unlock code: 6969.	OFF to 9999	**[Off]** (OFF)
COd2	**[PIN code 2]** Parameter can only be activated in **[expert]** mode. 2nd access code. The value **[Off]** (OFF) indicates that no access code has been set to **[enabled]**. The value **[On]** (On) indicates that the inverter is protected and an access code must be entered to enable it. Once the correct code has been entered, it remains on the display and the inverter is unlocked until the next time the power supply is disconnected. • PIN code 2 is an unlock code known only to B&R Product Support. If **[access code PIN 2]** (COd2) is not set to "off", only the menu **[MONITORING]** (SUP-) is displayed. If **[access code PIN 2]** (COd2) is set to "off" (inverter enabled), all the menus are displayed. If the display settings in the menu **[DISPLAY CONFIG.]** are changed and **[access code PIN 2]** (COd2) is not set to "off", the configured display is retained. If **[access code PIN 2]** (COd2) is set to "off" (inverter enabled), the display **[DISPLAY CONFIG.]** configured in the menu is retained.	OFF to 9999	**[Off]** (OFF)
ULr	**[Upload rights]** Read or copy the current configuration in the inverter.		**[allowed]** (ULr0)
ULr0	**[allowed]** (ULr0): The configuration currently used in the inverter may be loaded into the graphic display terminal at any time.		
ULr1	**[not allowed]** (ULr1): The configuration currently used in the inverter may only be loaded in the graphic display terminal if the inverter is not protected by an access code or if the correct code is entered.		
dLr	**[Download rights]** Writes the current configuration to the inverter or downloads a configuration to the inverter		**[FU unlocked]** (dLr1)
dLr0	**[FU locked]** (dLr0): A configuration file can only be downloaded to the inverter if the inverter is protected by an access code, which is the same as the access code for the configuration to be downloaded.		
dLr1	**[FU unlocked]** (dLr1): A configuration file can be downloaded to the inverter or a configuration in the inverter can be modified if the inverter is unlocked (access code entered) or is not protected by an access code.		
dLr2	**[not allowed]** (dLr2): Download not allowed.		
dLr3	**[FU locked/unlocked]** (dLr3): Combination of **[FU locked]** (dLr0) and **[FU unlocked]** (dLr1).		

2.8.20 [SELECT DISPLAY TYPE]

This menu can only be accessed with the graphic display terminal.



This can be used to configure the information displayed on the graphic display screen during operation.

[6.1 HEADER SELECTION]: Selection of 1 to 2 parameters in the upper line (the first two parameters cannot be changed.

[6.2 DISPLAY TYPE]: Selection of the parameters displayed in the center of the screen and the display mode (digital values or bar chart. Bar chart.

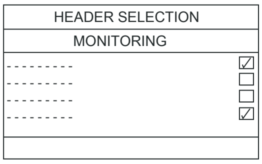
[6.3 STATUS COM IMAGE.]: Selection of displayed words and their format.

[PARAM. BAR SELECT]

Name/Description	
[PARAM. BAR SELECT]	
[Alarm groups]	
[Frequency ref.]	In Hz: Parameter displayed in the factory settings.
[Ref. Torq.]	As %
[Output frequency]	
[I motor]	In Hz
Mean Speed ENA]	In A: Parameter displayed in the factory settings.
[Speed]	In Hz
[Motor voltage]	
[Motor power]	In rpm
[Motor torque]	In V
[Mains voltage]	In W
[Drv.thermal state]	As %
[Drv.thermal state]	In V
[Th. brake val. state]	As %
[Consumption]	As %
[Run time]	As %
[Elapsed time]	In watt hours (Wh) or kilowatt hours (kWh) according to the inverter type
[IGBT alarm counter]	In hours (motor duty cycle)
[PID speed ref.]	In hours (motor duty cycle)
[PID feedback]	In seconds (accumulated time of the overtemperature alarms)
[PID error]	As %
[PID Output]	As %
[Config. active]	As %
[act. parameter set]	In Hz
	CNFO, 1 or 2
	SET1, 2 or 3

The parameter is selected using ENT (a tick then appears next to the parameter) or deselected. 1 or 2 parameters can be selected.

Example:



[Display value type]

Name/Description

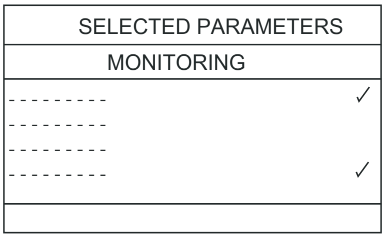
[Display value type]

- **[Dig display]**: Display of one or two digital values on the screen (factory configuration).
- **[Bar disp]**: Display of one or two bar graphs on the screen.
- **[List]**: Display of a list of one to five values on the screen.

[PARAMETER SELECTION]

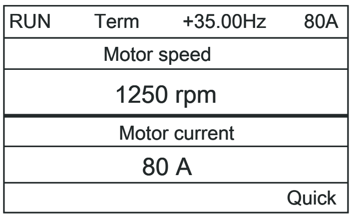
[Alarm groups]	Can only be activated if [Display type] = [List]
[Frequency ref.]	In Hz: Parameter displayed in the factory settings.
[Ref. Torq.]	As %
[Output frequency]	In Hz
[I motor]	In A
Mean Speed ENA]	In Hz
[Speed]	In rpm
[Motor voltage]	In V
[Motor power]	In W
[Motor torque]	As %
[Mains voltage]	In V
[Drv.thermal state]	As %
[Drv.thermal state]	As %
[Th. brake val. state]	As %
[Consumption]	In watt hours (Wh) or kilowatt hours (kWh) according to the inverter type
[Run time]	In hours (motor duty cycle)
[Elapsed time]	In hours (motor duty cycle)
[IGBT alarm counter]	In seconds (accumulated time of the overtemperature alarms)
[PID speed ref.]	As %
[PID feedback]	As %
[PID error]	As %
[PID Output]	In Hz
[Config. active]	CNFO, 1 or 2, can only be activated if [Display type] = [List]
[act. parameter set]	SET1, 2 or 3, can only be activated if [Display type] = [List]

Parameters are selected using ENT (a tick then appears next to the parameter) or deselected.

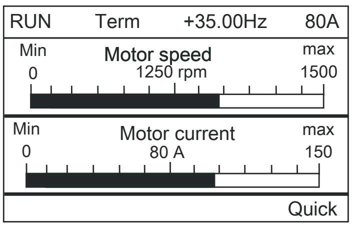


Examples:

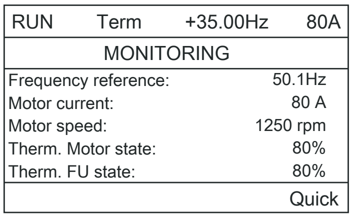
Display of 2 digital values
Values



Display of 2 digital values
Bar charts



Display of a list of
5 values

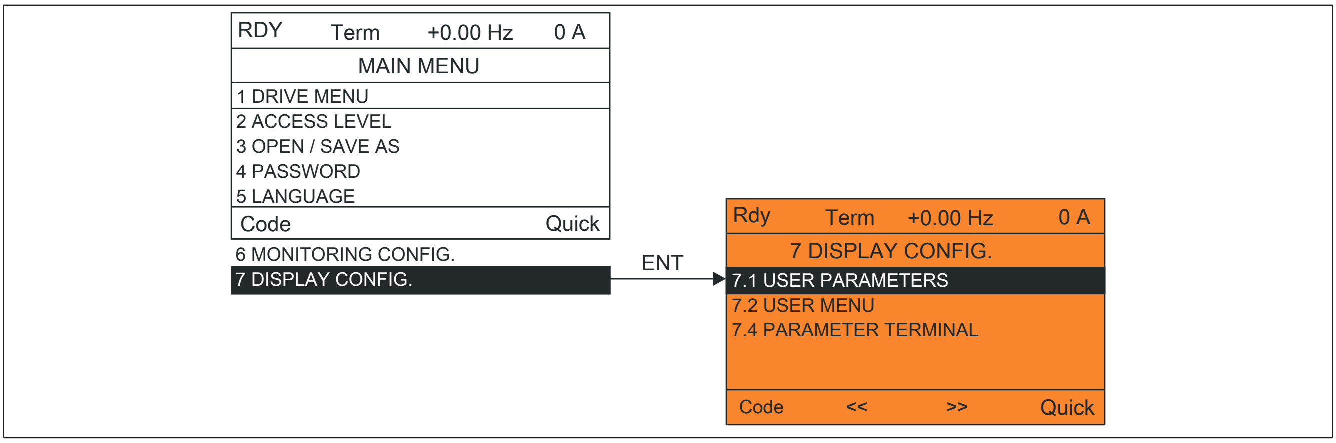


[Config. STATUS COMM]

Name/Description
[Config. STATUS COMM]
[Word IAd1 1 add. select.] Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the navigation button.
[Format word 1] Format of word 1. **[Hex]**: Hexadecimal **[Signed Int.]**: Decimal number with sign **[unsigned]**: Decimal number without prefix
[Word 2 add. select.] Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the navigation button.
[Format word 2] Format of word 2. **[Hex]**: Hexadecimal **[Signed Int.]**: Decimal number with sign **[unsigned]**: Decimal number without prefix
[Word 3 add. select.] Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the navigation button.
[Format word 3] Format of word 3. **[Hex]**: Hexadecimal **[Signed Int.]**: Decimal number with sign **[Unsigned]**: Decimal number without prefix
[Word 4 add. select.] Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the navigation button.
[Format word 4] Format of word 4. **[Hex]**: Hexadecimal **[Signed Int.]**: Decimal number with sign **[unsigned]**: Decimal number without prefix The selected words can then be displayed in the submenu **[IMAGE COMM.]** of the menu **[MONITOR]**. Example: RUN Term +35.00Hz 80A COMM MAP - - - - - - - - - - - - - - - - - - W3141: F230 Hex << >> Quick

2.8.21 [DISPLAY CONFIG.]

This menu can only be accessed with the graphic display terminal. It can be used to customize parameters or a menu and to access parameters.



⇨ USER PARAMETERS: Customization of 1 to 15 parameters
⇨ USER MENU: Creation of a customized menu
⇨ ACCESS PARAMETERS: Customization of the visibility and protection mechanisms of menus and parameters.
⇨ PARAMETER TERMINAL: Adjustment of the contrast and stand-by mode of the graphic display terminal (parameters stored in the terminal rather than in the inverter). Choice of the menu displayed on power up.

If **[Return std name]** is set to **[YES]**, the default display is restored but the adjustments are still saved.

RDY Term +0.00 Hz 0 A
7.1 USER PARAMETERS
Disp Status. Param: No
SELEC. PARAMETERS
CUSTOMER-SP SELECTION
CUSTOMER-SP MENU
DEVICE NAME
Code << >> Quick

SERVICE MESSAGE
CONFIG. 0
CONFIG. 1
CONFIG. 2
SERIAL NUMBER

ENT

SELEC. PARAMETERS
1 DRIVE MENU
1.1 FAST START MENU
1.2 MONITORING
1.3 SETTINGS
1.4 DRIVE DATA
1.5 INPUTS/OUTPUTS
Code << >> Quick

ENT

SELEC. PARAMETERS
1.3 SETTINGS
Ramp increment ✓
Acceleration
Deceleration
Acceleration 2
Deceleration 2
List

Selection of 1 to 15 free definable parameters.

List

Note: The first line [SELECTED PARAMETER] or [RDY Term +0.00 Hz 0 A] according to path (ENT or list).

ENT

RDY Term +0.00 Hz 0 A
CUSTOMER-SP SELECTION
Ramp increment
Acceleration
Speed prop. gain
Clear

List of customized parameters

ENT

RDY Term +0.00 Hz 0 A
Ramp increment
Username
Unit
Multiplier
Divisor
Offset
Clear

ENT

RDY Term +0.00 Hz 0 A
Username
FLOW REFERENCE
NBC - max number of digits 13
ABC << >>

If no customized information has been entered, then the default value is displayed (designations, units, etc.).

Display on 1 or 2 lines of characters.

Offset and coefficients are numerical values. Do not use any too high multipliers (max display 99999).

Use F1 to change to ABC, abc, 123, *[-.
By turning the jog dial, the character will be increased (alphabetical order), << and >> (F2 and F3) effect the change to the next or previous character.

ENT

RDY Term +0.00 Hz 0 A
Unit
Standard ✓
Customized
%
mA
Quick

RDY Term +0.00 Hz 0 A
Customized ✓
LBS
NBC - max number of digits 3
ABC << >>

- Standard: Use of the Factory set unit
- Customer specific: User-defined unit
- %, mA etc.: select from dropdown list

After the input of the unit by pressing the ENT the screen [Ramp increment] is activated again to display the designation Pressing ESC results a return to the screen [Unit].

RDY Term +0.00 Hz 0 A
SERVICE MESSAGE
LINE 1
LINE 2
LINE 3
LINE 4
LINE 5
View Quick

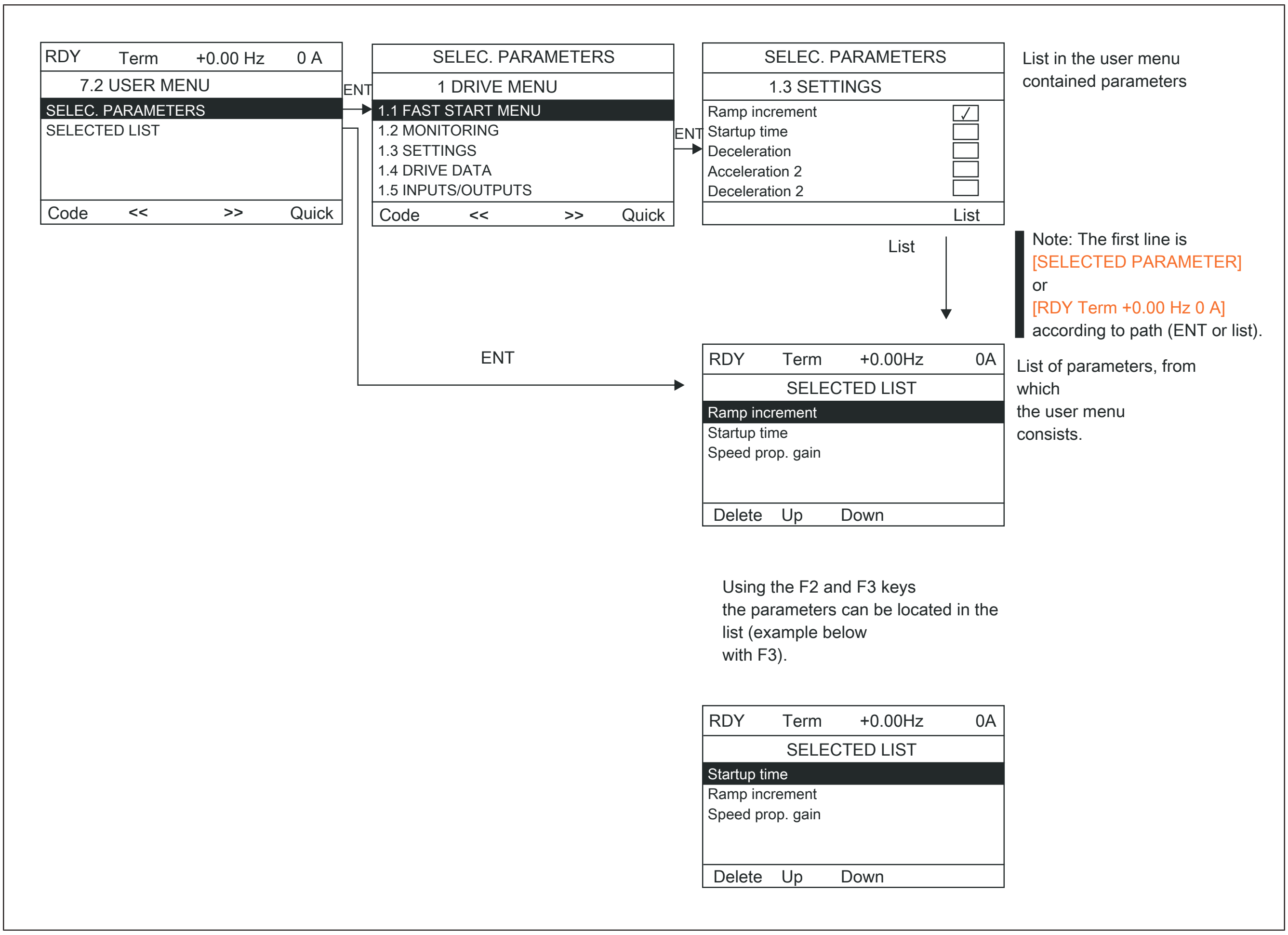
As long as the "view" key is pressed the entered Report is displayed.

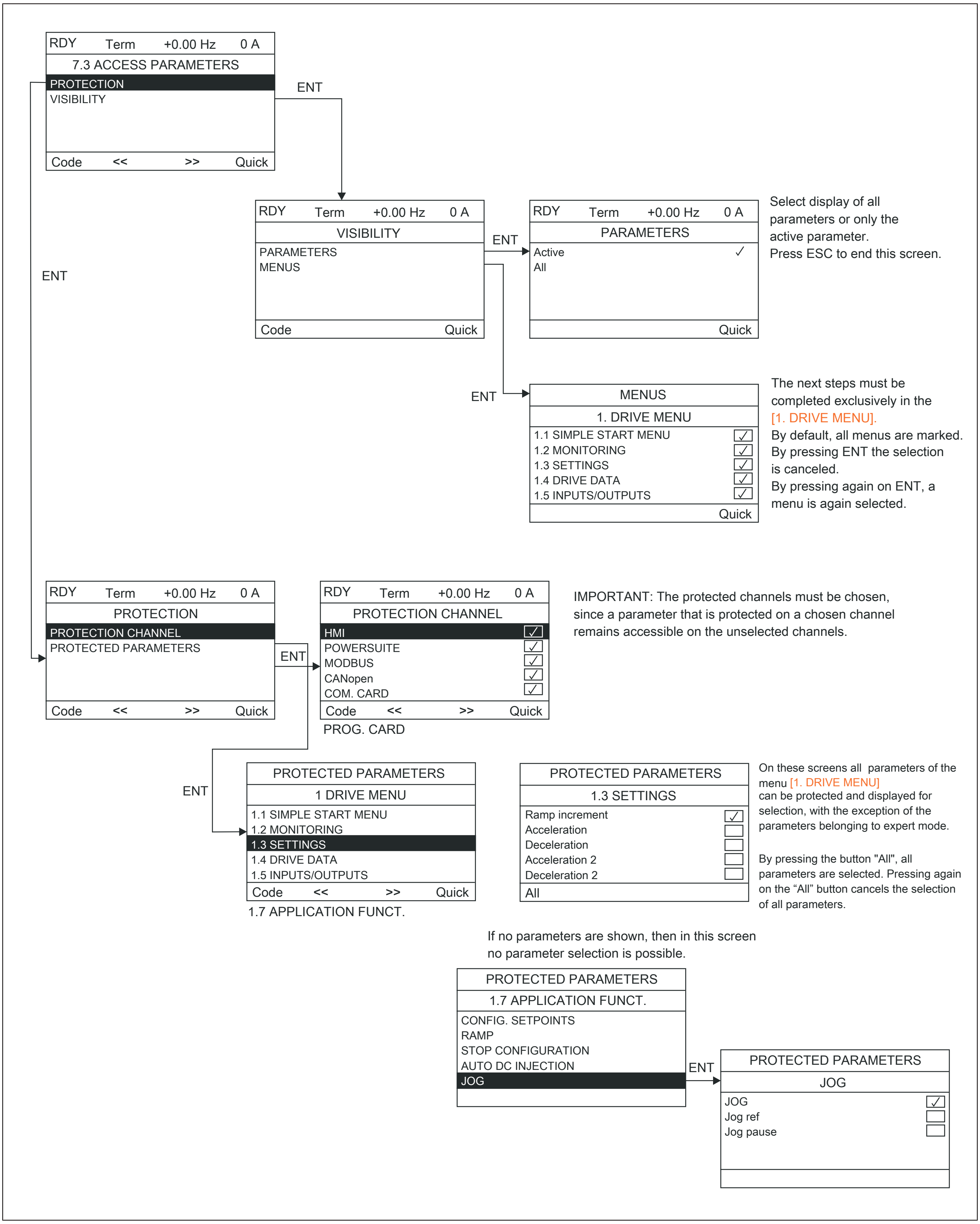
ENT

RDY Term +0.00 Hz 0 A
LINE 2
For any service, dial
NBC - max number of digits 23
ABC << >> Quick

RDY Term +0.00 Hz 0 A
CUSTOMER SPEC MENU
FLOW REFERENCE
NBC - max number of digits 18
ABC << >> Quick

Names (CUSTOMER-SPEC. MENU, DEVICE NAME, configuration , serial number, message lines, names of the units etc.) can be adjusted as in the example alongside for the parameter name.
If no custom settings have been made, the standard value appears (designations, units, etc.).
Display on 1 or 2 lines of characters.
Use F1 to change to ABC, abc, 123, *[-.
By turning the jog dial, the character will be increased (alphabetical order),
<< and >> (F2 and F3) effect the change to the next or previous character.


RDY Term +0.00 Hz 0 A
7.2 USER MENU
SELEC. PARAMETERS
SELECTED LIST
Code << >> Quick
ENT
SELEC. PARAMETERS
1 DRIVE MENU
1.1 FAST START MENU
1.2 MONITORING
1.3 SETTINGS
1.4 DRIVE DATA
1.5 INPUTS/OUTPUTS
Code << >> Quick
ENT
SELEC. PARAMETERS
1.3 SETTINGS
Ramp increment
Startup time
Deceleration
Acceleration 2
Deceleration 2
List
List in the user menu contained parameters
List
Note: The first line is
[SELECTED PARAMETER]
or
[RDY Term +0.00 Hz 0 A]
according to path (ENT or list).
ENT
RDY Term +0.00Hz 0A
SELECTED LIST
Ramp increment
Startup time
Speed prop. gain
Delete Up Down
List of parameters, from which the user menu consists.
Using the F2 and F3 keys the parameters can be located in the list (example below with F3).
RDY Term +0.00Hz 0A
SELECTED LIST
Startup time
Ramp increment
Speed prop. gain
Delete Up Down



Note:

The protected parameters are no longer accessible and are not, therefore, displayed for the selected channels.

RDY	Term	+0.00 Hz	0 A
7.3 PARAMETER TERMINAL			
Contrast			
Keypad stand-by			
Start menu			
Code	<<	>>	Quick

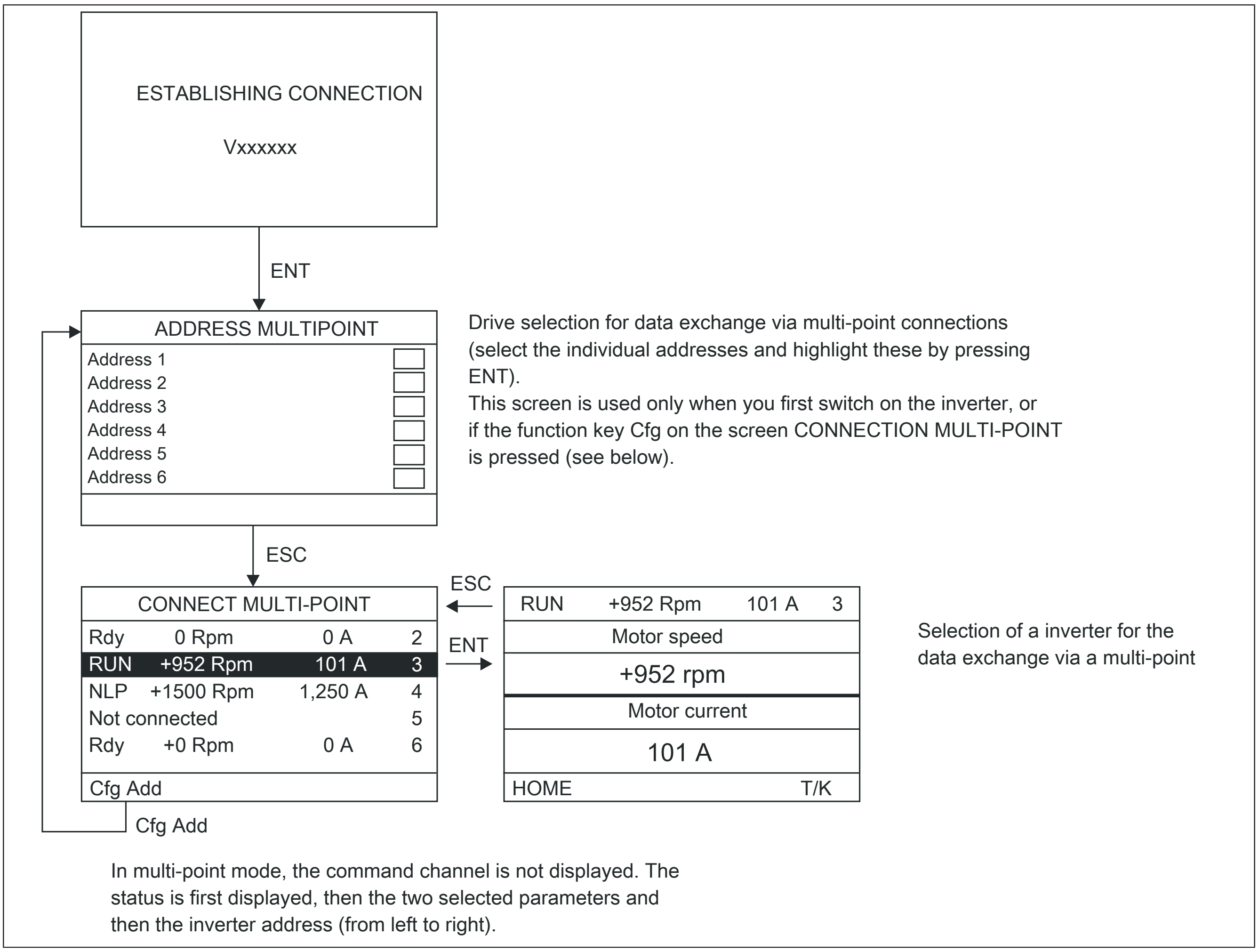
Parameter overview [DISPLAY CONFIG.]

Code	Name/Description	Setting range	Factory settings
	[Keypad contrast] Adjust the contrast on the graphical display.	0 to 100%	50%
	[Standby] Configures and the standby mode of the graphic display and makes adjustments. [No]: No standby mode [1] to [10]: Sets the time (in minutes), during which the terminal must remain idle before the standby mode is triggered. After this idle time, the background lighting of the display is switched off and the contrast is reduced. If a key or the navigation key is pressed, the screen returns to normal operation. This also happens if the terminal ends the normal display mode, for example in the event of a fault.		[5]
	[Start menu] Selection of the menu that appears on the product when it is started [FU menu]: Displays the Drive menu. [Fast start]: Displays the fast start menu. [Monitoring]: Displays the monitoring menu. [Setting]: Displays the setting menu. [Mot. data]: Displays the motor control menu. [I/O config.]: Displays the input/output configuration menu. [Control]: Displays the control menu. [Application fct]: Displays the application function menu. [Fault mgt]: Displays the fault management menu. [Communic.]: Displays the communication menu. [Diagnostics]: Displays the diagnostic menu. [Identif.]: Displays the identification menu. [FACTORY SETTING]: Displays the factory setting menu. [User menu]: Displays the user menu. [CI menu]: Displays the CI menu. [Main menu]: Displays the main menu.		[Main menu]

2.8.22 [CONNECT MULTI-POINT]

It is possible to communicate between a graphics terminal and several inverters connected to the same bus. The addresses of the inverter must be configured in advance in the menu **[COMMUNICATION]** via the parameter **[Address Modbus]** (Add).

If several converters are connected to the same graphic display terminal, this automatically displays the following screens:



All menus can be accessed in the multi-point mode. Only the control of the inverter via the graphic display terminal is not permitted, with the exception of the stop button, that locks all inverters.

In the event of a fault the display is positioned on this.

2.9 Servicing

2.9.1 Service

The ACOPOSinverter P84 requires no preventive maintenance. It is however recommended to regularly carry out the following operations:

- Check the condition and tightness of the connections.
- Make sure that the temperature around the unit remains at a permissible level and the ventilation is sufficient (average useful life of the fans: 3 to 5 years depending on the operating conditions).
- Keep the inverter free of dust.

2.9.2 Assistance during maintenance, fault display

If a problem occurs during the installation or during operation, first check whether the recommendations regarding environment, mounting and connections have been followed.

The first discovered faults will be stored and displayed and the inverter is locked.

The change of the inverter into fault mode may be displayed decentrally via a logic output or a relay. These can be configured in the menu **[INPUTS/OUTPUTS CFG]** (I-O-). See for example **[CONFIGURATION R1]** (r1-).

2.9.3 [DIAGNOSIS] menu

This menu can only be accessed with the graphic display terminal. It shows the detected errors and their causes in full-text and can be used for the implementation of tests.

2.9.4 Clearing the fault

In the case of a non-resettable fault, interrupt the voltage supply of the inverter.

Wait until the display has been completely cleared.

Determine the cause of the error and correct the error.

The inverter is released after a fault as follows:

- By switching off the inverter until the display is completely cleared , then switching on again
- Automatically in the cases that are described for the function **[Aut. Restart]** (Atr-)
- Via a logic input or a control bit with assignment to the function **[FAULT RESET]** (rSt-)
- By pressing the STOP/RESET on the graphic display terminal.

2.9.5 Menu [MONITOR] (SUP-)

Displays the inverter status and its current values to avoid faults and detect the causes of faults.

You can use the integrated operator terminal to access the menu.

2.9.6 Spares and repairs

Please contact your local B&R office.

2.10 Fault - Causes - Measures

2.10.1 The inverter does not start and no error is displayed.

- If the display does not light up, check the power supply to the inverter.
- The assignment of the "Fast stop" or "Freewheel" functions will prevent the inverter starting if the corresponding logic inputs are not powered up. The ACOPOSinverter P84 then displays **[freewheel stop]** (nSt) on freewheel stop and **[fast stop]** (FSt) for a fast stop. This is normal since these functions are active at zero so that the inverter will be stopped safely if there is a wire break.
- Make sure that the input or the inputs for run commands according to the selected control mode (parameter **[2/3 wire control]** (tCC) and **[Type 2 wire control]** (tCt)) is activated.
- If an input of the function "limit switch" is assigned and is set to zero, then the inverter can only be started with a run command for the opposite direction.
- If the reference or command channel is assigned to a communication bus, when connecting the power supply the inverter displays the message **[freewheel stop]** (nSt) and remains in stop mode until the communication bus sends a command.

2.10.2 Faults that do not allow automatic switch on again

The cause of the fault must be removed before resetting by turning off and then back on. The faults AnF, brF, ECF, EnF, SOF, SPF and tnF can also be decentrally corrected via a logic input or control bit (parameter **[fault reset]** (rSF)).

The faults AnF, EnF, InFA, InFb, SOF, SPF and tnF can also be decentrally locked via a logic input and deleted (parameter **[fault inhibit assign]** (InH)).

Error	Name	Probable cause	Error correction
AI2F	**[AI2 filter]**	• Inconsistency of the signal at the analog input AI2	• Check the wiring of analog input AI2 and the value of the signal.
AnF	**[Load slipping]**	• The actual speed of the encoder does not match the reference	• Check the motor, amplification and stability parameters. • Add a brake resistor. • Check the dimensioning of the motor/inverter/load. • Check the mechanical coupling of the encoder and its wiring. • If the torque control is used, please observe the note see "TORQUE CONTROL (tOr-)" on page 256.
bOF	**[Overl. brake res.]**	• The braking resistor is under excessive load.	• Check the size of the resistance and allow it to cool down. • Check the parameters **[brake resistor power]** (brP) and **[brake resistor value]** (brU).
brF	**[Brake contact]**	• The brake feedback contact does not match the brake logic control. • The brake does not stop the motor quickly enough (detected by measuring the speed on the impulse input).	• Check the feedback circuit and the brake logic control circuit • Check the mechanical state of the brake. • Check the state of the brake linings.
CrF1	**[Precharge]**	• Charging relay control fault or charging resistor damaged	• Switch the inverter off and on again. • Check the internal connections. • Examine and repair the inverter
CrF2	**[Thyr. soft charge]**	• Fault when charging the DC bus (thyristors)	
ECF	**[Mech Coupl Encoder]**	• Break in the mechanical coupling of the encoder	• Check the mechanical coupling of the encoder
EEF1	**[Control Eeprom]**	• Internal memory fault, control card	• Check the environment (electromagnetic compatibility). • Turn the device off and back on and reset it to factory settings. • Examine and repair the inverter
EEF2	**[Power Eeprom]**	• Internal memory fault, power card	
EnF	**[Encoder]**	• Encoder feedback fault	• Check parameters **[number of pulses]** (PGI) and **[Encoder type]** (EnS). • Check the mechanical and electrical functions of the encoder, its power supply and connections. • Change the rotation direction of the motor (parameter **[Phase rotation]** (PHr)) or the signals from the encoder.
FCF1	**[Motor cont. closed]**	• The output contactor remains closed although the opening conditions have been met	• Check the contactor and its wiring. • Check the feedback power path.
HdF	**[IGBT desaturation]**	• Short-circuit or grounding at the inverter output	• Check the connection cables from the inverter to the motor and the insulation of the motor. • Run the diagnostic tests via the menu **[DIAGNOSIS]** .

Error	Name	Probable cause	Error correction
ILF	[Internal serial link]	• Communication fault between the communication card and inverter	• Check the environment (electromagnetic compatibility). • Check the connections. • Check that the allowed maximum of 2 option cards on the inverter is not exceeded. • Replace the option card. • Examine and repair the inverter
InF1	[Wrong FU value]	• The power card is different from the card stored	• Check the reference of the power card.
InF2	[Power incompatible]	• The power card is incompatible with the control card.	• Check the reference of the power card and its compatibility.
InF3	[int communication]	• Communication fault between the internal cards	• Check the internal connections. • Examine and repair the inverter
InF4	[Internal-mftg zone]	• Internal data inconsistent	• Have the inverter re-calibrated (through the B&R Tech Support)
InF6	[Int. option]	• The option installed in the inverter is not recognized	• Check the reference and the compatibility of the option.
InF7	[Int. init. hardw]	• The inverter is not yet completely initialized.	• Switch the inverter off and reset it.
InF8	[Internal power supply voltage]	• Fault in the control power supply	• Check the control power supply.
InF9	[Internal- I measure]	• The current measurements are not correct.	• Run the diagnostic tests via the menu [DIAGNOSIS] . • Examine and repair the inverter
InFA	[Internal Power supply voltage supply]	• The input stage is not operating correctly	• Perform diagnostic tests via the menu [DIAGNOSIS]. • Check/repair the inverter.
InFb	[Internal PTC sensor]	• The inverter temperature sensor is not operating correctly • The brake unit temperature sensor is not operating correctly	• Replace the temperature sensor of the inverter • Examine and repair the inverter • Replace the temperature sensor of the brake unit • Examine and repair the brake unit
InFC	[Internal Time measure]	• Fault on the electronic timer	• Examine and repair the inverter
InFE	[Internal - CPU]	• Internal microprocessor fault	• Switch the inverter off and reset it. Examine and repair the inverter.
OCF	[Overcurrent]	• Parameters of the menus [SETTINGS] (Set-) and [DRIVE DATA] (drC-) are not correct. • Inertia or load too high • Mechanical locking	• Check the parameters. • Check the dimensioning of the motor/inverter/load. • Check the state of the mechanism.
PrF	[Power removal]	• Fault of the safety function "power removal" of the inverter	• Examine and repair the inverter
SCF1	[Motor short circuit]	• Short-circuit or grounding at the inverter output • Significant earth leakage current at the frequency inverter output if several motors are connected in parallel	• Check the connection cables from the inverter to the motor and the insulation of the motor. • Run the diagnostic tests via the menu [DIAGNOSIS]. • Reduce the frequency. • Connect motor throttles in series. • Check speed control and brake adjustment. • Increase the value of the parameter [Time to restart] (ttr) (see "Setting parameters (bEt - ttL)" on page 148).
SCF2	[Imp short circuit]		
SCF3	[Ground short circuit]		
SOF	[Overspeed]	• Instability or driving load too high	• Check the motor, amplification and stability parameters. • Add a brake resistor. • Check the dimensioning of the motor/inverter/load.
SPF	[Speed fdback loss]	• Feedback signal of the encoder is missing • There is no signal at the pulse input if this is used for the speed measurement	• Check the wiring between the encoder and the inverter. • Check the encoder. • Check the wiring at the input and at the detector used.
tnF	[AUTO TUNING FAULT]	• Special motor or motor whose power is not suitable for the inverter • Motor not connected to the inverter	• Check that the motor and inverter are compatible • Check that the motor is present during autotuning • Connect the motor protection during the autotuning

2.10.3 Faults that allow an automatic restart after eliminating the cause

These fault can also be reset by switching off and then on again or via a logic input or a command bit (parameter **[Fault reset]** (rSF)).

The faults APF, CnF, COF, EPF1, EPF2, FCF2, LFF2, LFF3, LFF4, ObF, OHF, OLF, OPF1, OPF2, OSF, OtF1, OtF2, OtFL, PHF, PtF1, PtF2, PtFL, SLF1, SLF2, SLF3, SrF, SSF and tJF can be decentrally blocked and deleted via a logic input or a command bit (parameters **[Fault inhibit assign.]** (InH)).

Error	Name	Probable cause	Error correction
APF	**[application fault]**	• Fault in control unit in the card	• See card-specific documentation.
bLF	**[Brake controller]**	• Brake opening current not attained • Threshold of the brake release frequency **[brake release freq.]** (bEn) only regulated when the brake logic is assigned.	• Check the inverter/motor connection. • Check the motor windings. • Check the settings. **[I brake engage upw.]** (Ibr) and **[I Brake engage rev.]** (Ird). • Apply the recommended settings for **[brake release freq.]** (bEn).
CnF 1)	**[Com. card]**	• Communication fault due to restart of the PLC. • Communication fault at POWERLINK • Communication fault on communication card	• Check whether the PLC has been restarted. • Check whether the POWERLINK network has been interrupted. • Check the environment (electromagnetic compatibility). • Check the wiring. • Check the timeout. • Replace the option card. • Examine and repair the inverter
COF	**[CANopen com.]**	• Interruption in integrated communication interface	• Check the communication bus. • Check time-out.
EPF1	**[ext fault LI/Bit]**	• Fault triggered by an external device, depending on user.	• Check the device that caused the fault and reset it.
EPF2	**[ext fault via com]**	• Fault triggered by a communication network	• Identify the cause of the fault and reset the device.
FCF2	**[motor contact open]**	• The output contactor remains open although the closing conditions have been met	• Check the contactor and its wiring. • Check the feedback power path.
LCF	**[Input contactor assign]**	• The inverter is not switched on, although the **[Time out mains voltage]** (LCt) has proceeded.	• Check the contactor and its wiring. • Check the timeout. • Check the connection to power supply/contactor/inverter.
LFF2	**[4-20 mA loss AI2]**	• Loss of the 4-20 mA reference on analog input AI2	• Check the connection on the analog inputs.
ObF	**[Overbraking]**	• Braking too strong or load is too high	• Increase the ramp-down time. • If necessary install a braking resistor. • Activate the function **[Adapt Deceleration Ramp]** (brA), see "Parameter overview RAMPTYPE" on page 206, if it is compatible with the application. • DCF parameter is too small. DCF=0 is the minimum ramp time
OHF	**[DRIVE OVERTEMP FAULT]**	• Inverter temperature too high	• Check the motor load, the inverter ventilation and the ambient temperature. Let the inverter cool down before switching it on again.
OLF	**[Motor overload]**	• Triggered by excessive motor current	• Check the setting of the motor thermal protection, check the motor load. Let the inverter cool down before switching it on again.
OPF1	**[1 output phase loss]**	• Loss of one phase at inverter output	• Check the connections between the inverter and motor.
OPF2	**[3out ph loss]**	• Motor not connected or motor power too low • Output contactor open • Instantaneous instability in the motor current	• Check the connections between the inverter and motor. • Set the parameter **[Output phase loss]** (OPL) to **[Outp. switch]** (OAC), if you are using an output contactor. • Test with a motor with low power or no motor: The function for detecting motor phase failures is enabled by default (factory setting). **([Output Phase Loss]** (OPL) = **[Yes]** (YES)) . To check the inverter in a test or maintenance environment, without having to use a motor with the same rating as the inverter (in particular for high power inverters), deactivate Output Phase Loss detection: **[Output Phase Loss]** (OPL) = **[No]** (nO). • Check and optimize the following parameters: **[IR compens.]** (UFr), **[rated motor voltage]** (UnS) and **[rated motor current]** (nCr) and carry out **[AUTO-TUNE FAULT]** (tUn).
OSF	**[Mains overvoltage]**	• Line voltage too high • Disturbed mains supply	• Check the mains supply voltage.

Error	Name	Probable cause	Error correction
OtFL	[Fault overtemp PTC=LI6]	• Overheating of PTC probes detected on input LI6	• Check load and rating of the motor. • Check the ventilation of the motor. • Let the motor cool down before switching on again. • Check the type and condition of the PTC sensor.
PtFL	[LI6=PTC overheat]	• PTC probes on input LI6 open or short-circuited	• Check PTC probes and their motor/inverter/wiring
SCF4	[IGBT short circuit]	• Power component fault	• Perform a test using the [DIAGNOSIS] menu. • Examine and repair the inverter
SCF5	[Motor short circuit]	• Short circuit at inverter output	• Check the connection cables from the inverter to the motor and the insulation of the motor. • Perform the tests using the [DIAGNOSIS] menu. • Examine and repair the inverter
SLF3	[HMI com.]	• Communication fault between the inverter and the graphic display terminal	• Check the terminal connection. • Check the timeout.
SrF	[Torque time-out.]	• The timeout of the torque control function has been reached	• Check the settings for the function. • Inspect the condition of the mechanism.
SSF	[Torque/current lim]	• Switch to torque limitation	• Check for a mechanical problem. • Check the parameters [TORQUE LIMIT] (tLA-) and the parameters of the fault [CURRENT/TORQ LIMIT] (tId-).
tJF	[IGBT overtemp.]	• Inverter overheating	• Check the dimensioning of the load/motor/inverter. • Reduce the frequency. • Let the motor cool down before switching on again.

1) Occurs each time the controller is restarted.

2.10.4 Fault that can be eliminated as soon as the cause is removed.

The fault can also be decentrally locked and deleted via a logic input.

(Parameter **[Fault inhibit assign.]** (InH)).

Error	Name	Probable cause	Error correction
CFF	**[Incorrect config]**	• Option card changed or removed • Control card replaced by a control card configured on a inverter with a different rating • The current configuration is inconsistent.	• Check that there are no card errors. • In the event of the option card being changed/removed deliberately, see the remarks below • Check that there are no card errors. • In the event of the control card being changed deliberately, see the remarks below • Restore the factory settings or the backup configuration (if valid) (see "Factory setting parameters (FCS1 - SCS1)" on page 315).
CFI	**[Config invalid]**	• Invalid configuration. The configuration loaded in the frequency inverter via the bus or communication network is inconsistent.	• Check the last loaded configuration • Load a compatible configuration.
dLF	**[Dynamic load fault]**	• Abnormal load variation	• Check that the load is not blocked by an obstacle • Removal of a run command causes a reset
HCF	**[CARDS PAIRING]**	• The function **[CARDS PAIRING]** (PPI-) (see "Cards pairing" on page 306) has been configured and a inverter card changed.	• In the event of a card error, reinsert the original card • Configuration by entering **[Merge code]** (PPI) must be confirmed if the card has been intentionally switched
PHF	**[Line phase error]**	• Inverter incorrectly supplied or a fuse blown • Failure of one phase • 3-phase ACOPOSinverter P84 used on a single-phase line supply • Unbalanced load Protection function is only effective under load	• Check the power connection and the fuses. • Use a 3-phase line supply. • Disable the fault by **[Line phase loss]** (IPL) = **[No]** (nO).
USF	**[Undervoltage]**	• Line supply too low • Transient voltage dip	• The voltage and the parameters of **[UNDERVOLTAGE MGT.]** (USb-) must be checked.

2.10.5 Change or removal of the option card

If the option card is deleted or replaced by another, the inverter locks in fault mode **[Incorrect config.]** (CFF) when switching on. If the card has been replaced or removed intentionally select "Yes" and the error can be deleted. Hold the ENT key for two seconds.

This results in the **restoration of all factory settings** (see "Factory setting parameters (FCS1 - SCS1)" on page 315) for the card-specific parameter groups.

These are:

Card replaced by a card of the same type

- Encoder cards: **[config inverter]** (drM)
- Communication cards: Only the parameters that are specific to communication cards

Remove the card (or replace it with a card of a different type):

- Encoder cards: **[config inverter]** (drM)
- Communication card: **[config inverter]** (drM) and communication card-specific parameters

2.10.6 Changing the control card

If a control card is replaced by a control card that has been configured in another type of inverter, the inverter locks in fault mode **[Incorrect config.]** (CFF) when switching on. If the card was intentionally replaced, the fault can be deleted by pressing twice on the ENT key, which **results in the restoration of all factory settings**.

2.11 Tables with user-specific settings

2.11.1 Menu [SIMPLE START] (SIM-)

Code	Name	Factory settings	User-specific setting
tCC	[2/3 wire control]	[2-wire control] (2C)	
CFG	[Macro configuration]	[Start/Stop] (StS)	
bFr	[Standard mot. freq]	[50 Hz] (50)	
nPr	[Rated motor power]	According to inverter performance	
UnS	[Rated motor volt.]	According to inverter performance	
nCr	[Rated mot. current]	According to inverter performance	
FrS	[Rated motor frequency]	50 Hz	
nSP	[Rated motor speed]	According to inverter performance	
tFr	[Max frequency]	60 Hz	
PHr	[Phase rotation]	ABC	
ItH	[Mot. therm. current]	According to inverter performance	
ACC	[Acceleration]	3.0 s	
dEC	[Deceleration]	3.0 s	
LSP	[Low speed]	0	
HSP	[High speed]	50 Hz	

2.11.2 Functional assignment of the I/O

Input/output	Assigned functions
LI1	
LI2	
LI3	
LI4	
LI5	
LI6	
LI7	
LI8	
LI9	
LI10	
LI11	
LI12	
LI13	
LI14	

Input/output	Assigned functions
LO1	
LO2	
LO3	
LO4	
AI1	
AI2	
AI3	
AI4	
R1	
R2	
R3	
R4	
RP	
Encoder	

2.11.3 Other parameters (table to be created by the user)

Code	Name	User-specific setting

3 Integrated safety functions

3.1 Before you begin

3.1.1 Safety instructions

The information contained in this guide complements the specifications listed in the specific product manuals.

You must read the respective product manual before using the product.

> **Danger!**
>
> **HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**
>
> - **Read and understand this manual before installing and operating the frequency inverter. Installation, adjustment, repair and maintenance must be performed by qualified personnel.**
> - **The user is responsible for complying with all relevant international and national electrical engineering requirements regarding the protective grounding of the equipment.**
> - **Numerous components of the frequency inverter, including the circuit boards, are supplied via the mains voltage. DO NOT TOUCH! Use only electrically insulated tools.**
> - **DO NOT TOUCH unshielded components or bolted connections on terminal blocks while connected to the power supply.**
> - **DO NOT short circuit terminals PA/+ and PC/- or the DC bus capacitors.**
> - **Before servicing the frequency inverter:**
>   - **Disconnect the entire power supply, including any external control voltage.**
>   - **Place a "DO NOT TURN ON" label on all power disconnection switches.**
>   - **Lock all power disconnection switches in the open position.**
>   - **WAIT 15 MINUTES to allow the DC bus capacitors to discharge.**
>   - **Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 V.**
>   - **If the DC bus capacitors do not discharge completely, contact your local B&R representative. The frequency inverter is not permitted to be repaired or put into operation in this case.**
> - **Install and close all covers before switching on the voltage supply or starting/stopping the frequency inverter.**
>
> **Failure to follow these instructions can result in serious injury or death!**

> **Danger!**
>
> **ACCIDENTAL OPERATION OF DEVICE**
>
> - **Read and understand this manual before installing and operating the frequency inverter.**
> - **Changes to the parameter settings must be carried out by specialist personnel.**
>
> **Failure to follow these instructions can result in serious injury or death!**

> **Warning!**
>
> **EQUIPMENT DAMAGE**
>
> **Do not operate or install any frequency inverter or accessory that appears damaged.**
>
> **Failure to follow these instructions can result in equipment damage, serious injury or death!**

Warning!

CONTROL FAILURE

- **The designer of any wiring scheme must consider the potential failure modes of control channels and, for certain critical functions, provide a means to achieve a safe state during and after a channel failure. Examples of critical control functions include an emergency stop switch (emergency stop) and overshoot stop.**
- **Separate or redundant control channels must be provided for critical control functions.**
- **Each implementation of a control system must be checked carefully and individually to ensure faultless operation before the device is put into operation.**
- **System control channels may include communication links. For this reason, the effects of unexpected transmission delays and connection disruptions must be taken into account.** [1]

Failure to follow these instructions can result in equipment damage, serious injury or death!

Caution!

INCOMPATIBLE MAINS VOLTAGE

Before switching on and configuring the frequency inverter, ensure that the mains voltage is compatible with the supply voltage shown on the frequency inverter nameplate. The frequency inverter may be damaged if the mains voltage is not compatible.

Failure to follow these instructions can result in equipment damage or injury.

Caution!

RISK OF LOSS OF POWER DUE TO CAPACITOR WEAR

The performance of product-specific capacitors may be reduced after long-term storage of over 2 years.

In this case, the following measures must be undertaken before using this product:

- **Use a variable AC power supply that is connected between L1 and L2 (also for model numbers 8I74T40xxxx.01P-1).**
- **Increase AC supply voltage to the following values:**
  - **25% of the rated voltage for 30 minutes**
  - **50% of the rated voltage for 30 minutes**
  - **75% of the rated voltage for 30 minutes**
  - **100% of the rated voltage for 30 minutes**

Failure to observe these instructions can result in damage to the device.

3.1.2 Personnel qualifications and usage

Personnel qualifications

Only trained employees who have read and understood the contents of this manual and all relevant product documentation are permitted to work on and with this product. In addition, these persons must have received relevant safety instructions in order to recognize and avoid potential sources of risk. This personnel must have received a technical education, collected knowledge and experience from the field and be able to foresee and recognize dangerous situations that may result from the use of this product, modifying its settings or from the mechanical, electrical and electronic components used throughout the entire system where this product will be used.

All persons who work with or near this product must be well-versed in all standards, guidelines and accident prevention guidelines relevant to their activities:

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation and Maintenance of Solid State Control" and NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Sys-

Intended use

The functions set forth in this guide refer only to the usage of the product listed herein. Before using another specific product, you must have already read and understood the respective product manual.

This product is only permitted to be used in adherence with all applicable safety regulations and guidelines in accordance with the specified requirements and technical data.

Before using this product, you must perform a risk assessment appropriate to the planned application. Based on the results, the appropriate security measures must be implemented. Since the product is used as a component in a whole system, you must guarantee the safety of staff through the design of this entire system (e.g. design of the machines).

This product may only be operated using the specified cables and accessories. Only use original accessories and spare parts.

Any use other than those expressly approved is prohibited and may entail hazards.

Electrical devices are only permitted to be installed, operated, maintained and repaired by qualified personnel.

This product is NEVER permitted to be used in explosive environments (Ex environments).

3.2 Overview

3.2.1 Introduction

The safety function integrated in ACOPOSinverter P84 allows you to develop applications aligned to the protection of people and machine.

The built-in security feature offers the following benefits:

- Eliminates the need for external safety equipment
- Reduced wiring and space requirements
- Reduced costs

ACOPOSinverter P84 inverters are compatible with standard requirements for implementing safety functions.

Safety functions per IEC 61800-5-2

PWR (STO)	Power removal (safe torque off) The purpose of this function is to place the motor in a state without torque, which is relevant for safety, since no torque is available on the motor level. Power modules are locked and the motor switches off or it is prevented from starting.

3.2.2 Standards and terminology

The technical terminology and descriptions in this guide correspond to the terminology and definitions in the relevant standards.

In the area of frequency inverter systems among other things this includes terms such as "safety function", "safe state", "error", "error reset", "failure", "fault", "warning", "warning message", etc.

This includes the following standards:

- Series of standards IEC 61800: "variable-speed electric frequency inverters"
- Series of standards EN IEC 61508 Ed.2: "Functional safety of electrical / electronic / programmable electronic safety-related systems"
- EN 954-1 "Safety of machinery - Safety-related parts of control systems"
- EN ISO 13849-1/2 Safety of machinery - Safety-related parts of control systems

EC declaration of conformity

You can request the EC declaration of conformity for the EMC Directive from your local B&R office.

Certification for functional safety

The integrated safety function is compatible and certified per IEC 61800-5-2 Ed. 1 Adjustable speed electrical power frequency inverter systems - Part 5-2: Safety requirements - functional safety.

As a product standard, IEC 61800-5-2 sets forth safety-related considerations for power frequency inverter systems with integrated safety functions "PDS (SR) s" (Power Drive Systems Safety Related) with respect to the framework laid out in the IEC 61508 Ed. 2 series.

The compliance of the safety functions listed in this guide with the IEC 61800-5-2 standard simplifies the integration of a PDS (SR) in a safety-related control system that conforms to the guidelines set forth in the IEC 61508 and/or ISO 13849-1 and IEC 62061 standards for process plants and machines.

The defined safety function is:

- SIL 2-compliant according to IEC 61800-5-2 and series of standards IEC 61508 ed.2.
- Performance Level "d" in accordance with ISO 13849-1.
- Compliance with category 3 and 4 of European standard ISO 13849-1 (EN 954-1)

The safety operating mode with requirement rate has been tested in high demand or continuous mode in accordance with the IEC 61800-5-2 standard.

The certificate for functional safety is available at www.br-automation.com.

3.2.3 Basic information

Functional safety

Automation and safety technology are two areas that in the past were completely separated, but have lately become more and more integrated.

The technical planning and installation of complex automation solutions are greatly simplified thanks to the integrated safety function.

The necessary safety requirements usually depend on the application.

The stringency of these requirements is determined by the risk and potential hazards brought about by the specific application.

The IEC 61508 standard

The IEC 61508 standard - "Functional safety of electrical / electronic / programmable electronic safety-related systems" - provides coverage for safety-related functionality. Instead of individual components an entire chain of functions (e.g. from a sensor via the analysis units to the actuator) is considered a single unit. This functional chain must meet the requirements of the specific safety integrity level as a whole. Systems and components can then be developed on this basis and used in a wide range of safety applications with comparably levels of risk.

SIL - Safety integrity level

The standard IEC 61508 defines 4 Safety Integrity Levels (SIL) for the safety function. SIL 1 is the lowest level, SIL 4 the highest. A hazard and risk analysis serves as a basis for determining the required safety integrity level. This can then be used to determine whether the respective chain of functions can be viewed as a safety function and which potential hazards must be covered.

PFH - Probability of a dangerous hardware failure per hour

To maintain the safety function the standard IEC 61508 requires different levels of measures for prevention and control of detected errors that are dependent on the required SIL. All of the components of a safety function must be subjected to a probability analysis to determine the effectiveness of the control measures implemented to evaluate detected errors. In this analysis, the probability of a dangerous failure per hour (Probability of a dangerous hardware Failure per Hour, PFH) is determined for a safety system. This is the probability per hour that a security system will fail in a dangerous manner and the safety function cannot be executed correctly. Depending on the SIL, the PFH for the entire safety system is not permitted to exceed certain values. The individual PFH values of a function chain are added together. The result is not permitted to exceed the maximum value defined in the standard.

SIL -Safety Integrity Level	Probability of a dangerous hardware failure per hour (PFH) for high or continuous demand rate
4	$\geq 10^{-9}$ to $<10^{-8}$
3	$\geq 10^{-8}$ to $<10^{-7}$
2	$\geq 10^{-7}$ to $<10^{-6}$
1	$\geq 10^{-6}$ to $<10^{-5}$

PL -Performance Level

The standard IEC 13849-1 defines 5 performance levels (PL) for the safety function. "a" is the lowest and "e" is the highest level. The five levels (a, b, c, d, e) correspond to the various values of the average probability of a dangerous hardware failure per hour.

Performance level	Probability of a dangerous hardware failure per hour (PFH)
e	$\geq 10^{-8}$ to $<10^{-7}$
d	$\geq 10^{-7}$ to $<10^{-6}$
c	$\geq 10^{-6}$ to $<3*10^{-6}$
b	$\geq 3*10^{-6}$ to $<10^{-5}$
a	$\geq 10^{-5}$ to $<10^{-4}$

HFT - Hardware fault tolerance and SFF - Safe failure fraction

Depending on the SIL for the safety system, the IEC 61508 standard and SFF value stipulate a special hardware detected fault tolerance (HFT) in connection with a special Safe Failure Fraction (SFF). Hardware fault tolerance is the ability of a system to execute the required safety function despite the presence of one or more detected hardware faults.

The SFF of a system is defined as the ratio between the rate of safe failures and the total failure rate of the system. Per IEC 61508, the maximum achievable SIL of a system is determined by the hardware fault tolerance (HFT) and partially by the safe failure fraction (SFF) of the system.

IEC 61508 differentiates between two types of subsystems (type A and type B). These types are based on criteria set forth by the standard for safety-related components.

SFF	Type A subsystem HFT			Type B subsystem HFT		
	0	1	2	0	1	2
<60%	SIL 1	SIL 2	SIL 3	---	SIL 1	SIL 2
60% to < 90%	SIL 2	SIL 3	SIL 4	SIL 1	SIL 2	SIL 3
60% to < 99%	SIL 3	SIL 4	SIL 4	SIL 2	SIL 3	SIL 4
≥99%	SIL 3	SIL 4	SIL 4	SIL 3	SIL 4	SIL 4

Measures for avoiding detected errors

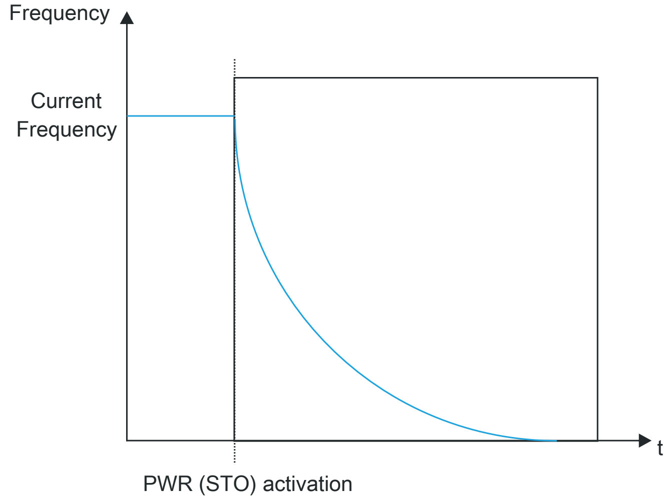
System errors in the specification, hardware and software, as well as errors detected during the use and maintenance of the safety system must be avoided to the maximum degree possible. To satisfy these requirements, IEC 61508 defines various measures for avoiding detected errors that must be implemented depending on the required SIL. These error avoidance measures must cover the entire service life of the safety system, i.e. from the planning of the system until it is taken out of commission.

3.3 Description

3.3.1 (PWR) Power removal (STO - Safe torque off)

The purpose of this function is to place the motor in a state without torque, where the motor coasts to a stop or motor startup is prevented. This status is safety-relevant, since no torque is available to the motor. This function is always assigned to logical input "PWR".

The status PWR (STO) can be activated via the inverter or with Automation Studio.



PWR (STO) - Normative reference

The normative definition of function PWR (STO) can be found in § 4.2.2.2.2 of standard IEC 61800-5-2: "No voltage is applied to the motor that can generate rotation (or movement in the case of a linear motor)". The PDS (SR) (power frequency inverter system with safety-related function) provides the motor with no energy with which torque (or, in the case of a linear motor, power) can be generated.

Note:

- **This safety function corresponds to an uncontrolled stop in accordance with stop category 0 of IEC 60204-1.**
- **This safety function may be used where power removal is required to prevent an unexpected startup.**
- **In situations where external influences (e.g. dropping suspended loads) are present, additional measures (e.g. mechanical brakes) may be required to eliminate any hazards.**
- **Electronic measures and contactors are not sufficient to protect against electric shock, so additional insulation measures may be required.**

Required safety function level (SF) for the PWR (STO) function

Configuration	SIL (Safety Integrity Level) per IEC 61-50	PL (Performance Level) in accordance with ISO-13849
PWR (STO) with or without a safety switching device	SIL 2	PL "d"

Therefore, for the following reasons the safety switching device (or equivalent equipment) must be used in the vicinity of the machine:

- In the vicinity of the machine (IEC 60204-1 and machine directive) a reset is not permitted to trigger a restart under any circumstances. There is a particularly compelling case if the voltage supply is switched off during the activation of the function PWR (STO). In this case, if PWR (STO) has been disabled during the interruption of the power supply, the motor is not permitted to be restarted automatically under any circumstances. The safety switching device can prevent an unwanted restart under this condition. The safety switching device is therefore mandatory for machine applications.
- E_STOP of several BDM in a PDS: The safety switching device has some safety outputs for applications that require one or several safety outputs.

The safety relay is not necessary in other environments unless required by the application: Fallback position of the system

3.4 Incompatibility with the safety functions

3.4.1 Limitations

Motor type

The function PWR (STO) can be used with induction motors.

Requirements for using these safety functions

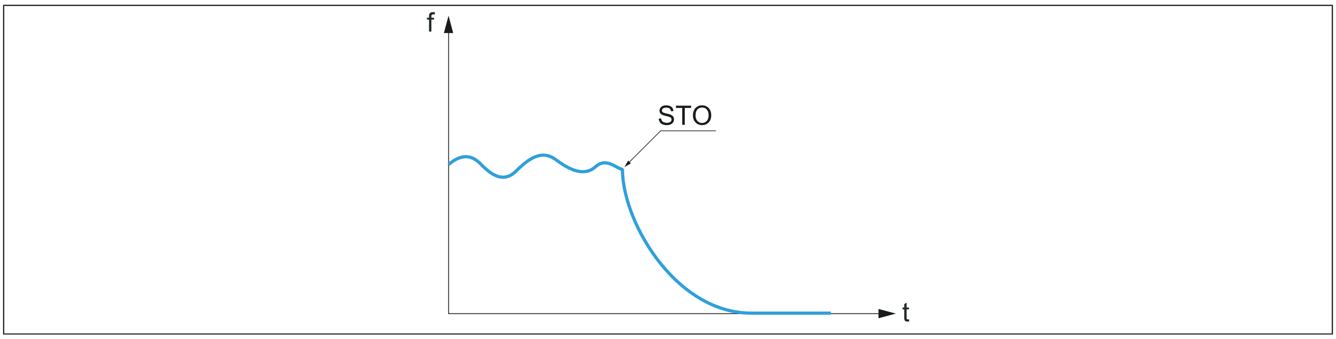
There are a few requirements that must be satisfied in order to ensure correct operation:

- The size of the motor must be sufficient for the application at hand and not approach its total capacity.
- The speed capacity of the drive has been selected according to the power supply (power grid), operating sequence, motor and application; it does not approach the limit values of the nominal power.
- Suitable options can be used as needed. Example: Dynamic brake resistor or motor choke.
- The inverter must be configured in a way suitable for the application with respect to speed and torque. The speed profile is regulated via the inverter's control loop.

Permissible and impermissible application for the safety function

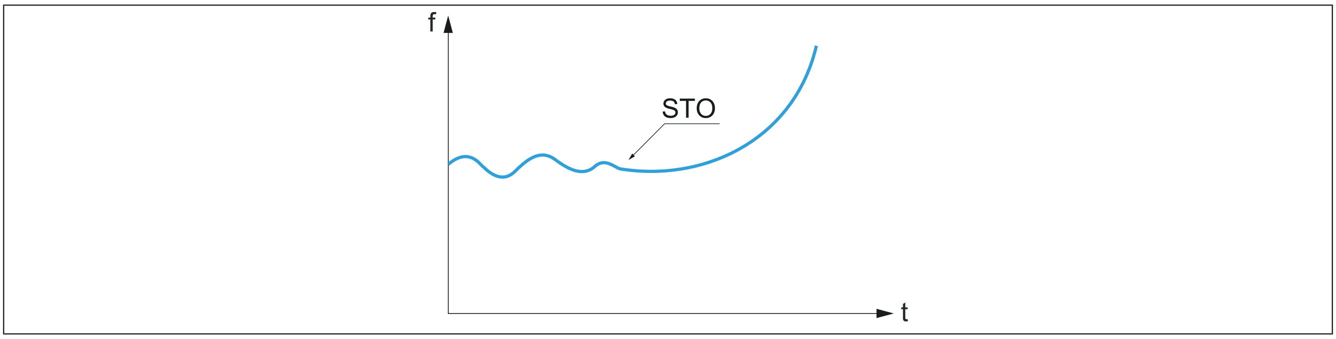
Permissible application

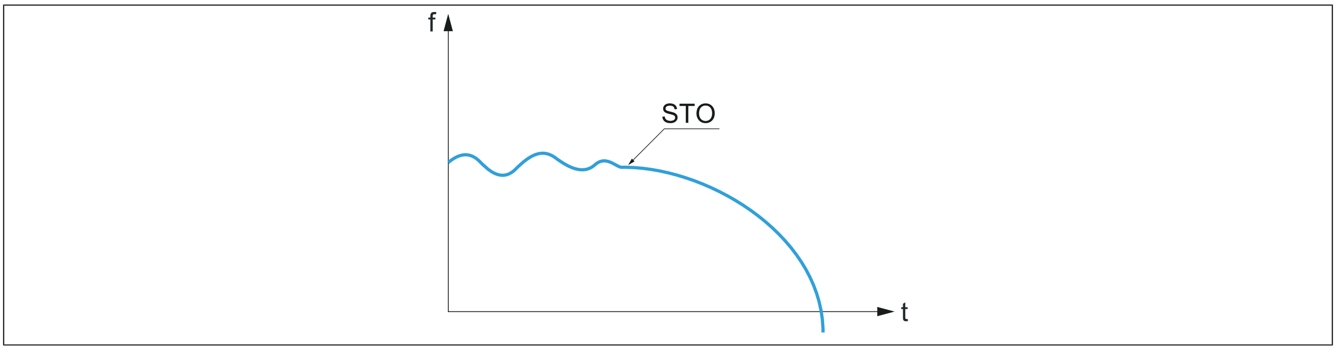
Fast stop after the STO request or freewheel stop permissible



Impermissible application

An application with load delay after the shutdown of the inverter or for long/permanent regenerative braking cycles is not permitted. Fast stop after the STO request or freewheel stop impermissible





Examples: Vertical conveyor, vertical pulling, lifting or winding equipment.

Fault inhibition

For certain types of errors, **[Fault inhibit assign.]**(InH) can be requested to prevent the inverter from stopping when an error occurs. The function of the fault inhibition is not compatible with the behavior of the safety function.

If a safety function is activated, then the fault state generated by the PrA safety function cannot be inhibited.

Factory settings

If the inverter is in a safe state and the factory settings are enabled, then only non-safety-related parameters are downloaded to the inverter. Safety parameters are not affected by the reset to factory settings.

3.5 Safety monitoring

Safety function "Power removal"

If the "power removal" input is active, the inverter prevents the output power bridge so that a torque is prevented in the motor.

The output power bridge is redundantly blocked by a software and hardware channel.

If a fault in the hardware of the safety function "Power removal" is detected, the inverter locks the converter output power bridge with the aid of the redundancy, even if the power removal input is not active.

If the "power removal" input is active, the power bridge is locked by the software and the status "Power Removal" active (PrA) is displayed.

If the power removal is active and faulty, the inverter switches to the mode "detected error" (PrF).

3.6 Technical data

3.6.1 Electrical data

The logical inputs and outputs of the inverter can be wired for the logic type 1 or logic type 2.

Logic type	Active state
1	Output drawing current (source) Current flows to the input
2	Output emits current from the input Power source (sink)

Safety functions are only used in sink mode; source mode is not compatible with the safety functions.

The signal inputs are protected against polarity reversal, while the outputs are protected against short circuits. Both the inputs and the outputs are electrically isolated.

3.6.2 Capacity of the safety functions

3.6.2.1 The safety functions of the safety-relevant power frequency inverter PDS(SR)

If, for the achievement of the qualitative and quantitative security objectives of the end application, certain adjustments must be made to ensure that the security functions can be used in a safe manner, the BDM-integrator is responsible for these additional developments (e.g. management of the mechanical motor brake).

In addition, the output data generated when using the safety functions (standard relay activation, controlling the brake logic relay, error codes, information on the display, etc.) do not comprise safety-related features.

Function		PWR (STO)
Standard	**Configuration**	**PWR (STO) with safety relay**
IEC 61800-5-2 / IEC 61508 /		SIL 2
IEC 62061 (1)		SIL 2 CL
EN 954-1 (2)		Category 3
ISO 13849-1 (3)		Category 3 PL "d"
IEC 60204-1		Stop category 0

(1) Since the standard IEC 62061 is an integration standard, the global safety function (according to SIL 2 ACOPOSinverter P84 - the charts process system SF - Case 1 see "Process system SF - Case 1" on page 360 and process system SF - Case 2 see "Process system SF - Case 2" on page 362) and the individual components of the safety function (according to SIL 2 CL for ACOPOSinverter P84) are differentiated between.
(2) See table 6 in the IEC 62061 (2005) standard.
(3) See table 4 in the EN 13849-1 (2008) standard.

3.6.2.2 Processor application

Function		PWR (STO)
Standard	**Configuration**	**PWR (STO)**
IEC 61800-5-2 / IEC 61508 /		SIL 2
IEC 62061 (1)		SIL 2 CL

(1) Since the standard IEC 62061 is an integration standard, the global safety function (according to SIL 2 ACOPOSinverter P84 - the charts process system SF - Case 1 see "Process system SF - Case 1" on page 360 and process system SF - Case 2 see "Process system SF - Case 2" on page 362) and the individual components of the safety function (according to SIL 2 CL for ACOPOSinverter P84) are differentiated between.

3.6.2.3 Input signals of the safety functions

Input signals of the safety functions	Unit	Value for LI3 to LI6	Value for STO
Logic 0 (Ulow)	**V**	**<5**	**<2**
Logic 1 (Uhigh)	V	>11	>17
Impedance (24 V)	kΩ	3.5	1.5
Debounce time	ms	<1	<1
Response time of the safety function	ms	<10	<10

3.6.2.4 Summary of the reliability study

Standard	Input	Size 2 to 5	Size 6 to 8	Size 9 to 10	Size 11 to 15	Size 23 to 24
IEC 61508 Ed. 2	SFF	92%	91%	91%	91%	92%
	PFH	1 E-8 h^{-1}	1 E-8 h^{-1}	1 E-8 h^{-1}	1 E-8 h^{-1}	1 E-8 h^{-1}
	Type	B	B	B	B	B
	HFT	1	1	1	1	1
	DC avg	70.40%	68.30%	71.20%	69.70%	69.70%
	SIL capability	2	2	2	2	2
IEC 62061 (1)	SIL CL capability	2	2	2	2	2
EN 954-1 (2)	Category	3	3	3	3	3
ISO 13849-1 (3)	PL	d	d	d	d	d
	Category	3	3	3	3	3
	MTTFd in years	1800	1900	1750	1850	1850

(1) Since the standard IEC 62061 is an integration standard, the global safety function (according to SIL 2 ACOPOSinverter P84 - the charts process system SF - Case 1 see "Process system SF - Case 1" on page 360 and process system SF - Case 2 see "Process system SF - Case 2" on page 362) and the individual components of the safety function (according to SIL 2 CL ACOPOSinverter P84) are differentiated between.

(2) See table 6 in the IEC 62061 (2005) standard.

(3) See table 4 in the EN 13849-1 (2008) standard.

As a preventive measure, an annual activation of the safety function is recommended. However, the safety levels are achieved without annual activation with lower margins.

Note:

The above table is not sufficient for the evaluation of the Performance Level (PL) of a power frequency inverter system. The PL assessment must take place at the system level. For the evaluation of the system performance levels the BDM mechanic or integrator must supplement the figures in the above table by the sensor data.

3.6.2.5 Mean time to failure

The following section shows the mean time to failure (MTTF) values of the ACOPOSinverter P84.

The MTTF is based on the IEC 62380

These values are specified for operation at an ambient temperature of 30°C.

The fan of the ACOPOSinverter P84 is a wear part and must be replaced as part of the maintenance.

Therefore, the fan is not taken into account in the MTTF evaluation.

Model number	Motor power (kW)	MTTF value for Interval operation	Standard
8I84T200075.01P-1 8I84T400075.01P-1	0.75	400000	IEC 62380
8I84T200220.01P-1 8I84T400220.01P-1	2.2		
8I84T200300.01P-1 8I84T400300.01P-1	3		
8I84T200400.01P-1 8I84T400400.01P-1	4		
8I84T200550.01P-1 8I84T400550.01P-1	5.5	350000	
8I84T200750.01P-1 8I84T400750.01P-1	7.5		
8I84T201100.01P-1 8I84T401100.01P-1	11		
8I84T201500.01P-1 8I84T401500.01P-1	15	300000	
8I84T201850.01P-1 8I84T401850.01P-1	18.5		
8I84T202200.01P-1 8I84T402200.01P-1	22	250000	
8I84T203000.01P-1 8I84T403000.01P-1	30		
8I84T203700.01P-1 8I84T403700.01P-1	37		
8I84T204500.01P-1 8I84T404500.01P-1	45		
8I84T405500.01P-1	55		
8I84T407500.01P-1	75		

MTTF values from the experience in the field

MTTF values for the ACOPOSinverter are between 1,000,000 and 3,000,000 hours.

Note:

- **MTTF: Mean time to failure (in hours, corresponds to the average time before an error occurs)**
- **MTBF: Mean Time Between 2 Failures = MTTF + MTTR**
- **MTTR: Mean Time To Repair (average duration of repair)**

3.6.2.6 PFD and PFH

Function	Standard	Characteristic value	Size 2 to 5	Size 6 to 8	Size 9 to 10	Size 11 to 15
STO	IEC 61508 Ed. 2	SFF	92%	91%	91%	91%
		$PFD_{10y\ avg}$	4.519x10^{-4}	4.519x10^{-4}	4.519x10^{-4}	4.519x10^{-4}
		$PFD_{10y\ avg}$	4.394x10^{-5}	4.394x10^{-5}	4.394x10^{-5}	4.394x10^{-5}
		PFH_{equ_1y}	10 FIT	10 FIT	10 FIT	10 FIT
		Type	B	B	B	B
		HFT	1	1	1	1
		DC	70.4%	60.3%	70.4%	70.4%
		SIL Level	**2**	**2**	**2**	**2**
	IEC 62061 (1)	SIL CL Level	2	2	2	2
	IEC 60204-1	Stop category	0	0	0	0
	EN 954-1 (2)	Category	3	3	3	3
	ISO 13849-1 (3)	PL	d	d	d	d
		Category	3	3	3	3
		MTTFd in years	1800	1900	1750	1850

(1) Since the standard IEC 62061 is an integrated standard, the global safety function and the individual components of the safety function are differentiated between.
(2) See table 6 in the IEC 62061 (2005) standard.
(3) See table 4 in the EN 13849-1 (2008) standard.

3.6.2.7 Functional Safety DATA (200 V / 400 V / 690 V)

Standard	Safety level	Areas of use	Part of the system	PFHd	SFF	DC	MTTFd	MTTFd
IEC/EN 61800-5-2 (ed1) IEC/EN 618508 (ed1)	SIL 2	All safety systems	Only ACPi P84	1*10^{-8}	>92%	>92%	30 years <MT-TFd <100 years	High
			Pushbutton and safety relay	2*10^{-7}	/	>90%	30 years <MT-TFd <100 years	High
			Complete safety system	2.1*10^{-7}	/	Medi-um	30 years <MT-TFd <100 years	High
EN 954-1 (=ISO 13849-1 ed1)	Cat. 3	Safety machinery sys-tems	Complete safety system.					
			A single fault of these components does not lead to the loss of the safety function.					
			The fault will be detected as soon as possible.					
ISO/EN 13849-1 (ed2)	PL "d"	Safety machinery sys-tems	Complete safety system	2.1*10^{-7}	/	Medi-um	30 years <MT-TFd <100 years	High

3.6.2.8 Recommended circuit breaker for IEC applications

ACOPOSinverter P84			Circuit breaker (1)		
Motor power		Product ID	Model number	Nominal power	Irm
kW	HP			A	A
3-phase, 200 to 240 V 50/ 60 Hz					
0.37	0.5	8I84T200037.010-1	GV2 L08	4	-
0.75	1	8I84T200075.010-1	GV2 L10	10	-
1.5	2	8I84T200150.010-1	GV2 L16	10	-
2.2	3	8I84T200220.010-1	GV2 L20	14	-
3	-	8I84T200300.010-1	GV2 L22	18	-
4	5	8I84T200400.010-1	GV2 L32	25	-
5.5	7.5	8I84T200550.010-1	GV3 L40	40	-
7.5	10	8I84T200750.010-1	GV3 L50	50	-
11	15	8I84T201100.010-1	GV3 L65	65	-
15	20	8I84T201500.010-1	NS80HMA80	80	480
18.5	25	8I84T201850.010-1	NS80HMA80	100	600
22	30	8I84T202200.010-1	NSX100xMA100	100	600
30	40	8I84T203000.010-1	NSX160xMA150	150	1350
37	50	8I84T203700.010-1	NSX160xMA150	150	1350
45	60	8I84T204500.010-1	NSX250xMA220	220	1980
3-phase, 380 to 480 V 50/ 60 Hz					
0.75	1/2	8I84T400075.010-1	GV2 L08	4	-
1.5	3/4	8I84T400150.010-1	GV2 L10	6.3	-
2.2	1	8I84T400220.010-1	GV2 L14	10	-
3	$1^{1/2}$	8I84T400300.010-1	GV2 L16	14	-
4	2	8I84T400400.010-1	GV2 L16	14	-
5.5	3	8I84T400550.010-1	GV2 L22	25	-
7.5	-	8I84T400550.010-1	GV2 L32	32	-
11	5	8I84T401100.010-1	GV3 L40	40	-
15	$7^{1/2}$	8I84T401500.010-1	GV3 L50	50	-
18.5	10	8I84T401850.010-1	GV3 L50	50	-
22	15	8I84T402200.010-1	GV3 L65	65	-
30	20	8I84T403000.010-1	NS80HMA80	80	480
37	50	8I84T403700.010-1	NSX100xMA100	100	800
45	60	8I84T404500.010-1	NSX160xMA150	150	1350
55	75	8I84T405500.010-1	NSX160xMA150	150	1350
75	100	8I84T407500.010-1	NSX250xMA220	220	1980

(1) This product is not included in the product portfolio of B&R and can for example be obtained from Schneider Electric. For further information, see online at www.schneider-electric.com.

3.6.2.9 Two certified architectures

> **Note:**
>
> **For certification with respect to functional aspects, only the safety-related power frequency inverter system PDS(SR) is taken into account, not the complete system in which the power frequency inverter is integrated to ensure the functional safety of a machine, system or process.**

The following architectures are certified:

- Process system SF - Case 1, see "Process system SF - Case 1" on page 360.
- Process system SF - Case 2, see "Process system SF - Case 2" on page 362.
- Process system SF - Case 3, see "Process system SF - Case 3" on page 364.

The safety functions of the PDS(SR) are part of a global system.

If, for the achievement of the qualitative and quantitative security objectives of the end application, certain adjustments must be made to ensure that the security functions can be used in a safe manner, the BDM-integrator is responsible for these additional developments (e.g. management of the mechanical motor brake).

In addition, the output data generated when using the safety functions (standard relay activation, controlling the brake logic relay, error codes, information on the display, etc.) do not comprise safety-related features.

3.6.2.10 Process system SF - Case 1

Connection diagram conforming to standards IEC/EN 61508 Category 3, ISO 13849-1 and IEC/EN 61508 Safety Integrity Level SIL 2, Stop Category 0 in accordance with standard IEC/EN 60204-1

This connection diagram is suitable for machines with a short free ramp-down (machines with low inertia or high resistance torque).

When the stop command is activated, the frequency inverter power supply is cut immediately and the motor stops in accordance with category 0 of standard IEC/EN 60204-1.

Information:

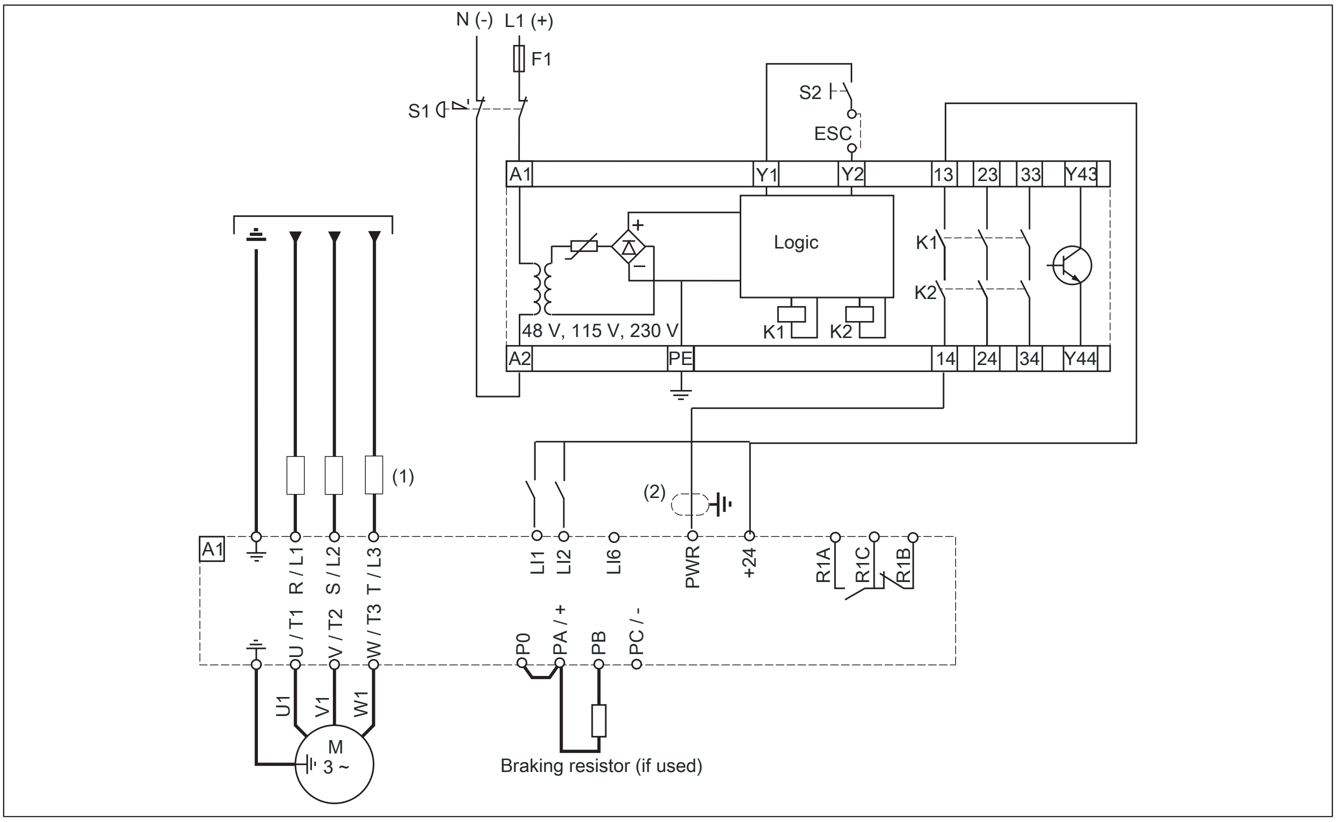
This template must be used for lifting applications when a mechanical brake is controlled by the ACOPOSinverter P84.

Note:

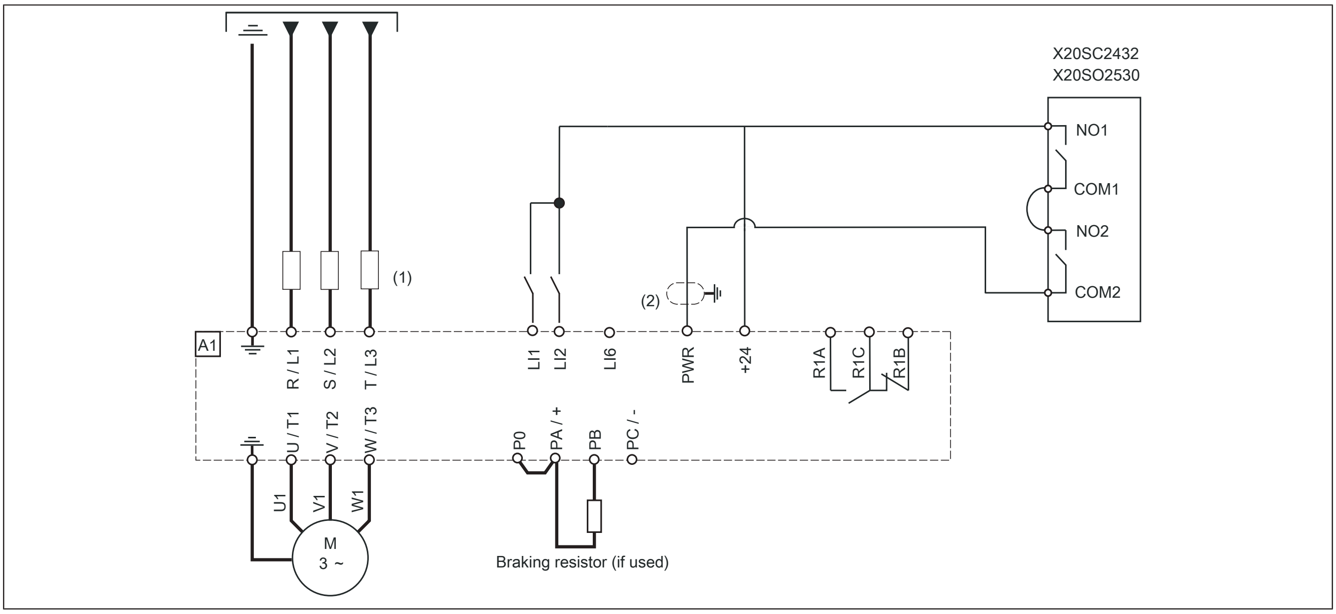
The brake control is not part of the ACOPOSinverter P84 safety function.

A contact on the safety switching relay must be inserted in the brake control circuit to engage the module safely when "Power removal" safety function is activated.

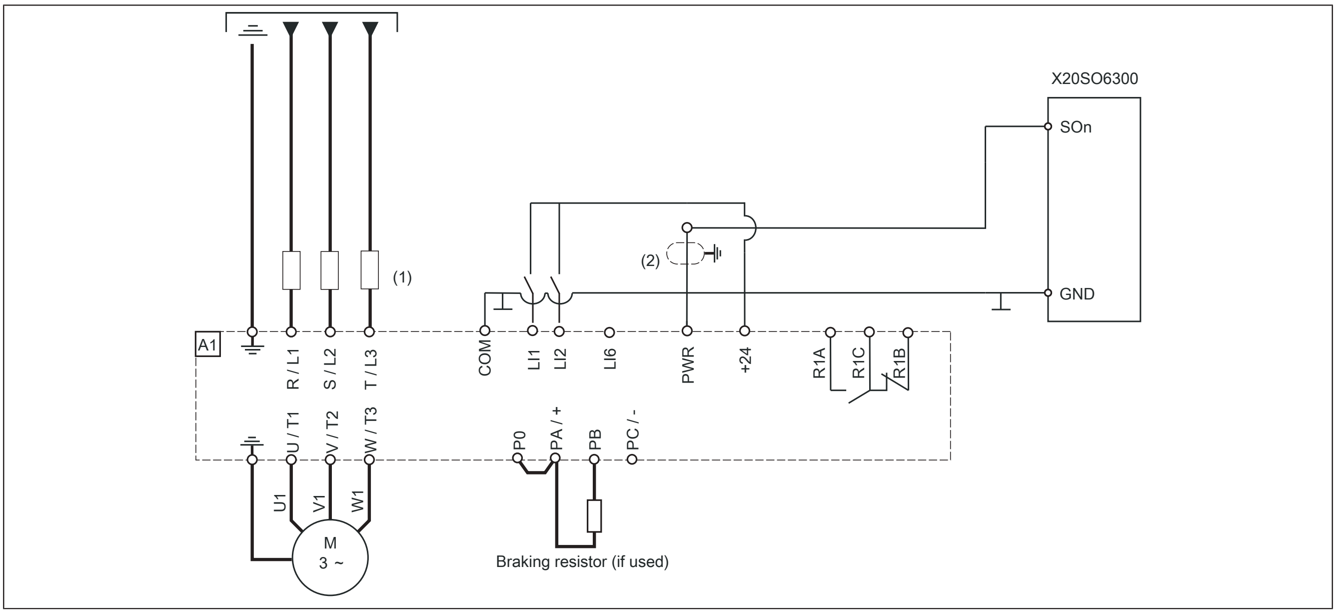
Example 1:



Example 2:



Example 3:



(1) Line choke (if used)
(2) Standard coaxial cable type RG174/U in accordance with MIL-C17 or KX3B according to NF C 93-550, outer diameter 2.54 mm, maximum length 15 m. The cable shield must be grounded.

- The standards IEC/EN 61508 Safety Integrity Level SIL 2 and ISO 13849 PL "d" require the use of a stop button with double contact (S1).
- S1 is used to activate the safety function "power removal".
- S2 is used to initialize the safety switching device during power up or after an emergency stop. You can use other initialization conditions of the module via ESC.
- A safety switching device can be used for the safety function "power removal" of multiple ACOPOSinverter P84 inverters.
- A logic output of the safety switching device can be used to safely indicate that the inverter is operating under safe conditions.

3.6.2.11 Process system SF - Case 2

Connection diagram conforming to standards IEC/EN 61508 Category 3, ISO 13849-1 and IEC/EN 61508 Safety Integrity Level SIL 2, Stop Category 1 in accordance with the standard IEC/EN 60204-1

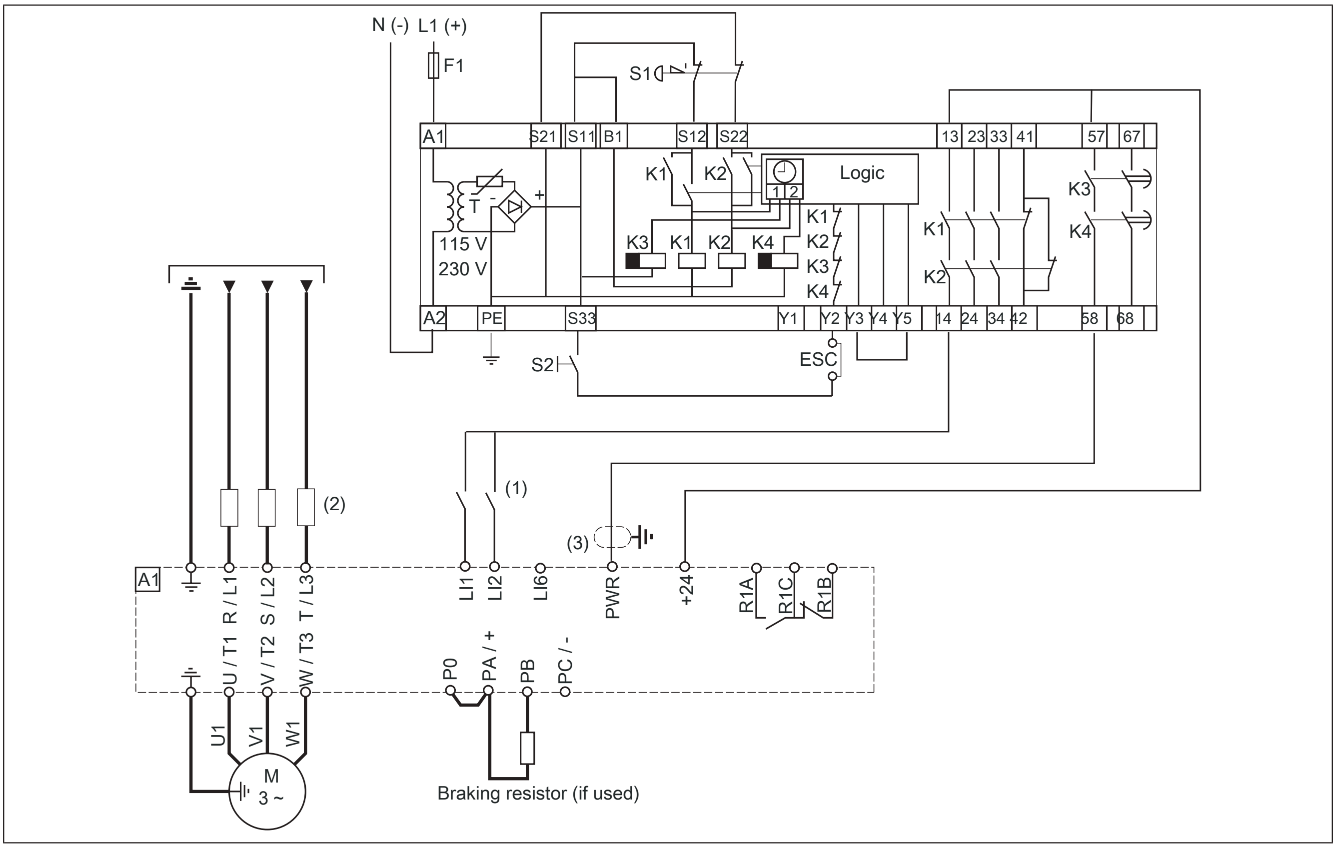
This connection diagram is suitable for machines with a long free ramp-down (machines with high inertia or low resistance torque).

This diagram is not permitted to be used for lifting applications.

On activation of the stop command, the deceleration of the motor controlled by the inverter is first requested. Then after a delay corresponding with the ramp-down time the safety function "power removal" is activated.

Example:

- 2-wire control
- LI1 is assigned to the movement in the right direction
- LI2 is assigned to the movement in the left direction



(1) In this example the logic inputs LIx are wired as "sink", but can also be wired as "source int" or "source ext".
(2) Line choke (if used)
(3) Standard coaxial cable type RG174/U in accordance with MIL-C17 or KX3B according to NF C 93-550, outer diameter 2.54 mm, maximum length 15 m. The cable shield must be grounded.

- The standards IEC/EN 61508 Safety Integrity Level SIL 2 and ISO 13849 PL "d" require the use of a stop button with double contact (S1).
- S1 is used to activate the safety function "power removal".
- S2 is used to initialize the safety switching device during power up or after an emergency stop. You can use other initialization conditions of the module via ESC.
- A safety switching device can be used for the safety function "power removal" of multiple ACOPOSinverter P84 inverters. In this case, the delay must be set in accordance with the longest stop time.
- A logic output of the safety switching device can be used to safely indicate that the inverter is operating under safe conditions.

Note:

For preventive maintenance, the function "power removal" must be activated at least once a year.

Before the preventive maintenance, the supply voltage of the inverter must be switched off and then back on.

The signals of the logic outputs of the inverter cannot be considered as safety-relevant signals.

Install suppressors in all inductive control circuits that are in the vicinity of the inverter or connected to the same circuit (relays, contactors, solenoid valves, etc.).

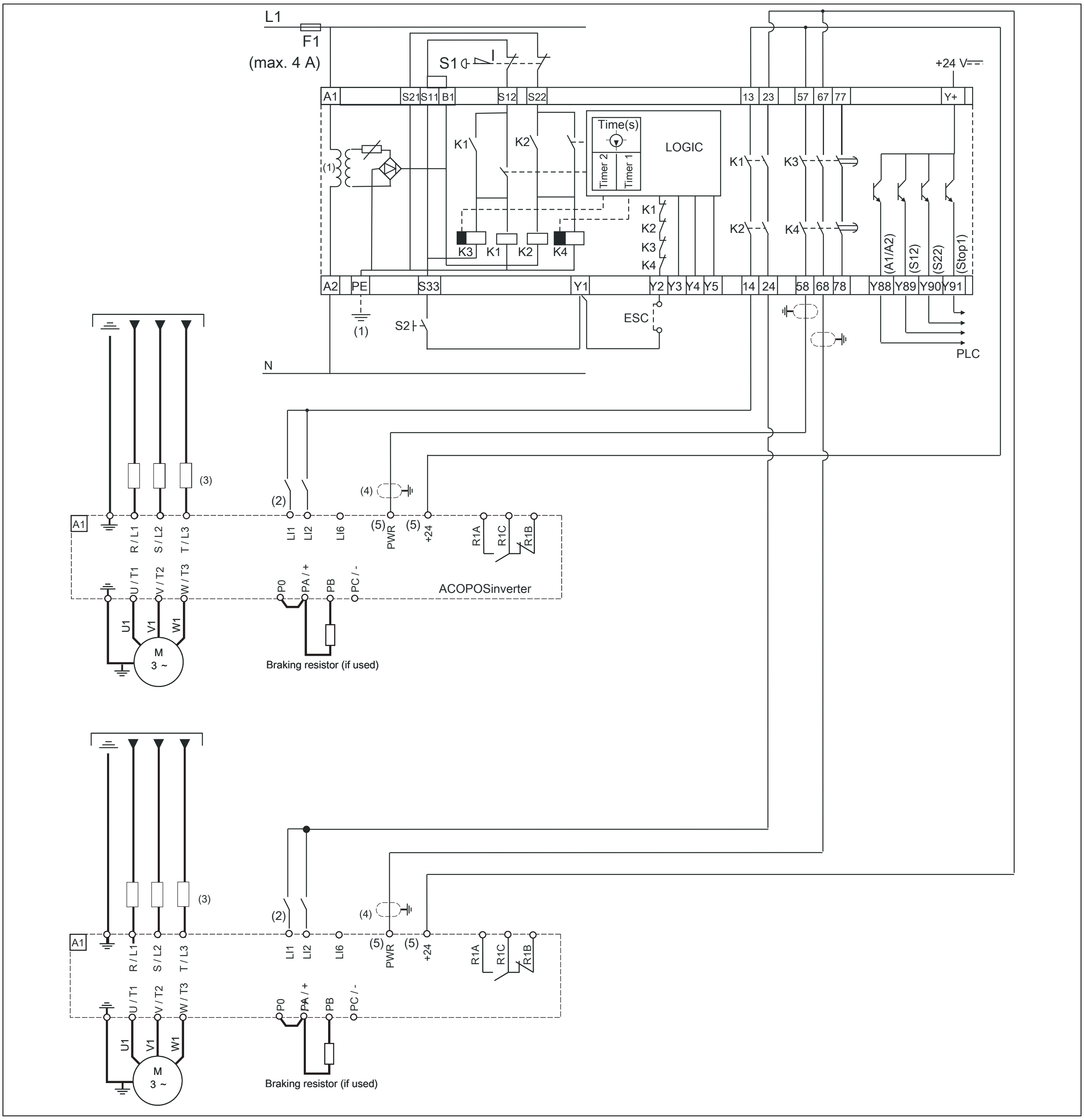
3.6.2.12 Process system SF - Case 3

Several frequency inverters conforming to standards EN954 61508 Category 3, ISO 13849-1 and IEC/EN 61508 Safety Integrity Level SIL 2, Stop Category 1 in accordance with the standard IEC/EN 60204-1

This connection diagram is suitable for machines with a short free ramp-down (machines with low inertia or high resistance torque).

Information:

This diagram is not permitted to be used for lifting applications.



(1) 115/230 V~
(2) In this example the logic inputs LIx are wired as "sink", but can also be wired as "source int" or "source ext
(3) (1) Mains choke (if used)
(4) Standard coaxial cable type RG174/U in accordance with MIL-C17 or KX3B according to NF C 93-550, outer diameter 2.54 mm, maximum length 15 m. The cable shield must be grounded.
(5) Use the cable ends DZ5CE020 (yellow) at the connector wires to the inputs PWR and +24

On activation of the stop command, the deceleration of the motor controlled by the inverter is first requested. Then after a delay corresponding with the ramp-down time the safety function "power removal" is activated

Example:

- 2-wire control
- LI1 is assigned to the movement in the right direction
- LI2 is assigned to the movement in the left direction

- The standards EN 954-1 Category 3 and ISO 13849-1 require the use of a stop button with double contact (S1).
- S1 is used to activate the safety function "power removal".
- S2 is used to initialize the safety switching device during power up or after an emergency stop. You can use other initialization conditions of the module via ESC.
- A safety switching device can be used for the safety function "power removal" of multiple ACOPOSinverter P84 inverters. In this case, the delay must be set in accordance with the longest stop time.

A logic output of the safety switching device can be used to safely indicate that the inverter is operating under safe conditions.

Note:

For preventive maintenance, the function "power removal" must be activated at least once a year.

Before the preventive maintenance, the supply voltage of the inverter must be switched off and then back on.

The signals of the logic outputs of the inverter cannot be considered as safety-relevant signals.

Install suppressors in all inductive control circuits that are in the vicinity of the inverter or connected to the same circuit (relays, contactors, solenoid valves, etc.).

4 Accessories

4.1 Overview

Material number	Brief description	Page
Graphics display		
8I0XD301.300-1	ACPi P74/P84 graphics display	368
8I0XD302.300-1	ACPi P74/P84 graphics display - Remote kit	
8I0XD303.300-1	ACPi P74/P84 graphics display - Front cover	
8I0XD304.301-1	ACPi P74/P84 graphics display - cable 1 m	
8I0XD304.303-1	ACPi P74/P84 graphics display - cable 3 m	
8I0XD304.305-1	ACPi P74/P84 graphics display - cable 5 m	
8I0XD304.310-1	ACPi P74/P84 graphics display - cable 10 m	
8I0XD305.300-1	ACPi P74/P84 graphics display - RJ45 adapter	
Mains choke		
8I0CS025.000-1	ACPi mains choke 1-phase 25 A	369
8I0CS045.000-1	ACPi mains choke 1-phase 45 A	
8I0CT004.000-1	ACPi mains choke 3-phase 4 A	
8I0CT010.000-1	ACPi mains choke 3-phase 10 A	
8I0CT016.000-1	ACPi mains choke 3-phase 17 A	
8I0CT030.000-1	ACPi mains choke 3-phase 30 A	
8I0CT060.000-1	ACPi mains choke 3-phase 60 A	
8I0CT100.000-1	ACPi mains choke 3-phase 100 A	
8I0CT184.000-1	ACPi mains choke 3-phase 184 A	
Braking resistors		
8I0BR003.000-1	ACPi braking resistor 2.5 Ohm 1kW	374
8I0BR004.000-1	ACPi braking resistor 4 Ohm 1kW	
8I0BR005.000-1	ACPi braking resistor 5 ohms 1.3 kW	
8I0BR008.000-1	ACPi braking resistor 8 Ohm 1kW	
8I0BR010.000-1	ACPi braking resistor 10 ohms 1 kW	
8I0BR015.000-1	ACPi braking resistor 15 ohms 1 kW	
8I0BR028.000-1	ACPi braking resistor 28 ohms 0.2 kW	
8I0BR060.000-1	ACPi braking resistor 60 ohms 0.1 kW	
8I0BR100.000-1	ACPi braking resistor 100 ohms 0.05 kW	
Additional EMC filters		
8I0FT012.300-1	ACPi P84 EMC filter 3-phase 12 A	378
8I0FT026.300-1	ACPi P84 EMC filter 3-phase 26 A	
8I0FT035.300-1	ACPi P84 EMC filter 3-phase 35 A	
8I0FT046.300-1	ACPi P84 EMC filter 3-phase 46 A	
8I0FT072.300-1	ACPi P84 EMC filter 3-phase 72 A	
8I0FT090.300-1	ACPi P84 EMC filter 3-phase 90 A	
8I0FT092.300-1	ACPi P84 EMC filter 3-phase 92 A	
8I0FT180.300-1	ACPi P84 EMC filter 3-phase 180 A	
Through-hole mounting kits		
8I0MF001.300-1	ACPi P84 feed-through mounting kit	387
8I0MF002.300-1	ACPi P84 feed-through mounting kit	
8I0MF003.300-1	ACPi P84 feed-through mounting kit	
8I0MF004.300-1	ACPi P84 feed-through mounting kit	
8I0MF005.300-1	ACPi P84 feed-through mounting kit	
8I0MF006.300-1	ACPi P84 feed-through mounting kit	
8I0MF007.300-1	ACPi P84 feed-through mounting kit	
8I0MF008.300-1	ACPi P84 feed-through mounting kit	
8I0MF009.300-1	ACPi P84 feed-through mounting kit	
Fans		
8I0XF084.020-1	Fan for ACOPOSinverter P84, size 2	Fans
8I0XF084.030-1	Fan for ACOPOSinverter P84, size 3	
8I0XF084.040-1	Fan for ACOPOSinverter P84, size 4	
8I0XF084.050-1	Fan for ACOPOSinverter P84, size 5A	
8I0XF084.055-1	Fan for ACOPOSinverter P84, size 5B	
8I0XF084.060-1	Fan for ACOPOSinverter P84, size 6	
8I0XF084.070-1	Fan for ACOPOSinverter P84, size 7	
8I0XF084.075-1	Fan for ACOPOSinverter P84, size 7B	
8I0XF084.080-1	Fan for ACOPOSinverter P84, size 8	
Control card fan kit		
8I0XF004.300-1	ACPi P84 control card fan kit	396
8I0XF005.300-1	ACPi P84 control card fan kit	
8I0XF006.300-1	ACPi P84 control card fan kit	

Table 19: Accessories - Overview

Material number	Brief description	Page
8I0XF007.300-1	ACPi P84 control card fan kit	
Incremental encoder interface		
8I0AC123.300-1	ACPi P84 encoder interface RS422 5V TTL	397
8I0AC123.301-1	ACPi P84 encoder interface RS422 15V TTL	
8I0AC123.302-1	ACPi P84 encoder interface, open coll, 12V	
8I0AC123.303-1	ACPi P84 encoder interface, open coll, 15V	
8I0AC123.304-1	ACPi P84 encoder inter. push-pull 12V HTL	
8I0AC123.305-1	ACPi P84 encoder inter. push-pull 15 V HTL	
8I0AC123.306-1	ACPi P84 encoder inter. push-pull 24 V HTL	
DC bus chokes		
8I0DC002.300-1	ACPi P84 DC bus choke 2 A	401
8I0DC004.300-1	ACPi P84 DC bus choke 4 A	
8I0DC008.300-1	ACPi P84 DC bus choke 8 A	
8I0DC010.300-1	ACPi P84 DC bus choke 10 A	
8I0DC014.300-1	ACPi P84 DC bus choke 14 A	
8I0DC019.300-1	ACPi P84 DC bus choke 19 A	
8I0DC027.300-1	ACPi P84 DC bus choke 27 A	
8I0DC036.300-1	ACPi P84 DC bus choke 36 A	
8I0DC044.300-1	ACPi P84 DC bus choke 44 A	
8I0DC084.300-1	ACPi P84 DC bus choke 84 A	
8I0DC171.300-1	ACPi P84 DC bus choke 171 A	
8I0DC195.300-1	ACPi P84 DC bus choke 195 A	

Table 19: Accessories - Overview

4.2 Graphics display

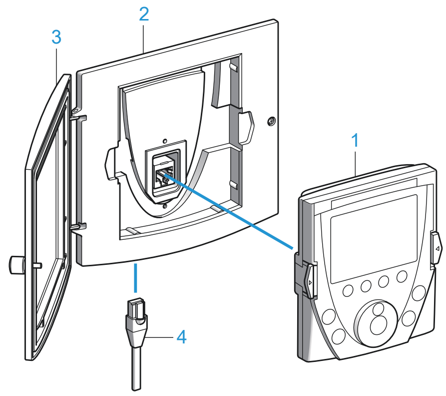
4.2.1 Order data

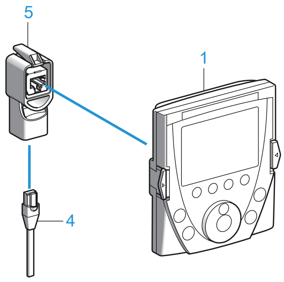
Model number	Short description	Figure
	ACOPOSinverter P74/P84 - Graphics display	
8I0XD301.300-1	ACOPOSinverter P74/P84 graphics display, 8 lines, 240 x 160 pixels, backlight, function keys, navigation keys, IP54 protection	
8I0XD302.300-1	Remote installation kit for graphics display, IP54 protection	
8I0XD303.300-1	Front cover for the remote installation kit for graphics display, IP65 protection	
8I0XD304.301-1	Graphics display remote cable 1 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.303-1	Graphics display remote cable 3 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.305-1	Graphics display remote cable 5 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD304.310-1	Graphics display remote cable 10 m for ACOPOSinverter P74/P84 (RJ45 - RJ45)	
8I0XD305.300-1	RJ45 adapter for graphic display	

Table 20: 8I0XD301.300-1, 8I0XD302.300-1, 8I0XD303.300-1, 8I0XD304.301-1, 8I0XD304.303-1, 8I0XD304.305-1, 8I0XD304.310-1, 8I0XD305.300-1 - Order data

Properties

- The optional graphic display can be installed on the front side of the ACOPOSinverter P84.
- It allows the following:
  - Controlling, aligning and configuring the inverter
  - Displaying current values (motor, I/O, etc.)
  - Saving and downloading configurations (4 configuration files can be saved)
- The following accessories are available:
  - A remote mounting kit for mounting in the door of a control cabinet with IP54 protection
  - A transparent cover that can be fastened to the remote mounting mechanism for IP65 protection
  - A cable for connecting the graphics display to the ACOPOSinverter P84 inverter.
  - An RJ45 adapter for connecting the graphics display to the remote cable





4.3 Mains choke

4.3.1 Order data

Model number	Short description	Figure
	ACOPOSinverter P74/P84 - Mains chokes	
8I0CS025.000-1	Mains choke 1-phase 25 A, for ACOPOSinverter P84 1x 200 to 240 V, 3 kW	
8I0CS045.000-1	Mains choke 1-phase 45 A, for ACOPOSinverter P84 1x 200 to 240 V, 4 to 5.5 kW	
	ACOPOSinverter P74/P76/P84 - Line chokes	
8I0CT004.000-1	Mains choke 3-phase 4 A, for ACOPOSinverter P74 3x 380 to 500 V, 0.37 to 1.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 1.5 kW	
8I0CT010.000-1	Mains choke 3-phase 10 A, for ACOPOSinverter P74 3x 380 to 500 V, 2.2 to 4 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 2.2 to 4 kW	
8I0CT016.000-1	Mains choke, 3-phase 17 A, for ACOPOSinverter P74 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0CT030.000-1	Mains choke 3-phase 30 A, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5.5 kW and 3x 380 to 480 V, 11 to 15 kW	
8I0CT060.000-1	Mains choke 3-phase 60 A, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 to 11 kW and 3x 380 to 480 V, 18.5 to 22 kW	
8I0CT100.000-1	Mains choke 3-phase 100 A, for ACOPOSinverter P84 3x 200 to 240 V, 15 kW and 3x 380 to 480 V, 30 to 55 kW	
8I0CT184.000-1	Mains choke 3-phase 184 A, for ACOPOSinverter P84 3x 380 to 480 V, 75 to 90 kW	

Table 21: 8I0CS025.000-1, 8I0CS045.000-1, 8I0CT004.000-1, 8I0CT010.000-1, 8I0C-T016.000-1, 8I0CT030.000-1, 8I0CT060.000-1, 8I0CT100.000-1, 8I0CT184.000-1 - Order data

4.3.2 Technical data

Model number	8I0CS025.000-1	8I0CS045.000-1
General information		
Certifications		
CE	Yes	
KC	Yes	
Mains connection		
Power dissipation	50 W	
Inductance	2 mH	1 mH
Nominal current	25 A	45 A
Voltage drop	From 3 to 5% of the rated supply voltage. Higher values result in torque loss.	
Operating conditions		
Installation at elevations above sea level	0 to 1000 m	
Protection		
Choke	IP00	
Terminals	IP20	
Max. relative humidity	95%, non-condensing No dripping water	
Ambient temperature	0 to 45°C	
Max. ambient temperature	Up to 55°C [1]	
Maximum installation elevation	3000 m [2]	
Environmental conditions		
Temperature		
Storage	-25 to 70°C	
Mechanical characteristics		
Weight	3.5 kg	
General information		
Conformity to standard	IEC 61800-5-1 (protection level 1 regarding overvoltages in the mains supply according to VDE 0160)	

Table 22: 8I0CS025.000-1, 8I0CS045.000-1 - Technical data

1) With current reduction of 2% per °C above 45°C.
2) From 1000 to 3000 m, current reduced by 1% per 100 m

Model number	8I0CT004.000-1	8I0CT010.000-1	8I0CT016.000-1
General information			
Certification			
CE	Yes		
KC	Yes		
Mains connection			
Power loss	45 W	65 W	75 W
Inductance	10 mH	4 mH	2 mH
Nominal current	4 A [1]	10 A [1]	17 A [1]
Voltage drop	From 3 to 5% of the rated supply voltage. Higher values result in torque loss.		
Saturation current	-		
Operating conditions			
Installation at elevations above sea level	0 to 1000 m		
Protection			
Choke	IP00		
Terminals	IP20		
Max. relative humidity	95%, non-condensing No dripping water		
Ambient temperature	0 to 45°C		
Max. ambient temperature	Up to 55°C [2]		
Maximum installation elevation	3000 m [3]		
Environmental conditions			
Temperature			
Storage	-25 to 70°C		
Mechanical characteristics			
Weight	1.5 kg	3.0 kg	3.5 kg
General information			
Conformity to standard	IEC 61800-5-1 (protection level 1 regarding overvoltages in the mains supply according to VDE 0160)		

Table 23: 8I0CT004.000-1, 8I0CT010.000-1, 8I0CT016.000-1 - Technical data

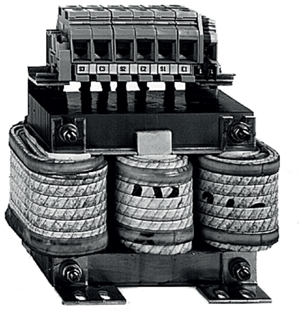
1) Max. current = 1.65 x rated current for 60 seconds.
2) With current reduction of 2% per °C above 45°C.
3) From 1000 to 3000 m, current reduced by 1% per 100 m

Model number	8I0CT030.000-1	8I0CT060.000-1	8I0CT100.000-1	8I0CT184.000-1
General information				
Certification				
CE	Yes			
KC	Yes			
Mains connection				
Power loss	90 W	94 W	260 W	220 W
Inductance	1 mH	0.5 mH	0.3 mH	0.155 mH
Nominal current	30 A [1]	60 A [1]	100 A [1]	184 A [1]
Voltage drop	From 3 to 5% of the rated supply voltage. Higher values result in torque loss.			
Saturation current	-			370 A
Operating conditions				
Installation at elevations above sea level	0 to 1000 m			
Protection				
Choke	IP00			
Terminals	IP10		IP00	
Max. relative humidity	95%, non-condensing No dripping water			
Ambient temperature	0 to 45°C			
Max. ambient temperature	Up to 55°C [2]			
Maximum installation elevation	3000 m [3]			
Environmental conditions				
Temperature				
Storage	-25 to 70°C			
Mechanical characteristics				
Weight	6.0 kg	11.0 kg	16.0 kg	31.0 kg
General information				
Conformity to standard	IEC 61800-5-1 (protection level 1 regarding overvoltages in the mains supply according to VDE 0160)			

Table 24: 8I0CT030.000-1, 8I0CT060.000-1, 8I0CT100.000-1, 8I0CT184.000-1 - Technical data

1) Max. current = 1.65 x rated current for 60 seconds.
2) With current reduction of 2% per °C above 45°C.
3) From 1000 to 3000 m, current reduced by 1% per 100 m

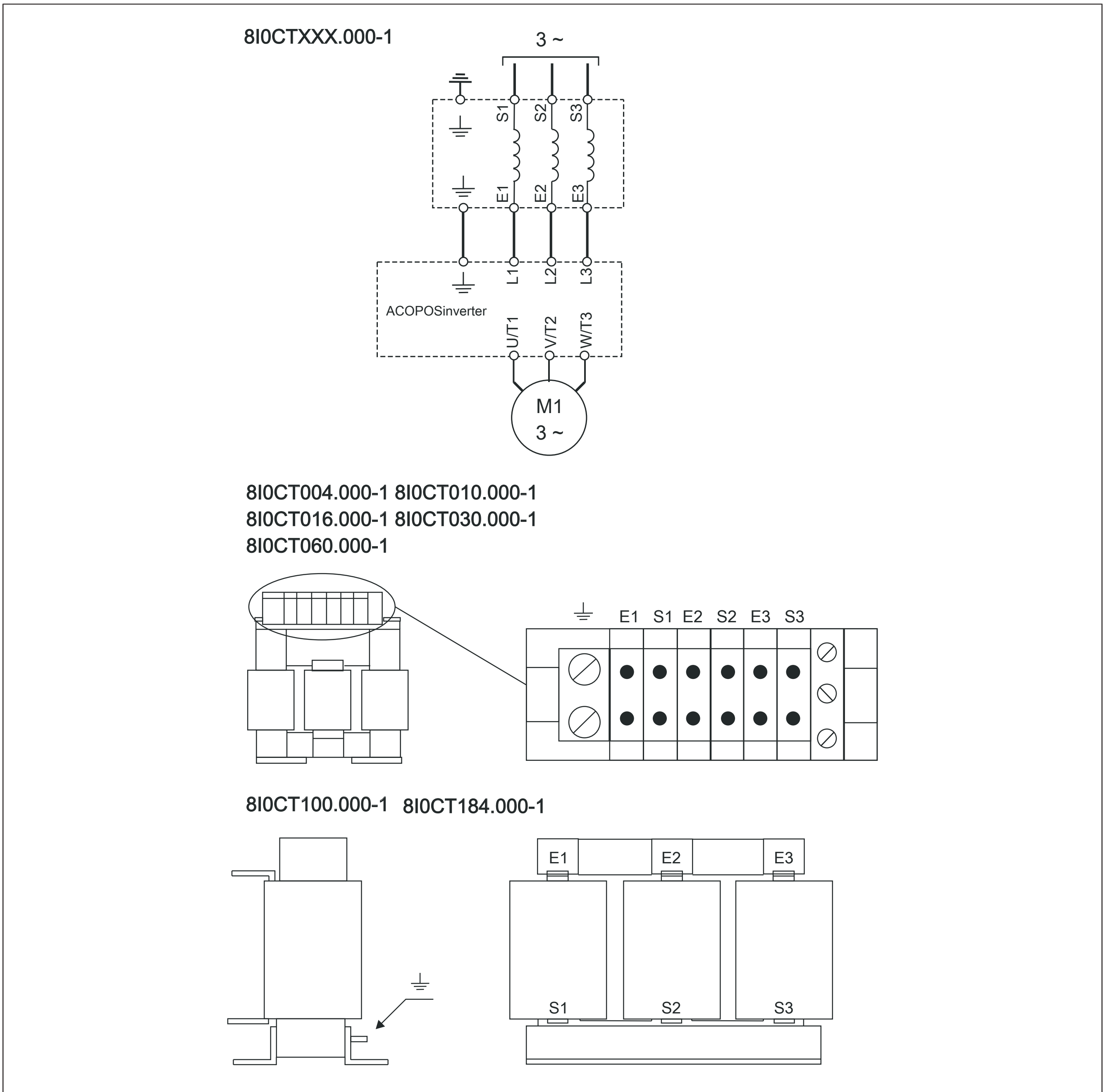
Properties



- Improved protection against overvoltages in the mains supply and reduced distortion factor of the current generated by the inverter.
- Limitation of the mains current.
- Using mains chokes is recommended when the following conditions apply:
  - Multiple inverters connected in parallel with little space between them
  - Mains supply with disturbances from other devices (interference, overvoltage)
  - Line supply with voltage imbalance between phases > 1.8% of the rated voltage
  - Inverter supplied via a line with very low impedance (10x higher than the rated voltage of the inverter close to power transformers)
  - Large number of frequency inverters connected on one line
  - Reduction of overloads on capacitors for cosine ϕ correction if the system has equipment for power factor correction

4.3.3 Wiring

4.3.3.1 8I0CTXXX.000-1

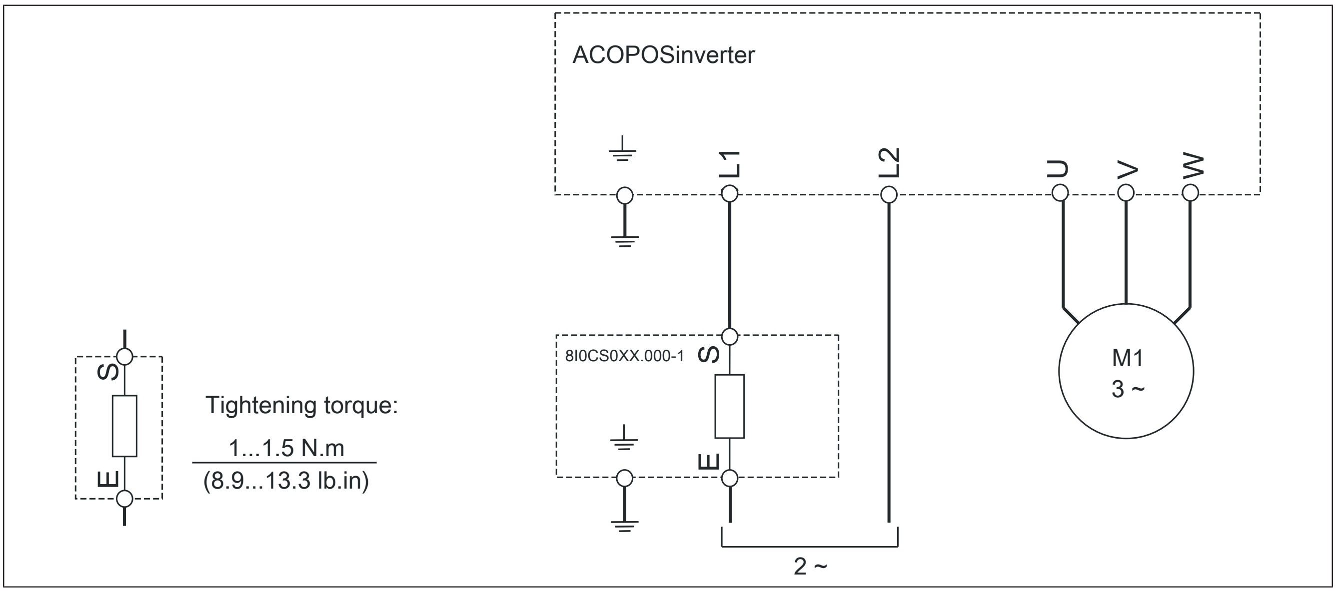


4.3.3.2 8I0CS0XX.000-1

Danger!

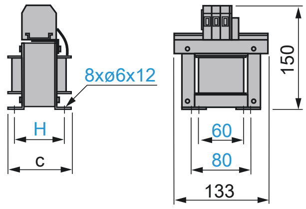
- **Read and understand this manual before installing and operating this option.**
- **The installation must be done by trained technicians.**
- **The user is responsible for complying with all relevant international and national electrical engineering requirements regarding the protective grounding of all equipment.**
- **Numerous components of the frequency inverter, including the circuit boards, are supplied via the mains voltage. DO NOT TOUCH! Use only electrically insulated tools.**
- **Do NOT touch shielded components or bolted connections on terminal blocks while connected to the power supply.**
- **Do NOT short across the braking resistors or across the DC bus**
- **Before servicing the inverter:**
  - **Disconnect all power supplies, including the power supply to the control section if applicable.**
  - **Place a "DO NOT TURN ON" label on all power disconnects.**
  - **Lock all power disconnects in the open position.**
  - **WAIT 15 MINUTES to allow the DC bus capacitors to discharge.**
  - **Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 V.**
  - **If the DC bus capacitors do not discharge completely, contact your local Bernecker and Rainer representative. The inverter is not permitted to be repaired or put into operation in this case.**
- **Mount and close all covers before reconnecting the power supply or starting and stopping the inverter.**

Failure to follow these instructions can result in death or serious injury.



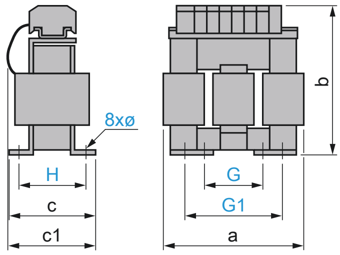
4.3.4 Dimensions

4.3.4.1 8I0CS025.000-1, 8I0CS045.000-1



	c	H
8I0CS025.000-1	95	65
8I0CS045.000-1	105	77

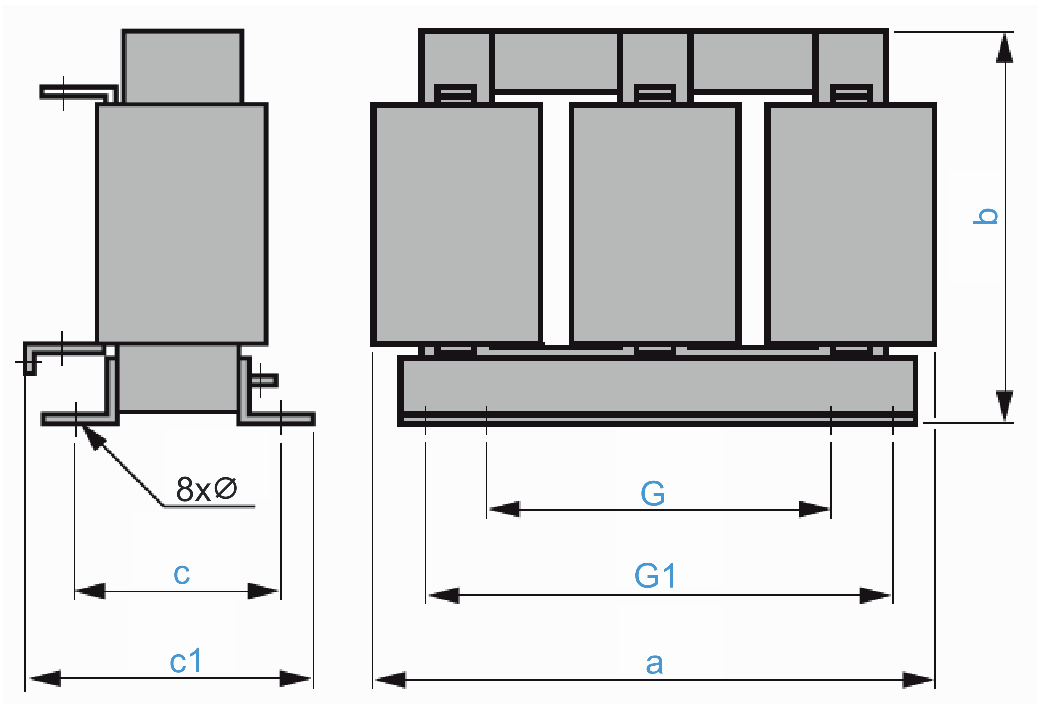
4.3.4.2 8I0CT004.000-1, 8I0CT010.000-1, 8I0CT016.000-1, 8I0CT030.000-1, 8I0CT060.000-1



	a	b	c	c1	G	G1	H	Diameter
8I0CT004.000-1	100	135	55	60	40	60	42	6x9
8I0CT010.000-1	130	155	85	90	60	80.5	62	6x12
8I0CT016.000-1	130	155	85	90	60	80.5	62	6x12
8I0CT030.000-1	155	170	115	135	75	107	90	6x12
8I0CT060.000-1	180	210	125	165	85	122	105	6x12

4.3.4.3 8I0CT100.000-1

Dimensions



	ø
8I0CT100.000-1	11 x 22

	a	b	b1	c	c1	G	G1	H	Diameter	Diameter 1	Diameter 2
8I0CT184.000-1	280	305	240	210	200	200	125	275	9	9	9

4.4 Braking resistors

4.4.1 Order data

Model number	Short description	Figure
	ACOPOSinverter P74/P84 - Braking resistors	
8I0BR003.000-1	Braking resistor 2.5 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 37 to 45 kW	
8I0BR004.000-1	Braking resistor 4 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 30 kW	
8I0BR005.000-1	Braking resistor 5 ohms, continuous braking power 1.3 kW, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 45 to 75 kW	
8I0BR008.000-1	Braking resistor 8 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 15 kW	
8I0BR010.000-1	Braking resistor 10 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 11 kW and 3x 380 to 480 V, 37 kW	
8I0BR015.000-1	Braking resistor 15 ohms, continuous braking power 1 kW, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 to 7.5 kW and 3x 380 to 480 V, 18.5 to 30 kW	
8I0BR028.000-1	Braking resistor 28 Ω continuous braking power 0.2 kW, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 to 4 kW and 3x 380 to 480 V, 11 to 15 kW	
8I0BR060.000-1	Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0BR100.000-1	Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW	

Table 25: 8I0BR003.000-1, 8I0BR004.000-1, 8I0BR005.000-1, 8I0BR008.000-1, 8I0BR010.000-1, 8I0BR015.000-1, 8I0BR028.000-1, 8I0BR060.000-1, 8I0BR100.000-1 - Order data

4.4.2 Technical data

Model number	8I0BR100.000-1	8I0BR060.000-1	8I0BR028.000-1	8I0BR015.000-1
General information				
Certifications				
CE	Yes			
KC	Yes			
Operating conditions				
Rated protection of housing	IP20			
Ambient temperature	0 to 50°C			
Environmental conditions				
Temperature				
Storage	-25 to 70°C			
Mechanical characteristics				
Weight	2 kg	2.4 kg	3.5 kg	11 kg
Properties				
Resistance value at 20°C	100 Ω	60 Ω	28 Ω	15 Ω
Average available power at 50°C	0.05 kW [1)]	0.1 kW [1)]	0.2 kW [1)]	1 kW [1)]
Thermal protection	Using temperature-controlled switch or the inverter			
Temperature controlled switch				
Activation temperature	120°C			
Max. voltage / Max. current	250 VAC / 1 A			
Min. voltage / Min. current	24 VDC / 0.1 A			
Max. contact resistance	60 mΩ			
Connection recommendation	The switch should be connected within the sequence (for use in signaling or line contactor control).			

Table 26: 8I0BR100.000-1, 8I0BR060.000-1, 8I0BR028.000-1, 8I0BR015.000-1 - Technical data

1) Load factors for resistors: The value for the average power that can be transferred from the resistor to the housing at 50°C is aligned to a brake load factor that corresponds to most standard applications.
For 8I0BR100.000-1 to 8I0BR003.000-1:
- Braking for 2 s with a braking torque of 0.6 Tn for a 40 second cycle
- Braking for 0.8 s with a braking torque of 1.5 Tn for a 40 second cycle
For 8I0BR003.001-1 to 8I0BR001.004-1:
- Braking for 10 s with a braking torque of 2 Tn for a 30 second cycle

Model number	8I0BR010.000-1	8I0BR008.000-1	8I0BR005.000-1	8I0BR004.000-1	8I0BR003.000-1
General information					
Certifications					
CE	Yes				
KC	Yes				
Operating conditions					
Rated protection of housing	IP20				
Ambient temperature	0 to 50°C				
Environmental conditions					
Temperature					
Storage	-25 to 70°C				
Mechanical characteristics					
Weight	11 kg				
Properties					
Resistance value at 20°C	10 Ω	8 Ω	5 Ω	4 Ω	2.5 Ω
Average available power at 50°C	1 kW 1)		1.3 kW 1)	1 kW 1)	
Thermal protection	Using temperature-controlled switch or the inverter				
Temperature controlled switch					
Activation temperature	120°C				
Max. voltage / Max. current	250 VAC / 1 A				
Min. voltage / Min. current	24 VDC / 0.1 A				
Max. contact resistance	60 mΩ				
Connection recommendation	The switch should be connected within the sequence (for use in signaling or line contactor control).				

Table 27: 8I0BR010.000-1, 8I0BR008.000-1, 8I0BR005.000-1, 8I0BR004.000-1, 8I0BR003.000-1 - Technical data

1) Load factors for resistors: The value for the average power that can be transferred from the resistor to the housing at 50°C is aligned to a brake load factor that corresponds to most standard applications.
For 8I0BR100.000-1 to 8I0BR003.000-1:
- Braking for 2 s with a braking torque of 0.6 Tn for a 40 second cycle
- Braking for 0.8 s with a braking torque of 1.5 Tn for a 40 second cycle
For 8I0BR003.001-1 to 8I0BR001.004-1:
- Braking for 10 s with a braking torque of 2 Tn for a 30 second cycle

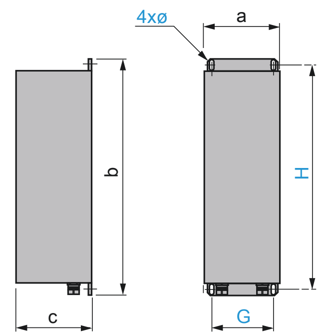
Properties

- The braking resistor allows the ACOPOSinverter device to run by branching off the brake energy when braking to a stop or slowing down.
- It permits a maximum short-term braking torque.
- The resistors are intended for installation on the outside of the housing are not permitted to interfere with natural cooling. Incoming and outgoing air is not permitted to be blocked.
- The air must be free of dust, condensation and corrosive gases.

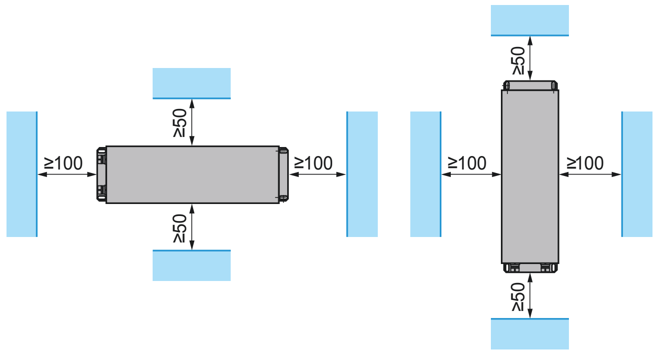
4.4.3 Dimensions and Installation recommendations

8I0BR100.000-1, 8I0BR060.000-1, 8I0BR028.000-1

Dimensions



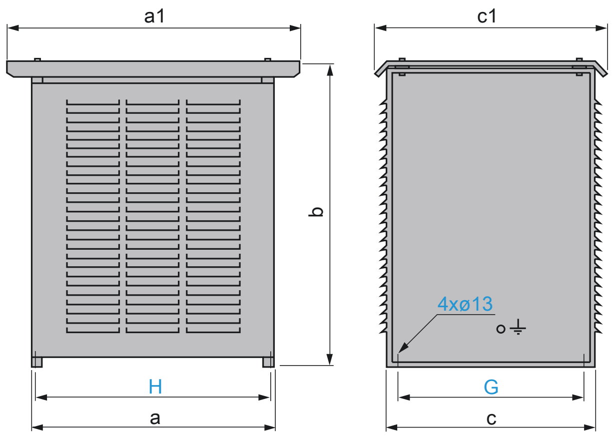
Installation recommendations



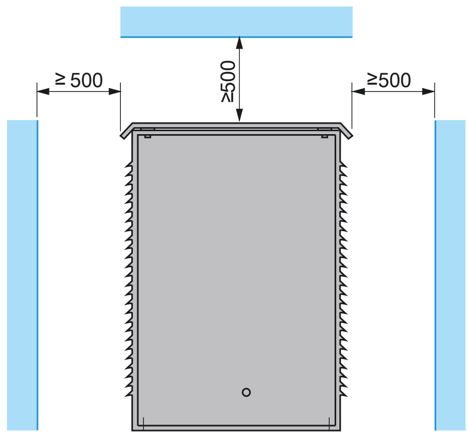
	a	b	c	G	H	Diameter
8I0BR100.000-1	95	293	95	70	275	6x12
8I0BR060.000-1	95	293	95	70	375	6x12
8I0BR028.000-1	140	393	120	120	375	6x12

8I0BR00x.00x-1

Dimensions



Installation recommendations

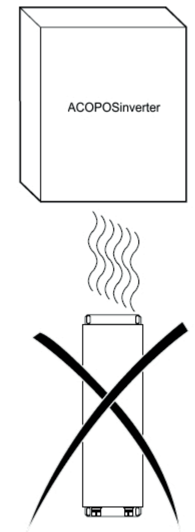


	a	a1	b	c	c1	G	H
8I0BR003.001-1	860	890	690	480	540	400	832
8I0BR002.000-1	960	1140	1150	380	460	300	932
8I0BR002.001-1	860	1040	1150	540	620	460	832
8I0BR001.001-1	960	1140	1150	540	620	460	932
8I0BR001.002-1 1)	960	1140	1150	740	820	660	932
8I0BR001.003-1 1) 2)	960	1140	1150	540	620	460	932
8I0BR001.004-1 1) 2)	960	1140	1150	740	820	660	932

1) For installation in series or parallel. At least 300 mm free space must remain open between the resistors.

2) The dimensions are valid for one component. Model numbers 8I0BR001.003-1 and 8I0BR001.004-1 consist of two components; all components must be taken into consideration when determining the total dimensions. At least 300 mm free space must remain open between the components.

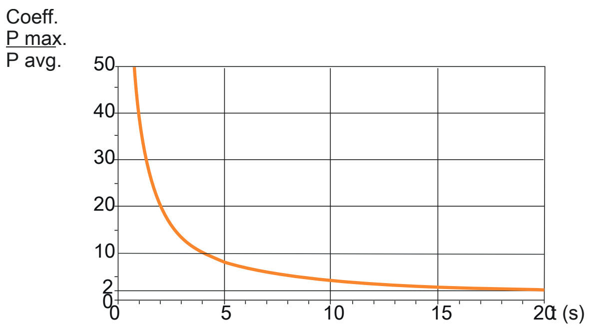
Additional installation recommendations



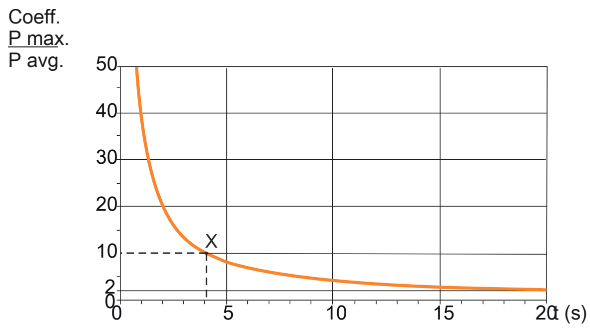
4.4.4 Characteristic curve for braking resistors

Example of use of characteristic curves

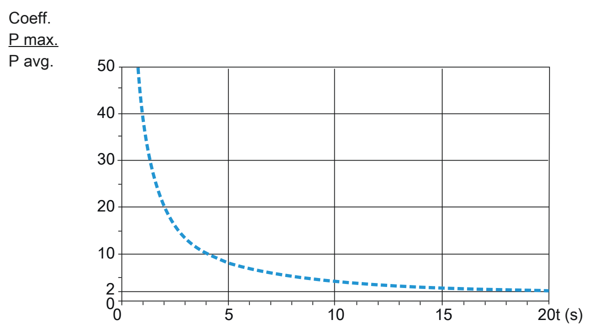
8I0BR100.000-1 (P continuous = 0.05 kW)



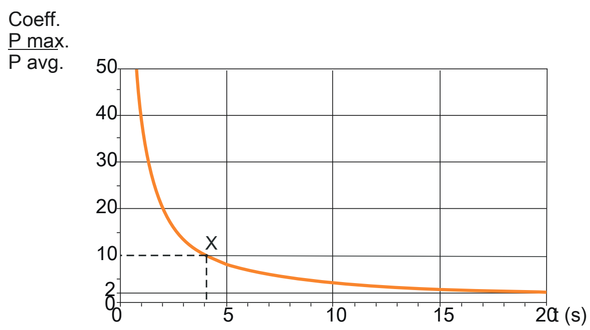
8I0BR060.000-1 (P continuous = 0.1 kW)



8I0BR028.000-1 (P continuous = 0.2 kW)



8I0BR015.000-1 (P continuous = 1 kW)
8I0BR010.000-1 (P continuous = 1 kW)



— P max. / P avg. (120 s cycle)

4.5 Additional EMC filters

4.5.1 Order data

Model number	Short description	Figure
	ACOPOSinverter P84 - Additional EMC input filters	
8I0FT012.300-1	EMC filter 3-phase 12 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
8I0FT026.300-1	EMC filter 3-phase 26 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
8I0FT035.300-1	EMC filter 3-phase 35 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0FT046.300-1	EMC filter 3-phase 46 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
8I0FT072.300-1	EMC filter 3-phase 72 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0FT090.300-1	EMC filter 3-phase 90 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	
8I0FT092.300-1	EMC filter 3-phase 92 A, bottom or side installation for ACOPOSinverter P84/P76 3x 380 to 480 V, 37 kW	
8I0FT180.300-1	EMC filter 3-phase 180 A, bottom or side installation, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW and 3x 380 to 480 V, 45 to 75 kW	

Table 28: 8I0FT012.300-1, 8I0FT026.300-1, 8I0FT035.300-1, 8I0FT046.300-1, 8I0FT072.300-1, 8I0FT090.300-1, 8I0FT092.300-1, 8I0FT180.300-1 - Order data

4.5.2 Technical data

Model number	8I0FT012.300-1	8I0FT026.300-1	8I0FT035.300-1
General information			
Certifications			
CE	Yes		
KC	Yes		
Mains connection			
Max. nominal voltage	3x 480 VAC +10%		
Nominal filter current	12 A	26 A	35 A
Max. fault current			
At 200 to 240 VAC	4 mA	4.4 mA	3 mA
At 380 to 480 VAC	7 mA	8 mA	7 mA
Power dissipation			
At 200 to 240 VAC	10 W	18 W	24 W
At 380 to 480 VAC	5 W	6 W	14 W
Operating conditions			
Installation at elevations above sea level	0 to 1000 m		
Degree of protection per EN 60529	IP21 and IP41 on upper part		
Max. relative humidity per IEC 60068-2-3	93%, non-condensing No dripping water		
Ambient temperature	-10 to 50°C		
Maximum installation elevation	3000 m [1)]		
Environmental conditions			
Temperature			
Storage	-40 to 65°C		
Mechanical characteristics			
Weight	2.2 kg	4.0 kg	5.8 kg
Installation	Below or next to the inverter		
General information			
Conformity to standard	EN 133200		

Table 29: 8I0FT012.300-1, 8I0FT026.300-1, 8I0FT035.300-1 - Technical data

1) From 1000 to 3000 m, current reduced by 1% per 100 m, limited to 2000 m for a grounded phase distribution network.

Model number	8I0FT046.300-1	8I0FT072.300-1	8I0FT090.300-1
General information			
Certifications			
CE	Yes		
KC	Yes		
Mains connection			
Max. nominal voltage	3x 480 VAC +10%		
Nominal filter current	46 A	72 A	90 A
Max. fault current			
At 200 to 240 VAC	10 mA	33 mA	
At 380 to 480 VAC	14 mA	60 mA	
Power dissipation			
At 200 to 240 VAC	19 W	34 W	
At 380 to 480 VAC	13 W	14 W	11 W
Operating conditions			
Installation at elevations above sea level	0 to 1000 m		
Degree of protection per EN 60529	IP21 and IP41 on upper part		
Max. relative humidity per IEC 60068-2-3	93%, non-condensing No dripping water		
Ambient temperature	-10 to 50°C		
Maximum installation elevation	3000 m [1)]		
Environmental conditions			
Temperature			
Storage	-40 to 65°C		
Mechanical characteristics			
Weight	7.0 kg	12.0 kg	15.0 kg
Installation	Below or next to the inverter		
General information			
Conformity to standard	EN 133200		

Table 30: 8I0FT046.300-1, 8I0FT072.300-1, 8I0FT090.300-1 - Technical data

1) From 1000 to 3000 m, current reduced by 1% per 100 m, limited to 2000 m for a grounded phase distribution network.

Model number	8I0FT092.300-1	8I0FT180.300-1
General information		
Certification		
CE	Yes	
KC	Yes	
Mains connection		
Max. nominal voltage	3x 480 VAC +10%	
Nominal filter current	92 A	180 A
Max. fault current		
At 200 to 240 VAC	-	80 mA
At 380 to 480 VAC	60 mA	140 mA
Power loss		
At 200 to 240 VAC	-	58 W
At 380 to 480 VAC	30 W	58 W
Operating conditions		
Installation at elevations above sea level	0 to 1000 m	
EN 60529 protection	IP21 and IP41 on upper part	
Max. relative humidity in accordance with IEC 60068-2-3	93%, non-condensing No dripping water	
Ambient temperature	-10 to 50°C	
Maximum installation elevation	3000 m [1]	
Environmental conditions		
Temperature		
Storage	-40 to 65°C	
Mechanical characteristics		
Weight	17.0 kg	40.0 kg
Installation	Below or next to the inverter	
General information		
Conformity to standard	EN 133200	

Table 31: 8I0FT092.300-1, 8I0FT180.300-1 - Technical data

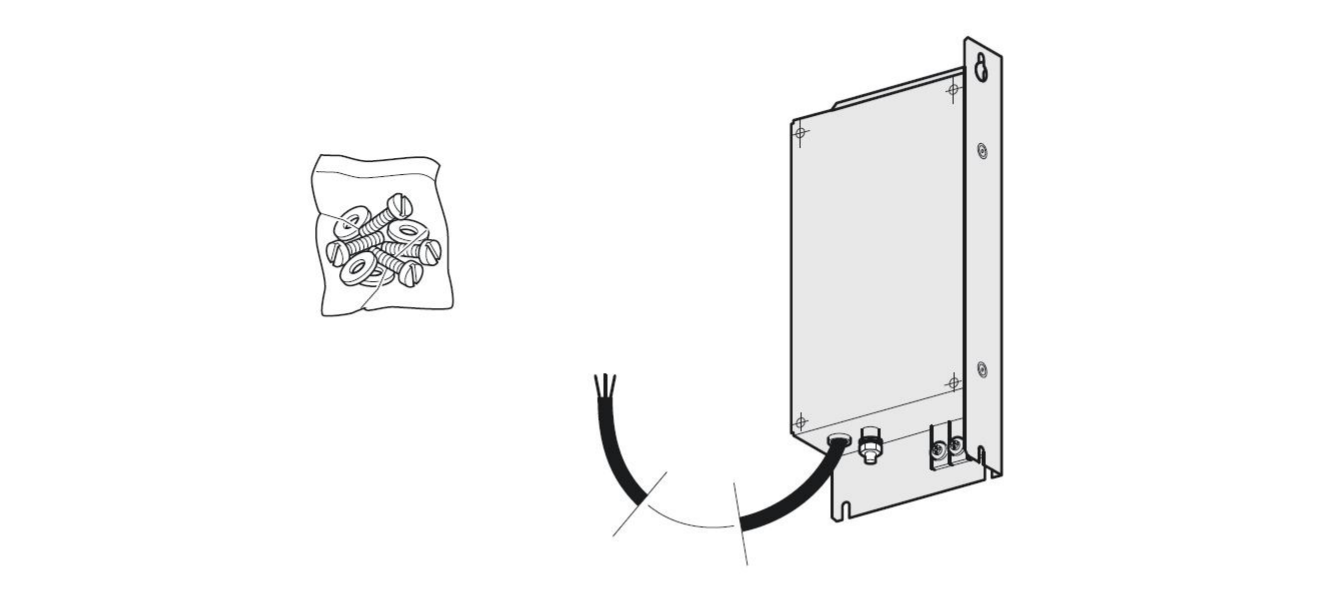
1) From 1000 to 3000 m, current reduced by 1% per 100 m, limited to 2000 m for a grounded phase distribution network.

Properties

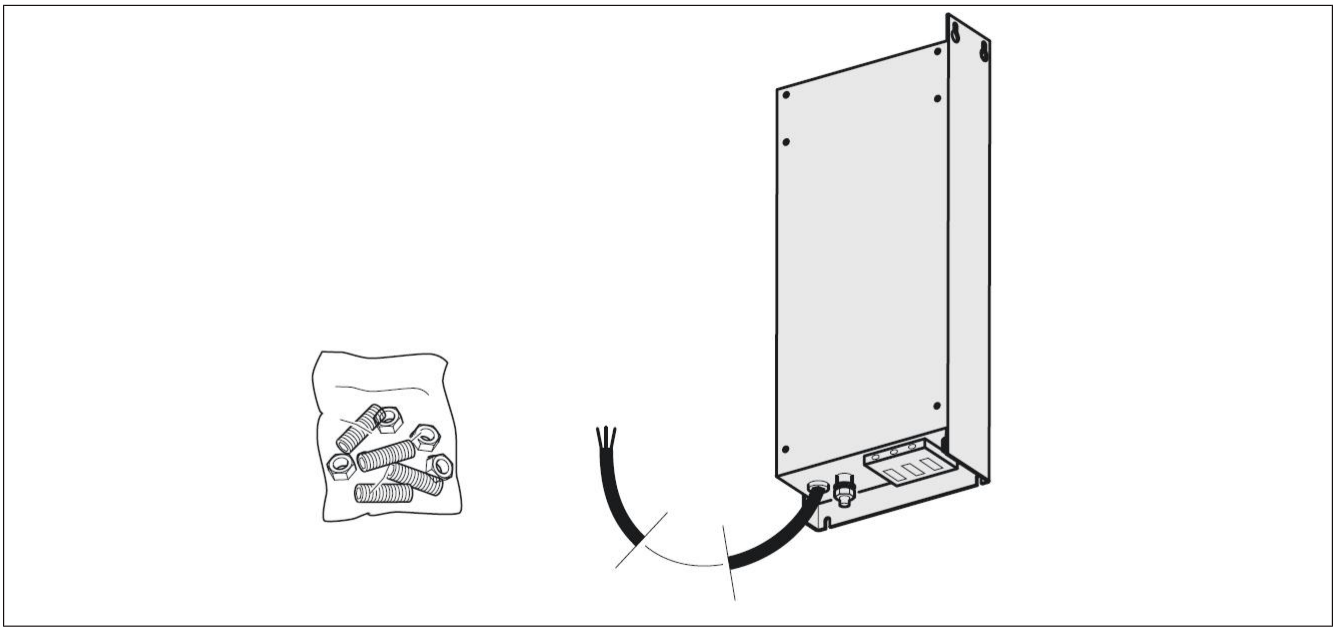
- Additional EMC filters are intended to reduce conducted interference emissions from the mains supply to a level under the limits specified in IEC/EN 61800-3, category C1, C2 or C3 in environment 1 (public power system) or 2 (industrial power system) depending on the inverter power.
- The data for determining the permissible length of the shielded motor cable is listed in the technical data for ACOPOSinverter P84 devices under "Line-conducted and radiated emissions".
- Additional EMC filters can only be used for TN (neutral) and TT (neutral-ground) connection types.

4.5.3 Installation

8I0FT012.300-1, 8I0FT026.300-1, 8I0FT035.300-1, 8I0FT046.300-1, 8I0FT072.300-1, 8I0FT090.300-1, 8I0FT092.300-1



8I0FT180.300-1

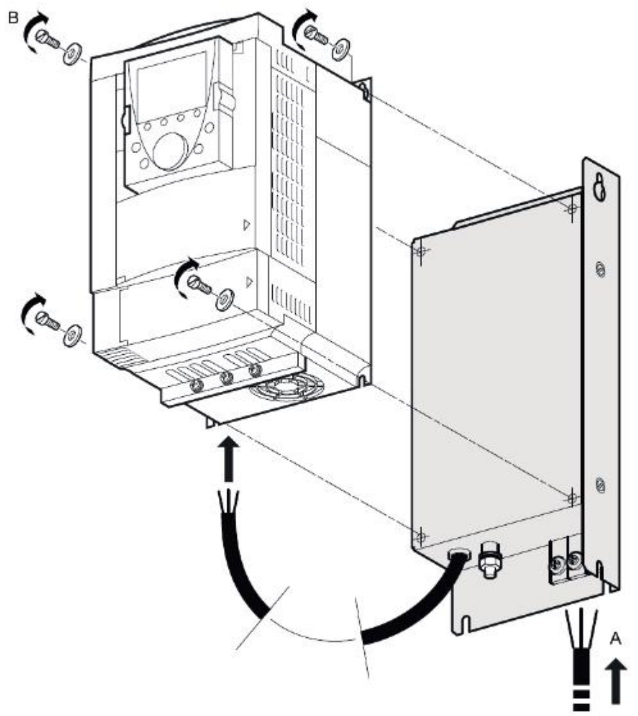


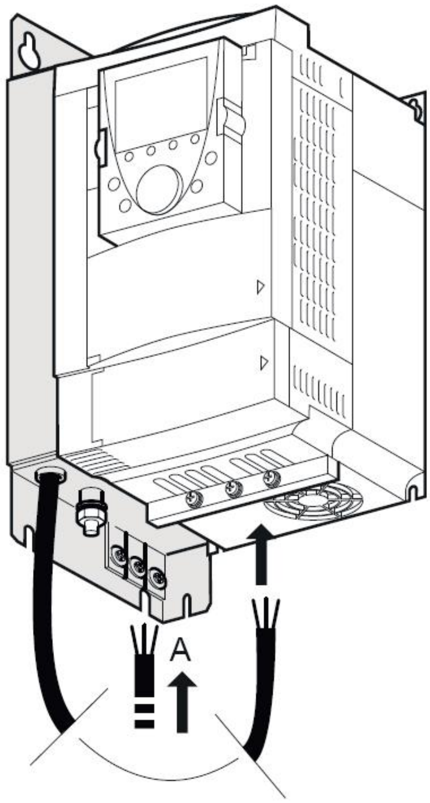
Danger!

- **Read and understand this manual before installing and operating this option.**
- **The installation must be done by trained technicians.**
- **The user is responsible for complying with all relevant international and national electrical engineering requirements regarding the protective grounding of all equipment.**
- **Numerous components of the frequency inverter, including the circuit boards, are supplied via the mains voltage. DO NOT TOUCH! Use only electrically insulated tools.**
- **Do NOT touch shielded components or bolted connections on terminal blocks while connected to the power supply.**
- **Do NOT short across the braking resistors or across the DC bus**
- **Before servicing the inverter:**
  - **Disconnect all power supplies, including the power supply to the control section if applicable.**
  - **Place a "DO NOT TURN ON" label on all power disconnects.**
  - **Lock all power disconnects in the open position.**
  - **WAIT 15 MINUTES to allow the DC bus capacitors to discharge.**
  - **Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 V.**
  - **If the DC bus capacitors do not discharge completely, contact your local Bernecker and Rainer representative. The inverter is not permitted to be repaired or put into operation in this case.**
- **Mount and close all covers before reconnecting the power supply or starting and stopping the inverter.**

Failure to follow these instructions can result in death or serious injury.

8I0FT012.300-1, 8I0FT026.300-1, 8I0FT035.300-1, 8I0FT046.300-1, 8I0FT072.300-1, 8I0FT090.300-1, 8I0FT092.300-1

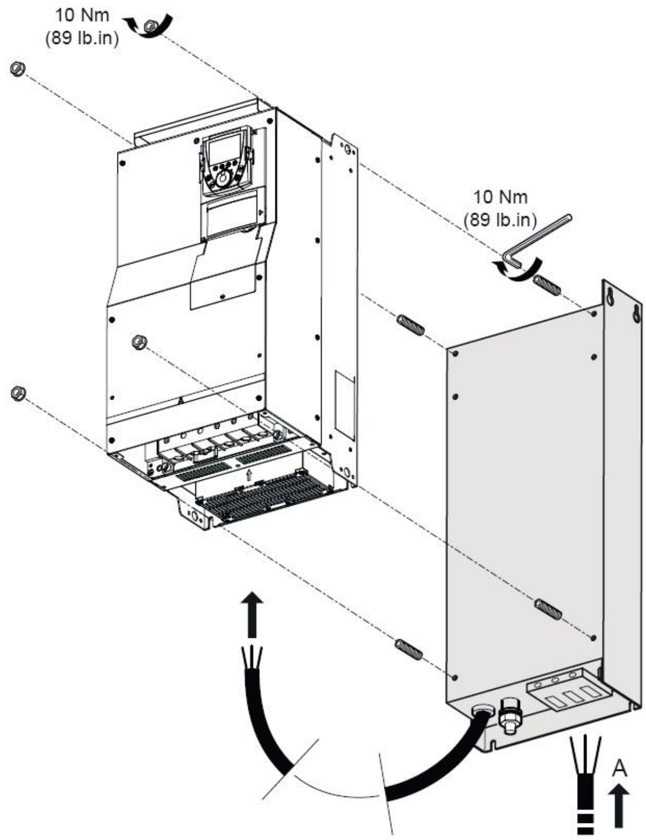


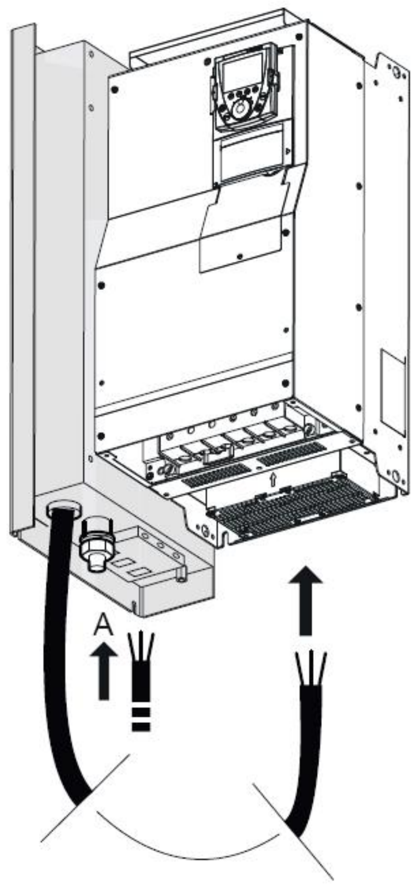


	A	
	Nm	**lb.in**
8I0FT012.300-1	0.6	5.3
8I0FT026.300-1	1.5	13.3
8I0FT035.300-1	1.5	13.3
8I0FT046.300-1	2	17.7
8I0FT072.300-1	6	53
8I0FT090.300-1	6	53
8I0FT092.300-1	4	53

	B	
	Nm	**lb.in**
8I0FT012.300-1	1.5	13
8I0FT026.300-1	1.5	13
8I0FT035.300-1	3	27
8I0FT046.300-1	3	27
8I0FT072.300-1	3	27
8I0FT090.300-1	4	36
8I0FT092.300-1	4	36

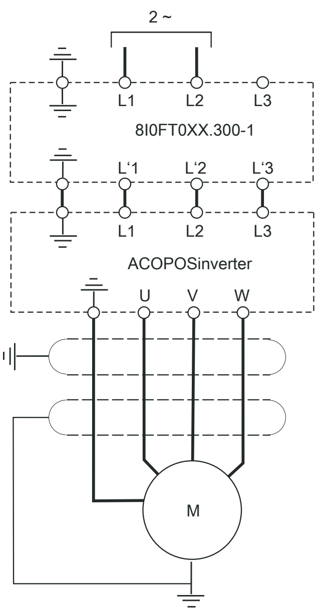
8I0FT180.300-1





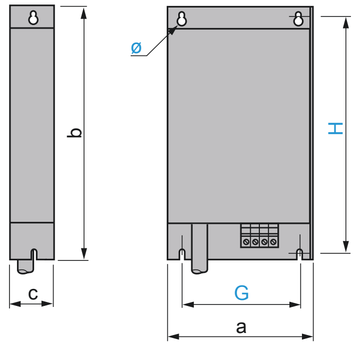
	A	
	Nm	lb.in
8I0FT180.300-1	25	221.3

4.5.4 Wiring



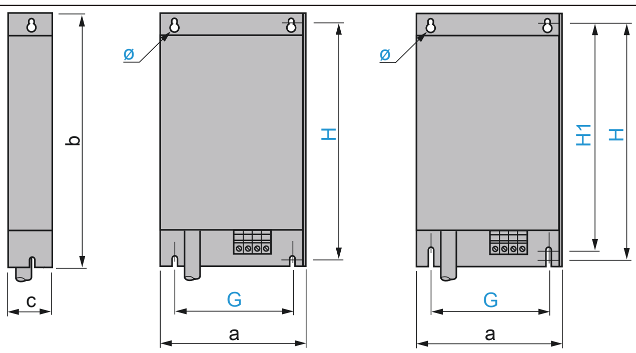
4.5.5 Dimensions

8I0FT012.300-1, 8I0FT026.300-1, 8I0FT035.300-1

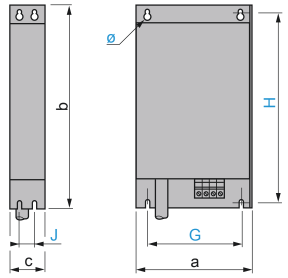


	a	b	c	G	H	Diameter
8I0FT012.300-1	130	290	40	105	275	4.5
8I0FT026.300-1	155	324	50	130	309	4.5
8I0FT035.300-1	175	370	60	150	355	6.5

8I0FT046.300-1, 8I0FT072.300-1, 8I0FT090.300-1

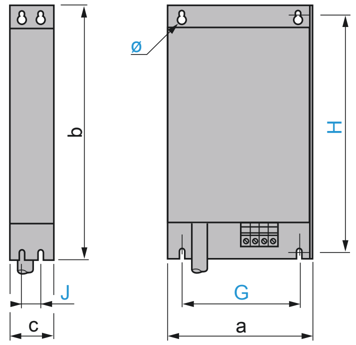


	a	b	c	G	H	H1	Diameter
8I0FT046.300-1	210	380	60	190	365	-	6.5
8I0FT072.300-1	230	498.5	62	190	479.5	460	6.5



	a	b	c	G	H	J	Diameter
8I0FT090.300-1	240	522	79	200	502.5	40	9

8I0FT092.300-1, 8I0FT180.300-1



	a	b	c	G	H	J	Diameter
8I0FT092.300-1	240	650	79	200	631	40	9
8I0FT180.300-1	320	750	119	280	725	80	9

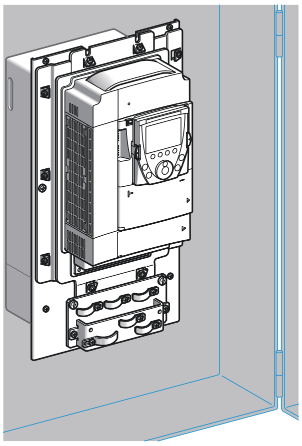
4.6 Through-hole mounting kits

4.6.1 Order data

Model number	Short description	Figure
	ACOPOSinverter P84 - Feed-through mounting kits	
8I0MF001.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
8I0MF002.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
8I0MF003.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0MF004.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
8I0MF005.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0MF006.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	
8I0MF007.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW	
8I0MF008.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW	
8I0MF009.300-1	Feed-through mounting kit, for ACOPOSinverter P84 3x 380 to 480 V, 45 to 75 kW	

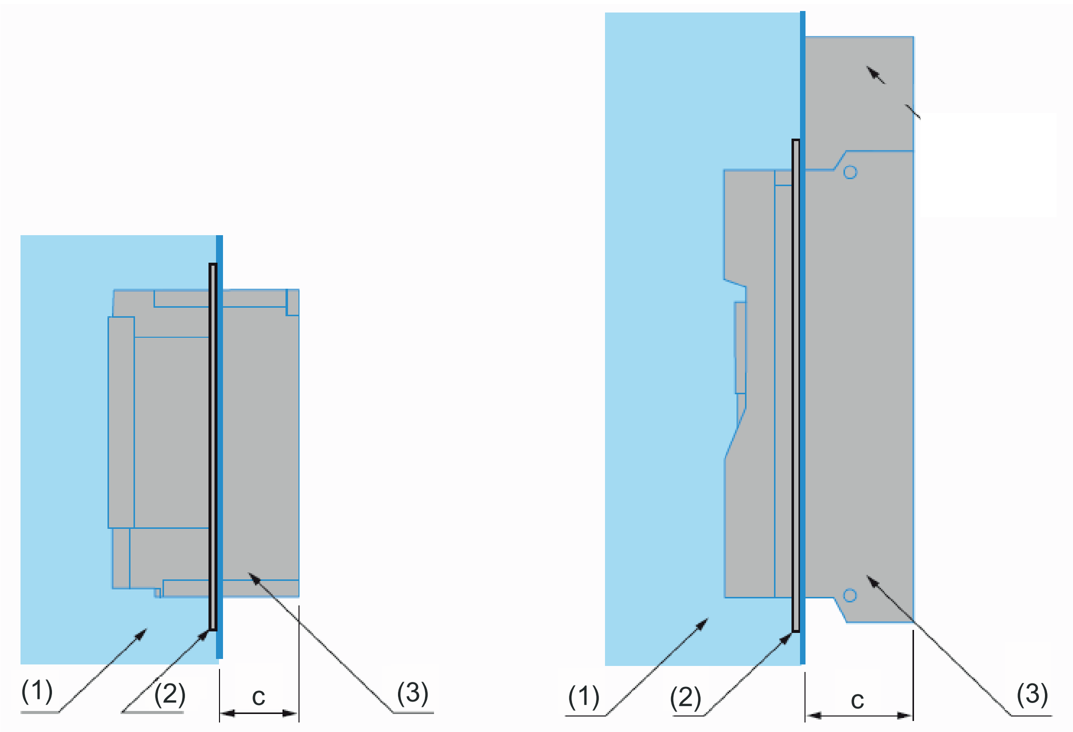
Table 32: 8I0MF001.300-1, 8I0MF002.300-1, 8I0MF003.300-1, 8I0MF004.300-1, 8I0M-F005.300-1, 8I0MF006.300-1, 8I0MF007.300-1, 8I0MF008.300-1, 8I0MF009.300-1 - Order data

Properties



- Kits for feed-through mounting of an ACOPOSinverter P84 in a housing protected against dust and moisture
- These kits can be used to mount the inverter power unit outside the housing (IP54 protection), which reduces the amount of energy dissipated inside the control cabinet.
- With this type of installation, the maximum temperature inside the housing can reach 60°C without the need to reduce the output current. From 50 to 60°C, a control card fan kit must be used for the following ACOPOSinverter P84 devices:
  3x 200 to 240 V, 18.5 to 45 kW and 3x 380 to 480 V, 22 to 75 kW.

Side view:

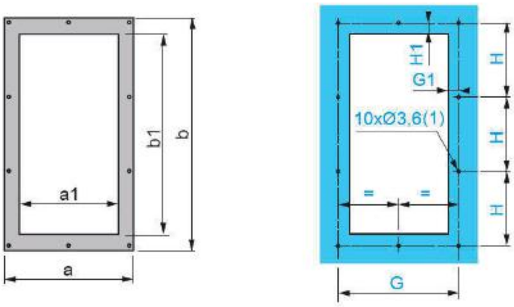


(1) Housing protected against dust and moisture
(2) Kit for feed-through mounting in a housing protected against dust and moisture
(3) Inverter power unit outside the housing

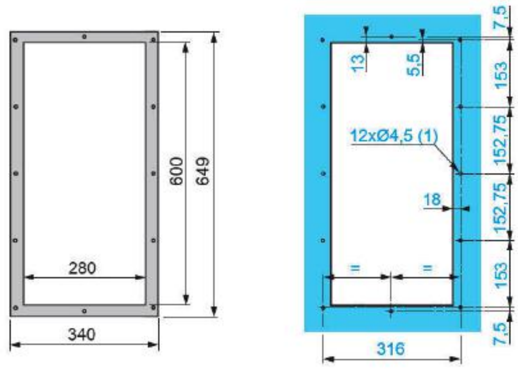
4.6.2 Dimensions

8I0MF001.300-1, 8I0MF002.300-1, 8I0MF003.300-1, 8I0MF004.300-1, 8I0MF005.300-1

Cutouts and drill holes



8I0MF006.300-1
Cutouts and drill holes



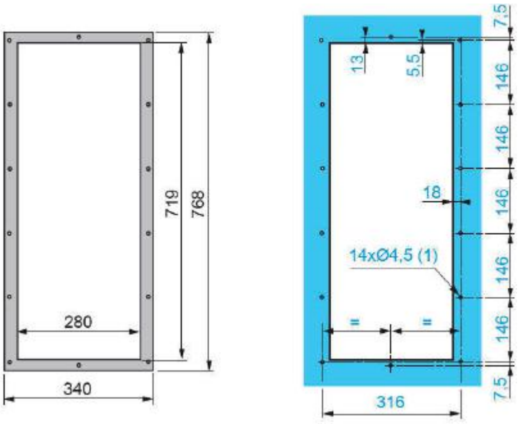
(1) Drill hole ø 3.6 for self-tapping M4 screws.

(1) Drill hole ø 4.5 for self-tapping M4 screws.

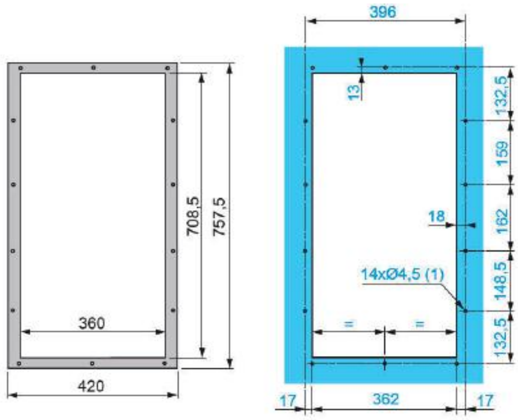
	a	a1	b	b1	G	G1	H	H1
8I0MF001.300-1	222	170	397	351	205	17.5	127	15
8I0MF002.300-1	250	198	429.5	384.5	233	17.5	137.5	14
8I0MF003.300-1	267	215	465	419	250	17.5	149.5	14.5
8I0MF004.300-1	302	250	481.5	438	285	17.5	155	13
8I0MF005.300-1	324	270	584.5	537.5	305	17.5	189.5	15.5

8I0MF007.300-1, 8I0MF008.300-1, 8I0MF009.300-1

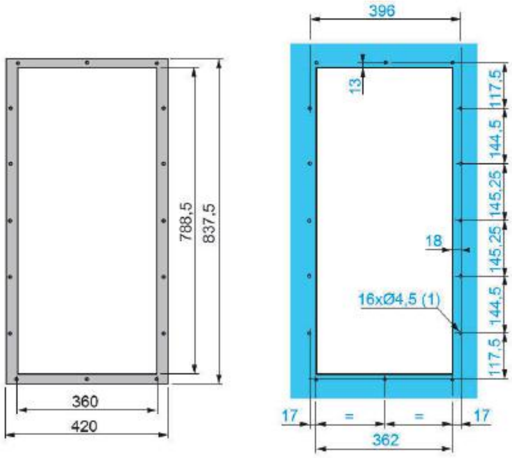
8I0MF007.300-1
Cutouts and drill holes



8I0MF008.300-1
Cutouts and drill holes



8I0MF009.300-1
Cutouts and drill holes



(1) Drill hole ø 4.5 for self-tapping M5 screws.

4.7 Fans

Danger!

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- **Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair and maintenance must be performed by qualified personnel.**
- **The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.**
- **Many components of the product, including the printed circuit boards, operate with mains voltage. Do not touch. Use only electrically insulated tools.**
- **Do not touch unshielded components or terminals with voltage present.**
- **Motors can generate voltage when the shaft is rotated. Before performing any type of work on the drive system, block the motor shaft to prevent rotation.**
- **AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.**
- **Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.**
- **Before performing work on the drive system:**
  - **Disconnect all power, including external control power that may be present.**
  - **Place a "Do Not Turn On" label on all power switches.**
  - **Lock all power switches in the open position.**
  - **Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800 VDC.**
  - **Measure the voltage on the DC bus between the DC bus terminals using a properly rated voltmeter to verify that the voltage is <42 VDC.**
  - **If the DC bus capacitors do not discharge properly, contact your local B&R representative.**
- **Install and close all covers before applying voltage.**

Failure to follow these instructions will result in death or serious injury.

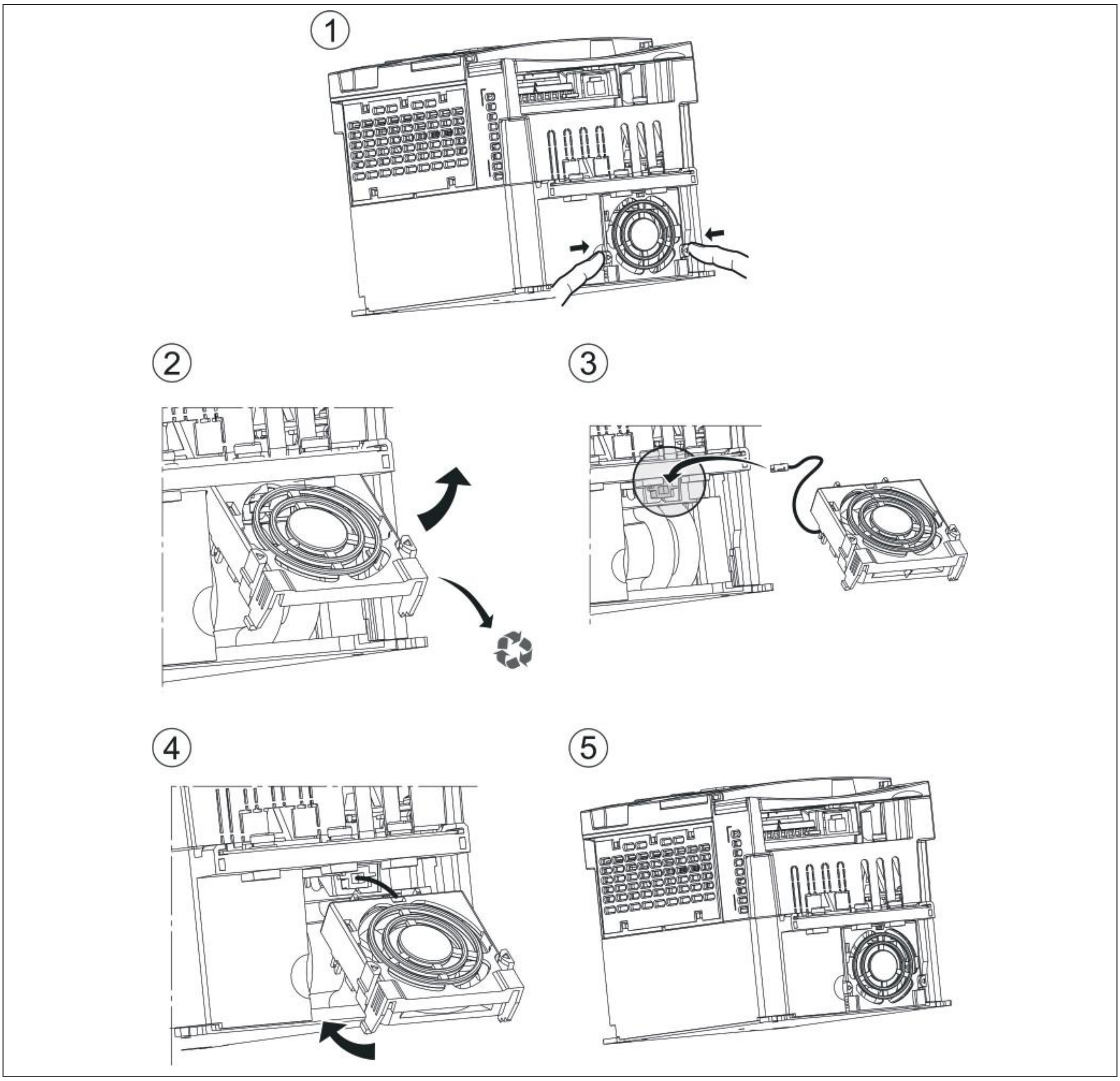
4.7.1 Fans

Model number	Short description	Figure
	ACOPOSinverter P84 - Fan	
8I0XF084.020-1	Fan for ACOPOSinverter 3x 200 to 240 V, 0.37 to 1.5 kW and 3x 380 to 480 V, 0.75 to 2.2 kW	
8I0XF084.030-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 2.2 to 4 kW and 3x 380 to 480 V, 3 to 4 kW	
8I0XF084.040-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 5.5 kW and 3x 380 to 480 V, 5.5 to 7.5 kW	
8I0XF084.050-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW and 3x 380 to 480 V, 11 kW	
8I0XF084.055-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0XF084.060-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW	
8I0XF084.070-1	Fan for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW	
8I0XF084.075-1	Fan for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW	
8I0XF084.080-1	Fan for ACOPOSinverter P84 3x 380 to 480 V, 45 to 75 kW	

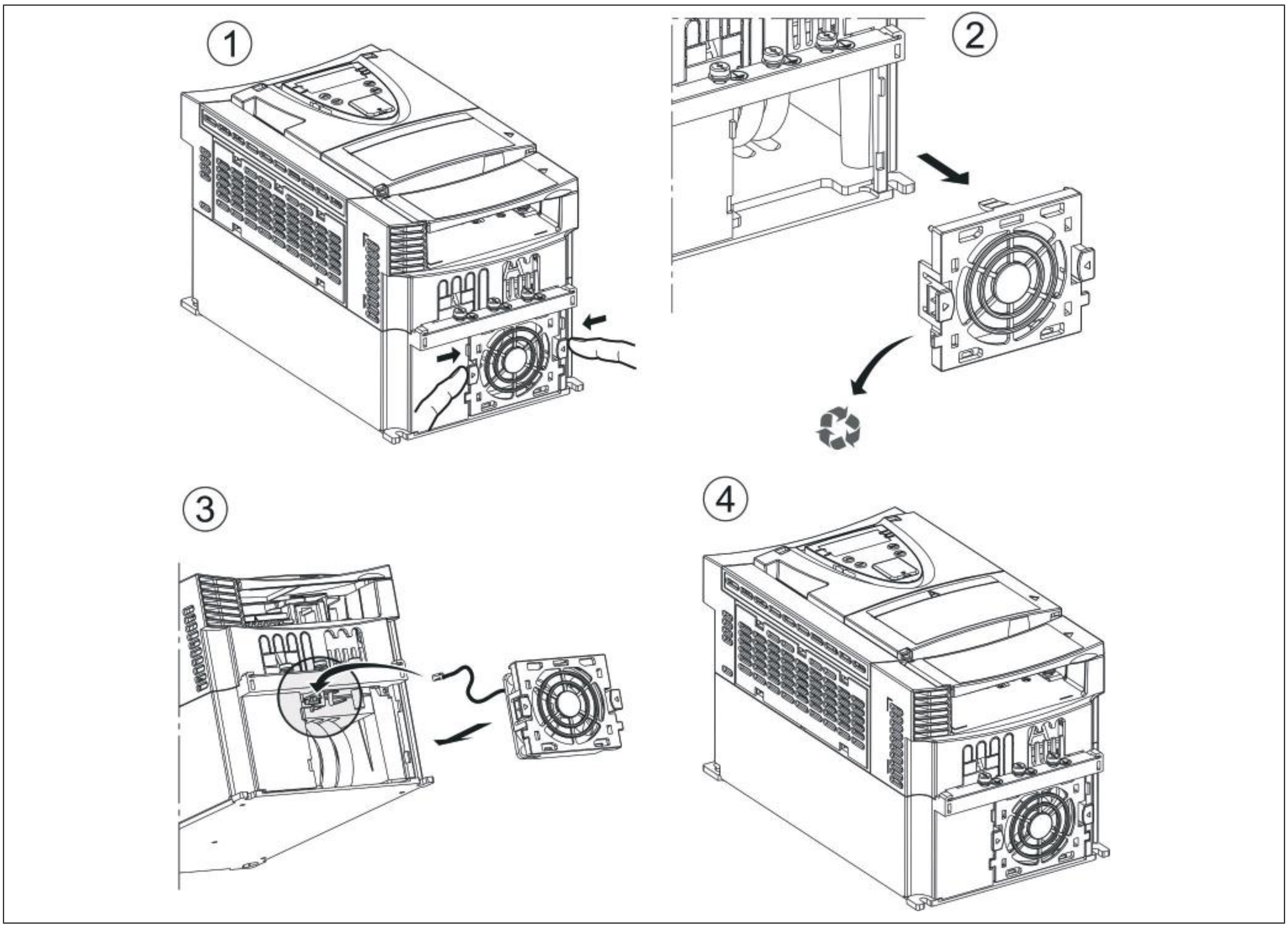
Table 33: 8I0XF084.020-1, 8I0XF084.030-1, 8I0XF084.040-1, 8I0XF084.050-1, 8I0XF084.055-1, 8I0XF084.060-1, 8I0XF084.070-1, 8I0XF084.075-1, 8I0XF084.080-1 - Order data

4.7.2 Installation

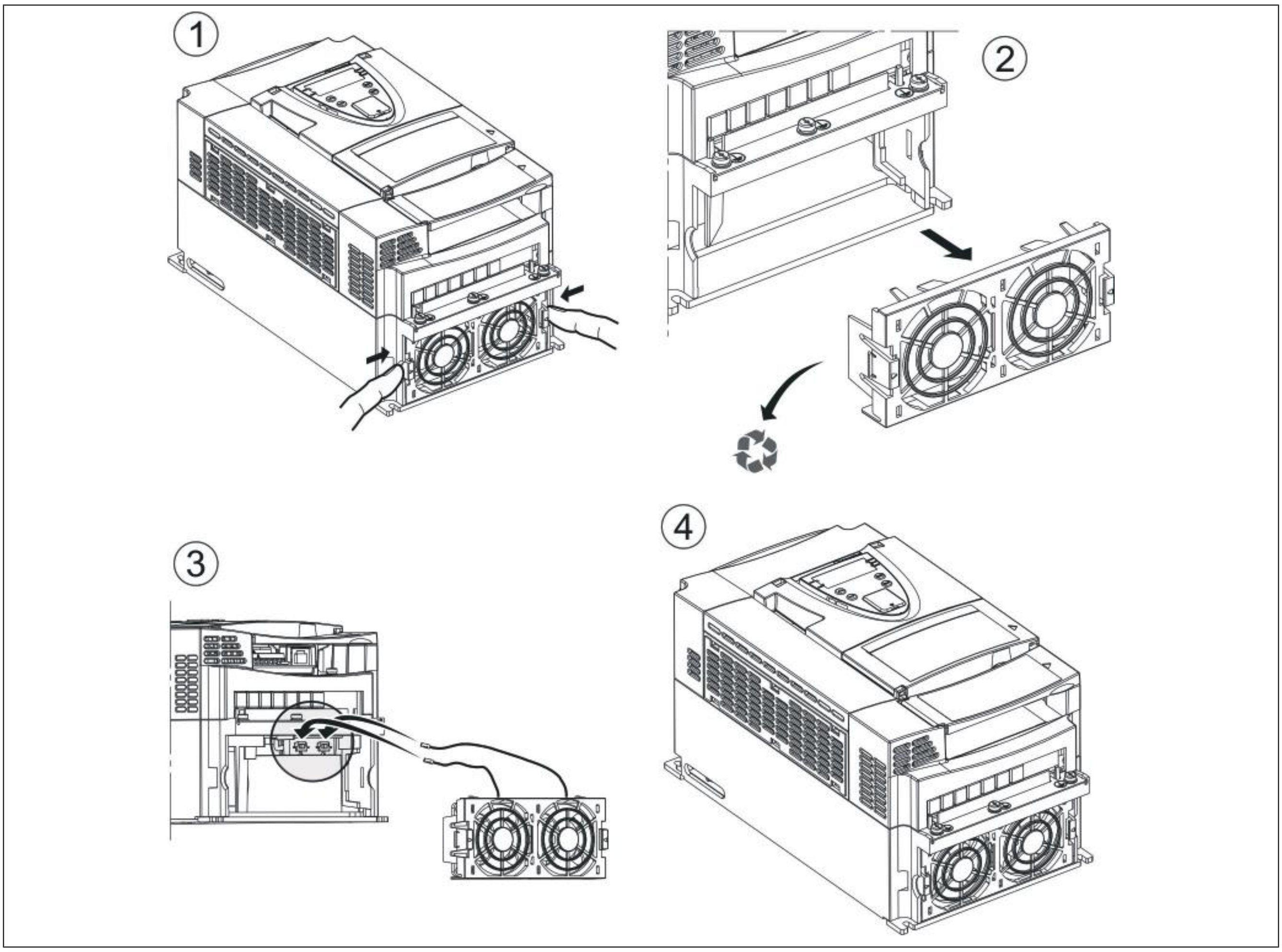
8I0XF084.020-1



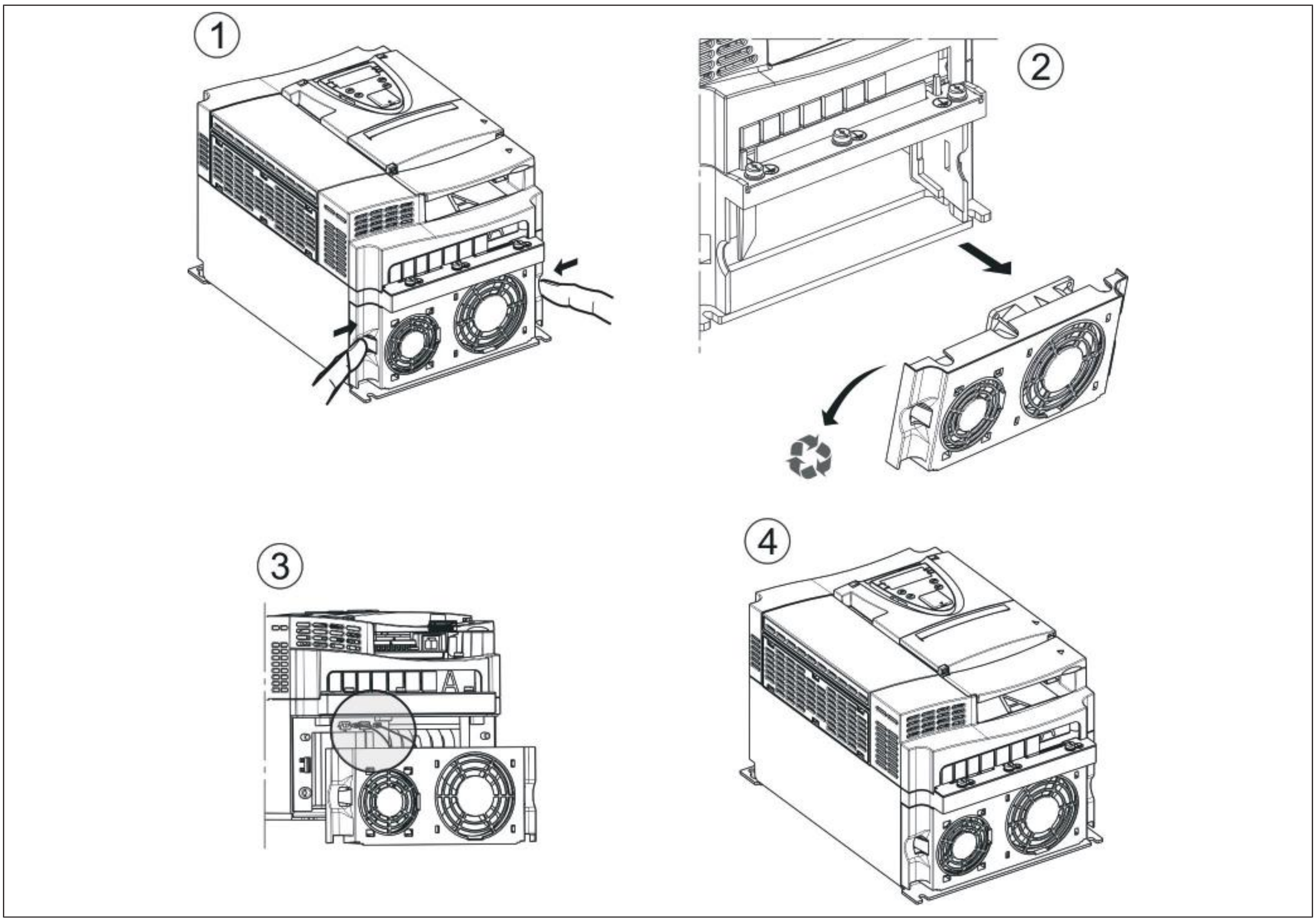
8I0XF084.030-1



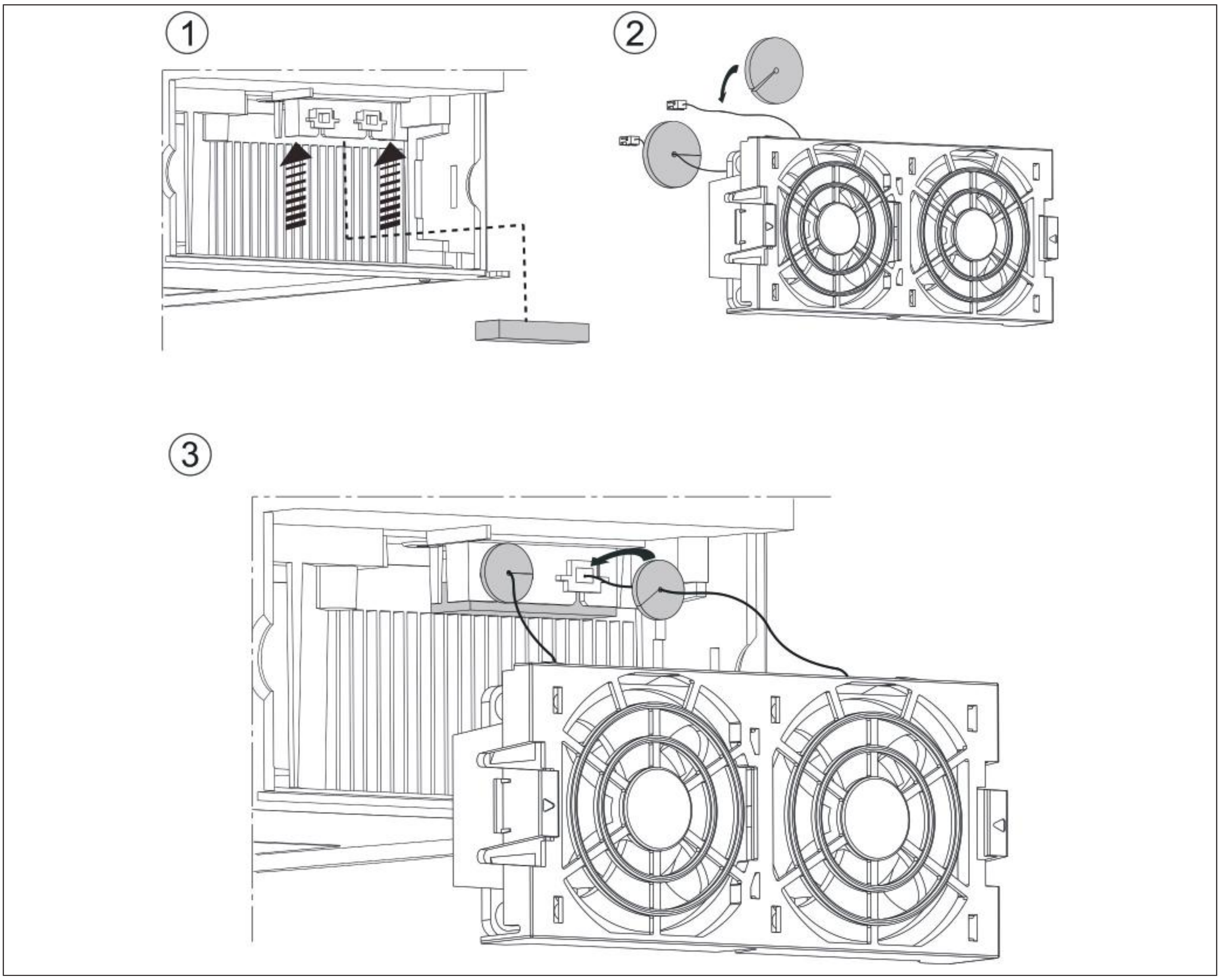
8I0XF084.040-1



8I0XF084.050-1



8I0XF084.0x0-1



4.8 Control card - fan kits

4.8.1 Order data

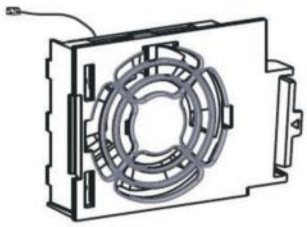
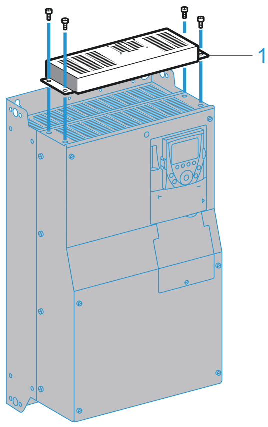
Model number	Short description	Figure
	ACOPOSinverter P84 - Control card fan kits	
8I0XF004.300-1	Control card fan kit, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 22 kW, for operation at ambient temperature of 50 to 60°C	
8I0XF005.300-1	Control card fan kit, for ACOPOSinverter P84 3x 380 to 480 V, 30 to 37 kW, for operation at ambient temperature of 50 to 60°C	
8I0XF006.300-1	Control card fan kit, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW, for operation at ambient temperature of 50 to 60°C	
8I0XF007.300-1	Control card fan kit, for ACOPOSinverter P84 3x 380 to 480 V, 45 to 75 kW, for operation at ambient temperature of 50 to 60°C	

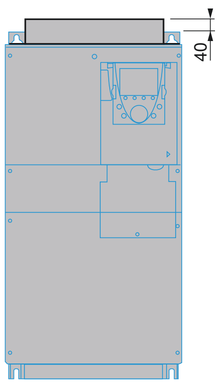
Table 34: 8I0XF004.300-1, 8I0XF005.300-1, 8I0XF006.300-1, 8I0XF007.300-1 - Order data

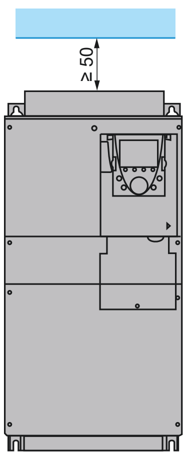
Properties



- This kit is required for ACOPOSinverter P84 inverters with 3x 200 to 240 V, 18.5 to 45 kW and 3x 380 to 80 V, 22 to 75 kW for operation at an ambient temperature of 50 to 60°C.

Installation recommendations





4.9 Incremental encoder interface

4.9.1 Order data

Model number	Short description	Figure
	ACOPOSinverter P84 - Incremental encoder interfaces	
8I0AC123.300-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 5 V supply voltage	
8I0AC123.301-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for RS422 signals (TTL), 15 V supply voltage	
8I0AC123.302-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 12 V supply voltage	
8I0AC123.303-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for open collector, 15 V supply voltage	
8I0AC123.304-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 12 V supply voltage	
8I0AC123.305-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 15 V supply voltage	
8I0AC123.306-1	ACOPOSinverter P84 plug-in module, incremental encoder interface for push-pull HTL, 24 V supply voltage	

Table 35: 8I0AC123.300-1, 8I0AC123.301-1, 8I0AC123.302-1, 8I0AC123.303-1, 8I0AC123.304-1, 8I0AC123.305-1, 8I0AC123.306-1 - Order data

4.9.2 Technical data

Model number	8I0AC123.300-1	8I0AC123.301-1	8I0AC123.302-1
General information			
Certifications			
CE	Yes		
KC	Yes		
Encoder power supply			
Short circuit protection, overload protection	Yes		
Supply voltages	5 VDC (min. 5 V, max. 5.5 V)	15 VDC (min. 15 V, max. 16 V)	12 VDC (min. 12 V, max. 13 V)
Max. current	200 mA	175 mA	
Incremental encoder			
Max. input frequency	300 kHz		
Input signals	A, A\, B, B\		A, A\, B, B\ / AB / A
Input signals			
Impedance	440 Ω		1 Ω
Number of pulses per encoder revolution	Max. 5000		
Encoder input			
Connection	Terminal block		
Max. encoder cable length	50 m	100 m	500 m
General information			
Encoder type	Encoder interface cards with RS422-compatible differential outputs		Encoder interface card with open collector outputs
Module type	ACOPOSinverter plug-in module		

Table 36: 8I0AC123.300-1, 8I0AC123.301-1, 8I0AC123.302-1 - Technical data

Model number	8I0AC123.303-1	8I0AC123.304-1	8I0AC123.305-1	8I0AC123.306-1
General information				
Certifications				
CE	Yes			
KC	Yes			
Encoder power supply				
Short circuit protection, overload protection	Yes			
Supply voltages	15 VDC (min. 15 V, max. 16 V)	12 VDC (min. 12 V, max. 13 V)	15 VDC (min. 15 V, max. 16 V)	24 VDC (min. 20 V, max. 30 V)
Max. current	175 mA			
Incremental encoder				
Max. input frequency	300 kHz			
Input signals	A, A\, B, B\ / AB / A			
Input signals				
Impedance	1 Ω			1.6 Ω
State 0	-	<1.5 V		
State 1	-	>7.7 V and <13 V	>7.7 V and <16 V	>11.5 V and <25 V

Table 37: 8I0AC123.303-1, 8I0AC123.304-1, 8I0AC123.305-1, 8I0AC123.306-1 - Technical data

Model number	8I0AC123.303-1	8I0AC123.304-1	8I0AC123.305-1	8I0AC123.306-1
Number of pulses per encoder revolution	Max. 5000			
Encoder input				
Connection	Terminal block			
Max. encoder cable length	500 m			
General information				
Encoder type	Encoder interface card with open collector outputs	Encoder interface card with push-pull outputs		
Module type	ACOPOSinverter plug-in module			

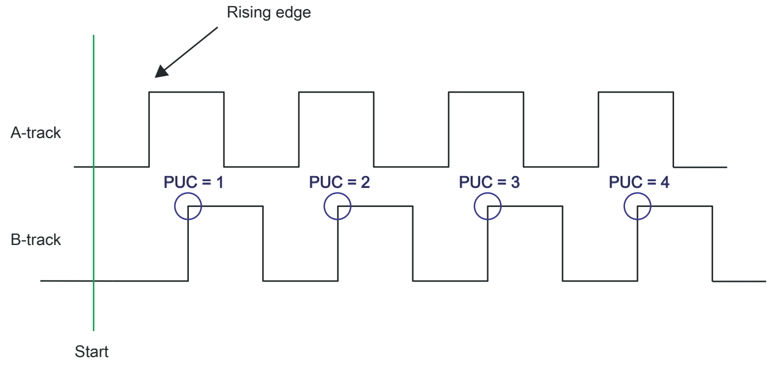
Table 37: 8I0AC123.303-1, 8I0AC123.304-1, 8I0AC123.305-1, 8I0AC123.306-1 - Technical data

Note:

If the parameter [Encoder type] (EnS) is set to AB, the ACOPOSinverter P84 only counts the positive edges of the AB encoder.

Example:

If you use an AB encoder with 1024 increments per revolution, for the parameter **[number of pulses]**(PGI) 256 must be configured because the ACOPOSinverter P84 only counts the 256 positive edges.



PUC: Encoder count value

Properties

- Encoder interface boards are used to handle flux vector control with an encoder (FVC mode) for induction motors. This improves the drive performance regardless of the motor load status:
  - Torque at standstill (0 rpm)
  - Precise speed control
  - Exact torque
  - Shorter response times for sudden increases in torque
  - Improved dynamic performance.
- For induction motors, encoder interface boards used in the other control modes (voltage vector control, voltage/frequency ratio - V/f characteristic curve) can improve the static speed precision.
- Three board types are available depending on the encoder technology:
  - RS422-compatible differential outputs
  - Open collector outputs (NPN)
  - Push-pull outputs
- Regardless of the control type, the encoder interface card provides extra safety for the machine:
  - Measures overspeed
  - Measures motor pull-out

With the encoder interface card a reference value of an encoder input can also be transferred to the ACOPOSinverter P84. This application is specifically for the speed synchronization of several inverters.
These two functions are available in conjunction with the encoder interface cards 8I0AC123.300-1 ... 8I0AC123.306-1.
The ACOPOSinverter P84 is designed for the inclusion of an encoder interface card. It is inserted in a special slot in the inverter.

Note:

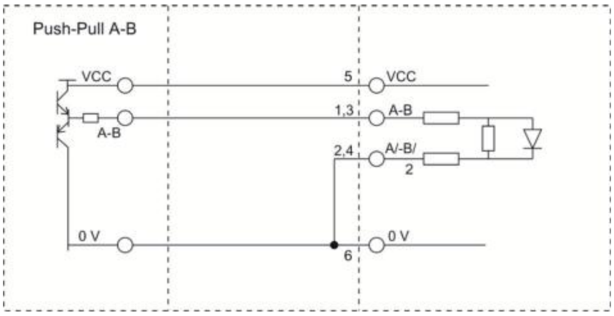
If an encoder card that supports A, A and B, B as well as A/B differential signals is used as an accessory, the B/ and A/ pins must be connected to ground.

Wiring

The pin outputs can vary depending on the encoder type or connector type.

Basic settings:

- A (encoder) connected to A (encoder card)
- A (encoder) connected to B (encoder card)
- A/ and B/ are linked and jumpers to 0 V encoder card
- +24 VDC connected to +V (encoder card)
- 0 V to 0 V (encoder card)


Push-Pull A-B
VCC
A-B
0 V
5
VCC
1,3
A-B
2,4
A/-B/
2
6
0 V

4.10 DC bus chokes

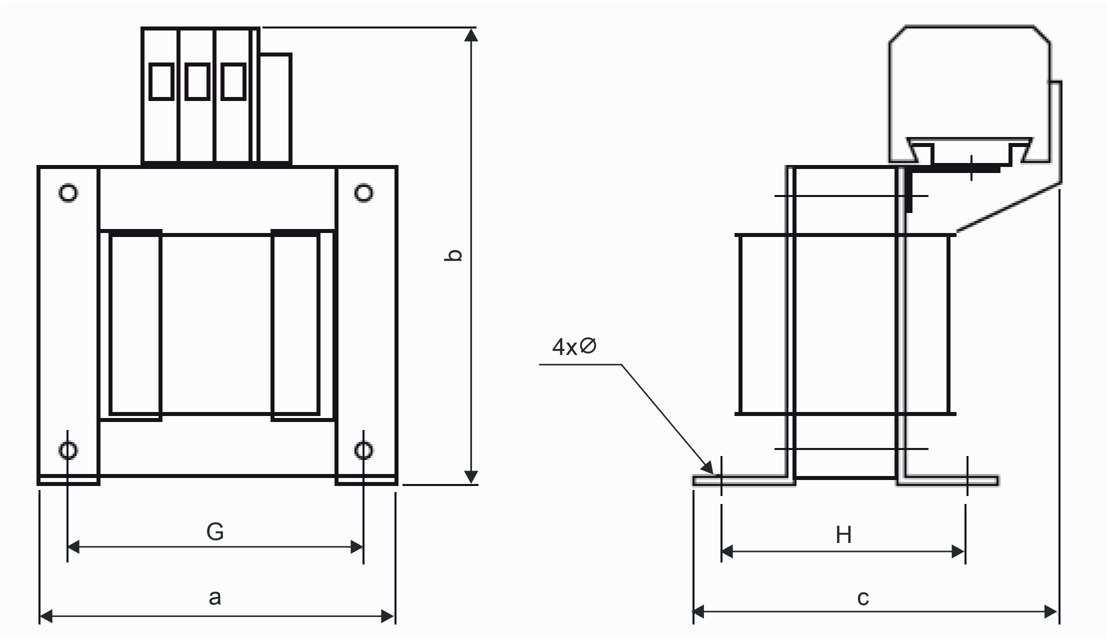
4.10.1 Order data

Model number	Short description	Figure
	ACOPOSinverter P84 - DC bus choke	
8I0DC002.300-1	DC bus choke 2 A, for ACOPOSinverter P84 3x 200 to 240 V, 0.37 kW and 3x 380 to 480 V, 0.75 kW	
8I0DC004.300-1	DC bus choke 4 A, for ACOPOSinverter P84 3x 380 to 480 V, 1.5 kW	
8I0DC008.300-1	DC bus choke 8 A, for ACOPOSinverter P84 3x 200 to 240 V, 0.75 kW and 3x 380 to 480 V, 2.2 to 3 kW	
8I0DC010.300-1	DC bus choke 10 A, for ACOPOSinverter P84 3x 380 to 480 V, 4 kW	
8I0DC014.300-1	DC bus choke 14 A, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 kW and 3x 380 to 480 V, 5.5 kW	
8I0DC019.300-1	DC bus choke 19 A, for ACOPOSinverter P84 3x 200 to 240 V, 2.2 kW and 3x 380 to 480 V, 7.5 kW	
8I0DC027.300-1	DC bus choke 27 A, for ACOPOSinverter P84 3x 200 to 240 V, 3 kW and 3x 380 to 480 V, 11 kW	
8I0DC036.300-1	DC bus choke 36 A, for ACOPOSinverter P84 3x 200 to 240 V, 7.5 kW	
8I0DC044.300-1	DC bus choke 44 A, for ACOPOSinverter P84 3x 200 to 240 V, 4 to 5 kW and 3x 380 to 480 V, 15 to 18.5 kW	
8I0DC084.300-1	DC bus choke 84 A, for ACOPOSinverter P84 3x 200 to 240 V, 11 to 15 kW and 3x 380 to 480 V, 22 to 37 kW	
8I0DC171.300-1	DC bus choke 171 A, for ACOPOSinverter P84 3x 200 to 240 V, 18.5 to 22 kW and 3x 380 to 480 V, 45 to 75 kW	
8I0DC195.300-1	DC bus choke 195 A, for ACOPOSinverter P84 3x 200 to 240 V, 30 to 45 kW	

Table 38: 8I0DC002.300-1, 8I0DC004.300-1, 8I0DC008.300-1, 8I0DC010.300-1, 8I0DC014.300-1, 8I0DC019.300-1, 8I0DC027.300-1, 8I0DC036.300-1, 8I0DC044.300-1, 8I0DC084.300-1, 8I0DC171.300-1, 8I0DC195.300-1 - Order data

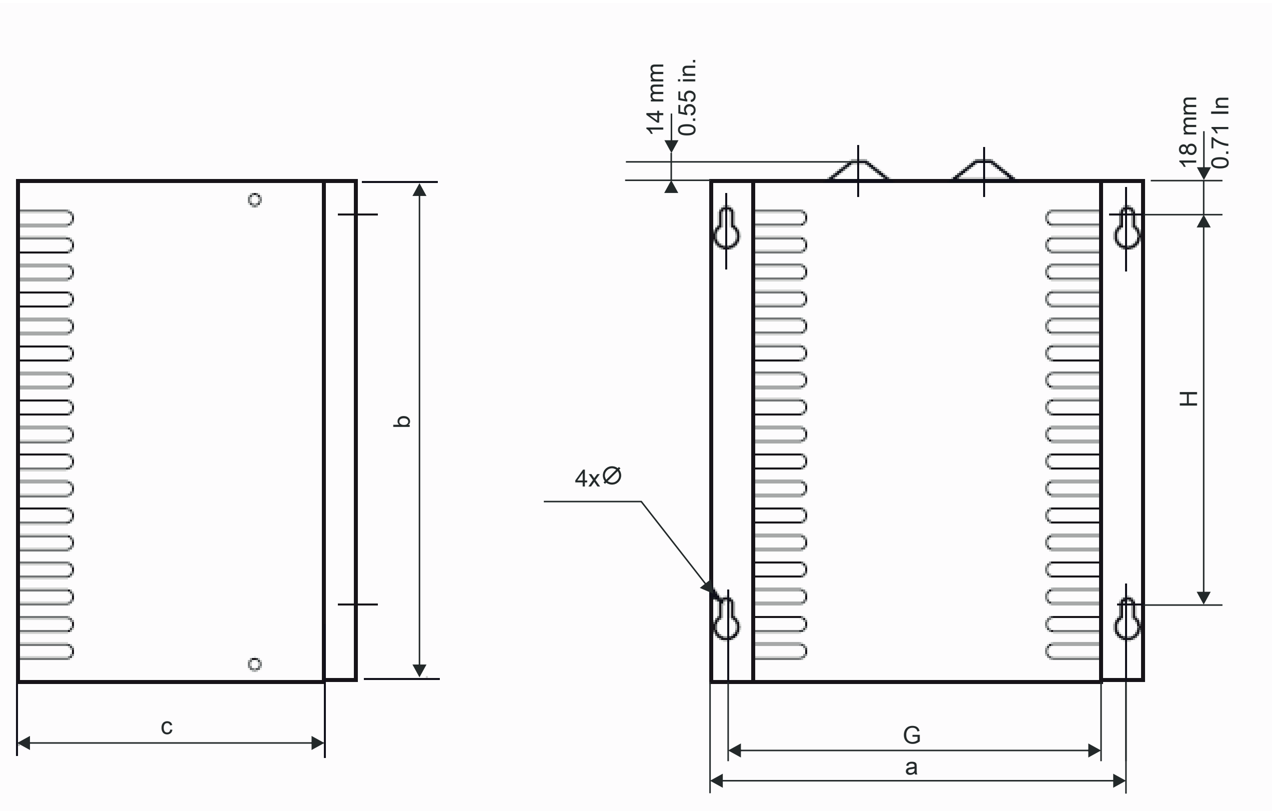
4.10.2 Dimensions

8I0DC002.300-1 8I0DC004.300-1 8I0DC008.300-1 8I0DC010.300-18I0DC014.300-1 8I0DC019.300-1 8I0D-C027.300-1 8I0DC044.300-18I0DC036.300-1 8I0DC084.300-1



mm	a	b	c	G	H	Diameter
8I0DC002.300-1	60	130	95	50	51	3.5
8I0DC004.300-1	60	103	118	50	68	3.5
8I0DC008.300-1	96	134	115	80	65	5.5
8I0DC010.300-1	96	134	115	80	64	5.5
8I0DC014.300-1	96	134	120	80	70	5.5
8I0DC019.300-1	96	134	120	80	74	5.5
8I0DC027.300-1	96	134	130	80	84	5.5
8I0DC044.300-1	108	142	145	90	97	5.5
8I0DC036.300-1	96	134	120	80	74	5.5
8I0DC084.300-1	126	171	170	105	103	7.0

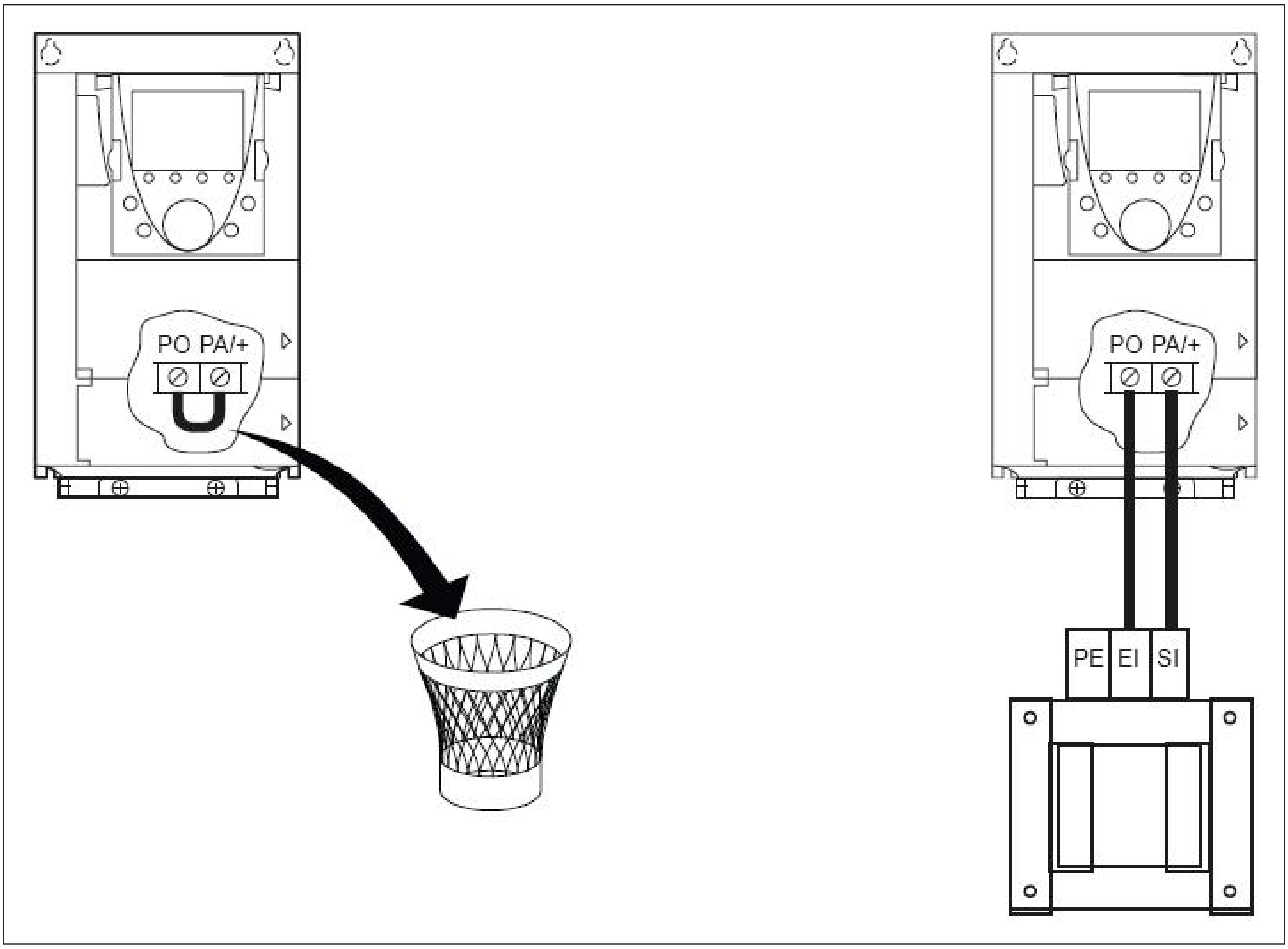
8I0DC171.300-1 and 8I0DC195.300-1



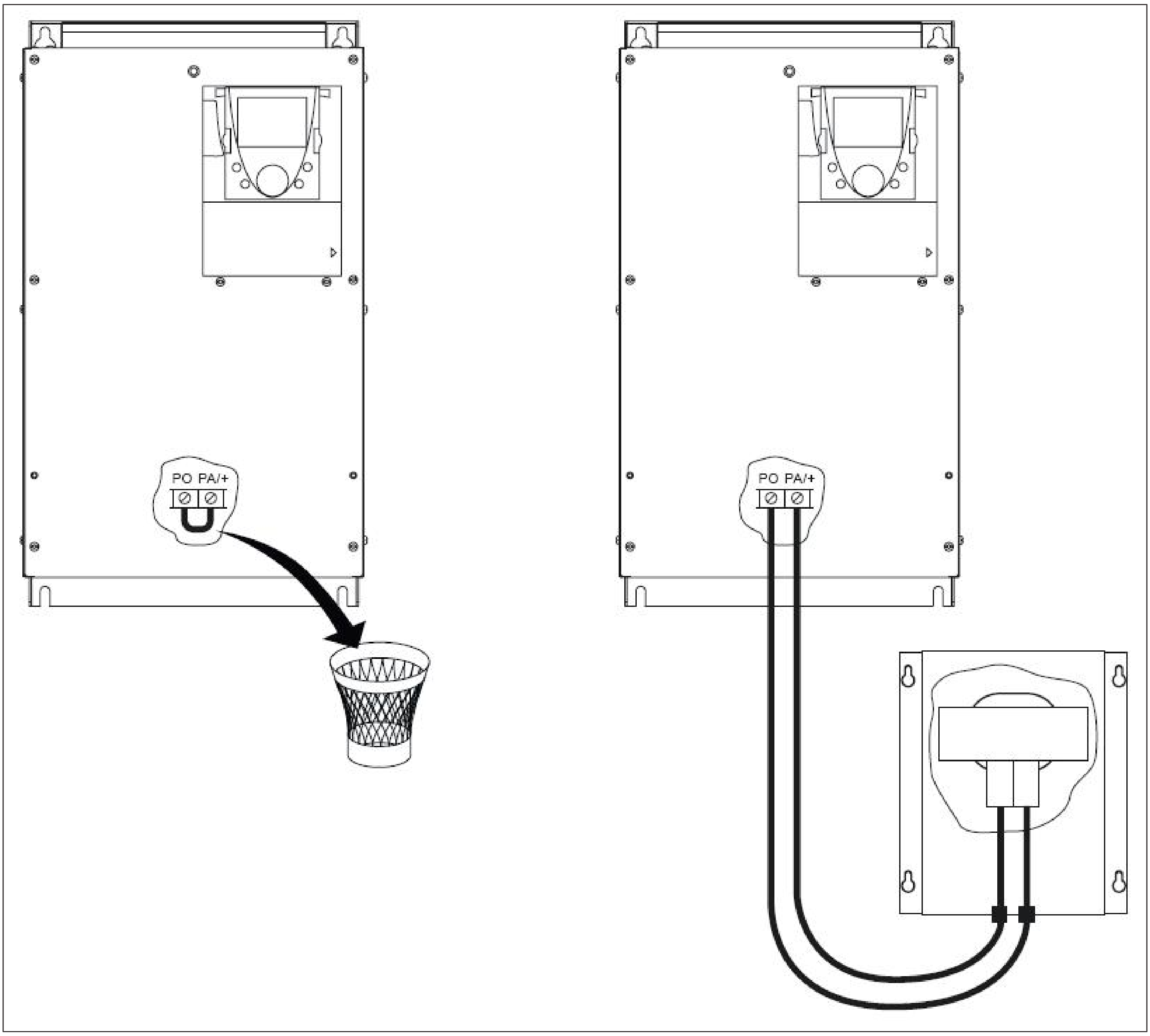
mm	a	b	c	G	H	Diameter
8I0DC171.300-1	240	280	191	222	217	7
8I0DC195.300-1	240	280	191	222	217	7

4.10.3 Installation

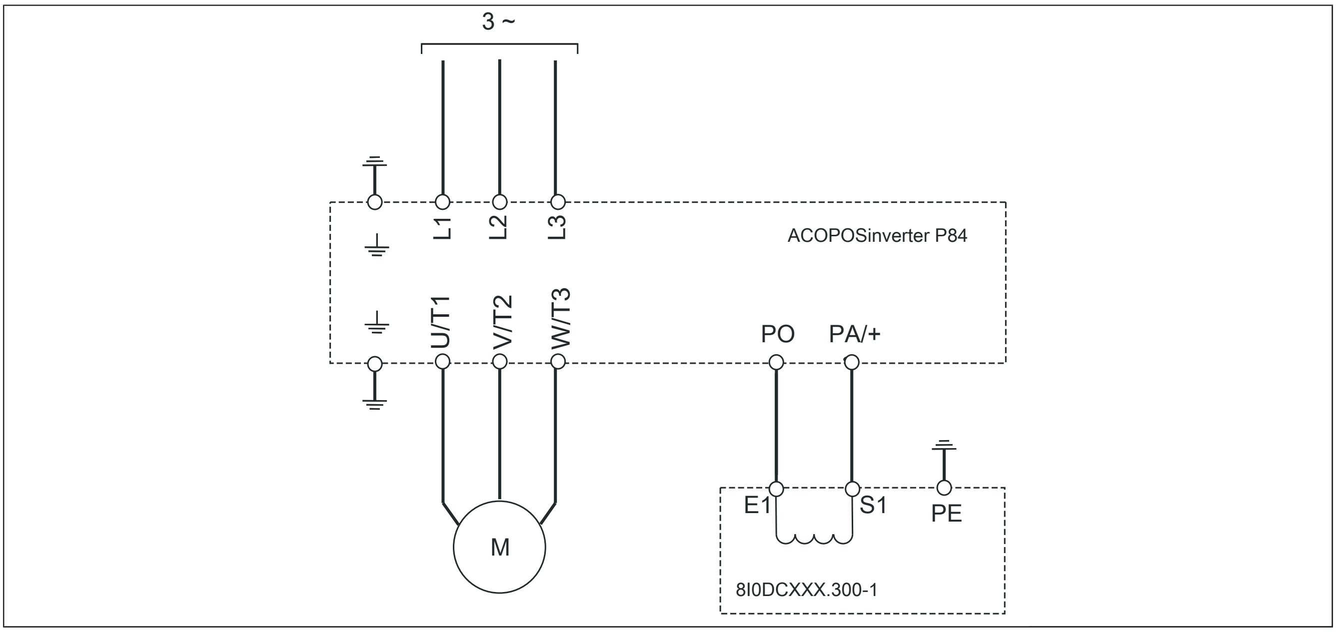
8I0DC002.300-1 8I0DC004.300-1 8I0DC008.300-1 8I0DC010.300-18I0DC014.300-1 8I0DC019.300-1 8I0D-C027.300-1 8I0DC044.300-18I0DC036.300-1 8I0DC084.300-1



8I0DC171.300-1 and 8I0DC195.300-1



4.10.4 Wiring



5 Register description

For the complete register description for the ACOPOSinverter P84, see the Excel file (appendix).

Please follow the link to open the file "ACOPOSinverter P84 - Communication Parameters":

- ACOPOSinverter_P84_Communication Parameters