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SINAMICS

Intelligent Operator Panel

Intelligent commissioning and application configuration tool

Operating Instructions

Edition 05/2015

Answers for industry.

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SINAMICS

Intelligent Operator Panel (IOP)

Operating Instructions

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Changes in the manual

New Firmware Functions for V1.6	In Chapter
Custom Hand Mode The custom hand mode allows the user to setup a command source and setpoint source directly from the Intelligent Operator Panel (IOP).	Custom Hand mode (Page 49)
Startup in Hand Mode Startup in Hand mode allows the converter, under the control of the Intelligent Operator Panel (IOP), to startup in Hand mode automatically. The command source is then taken from the off and on buttons of the IOP.	Startup in Hand mode (Page 53)
HAND/AUTO disable The Hand/Auto disable function disables the HAND/AUTO key on the Intelligent Operator Panel (IOP) and pressing the key will not produce any action by the IOP.	Hand/Auto disable (Page 54)
Custom Parameter sets Custom parameter sets can now be created and stored on the Intelligent Operator Panel (IOP). The IOP can store up to 16 fixed parameter sets and up to 235 parameter sets with customized names.	Custom parameter sets (Page 68)

Note

Firmware version restrictions

The functions described in the table above require firmware version V4.7 SP3 to be installed in the Control Unit, all other functionality described in this manual is independent of the firmware installed on the Control Units.

Safety notes

1

Warnings and cautions

⚠ DANGER

Ensuring a safe and stable state

During commissioning of the Inverter it is essential to ensure that the system is in a safe and stable state, as some commissioning processes have the potential to start the motor. Therefore it is important to secure any loads and ensure that should the motor start, no potentially dangerous conditions exist.

Note

- The IOP can be fitted to and removed from the inverter while power is applied.
- The IOP will set the USS PZD (P2012) length to 4 when connected to the inverter.

Overview 2

2.1 Introduction

Compatibility

The Intelligent Operator Panel (IOP) has been designed to enhance the interface and communications capabilities of SINAMICS Inverters.

The IOP connects to the Inverter through an RS232 interface. It has been designed to automatically recognize the following devices from the SINAMICS range:

- SINAMICS G120 CU230P-2
- SINAMICS G120 CU240B-2
- SINAMICS G120 CU240E-2
- SINAMICS G120 CU250S-2
- SINAMICS G120C
- SINAMICS G120D-2 CU240D-2*
- SINAMICS G120D-2 CU250D-2*
- SINAMICS ET 200pro FC-2*
- SINAMICS G110D*
- SINAMICS G110M*
- SINAMICS S110 CU305*

*Denotes Control Units that require the IOP Hand-Held Kit to connect the IOP to the Control Unit.

Hand-Held Kit order number: 6SL3255-0AA00-4HA0.
Optical cable order number: 3RK1922-2BP00 (not required for the SINAMICS S110 CU305)

For information on firmware and language upgrades, please see Firmware and language upgrade (Page 23).

Note

IOP functional support

- Drives with SINAMICS firmware prior to version 4.2 may not be fully supported by the IOP.
- The actual menu structure and functionality of the IOP will be influenced by the following factors:
  - The software version and type of Control Unit to which the IOP is fitted.
  - The firmware and software version of the IOP.
  - The selected functional group filtering of the parameters.

2.2 Layout and functions

Overview

The physical layout of the IOP is shown below:

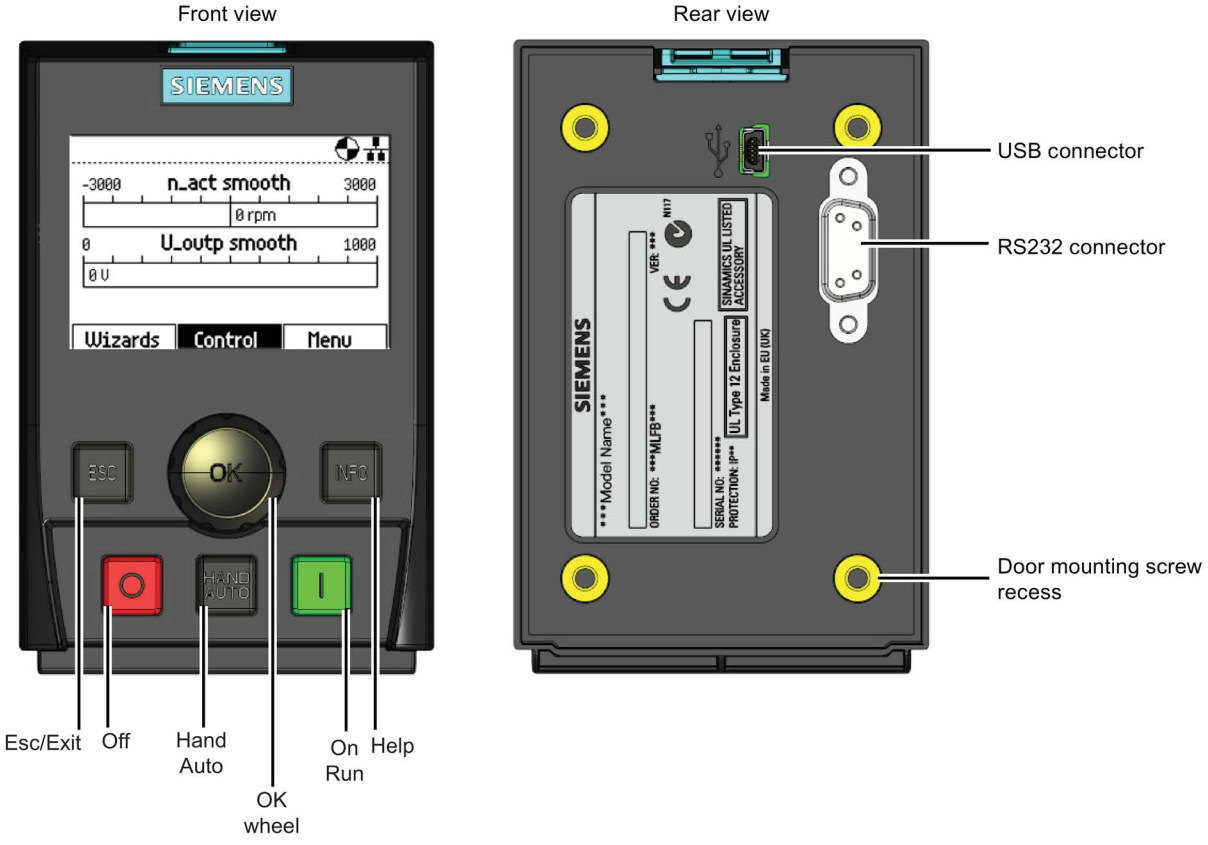
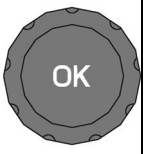


Figure 2-1 Layout of IOP

The IOP is operated by using a push-wheel and five additional buttons. The specific functions of the push-wheel and buttons are shown in the table below.

Table 2- 1 Function of the IOP controls

Key	Function
	The push-wheel has the following functions: • In a menu, turning the push-wheel changes the selection. • When a selection is highlighted, pressing the push-wheel confirms the selection. • When editing a parameter, turning the push-wheel changes the displayed value; clockwise increases the value and anti-clockwise decreases the displayed value. • When editing parameter or search values there is a choice to edit individual digits or an entire value. With a long press of the push-wheel (>3 sec) it will toggle between the two different value editing modes.
	The ON key has the following functions: • In AUTO mode, the screens displays an information screen, stating that the command sources is AUTO and can be changed by pressing the HAND/AUTO KEY. • In HAND mode the Inverter is started - the Inverter status icon starts turning. Notes: For Control Units with firmware versions less than 4.0: When running in AUTO mode, HAND mode cannot be selected unless the Inverter is stopped. For Control Units with firmware versions 4.0 or greater: When running in AUTO mode, HAND mode can be selected and the motor will continue to run at the last selected setpoint speed. When the Inverter is running in HAND mode, the motor stops when switched to AUTO.
	The OFF key has the following functions: • If pressed for longer than 3 seconds the Inverter will perform an OFF2; the motor will then coast down to a standstill. Note: 2 presses of the OFF key within 3 seconds will also perform and OFF2. • If pressed for less than 3 seconds the following actions will be performed: – If in AUTO mode the screen will display an information screen stating that the command sources is AUTO and can be changed using the HAND/AUTO key. The Inverter will not be stopped. – If in HAND mode the Inverter will perform an OFF1; the motor will come to a standstill in the ramp-down time set in parameter P1121.
	The ESC key has the following functions: • If pressed for less than 3 seconds the IOP returns to the previous screen or if a value has been edited, the new value is not saved. • If pressed longer than 3 seconds the IOP returns to the status screen. When using the ESC key in the parameter editing mode, no data is saved unless the OK key is pressed first.
	The INFO key has the following functions: • Displays additional information for the currently selected item. • Pressing the INFO key again will display the previous screen. • Pressing the INFO key during power-up of the IOP will place the IOP in DEMO mode. To exit DEMO mode, power-cycle the IOP.
	The HAND/AUTO key switches the command source between HAND and AUTO mode. • HAND sets the command source to the IOP. • AUTO sets the command source to an external source, for example, fieldbus.

Changes in functionality of the IOP keys

The functionality of the individual controls of the IOP is changed when the following functions are activated, the user should be aware of these changes of functions to ensure that the IOP operates in the intended manner.

- Custom Hand mode Custom Hand mode (Page 49)
- Startup in Hand mode Startup in Hand mode (Page 53)
- Hand/Auto disable Hand/Auto disable (Page 54)

DEMO mode

To enter the DEMO mode it is necessary to do a long press of the ESC key or INFO key during the power-up cycle. The IOP must be power cycled again to exit the DEMO mode.

DEMO mode allows the IOP to be used for demonstration purposes without affecting the Inverter to which it is connected. Menus can be navigated and functions selected, but all communications with the Inverter are blocked to ensure that the Inverter does not react to any commands issued from the IOP.

Locking and unlocking the keypad

The keypad can only be locked once the power-up cycle has been completed. If the keys are actived before the power-up cycle is completed, the IOP will enter the DEMO mode.

To lock the IOP keypad press **ESC** and **INFO** simultaneously for 3 seconds or more. To unlock the keypad press **ESC** and **INFO** simultaneously for 3 seconds or more.

2.3 Screen icons

Overview

The IOP displays a number of icons at the top right-hand edge of the display to indicate various states or current conditions of the Inverter. These icons are explained in the table below.

Table 2- 2 Screen icons

Function	Status	Icon	Remarks
Command source	Auto		
	JOG	JOG	Displayed when the JOG function is active.
	Hand		
Inverter status	Ready		
	Running		Icon rotates when the motor is running
Fault pending	Fault		
Alarm pending	Alarm		
Saving to RAM	Active		Indicates all data is currently saved to RAM. If power is terminated all data is lost.
PID autotuning	Active		
Hibernation mode	Active		
Write Protection	Active		Parameters cannot be modified.
Know How Protection	Active		Parameters cannot be viewed or modified.
ESM	Active		Essential Services Mode
Battery condition	Fully charged		The battery status is only shown when the IOP Hand-held kit is used.
	¾ charged		
	½ charged		
	¼ charged		
	No charge		
	Charging		

2.4 Menu structure

The IOP is a menu-driven device and has the following menu structure:

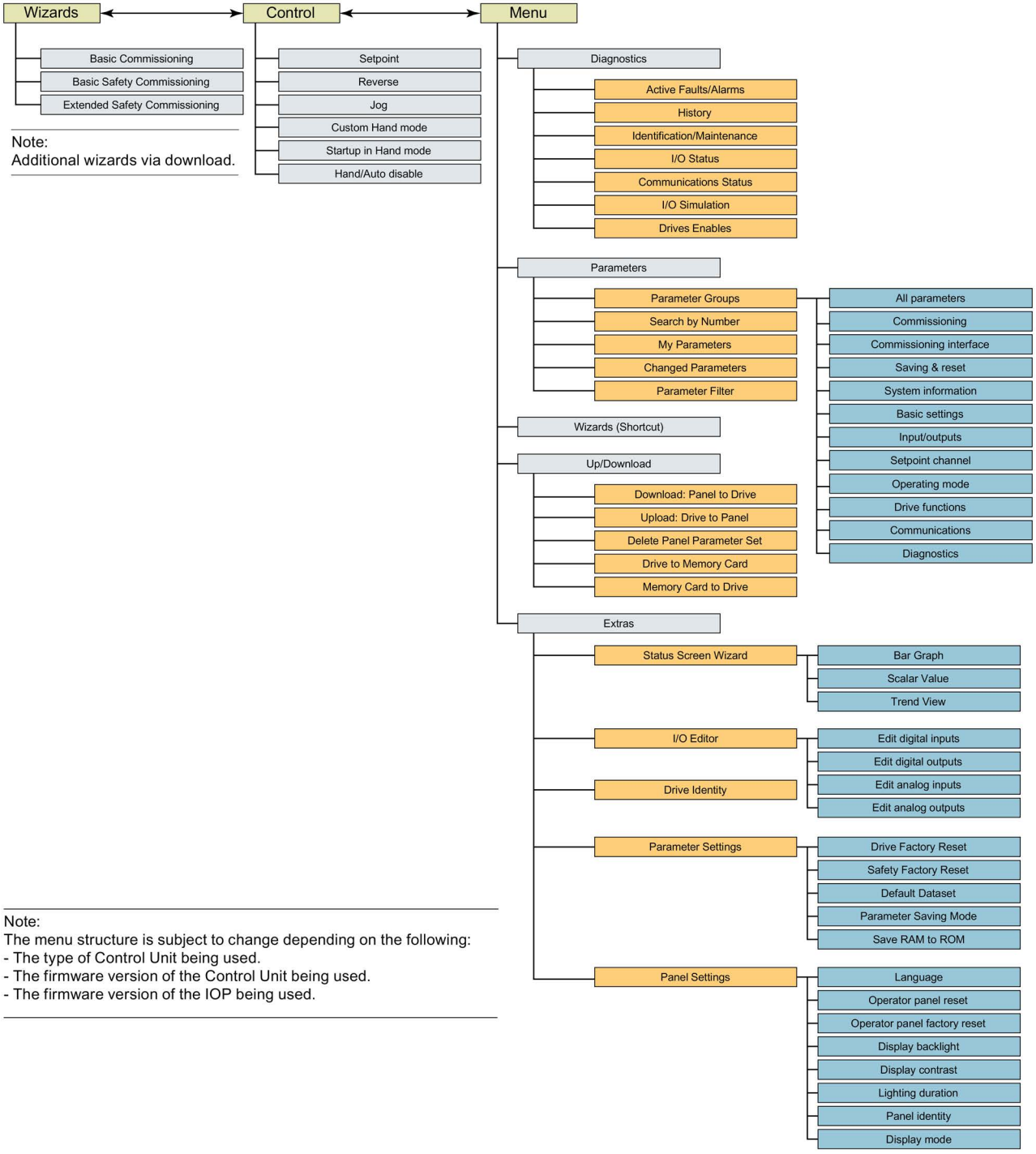


Figure 2-2 IOP menu structure

Installation

3

3.1 Fitting the IOP

Fitting the IOP to the Control Unit

Note

IOP power supply

The IOP has no internal power supply and derives its power directly from the Control Unit of the Inverter through the RS232 interface. The IOP can also be connected to a PC and derives its power through the USB connection.

To fit the IOP to the Inverter Control Unit the following procedure should be performed:

1. Place the bottom edge of the IOP casing into the lower recess of the Control Unit housing.
2. Push the IOP forward until the top fastening clicks into place on the Control Unit housing.



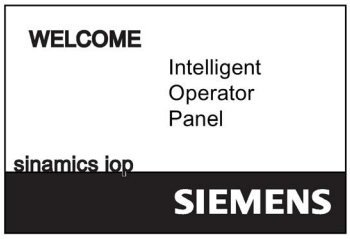
Figure 3-1 Fitting the IOP to the Control Unit

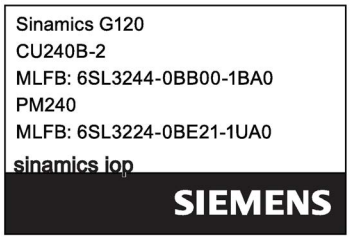
3.2 Initial Set-up

Initial set-up sequence

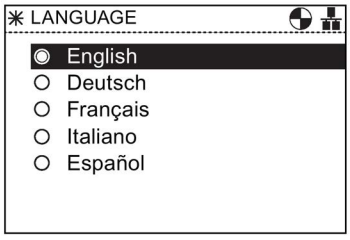
Once the IOP is fitted and powered-up it will automatically detect the type of Control Unit and Power Module to which it has been fitted. On first-time use, the IOP automatically displays the option to select the default language and allow the time and date to be set (if the Control Unit to which the IOP is fitted has a real-time clock).

After the initial start-up screen has been displayed, the IOP will then display details of the type of Control Unit and Power module, including the orders numbers.





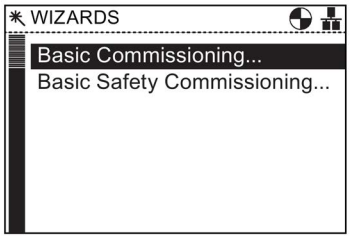
After the Identification screen has been displayed the Language selection screen will be displayed.



Once the language is selected - the Wizard menu is displayed.

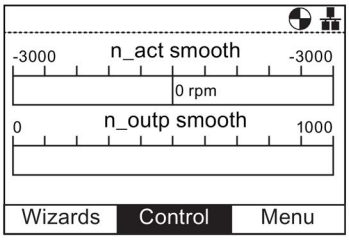
Note:

The IOP is delivered with only the Basic Commissioning wizards. All other wizards can be downloaded using the IOP updater tool. For futher information, please see Firmware and language upgrade (Page 23).



If the Wizard menu is not required, then press Esc to return to the normal status screen.

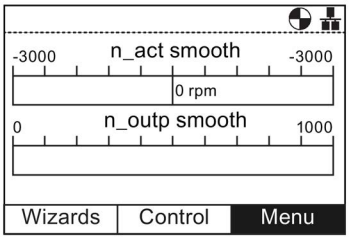
The status screen can be reconfigured to show a number of different views and types of values; these can be configured using the "**Status Screen Wizard**" in the "**Extras**" menu, see Extras (Page 72).

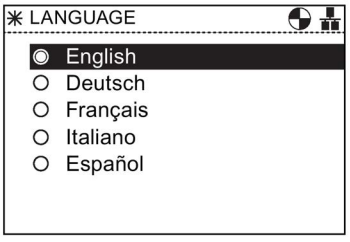


Language selection

To select the language that the IOP should display, the following actions should be performed:

1. Rotate the **Wheel** to select "**Menu**".
2. Press the **Wheel** to confirm selection.
3. The "**Menu**" screen is displayed.
4. Rotate the **Wheel** to select "**Extras**".
5. Press the **Wheel** to confirm selection.
6. The "**Extras**" screen is displayed.
7. Rotate the **Wheel** to select "**Panel Settings**"
8. Press the **Wheel** to confirm selection.
9. Rotate the **Wheel** to select the required language.
10. Press the **Wheel** to confirm selection.
11. The "Language" screen is displayed.
12. Rotate the **Wheel** to select the language.
13. Press the **Wheel** to confirm selection.
14. The selected language will now be used by the IOP.
15. The IOP will return to the "**Extras**" menu.
16. Press "**Esc**" for more than 3 seconds to return to the "**Status**" screen.

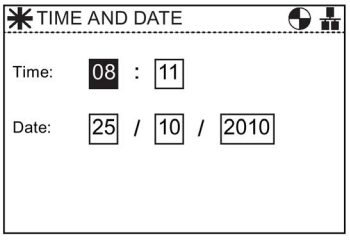




Additonal languages are available for the IOP. For further information, please see Firmware and language upgrade (Page 23).

Setting time and date

When the IOP is first fitted to a Control Unit, which has a real-time clock, it will automatically display the time and date screen, the following actions should be performed:

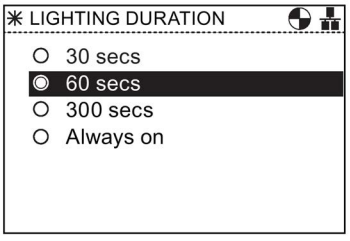


1. The "**Time and Date**" screen is displayed.
2. Rotate the **Wheel** to change the value.
3. Press the **Wheel** to confirm the value and move to the next field.
4. Rotate the **Wheel** to change the value.
5. Press the **Wheel** to confirm value and move to the next field.
6. Continue the process for the date fields.
7. When the last field of the date is completed, the screen will return to the "**Extras**" menu.
8. Press "**Esc**" for more than 3 seconds to return to the "**Status**" screen.

The settings for time are normally done on the Control Unit if it has a Real-time Clock (RTC). If the Inverter has an RTC the IOP will take its settings from the Control Unit.

Lighting duration

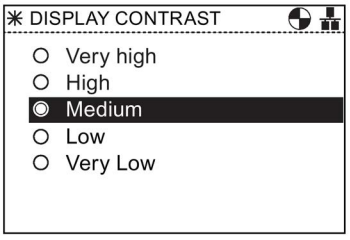
To set the length of time that the display remains lit, the following actions should be performed:



1. Rotate the **Wheel** to select "**Menu**".
2. Press the **Wheel** to confirm selection.
3. The "**Menu**" screen is displayed.
4. Rotate the **Wheel** to select "**Extras**".
5. Press the **Wheel** to confirm selection.
6. The "**Extras**" screen is displayed.
7. Rotate the **Wheel** to select "**Panel Settings**"
8. Press the **Wheel** to confirm selection.
9. Rotate the **Wheel** to selected "**Lighting duration**".
10. Press the **Wheel** to confirm selection.
11. The "**Lighting duration**" screen is displayed.
12. Rotate the **Wheel** to select the required lighting duration.
13. Press the **Wheel** to confirm selection.
14. The display returns to the "**Extras**" menu.
15. Press "**Esc**" for more than 3 seconds to return to the "**Status**" screen.

Display contrast

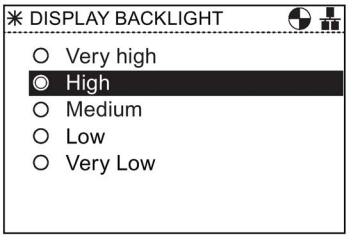
To set the contrast level of the IOP, the following actions should be performed:



1. Rotate the **Wheel** to select "**Menu**".
2. Press the **Wheel** to confirm selection.
3. The "**Menu**" screen is displayed.
4. Rotate the **Wheel** to select "**Extras**".
5. Press the **Wheel** to confirm selection.
6. The "**Extras**" screen is displayed.
7. Rotate the **Wheel** to select "**Panel Settings**"
8. Press the **Wheel** to confirm selection.
9. Rotate the **Wheel** to selected "Display contrast".
10. Press the **Wheel** to confirm selection.
11. The "**Display contrast**" screen is displayed.
12. Rotate the **Wheel** to select the required contrast setting.
13. Press the **Wheel** to confirm selection.
14. The display returns to the "**Extras**" menu.
15. Press "**Esc**" for more than 3 seconds to return to the "**Status**" screen.

Display backlight

To change the intensity of the backlight, the following actions should be performed:

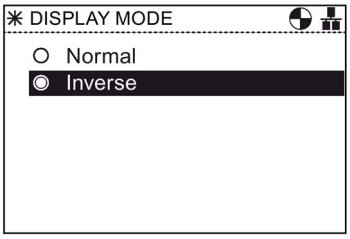


1. Rotate the **Wheel** to select "**Menu**".
2. Press the **Wheel** to confirm selection.
3. The "**Menu**" screen is displayed.
4. Rotate the **Wheel** to select "**Extras**".
5. Press the **Wheel** to confirm selection.
6. The "**Extras**" screen is displayed.
7. Rotate the **Wheel** to select "**Panel Settings**"
8. Press the **Wheel** to confirm selection.
9. Rotate the **Wheel** to selected "**Display backlight**".
10. Press the **Wheel** to confirm selection.
11. The "**Display backlight**" screen is displayed.
12. Rotate the **Wheel** to select the required brightness setting.
13. Press the **Wheel** to confirm selection.
14. The display returns to the "**Extras**" menu.
15. Press "**Esc**" for more than 3 seconds to return to the "**Status**" screen.

The display backlight setting will be automatically changed to the "Low" setting after 60 seconds from the last key press to extend the life of the display. When any key is pressed the backlight setting will automatically return to the user setting.

Display mode

To change the display mode, the following actions should be performed:



1. Rotate the **Wheel** to select "**Menu**".
2. Press the **Wheel** to confirm selection.
3. The "**Menu**" screen is displayed.
4. Rotate the **Wheel** to select "**Extras**".
5. Press the **Wheel** to confirm selection.
6. The "**Extras**" screen is displayed.
7. Rotate the **Wheel** to select "**Panel Settings**"
8. Press the **Wheel** to confirm selection.
9. Rotate the **Wheel** to selected "**Display mode**".
10. Press the **Wheel** to confirm selection.
11. The "**Display mode**" screen is displayed.
12. Rotate the **Wheel** to select the required setting.
    - "Normal" displays white text on a black background.
    - "Inverse" displays black text on a white background.
13. Press the **Wheel** to confirm selection.
14. The display returns to the "**Extras**" menu.
15. Press "**Esc**" for more than 3 seconds to return to the "**Status**" screen.

3.3 Firmware and language upgrade

Overview

The IOP Updater tool allows the user to download:

- Additional language packs
- Firmware updates
- Additional wizards
- Application wizards

The IOP Udater tool contains the necessary drivers to allow the IOP to be connected to the USB port of your PC with a mini USB cable.

Note

English language is mandatory

The English language file is essential to the correct functioning of the IOP and therefore cannot be deleted. All other available languages can be downloaded to the IOP or deleted as necessary.

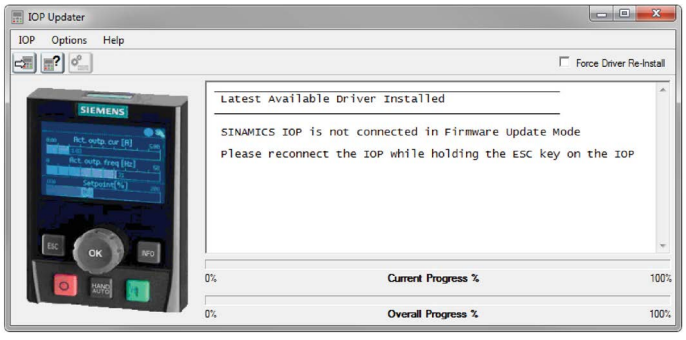


Figure 3-2 IOP Updater

The IOP Updater software, additional wizards, firmware files and languages files can be downloaded from the Siemens Service and Support website at the following link:

IOP Updater download (http://support.automation.siemens.com/WW/view/en/67273266)

The website contains getting started files which explain the installation and use of the IOP Updater software.

Wizards

4

Overview

The IOP wizards are question-driven macros that assist the user to set-up various functions and applications of the Inverter.

⚠WARNING

Safe and stable state of the Inverter

During commissioning of the Inverter it is essential to ensure that the system is in a safe and stable state, as some commissioning processes have the potential to start the motor. Therefore it is important to secure any loads and ensure that should the motor start, no potentially dangerous conditions exist.

⚠CAUTION

Default datasets

The wizards use the default Drive datasets (DDS0 and CDS0), if the default datasets are changed to the other datasets, the wizards may not function correctly.

Note

Default wizard and downloading

The IOP is delivered with only the Basic Commissioning Wizard installed. If the CU has safety functions, the Basic Safety Commissioning Wizard will also be available.

All other wizard can be downloaded using the IOP updater tool, see Firmware and language upgrade (Page 23)

Wizards

There are several wizards (available via download) which allow the user to set-up various functions and commission the Inverter. An example of the type of wizards are given below:

- Basic commissioning
- Open Loop Compressor
- Fixed Closed Loop Compressor
- Open Loop Fan
- Fixed Closed Loop Fan
- Open Loop Pump
- Fixed Closed Loop Pump

- Boost
- PID Wizard
- Roller Conveyor
- Basic Safety Commissioning
- Extended Safety Commissioning

The relevant wiring diagrams, if required, are contained in the "Wiring diagrams" section in this chapter.

Note

Wizards

The actual menu structure and the functionality of the IOP will be influenced by the following factors:

- The software version and type of Control Unit to which the IOP has been fitted.
- The firmware and software version of the IOP.
- The Roller conveyor wizard requires a fieldbus compatible Control Unit (PROFIBUS/PROFINET).

SINAMICS ET200S (Pro) and SINAMICS G120D Inverters

The Roller conveyor wizard is the only application wizard available for SINAMICS ET 200pro and SINAMICS G120D Inverters.

Accessing the IOP wizards

Wizards are accessed from the wizards menu, at the bottom-left of the Status screen as shown in the figure below.

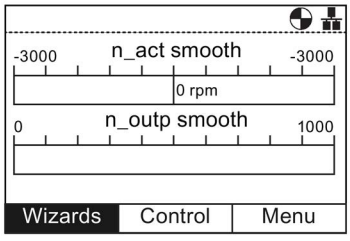


Figure 4-1 Status screen with Wizard menu highlighted

Prerequisites

Note

Factory reset

A factory reset option is offered by each wizard. It is highly recommended that the factory reset option is accepted.

The user must ensure that all the following actions have been completed prior to using the IOP application wizards:

- All necessary equipment is available and installed correctly, according to the relevant wiring diagram for the specific application wizard.
- All wiring of the Inverter, motor and any other devices used within the application has been completed in accordance with the wiring diagrams included in the appropriate section of this manual.
- All components of the system have been tested to ensure their correct and safe installation.

Information requested by the wizards

Since the IOP wizards will request detailed technical information during the setting-up process, it is important to have this information available. This information can be obtained from the following sources:

- **Motor data** - this data is obtained from the motor rating plate. At the motor data stage of the Basic Commissioning wizard, the individual data elements can be entered from the data on rating label of the motor, or the motor code can be entered/selected. See figure below.
- **Sensor data** - details of the types of sensors that may be used with the Inverter, such as temperature sensors and pressure sensors. The required information is normally found on the rating label of the sensor.

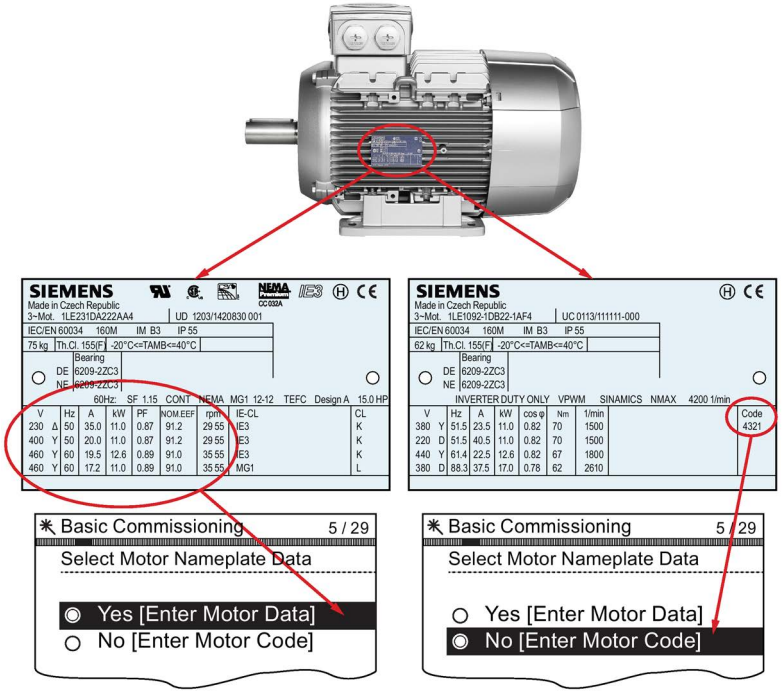


Figure 4-2 Typical motor rating label for input of motor data or motor code

Basic Commissioning

The basic commissioning of the Inverter and motor comprises a number of processes. The processes are as follows:

- Basic commissioning
- Application class and control mode
- Calculation of motor and control data

The wizard will guide the user through the basic commissioning process by presenting a number of screens where the user can choose the necessary options and values to commission the Inverter and motor. At the conclusion of the basic commissioning process, the data can be saved to the Inverters memory.

Open Loop Compressor

The Inverter is used to control the output pressure of a compressor to ensure that it adapts to the varying volume of gas that is required to be compressed.

Compressing the gas involves reducing the volume and increasing the pressure within the container to compress the gas.

The setpoint is controlled by the analog inputs.

Fixed Closed Loop Compressor

A constant pressure is required to be maintained within a system utilizing the minimum use of energy.

The pressure in the system is monitored using the PID controller and if the pressure remains constant then the Inverter will run the system at the minimum frequency to maintain the pressure.

The setpoints are controlled by analog input 0.

The feedback from the system are received from the pressure sensor utilizing analog input 1. This feedback is then used by the Inverter to react to changes in the system pressure.

The on/off and reset commands are controlled using digital inputs 0 and 1 respectively.

The general monitoring of the condition of the Inverter is achieved using digital outputs 0, 1 and 2 for drive failure, drive ready and drive running respectively.

Open Loop Fan

This is a basic fan application where the fan is under the control of the Inverter.

Fixed Closed Loop Fan

The purpose of the closed-loop controlled fan application is to maintain a constant airflow within a ventilation system, utilizing as little energy as possible.

A specific airflow and pressure for the fan system is set within the Inverter and these values are directly monitored using the PID controller. Depending on a decrease or increase in pressure readings, the Inverter will increase or decrease the speed of the fan accordingly.

Open Loop Pump

The purpose of this application is to maintain a constant level of fluid in a pumping system and reacting to maintain the pre-determined level even if fluid is being drawn from the system.

The analog input is used to set the frequency setpoint.

Fixed Closed Loop Pump

The closed-loop application allows for the fluid in a tank to be directly monitored using the PID control function.

Boost

At low output frequencies, the V/f characteristics give only a low output voltage. This means that the output voltage can be too low in order to:

- Implement the magnetization of an induction motor
- to hold the load
- to equalize losses in the system
- to provide a breakaway, acceleration or braking torque.

The output voltage can be increased (boosted) in the Inverter using the boost function.

The Boost settings wizard guide the user through the correct setting of the boost function.

PID Wizard

Fixed Closed Loop control is widely used in industrial applications to control a wide variety of processes. A simple closed-loop control uses a feedback signal from the process (such as, temperature, pressure and speed) and a desired value or setpoint. The control system compares the two values and derives an error signal. The error signal is used to control the Inverter and motor to reduce the error.

The error signal processing can be very complex because of the delays in the system. The error signal is processed using a Proportional and Integral differential (PID) controller whose parameters can be adjusted to optimize the performance and stability of the system.

The PID controller wizard guide the user through the PID setting-up process.

Roller conveyor

This wizard can be used for the typical material handling applications, such as conveyor belts, roller conveyors and turn-tables.

The sensors are directly connected to the Inverter to allow their individual status to be sent to the controlling PLC.

Safety Commissioning

This wizard is designed to allow the user to commission the Inverters with safety-integrated functions. The user is guided through the necessary steps to commission the various safety-integrated functions available, depending upon the type of Control Unit to be used with the user application. The wizard will only display the functions that are available for their specific Control Unit; if no safety functions are available, the wizard will not be displayed in the wizard menu structure.

The are two levels of safety commissioning wizards and these are as follows:

- Basic Safety Commissioning - allows the configuration of the safety digital inputs and signals for the following safety functions:
  - Safe Torque Off (STO)
  - ProfiSafe
- Extended Safety Commissioning - allows the configuration of the safety digital inputs and signals for the following safety functions:
  - Safe Stop 1 (SS1)
  - Safe Stop 2 (SS2)
  - Safe Operating Stop (SOS)
  - Safe Low Speed (SLS)
  - Safe Torque Off (STO)
  - ProfiSafe

Each of these wizards can be used to configure inputs and signals for the users specific application requirements.

Fan staging with PID

this application is used to run several fans in parallel depending on the actual airflow requirement.

One fan is under direct control and monitoring of the Inverter, the other fans are started and stopped as required, but no feedback from the other fans is required. The monitoring is performed by the use of pressure sensors utilizing the PID controller.

The analog inputs are used for setting the setpoint and receiving the feedback from the various sensors, to which the PID control will react. The digital outputs are used to control the fans.

Each fan, when started is ran at the minimum frequency; this is done to achieve a uniformed increase in pressure/airflow without causing a surge in pressure within the system.

Since all fans have the ability to be started and stopped by the Inverter, it is possible to use the fans in a different number of sequences to ensure that no one fan is working permanently and the workload is distributed in a balanced manner.

Pump staging with PID

This application is designed to operate a number of pumps in parallel depending on the required demand for water. This allows the system to react in real-time to the demand requirements using the minimum investment in hardware.

Several pumps are operated in parallel with a water supply system. One of the pumps is directly controlled by the Inverter. The remaining pumps, if required, are operated at a fixed-speed.

4.1 Example wizard

Overview of wizards

The following example of how wizards work on the IOP are purely for demonstration purpose only. It should be understood that the screens, questions and steps for each wizard are dependent on the following influences:

- The firmware version of the IOP in use.
- The firmware version of the Control Unit to which the IOP is fitted.
- The type of Control Unit to which the IOP is fitted - not all Control Units have the same functionality and this will change the structure of the IOP menus including the type and number of wizards that will be offered to the user.

⚠ CAUTION

Before commissioning an application

Prior to using the a wizard, it is essential that the user's Control Unit and Power Module have been installed and wired correctly, in accordance with the requirements of the user's application. This is extremely important in the case of commissioning safety-integrated applications. All inputs and outputs must be defined and configured before any commissioning can take place, including the observation and adherence of all local, national and international safety regulations required for the user's application and all devices utilized by the user's application.

Basic commissioning wizards

The basic commissioning wizards all the user to commission the converter in both standard and safety modes. If the converter is a safety variant both wizards will be presented in the wizards menu by default. All other wizards can be downloaded using the IOP updater tool, see Firmware and language upgrade (Page 23).

The basic commissioning wizard presents three levels of commissioning, as follows:

- **Expert Mode** - this mode presents the user with a detailed list of all relevant parameters that require to be configured.
- **Standard Drive Control** - this mode presents the user with the necessary input screens for standard applications.
- **Dynamic Drive Control** - this mode presents the user with the necessary input screens for more complex applications.

The Standard Drive Control and Dynamic Drive Control are specifically designed to work with the PM240, PM240-2, PM330 Power Modules and the SINAMICS G120C converter.

Note

Macro source selection

During the basic commissioning process, the user will be presented with a list of preset macros that determine the configuration of converter. Every Control Unit Operating Instructions contain a list of the macros that are specific for that particular Control Unit and show the wiring configurations for each macro. For further information, see the relevant Operating Instructions and Basic commissioning with IOP (Page 33) in this manual.

Application wizards

Wizards for specific types of application can be download using the IOP updater tool, see Firmware and language upgrade (Page 23).

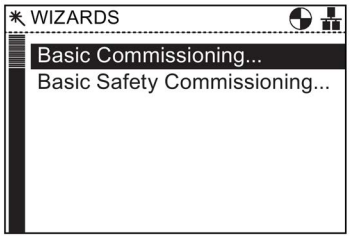
The wiring diagrams for the application wizards are shown in this manual, see Wiring diagrams (Page 36).

4.1.1 Basic commissioning with IOP

Basic commissioning wizard



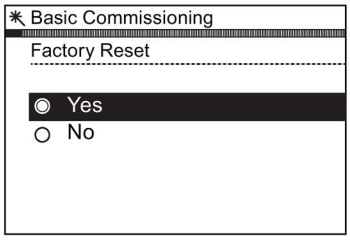
1. Select "**Basic Commissioning...**" from the Wizards menu.



2. Select "**Yes**" or "**No**" to a factory reset.

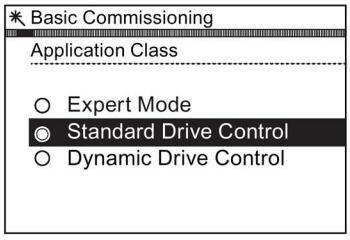
   It is recommended that a factory reset is performed to ensure that the converter is in a known and stable state prior to commissioning.

   Once "**Yes**" is selected the IOP will initiate a factory reset immediately.



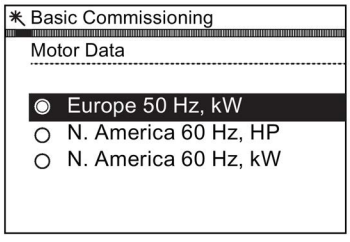
3. On completion of the factory reset the "**Application Class**" is selected.

   In this example the "Standard Drive Control" is selected.

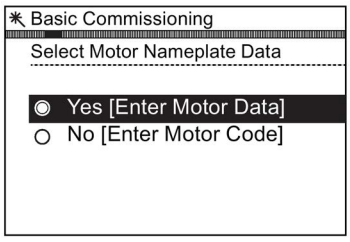


4. Select the correct Motor Data for your Inverter and attached motor.

   This data is used to calculate the correct speed and displayed values for the application.

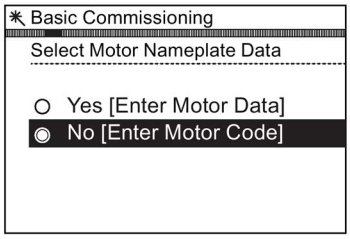


5. Select "**Yes (Enter Motor Data)**" to manually enter the motor data from the rating label of the motor.



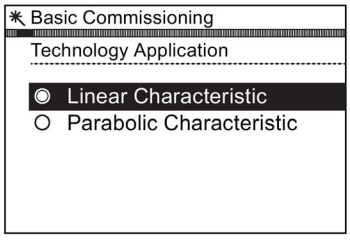
OR

6. Select "**No (Enter Motor Code)**" to enter the motor code from the motor rating label.
   All the relevant motor data will be automatically entered.

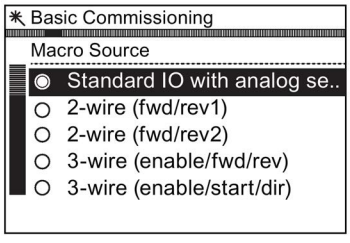


7. The IOP will then present a number of screens, specific to your selction of Step 5 or Step 6. Enter the relevant data in the appropriate fields as they are presented. You will automatically advanced through the commissioning process. Once the motor data has been entered, the steps shown below will be presented.

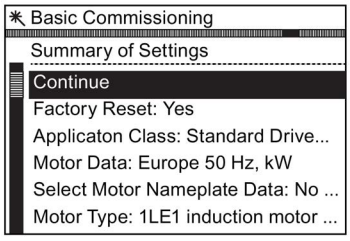
8. Select the Technology Application characteristics of the application.



11. Select the required macro source.
    See Basic commissioning with IOP (Page 33).

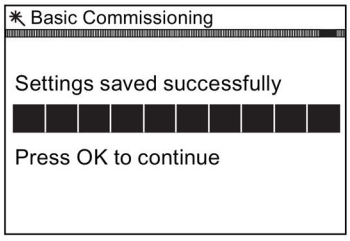


15. A summary of all the settings are displayed.
    If the settings are correct, select continue.



16. The final screens gives two options:
    - Save settings
    - Cancel Wizard

    If the save option is selected, the settings are saved to the converter memory. The location of the saved data is assigned using the "**Parameter Saving Mode**" function in "**Parameter Settings**" in "**Menu**".



Examples of macro (P0015) IO pre-assigments

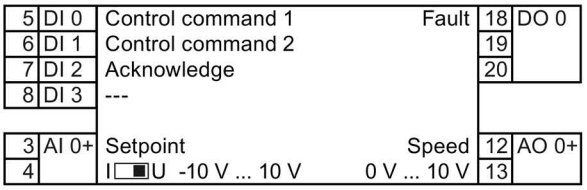
The following example shows the pre-assigned inputs and outputs that are setup automatically depending upon the macro that is selected during basic commissioning.

The input and output assignments are specific for each individual type of Control Unit and therefore, the information given below is only as an example.

It is important that the user refers to the Operating Instructions for their specific Control Unit where detailed information is given regarding the pre-assignment of inputs and outputs.

It is possible to manually configure the inputs and outputs if a suitable macro cannot be found for the users application; detailed information on manually configuring the input and outputs is also given in the Operating Instructions for each specific Control Unit.

	Macro 12	Macro 17	Macro 18
Two-wire control	Method 1	Method 2	Method 3
Control command 1	ON/OFF1	ON/OFF1 right	ON/OFF1 right
Control command 2	Reversing	ON/OFF1 left	ON/OFF1 left



	Macro 19	Macro 20
Three-wire control	Method 1	Method 2
Control command 1	Enable/OFF1	Enable/OFF1
Control command 2	ON right	ON
Control command 3	ON left	Reversing

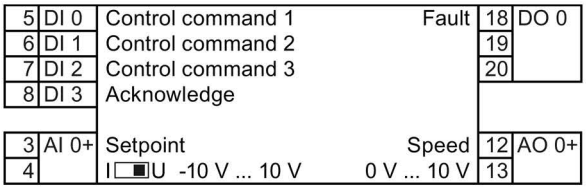


Figure 4-3 Example of two and three wire control macros

4.1.2 Wiring diagrams

Overview

Since the purpose of the IOP Wizards are to guide the user through the setting-up and commissioning of applications, some assumptions must be made as to the technical knowledge, qualifications and practical knowledge of the potential user.

The user must be a qualified and experienced drives engineer - this is required because they must have a complete understanding of the application that is to be commissioned.

The user must be fully conversant with all the technologies and protocols of the following:

- PLCs - Set-up, programming and communications
- Inverters - Set-up, wiring and commissioning
- All relevant international, local safety regulations

The information provided will be the information required to wiring the application with regards to the Inverter inputs, outputs and communications connections.

Prerequisite actions

The user must ensure that all the following actions are completed prior to using the IOP wizards:

- All necessary equipment is available and installed correctly, according to the relevant wiring diagram for the specific application wizard.
- All wiring of the Inverter, motor and other devices used within the application is complete in accordance to the enclosed wiring diagrams.
- All necessary information, such as the rating label information of the motor, is available.
- All components of the system have been tested to ensure their correct and safe installation.

IOP Wizard Information

The IOP will present to the user a menu system, by which they can select the appropriate Wizard for the application. The user will then be presented with a list of questions specific to the application. The user can use the wiring diagrams to answer the questions, concerning connections, input and outputs and their associated functions.

A complete wiring diagram is given in this section for each application.

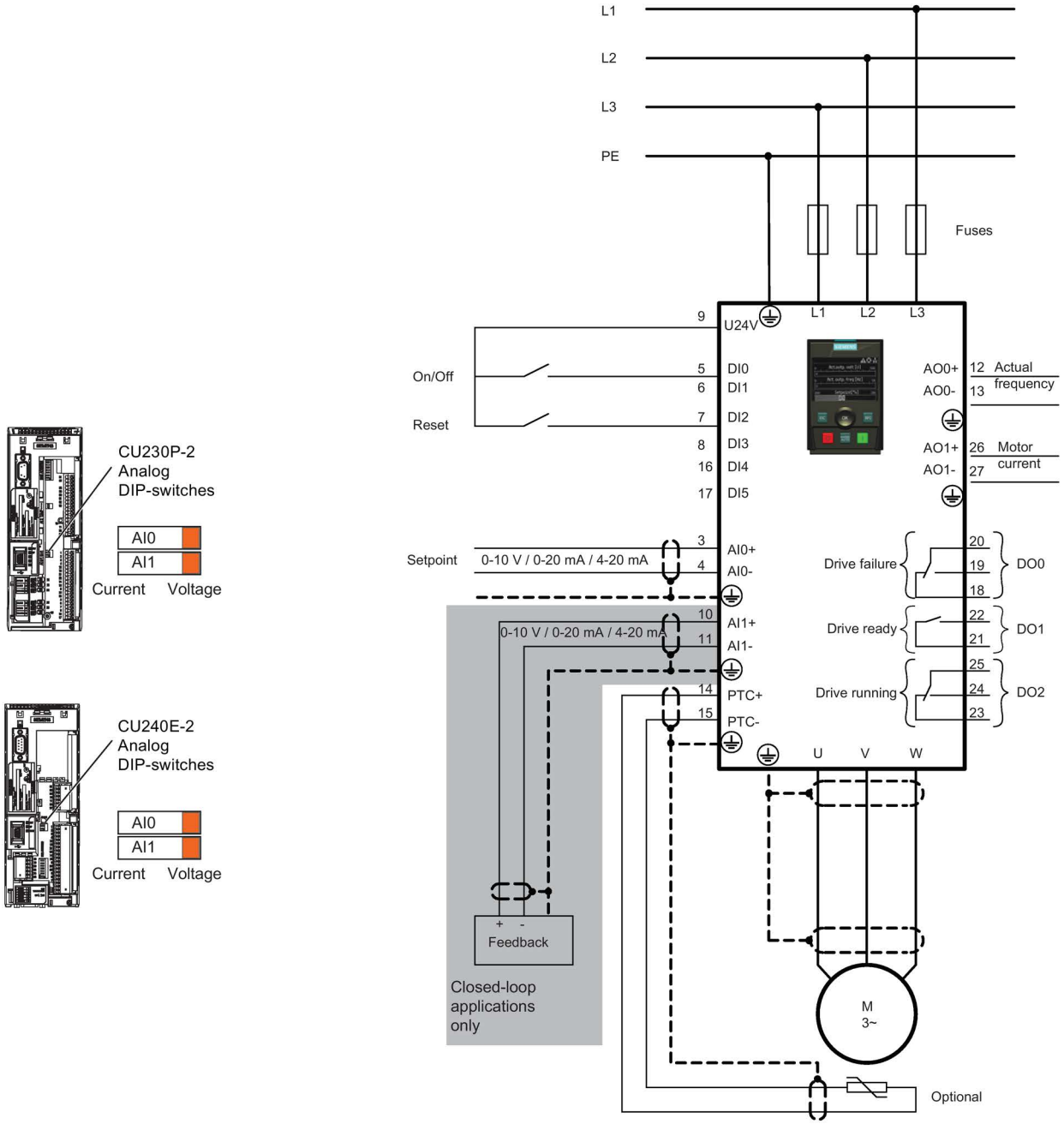


Figure 4-4 Compressor wiring diagram CU230P-2 and CU240E-2

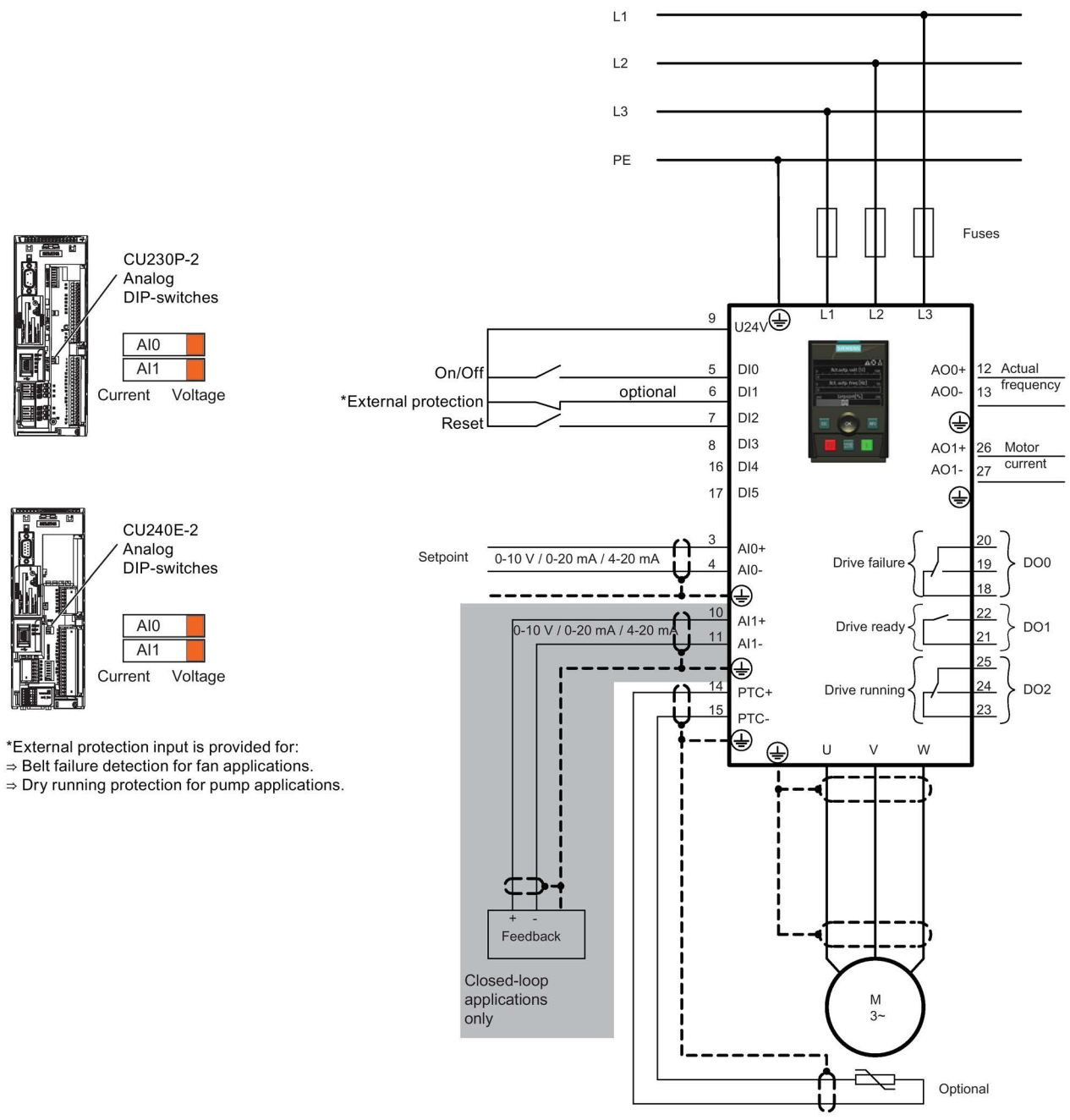


Figure 4-5 Pump and fan wiring diagram CU230P-2 and CU240E-2

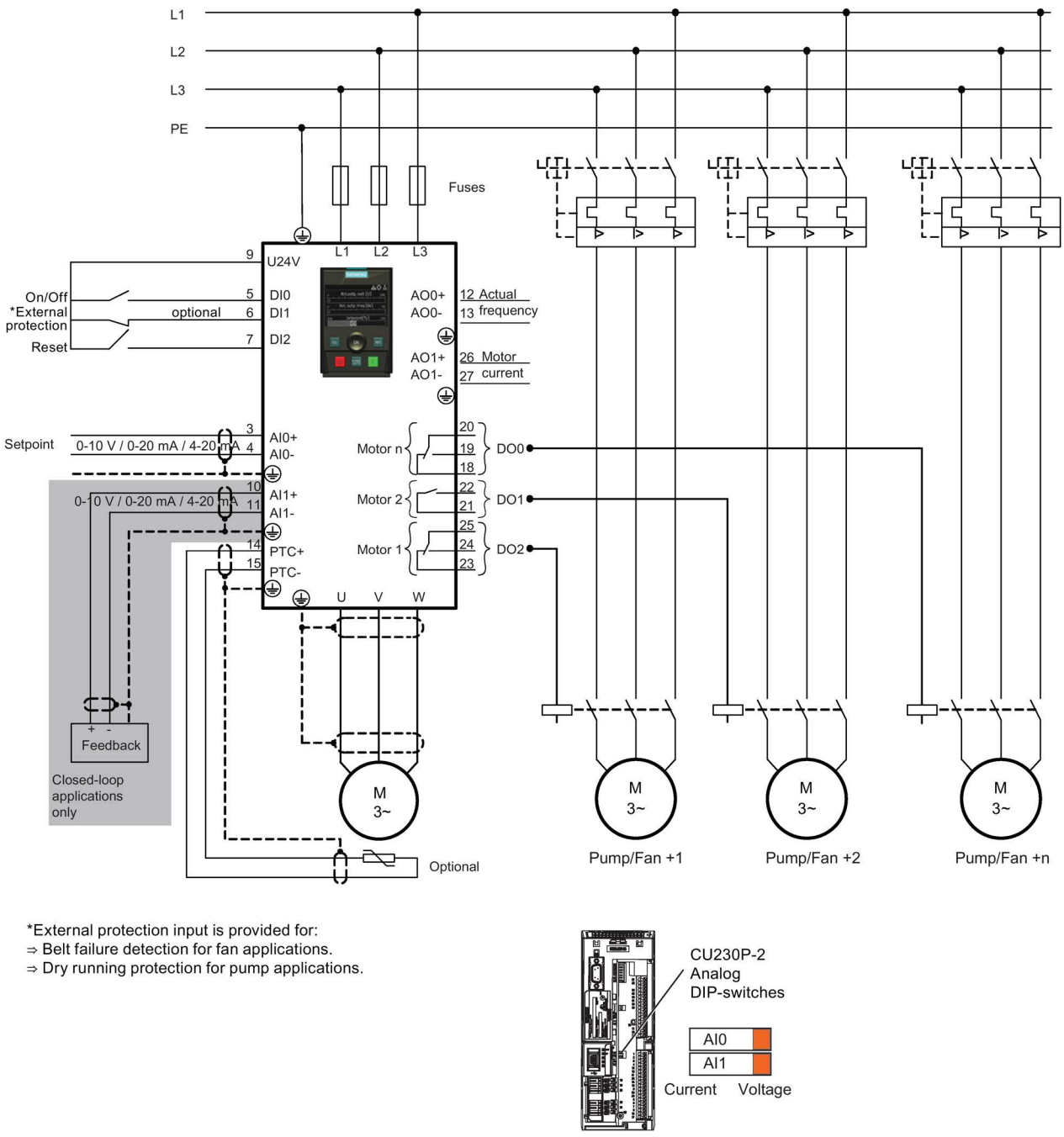


Figure 4-6 Pump and fan staging wiring diagram CU230P-2

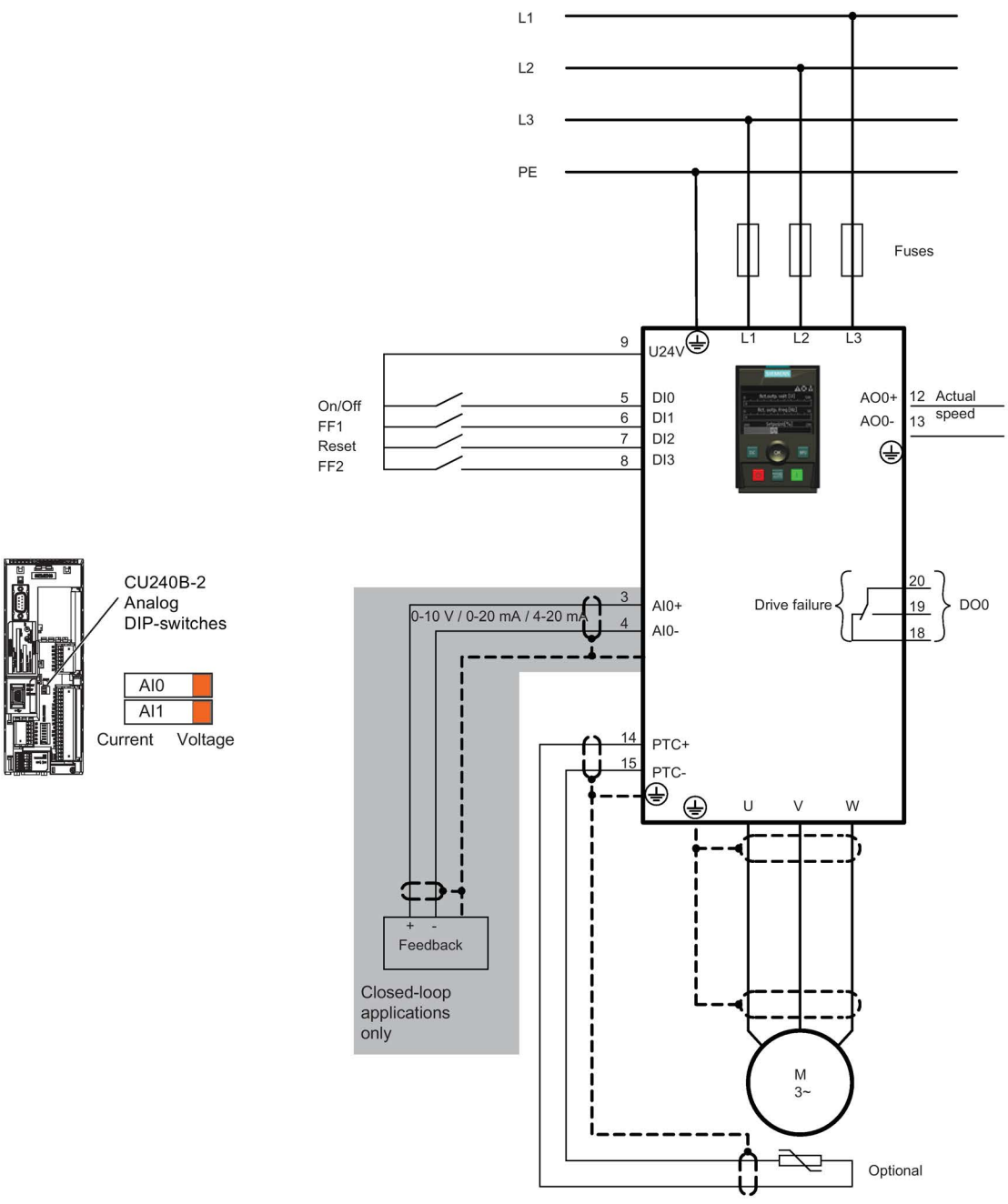


Figure 4-7 Compressor, pump and fan wiring diagram CU240B-2 and G120C

Wiring diagrams for conveyor applications

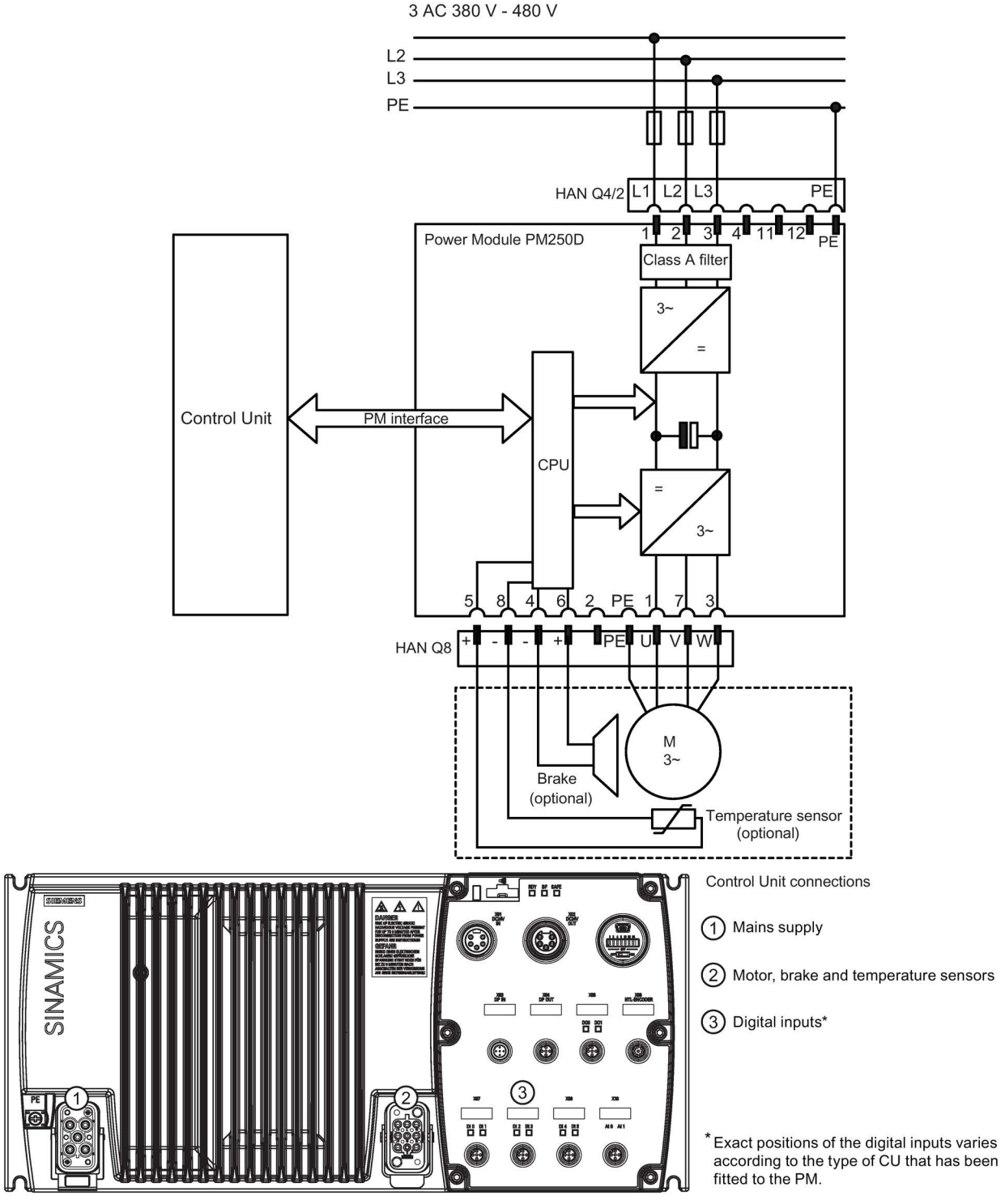


Figure 4-8 Conveyor application wiring diagram

Configuration Information for conveyor wizard

This information allows the user to configure the Inverter for the following applications:

- Roller conveyor with 2 speeds and 2 directions
- Roller conveyor with 2 speeds and 1 direction
- A turntable

Digital connections

The digital inputs are assigned as follows for each application:

Table 4- 1 Roller conveyor (2 directions/2 speeds) and turntable conveyor inputs

Digital input	Function	Device	Abbreviation
DI0	Roller conveyor position F	Sensor	-F
DI2	Roller conveyor position B	Sensor	-B
DI4	Changeover, fast/slow after F	Sensor	-F/S-F
DI5	Changeover, fast/slow after B	Sensor	-F/S-B

Table 4- 2 Roller conveyor (1 direction/2 speeds) inputs

Digital input	Function	Device	Abbreviation
DI0	Roller conveyor position F	Sensor	-F
DI2	Roller conveyor position B	Sensor	-B
DI4	Changeover, fast/slow after F	Sensor	-F/S-F

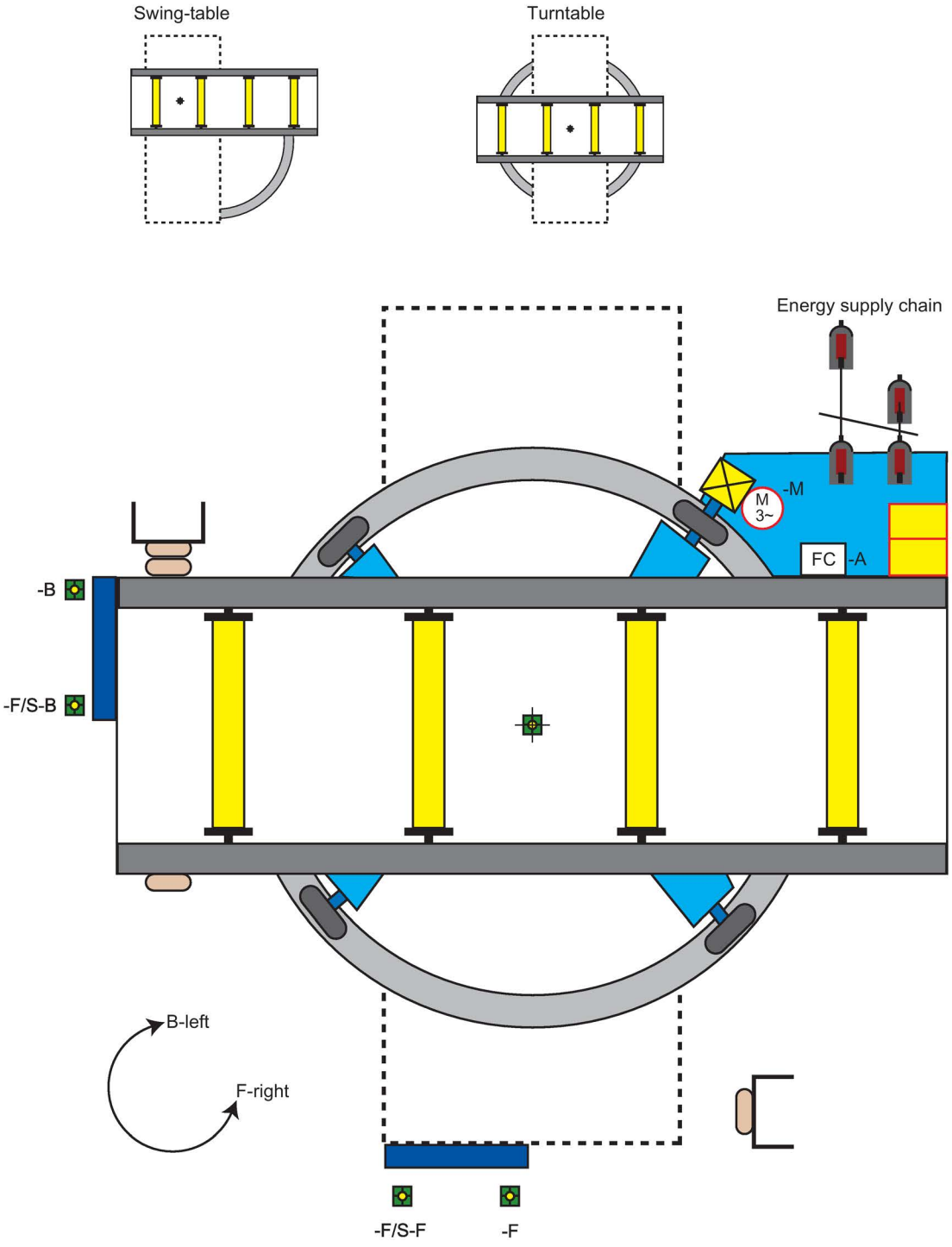


Figure 4-9 Rotary conveyor schematic

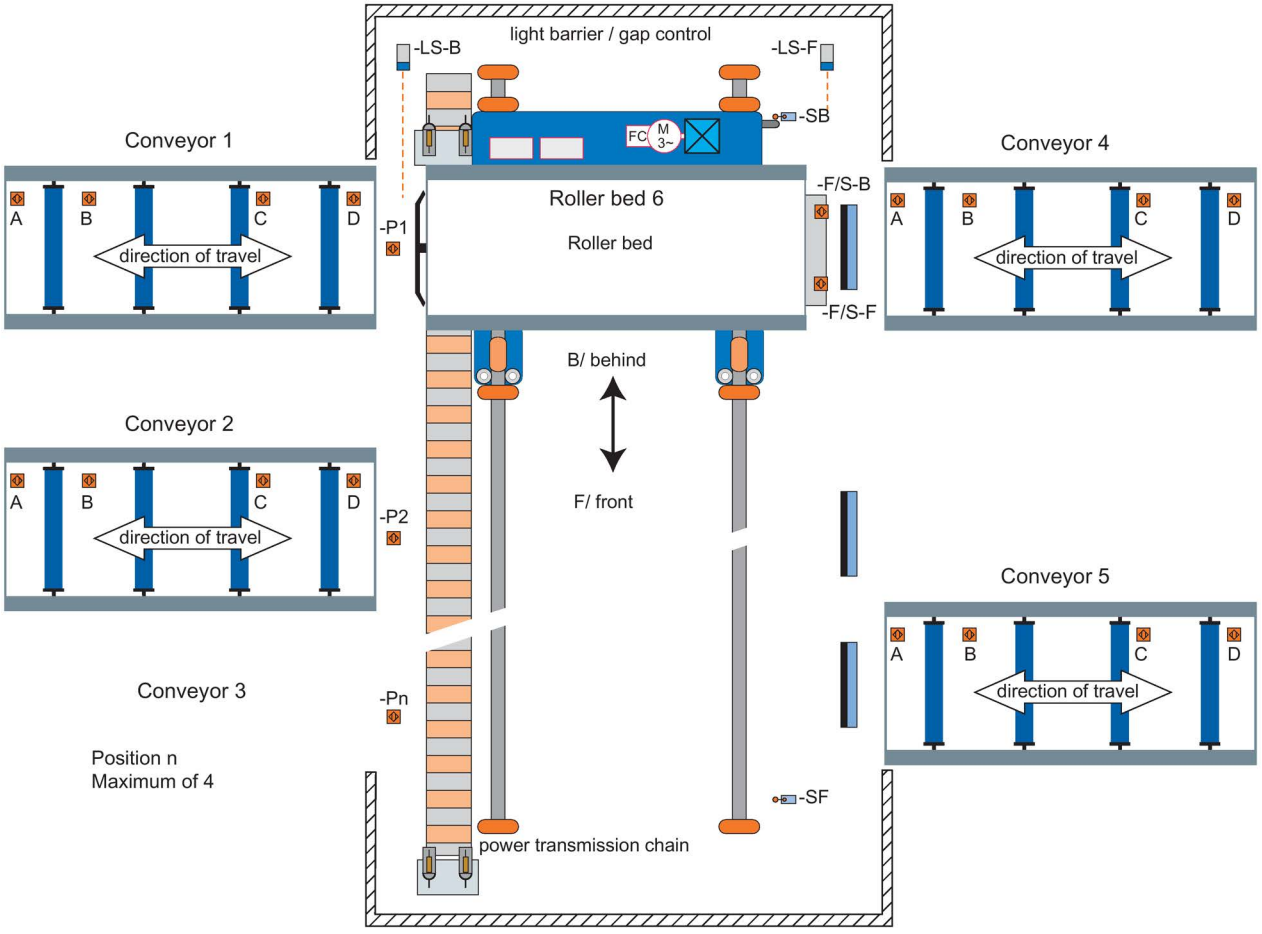


Figure 4-10 Roller conveyor schematic

Control

5

Overview

The Control menu allows the user to change the following settings in real-time:

- Setpoint
- Reverse
- Jog
- Custom Hand mode
- Startup in Hand mode
- Hand/Auto disable

The control menu is accessed from the menu at the bottom-centre of the Status screen, as shown below.

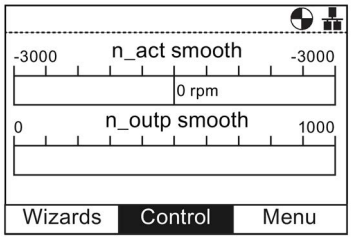


Figure 5-1 Status screen with the Control Menu highlighted

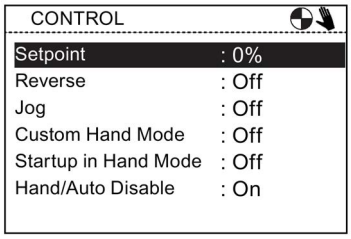
Setpoint

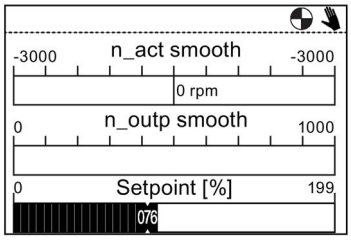
The setpoint value determines the speed at which the motor runs as a percentage of its full range of motion.

To change the setpoint, the following actions should be performed:

1. Rotate the **Wheel** to select "**Control**".
2. Press the **Wheel** to confirm selection.
3. The "**Control**" screen is displayed.
4. "**Setpoint**" is already highlighted.
5. Press the **Wheel** to select the "**Setpoint**".
6. The "**Setpoint**" screen is displayed.
7. Rotate the **Wheel** to increase or decrease the setpoint.
8. Press the **Wheel** to confirm new setpoint. If the "**Esc**" is given a single or a long press the setpoint is also saved.
9. The "**Control**" screen is displayed.
10. Press "**Esc**" to return to the "**Status**" screen.

The setpoint can only be modified from the IOP when the IOP is in Hand mode. Changing from HAND back to AUTO will reset the setpoint.



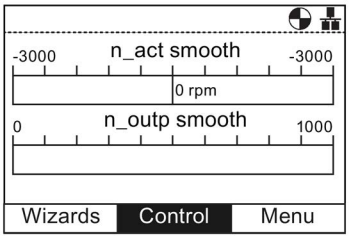


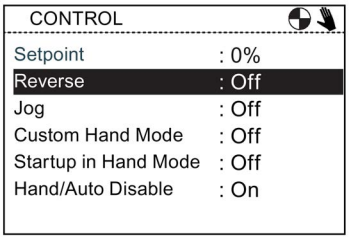
Reverse

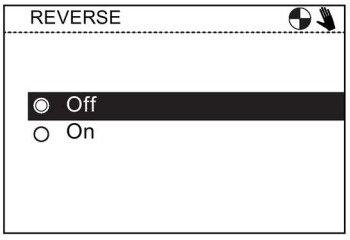
The function of the reverse command is to set the direction of rotation of the motor from its normal forward motion.

To reverse the direction of the motor, the following actions should be performed:

1. Rotate the **Wheel** to select "**Control**".
2. Press the **Wheel** to confirm selection.
3. The "**Control**" screen is displayed.
4. Rotate the **Wheel** to select the "**Reverse**" option.
5. Press the **Wheel** to confirm selection.
6. The "**Reverse**" screen is displayed.
7. Rotate the **Wheel** to select "**On**" or "**Off**".
8. Press the **Wheel** to confirm the selection.
9. The display returns to the "**Control**" screen.
10. Press "**Esc**" to return to the "**Status**" screen.





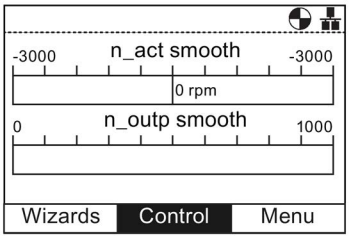


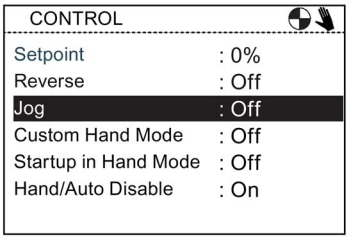
Jog

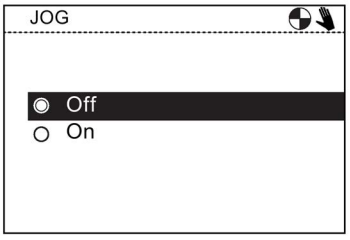
The Jog function, when selected will allow the motor to be manually rotated by a pre-determined value with each press of . If is pressed continuously, the motor will rotate continuously until is released.

To enable or disable the Jog function, the following actions should be performed:

1. Rotate the **Wheel** to select "**Control**".
2. Press the **Wheel** to confirm selection.
3. The "**Control**" screen is displayed.
4. Rotate the **Wheel** to select the "**Jog**" option.
5. Press the **Wheel** to confirm selection.
6. The "**Jog**" screen is displayed.
7. Rotate the **Wheel** to select "**On**" or "**Off**".
8. Press the **Wheel** to confirm selection.
9. The display returns to the "**Control**" screen
10. Press "**Esc**" to return to the "**Status**" screen.







Note

Selection of Jog frequencies

It is important that the Jog parameters P1058 (Jog right) and P1059 (Jog left) are set to the required frequencies for the users application. The default jogging setpoint for both parameters is 5 Hz (150 rpm).

When the Jog left and Jog right (Jog1 and Jog 2) have been set; it is necessary to do a long press of the "INFO" key to select the other jog mode.

5.1 Custom Hand mode

Overview

The custom hand mode allows the user to setup a command source and setpoint source directly from the Intelligent Operator Panel (IOP).

When the custom hand mode has been set, the IOP wheel can be used as the setpoint source.

The Auto mode is unaffected by any changes made by the custom hand mode function.

A breakdown of all the interconnection inputs are given in the table below.

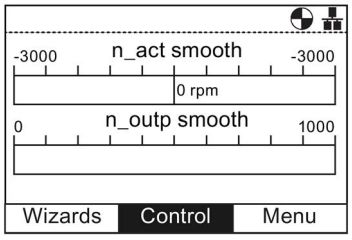
An example of setting up the custom hand mode is given in the instructions below.

Table 5- 1 Interconnection inputs for Status Word 1 in Custom Hand mode

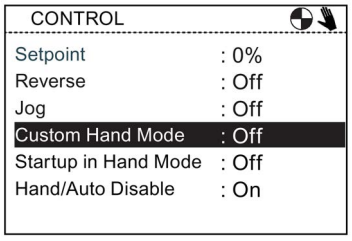
Standard interconnection				
r8540	**STW 1 from IOP**	**Binector Inputs (BI)**	**p8542**	**Effective STW1 in Custom Hand mode**
Bit0	ON/OFF key	->	Bit0	ON/OFF1
Bit1	Two quick press of the OFF key	->	Bit1	OFF2
Bit2	A long press of the OFF key	->	Bit2	OFF3
Bit3	Reserved	->	Bit3	Inhibit/enable operation
Bit4	Reserved	->	Bit4	Ramp-function generator enable
Bit5	Reserved	->	Bit5	Continue ramp-function generator
Bit6	Reserved	->	Bit6	Setpoint enable
Bit7	Alarms menu acknowledge all faults	->	Bit7	Acknowledge faults
Bit8	Jog 1 (Control menu)	->	Bit8	Jog 1
Bit9	Jog 2 (Control menu)	->	Bit9	Jog 2
Bit10	Reserved	->	Bit10	Control by PLC
Bit11	Change direction (Control menu)	->	Bit11	Direction of rotating - reversed
Bit12	Reserved	->	Bit12	Speed control enable
Bit13	Reserved	->	Bit13	Motorized potentiometer, setpoint, increase
Bit14	Reserved	->	Bit14	Motorized potentiometer, setpoint, decrease
Bit15	Reserved	->	Bit15	CDS selection
Standard interconnection				
r8541	**Speed setpoint from IOP**	**Connector Inputs (CI)**	**p8543**	**Effective speed setpoint in Custom Hand mode**
	N_soll OP	->		Speed setpoint

Setting up Custom Hand mode example

1. Select the "**Control**".



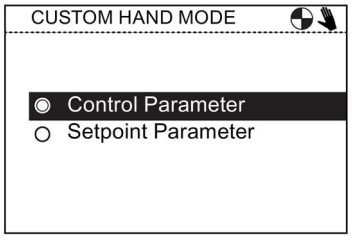
2. Select "**Custom Hand Mode**".



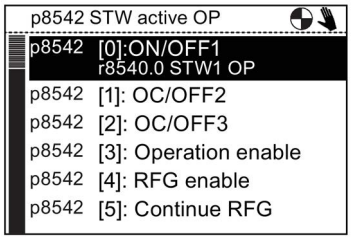
3. Select "**On: Custom Hand Mode**".



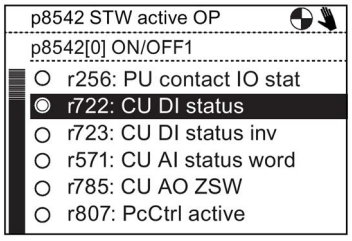
4. Select "**Control Parameter**" to setup the control source.



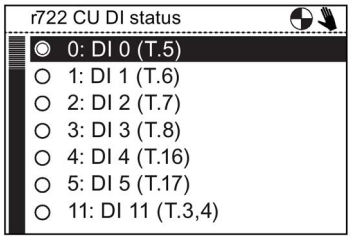
5. Select the required function. In this example, the ON/OFF1 command is selected.



6. Select the source of the command signal. In this example, a digital input will be used.

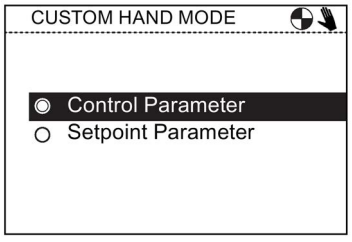


7. Select the actual digital input that will receive the command signal. In this example, it is digital input 0 (DI0).

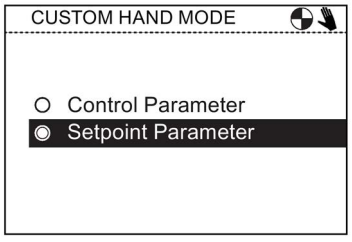


Once the command signal input has been selected, the IOP will return to the Status Word selection screen. This allows the user to configure any other command signals that may be required.

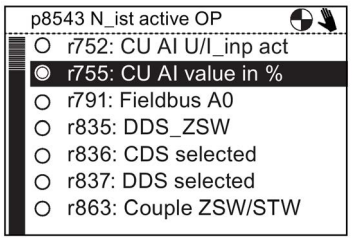
8. Setup any additional command signal inputs, or press **ESC** twice to return to the "**Custom Hand Mode**" screen.



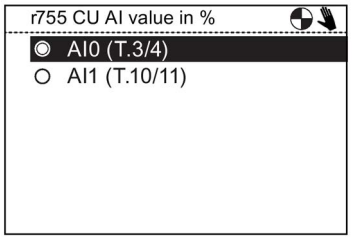
9. Select "**Setpoint Parameter**" to setup the setpoint signal and value.



10. Select the setpoint signal source. In this example, it is an analog input with a percentage value scale.



11. Select the actual analog input that will receive the setpoint signal. In this example, it is Analog Input 0 (AI0).



Once the setpoint signal input has been selected, the IOP will return to the Setpoint selection screen then press **ESC** for >3 secs, to return to the status screen.

The converter is now setup to receive the ON/OFF1 command from Digital Input 0 (DI0) and the speed setpoint from Analog Input 0 (AI0), from the controlling PLC.

5.2 Startup in Hand mode

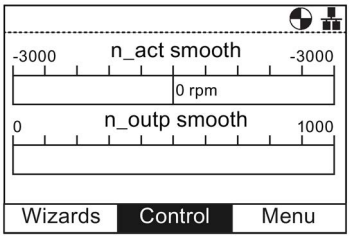
Overview

Startup in Hand mode allows the converter, under the control of the Intelligent Operator Panel (IOP), to startup in Hand mode automatically. The command source is then taken from the off and on buttons of the IOP.

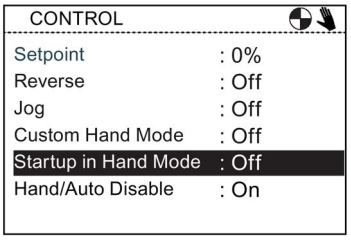
An example of setting up the Startup in Hand mode is given in the instructions below.

Setting up Startup in Hand mode example

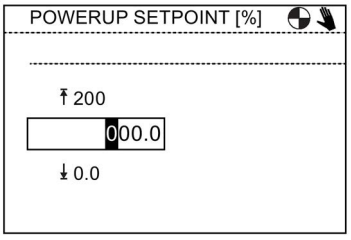
1. Select the "**Control**".



2. Select "**Startup in Hand Mode**".



3. Set the required speed setpoint as a percentage value.



The IOP will automatically return to the Control menu and show that "**Startup in Hand Mode**" is "**On**".

The converter, after a power-cycle will automatically startup in Hand mode, but the attached motor will not run until the run command is given by the buttons on the IOP.

5.3 Hand/Auto disable

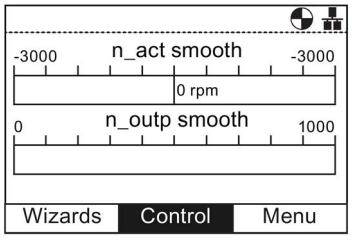
Overview

The Hand/Auto disable function disables the HAND/AUTO key on the Intelligent Operator Panel (IOP) and pressing the key will not produce any action by the IOP.

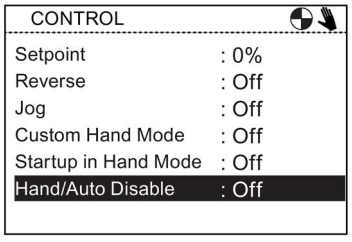
An example of setting up the Startup in Hand mode is given in the instructions below.

Setting up the Hand/Auto disable function

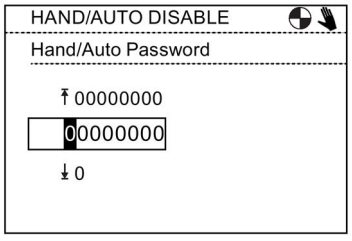
1. Select the "**Control**".



2. Select "**Hand/Auto Disable**".

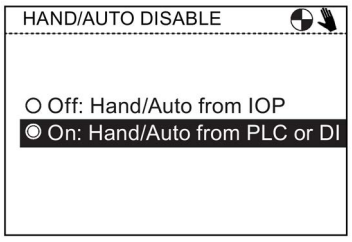


3. Enter the password (default password is: 00000000).

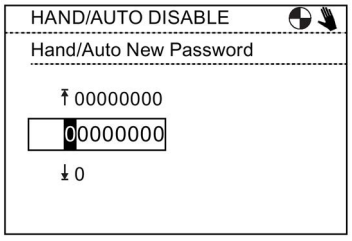


If the incorrect password is entered, the IOP will return to the "**Control Menu**".

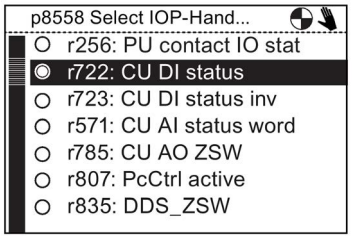
4. Select "**On: Hand/Auto from PLC or DI**".



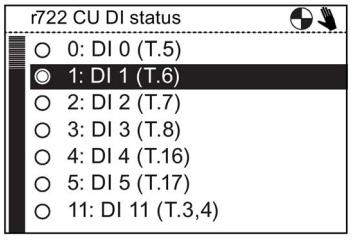
5. Enter the password again, or use this screen to create a new password.



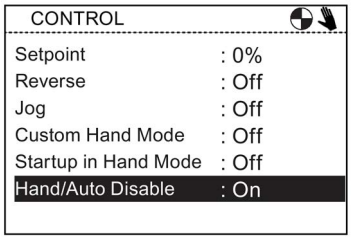
6. Select the signal source. In this example, parameter r722 CU DI Status, is used.



7. Select the actual digital input that will receive the control signal. In this example, digital input 1 (DI1) is used.



8. Press **ESC** once, to return to the "**Control Menu**"



The HAND/AUTO button is now disabled and local control of the IOP cannot be activated by the HAND/AUTO button.

Note

Power-cycle required to complete the HAND/AUTO disable function

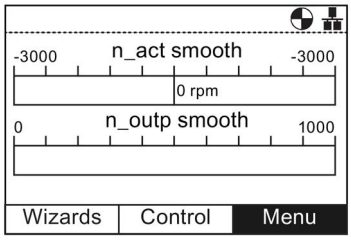
When the HAND/AUTO disable function is initiated the function will not become active until a power-cycle of the IOP has been performed. When the HAND/AUTO disable function is turned off, again, a power-cycle of the IOP is required to complete the deactivation of the function.

Menu

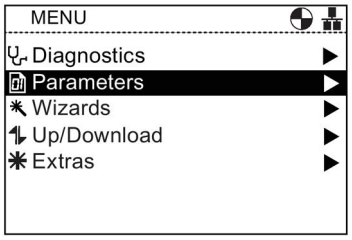
6

6.1 Overview

The "Menu" is selected from the three menu options at the bottom of the IOP screen. If the menu options are not displayed, then one press of the Wheel will display the menu options.



Menu selection



Menu screen

When the "Menu" option is selected the following functions are displayed:

- Diagnostics
- Parameters
- Wizards (this is a shortcut to the main Wizards menu)
- Up/Download
- Extras

By rotating the Wheel the required function can be highlighted. Pushing the Wheel confirms the selection and further sub-menus will be displayed. Pressing **"Esc"** once, will return the IOP to the previous screen, a longer press will return the display to the "Status" screen.

Note

IOP functional support

The actual menu structure and functionality of the IOP will be influenced by the following factors:

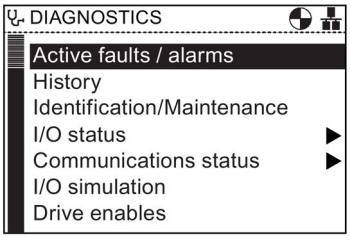
- The software version and type of Control Unit to which the IOP is fitted.
- The firmware and software version of the IOP.
- The selected functional group filtering of the parameters.

6.2 Diagnostics

Diagnostics menu

When the diagnostic function is selected the following options are presented:

- Active faults/alarms
- History
- Identification/Maintenance
- I/O status
- Communications status
- I/O simulation
- Drive enables

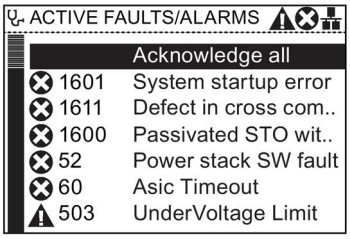


Active faults/alarms

When this option is selected the screen will display any active faults and alarms that have not yet been acknowledged.

Each fault and alarm can be selected and by pressing the **INFO** key or the **OK** key, an explanation of the fault or alarm will be displayed.

Pressing **INFO** or **OK** or **Esc** will return the display to the previous list of faults and alarms.

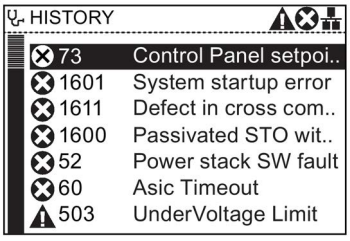


History

When this option is selected the screen will display a list of all previous faults and alarms with the time that they occurred.

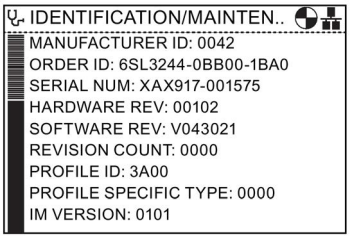
Each fault and alarm can be selected and by pressing the **INFO** key or the **OK** key, an explanation of the fault or alarm will be displayed.

Pressing **INFO** or **OK** or **Esc** will return the display to the previous list of faults and alarms.



Identification/Maintenance

Displays specific technical information regarding the Control Unit and Power Module to which the IOP is attached will be displayed. The actual information displayed depends on the type of Control Unit and Power Module to which the IOP is connected.



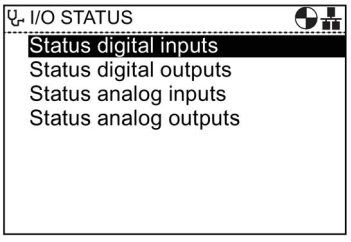
I/O status

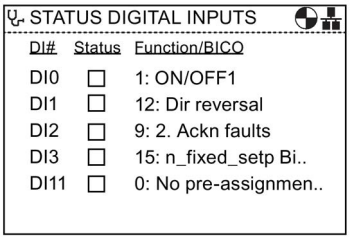
This option displays a list of the digital and analog inputs and outputs of the Inverter and their current status.

This is an information screen and cannot be changed.

Pressing **Esc** will return the display to the previous menu.

In the example shown opposite, the status of the digital inputs are displayed.

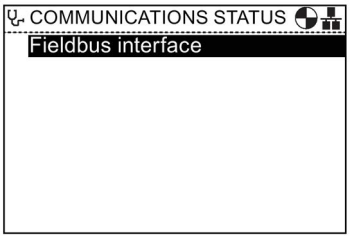


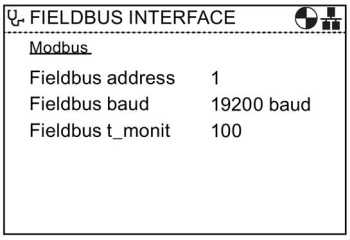


Communications status

The option displays the status of the fieldbus interface and the details of the settings for the data exchange, for example status words and control word lengths.

In the example shown opposite, the status of the fieldbus communications is shown.





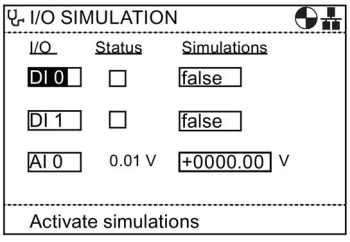
I/O simulation

⚠WARNING

Loss of control of the Inverter

If the Inverter is started using the I/O simulation and the IOP is removed from the Inverter it will not be possible to stop the Inverter running the motor. If the I/O simulation is activated, then only the I/O simulation can be used to stop the Inverter.

The IOP simulation screen allows digital and analog IOs to be simulated without the requirement for external signals. These features are of great benefit during commissioning and fault finding, as the user can quickly simulate a situation without using wires, tools and external equipment.



For example:

- A digital input can be made high without any wires in the terminals.
- An analog input or output can be driven to any value without any wires in the terminals.
- A digital output can be overridden and made high.

The screen presents the following options:

- I/O - Three I/Os can be simulated - two digital and one analog.
- Status - this indicates the real-time status of the input or output. If the square is shaded then the input or output signal is present. This is a read-only section of the screen.

- Control - this column of the screen displays the present status of the input or output and can be altered.

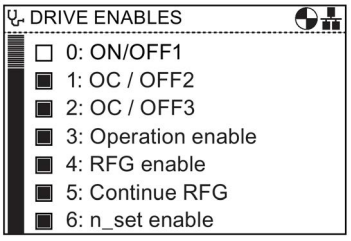
To use the I/O simulation the following actions should be performed:

1. Using the **wheel**, rotate the wheel until the required digital input or output is displayed in the first field.
2. Press **OK**.
3. The relevant control field is highlighted.
4. Using the **wheel**, rotate the wheel until the required control signal is displayed.
5. Press **OK**.
6. Repeat this process until all the fields have been completed as required.
7. When all fields have been completed the "activate the simulation" will be highlighted.
8. Press **OK**. The simulation will start running.
9. While the simulation is running "**Deactivate simulation**" will be highlighted - Press **OK** to stop the simulation.

Drive enables

The drive enables screen displays a list of all the current enabling signals for the Inverter. If the enable signal is present and active it will be selected ■. If the enable signal is not present and is not active it will be unselected □.

This screen is read-only and is for information purposes only.



6.3 Parameters

Parameter menu

Note

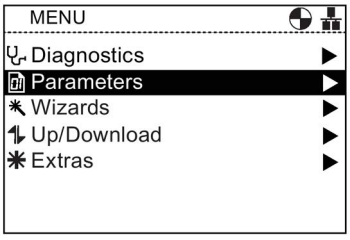
IOP functional support

The actual menu structure and functionality of the IOP will be influenced by the following factors:

- The software version and type of Control Unit to which the IOP is fitted.
- The firmware and software version of the IOP.
- The selected functional group filtering of the parameters.

When editing parameter or search values there is a choice to edit individual digits or an entire value. With a long press of the **Wheel** (>3 sec) it will toggle between the two different value editing modes.

The parameter menu allows the user extensive functionality and access to all the Inverter parameters. When this option is selected the user is given the opportunity to perform parameter orientated functions grouped in the following manner:



- Parameter groups
- Search by number
- My parameters
- Changed parameters

Note

SINAMICS S Drive Objects

The SINAMICS S range of Inverters deal with each component of the Inverter system as unique and separate entities, these unique entities are called "drive objects" (DO). When selecting "Parameters" from the Menu, there is an additional screen that requires the selection of the relevant DO before any parameters can be accessed. The default drive object is always Servo (DO2). If you wish to access the parameter relating to the Control Unit, the select "Control Unit (DO1)". See screenshot below.

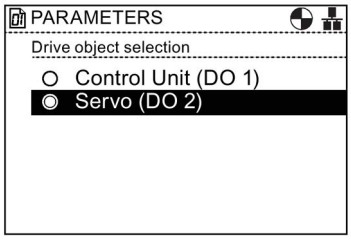
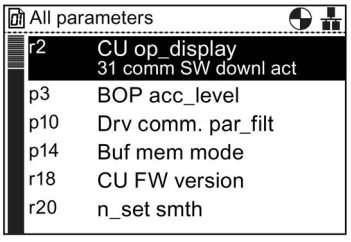


Figure 6-1 Parameters - Drive Object Selection

Parameter groups

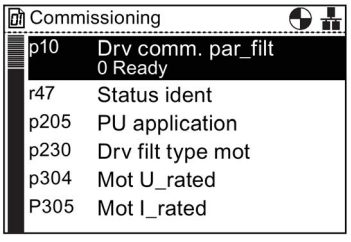
All parameters

This options allows the user access to the individual parameters of the Inverter. The default filter is "Standard" which allows the user access to the most frequently used parameters. The default filter settings can be changed by selecting "Parameter filter" from the "Parameter settings" option in the "Extras Menu".



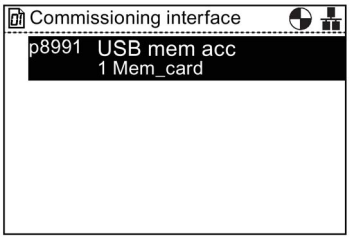
Commissioning

This screen displays a complete listing of all the parameters required for quick commissioning. The parameters are listed in numerical order and can be accessed to either confirm the set values or modified should there be a need to fine tune the application or correct any errors in the parameter values.



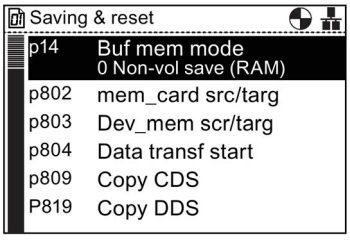
Commissioning interface

Selects the storage medium for access via the USB mass storage.



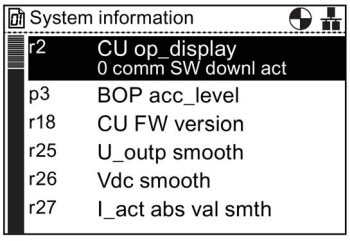
Saving & reset

This option allows the user access to all the parameters regarding the saving and reset functions of the Inverter. Each parameter displays is currently set value and these can be modified if required.



System information

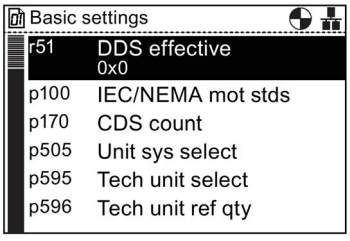
This screen displays all the parameters that contain system information regarding the Inverter. The majority of these parameters are read-only and are for information purposes only.



Basic settings

Displays the effective Drive Data Set (DDS).

Each basic setting can be selected and modified if necessary.

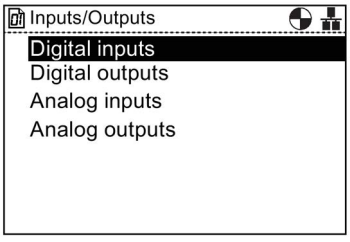


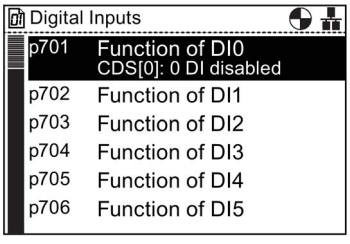
Inputs/outputs

This option allows access to all the necessary parameters to configure the following signals:

- Digital inputs
- Digital outputs
- Analog inputs
- Analog outputs

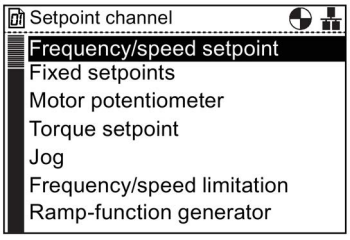
The user can navigate through the various inputs and outputs to see the current configuration of the inputs and outputs and, if necessary access the parameters directly to modify their values. In the example screen opposite, the parameters for the digital inputs is shown.





Setpoint channels

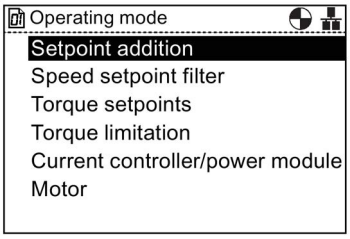
This option allows the user to display and modify the following setpoint parameters:



- Frequency setpoint
- Fixed setpoints
- Motor potentiometer
- Torque setpoint
- Jog setpoint
- Frequency limitation
- Ramp-function generator

Operating mode

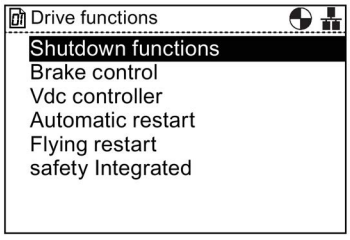
This option allows the user to display and modify the operating mode parameters:



- Setpoint addition
- Speed setpoint filter
- Torque setpoints
- Torque limitation
- Current controller/power module
- Motor

Drive functions

This option allows the user direct access to the parameters regarding the following drive functions:

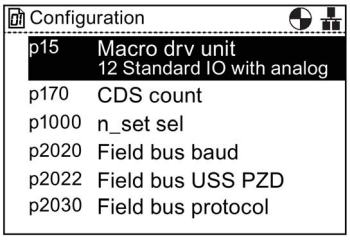


- Shutdown functions
- Brake control
- Vdc controller
- Automatic restart
- Flying restart
- Safety Integrated

It is important that if any parameters concerning the above mentioned functions are to be modified, that the Inverter/motor system is in a safe state prior to the parameter changes.

Communications

This option allows the user direct access to the parameters that control and configure the communications fieldbus of the Inverter. The parameters can be viewed to confirm their settings and values, they can also be modified if they are not read-only parameters.

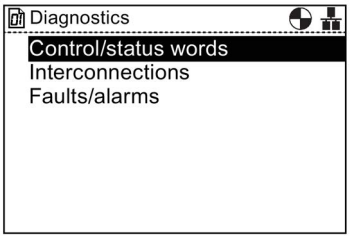


Diagnostics

This option allows the user direct access to the parameters that monitor the state of the system. The are divided into the following functional groups:

- Control/status words
- Interconnections
- Faults/alarms

All the parameters under these groupings are read-only and cannot be modified.

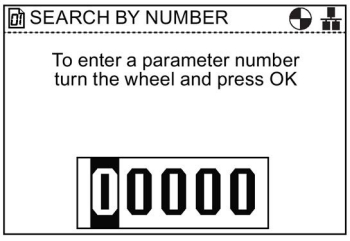


Search by number

This option allows the user to search for a specific parameter number. Should the parameter number not exist, then the nearest parameter to the entered value is displayed.

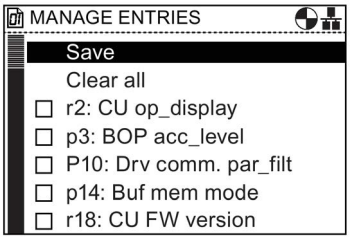
Use the **Wheel** to alter the value of each digit and press the **Wheel** to confirm. The next digit will automatically be highlighted, rotate the **Wheel** to change the value and press the **Wheel** to confirm. Once all fields have been entered, the IOP will display the parameter. If a wrong digit is selected, press **Esc** to go back one digit.

If the parameter number does not exist, the screen will display a choice between "Select a new number" or "Go to the nearest parameter number".



My parameters

This option allows the user to select the parameters that they wish to list. The user is presented with a list of parameters that can be selected. Once selected - only those parameters are displayed when the "My Parameters" option is selected. There are additional options that allow the user to manage their list of parameters.

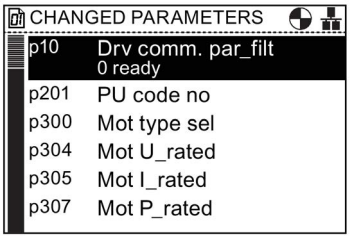


Changed parameters

When the "Changed parameters" option is selected the IOP will search the Inverter parameter list for all the parameters that have had their values changed from the factory default settings.

Once the search is complete, the screen will present a list of all parameters that have changed values.

The individual parameters can be accessed so that their current values can be displayed and modified if necessary.



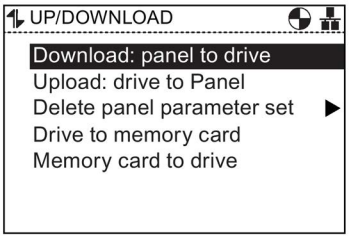
6.4 Up/Download

Overview

The upload and download options allow the user to save parameter sets to the various memory storage that is available to the system.

The following options are presented to the user:

- Panel to drive
- Drive to panel
- Delete panel parameter set
- Drive to memory card
- Memory card to drive



⚠WARNING

Unexpected behaviour of Inverter

During the transfer of data to and from the Inverter, it is essential that the transfer is not interrupted and the process is allowed to be completed. If the process is interrupted, it is possible that the data could be corrupted and the system may behave in an unexpected manner. Should an interruption of the transfer process occur, then it is highly recommended that a factory reset of the Inverter is performed prior to any further parameterization or giving the Inverter control of the application.

Fault screen during up/download

If during the up/download process a fault occurs and the fault screen is displayed, press **Esc** if you wish the up/download to be continued. If OK is pressed, it will cancel the up/download process.

Safety Parameters

If safety parameters are to be downloaded a function test of the safety functions has to be performed. Please refer to the "Safety Integrated Function Manual" which can be found at the hyperlink below.

6.5 Custom parameter sets

Overview

Custom parameter sets can now be created and stored on the Intelligent Operator Panel (IOP).

The IOP can store up to 16 fixed parameter sets and up to 235 parameter sets with customized names.

The steps to create and store a custom parameter set on the IOP is given in the procedure outlined below.

Note

Custom parameter set file name limitations

Although the file name for a custom parameter set can be up to 96 ANSI characters in length, if all the file names are 96 characters long, it will eventually limit the number of parameter sets that can be saved on the IOP.

This is due to the specialized nature of the IOP's internal memory system.

Standard parameter set access

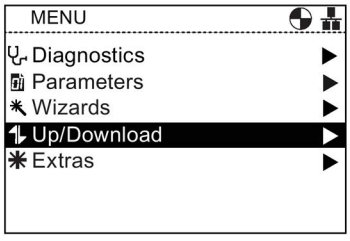
New standard parameter sets can be uploaded from the drive to the IOP, but any standard parameter set (in the "ifs/config" folder) will not be accessible without either moving them to the "cps" folder or deleting the contents of the "cps" folder. This is because, when using customer parameter sets, the IOP automatically look at the "cps" folder. If the "cps" folder is empty, it will then search the "ifs/config" folder.

Creating a custom parameter set

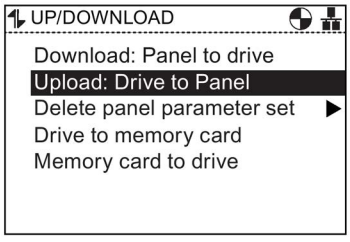
This procedure makes the following assumptions:

- The user is conversant with the copying and renaming of files in the Windows environment
- The user is conversant with commissioning the converter
- The user has already changed all the relevant parameters for their application
- The user has saved their customized parameter set in the IOP under Parameter Set 0 (although the user can assign their parameter set any of the available parameter set numbers).

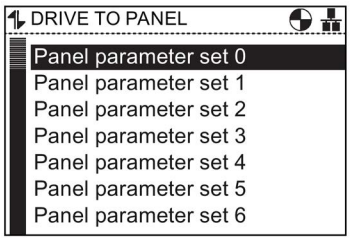
1. Navigate through the "**Menu**" and selected "**Up/Download**"



2. Select "**Upload: Drive to Panel**"



3. Select the parameter set to upload to the IOP.
   In this example, Panel parameter set 0 is used.



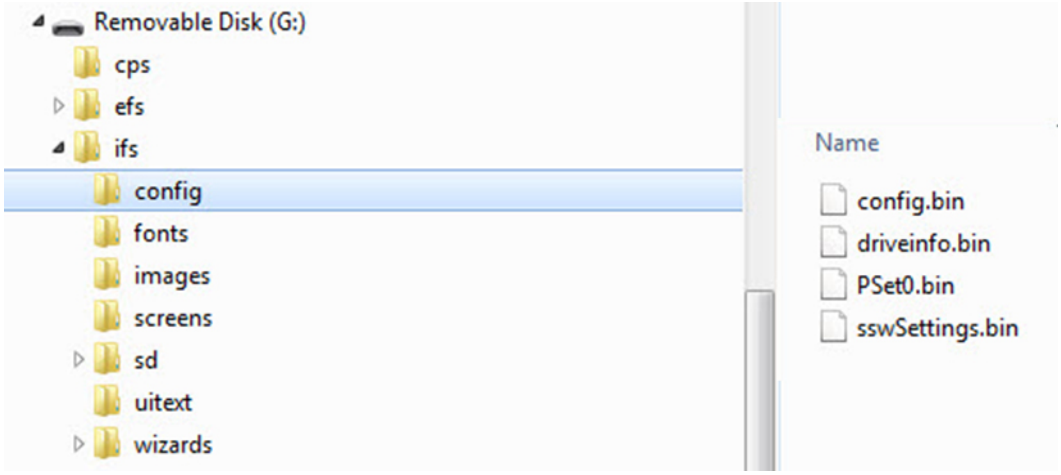
4. Once selected the parameter set is uploaded to the IOP.
   When the save is completed successfully, the screen will display a notification that the save has succeeded.



5. Disconnected the IOP from the Control Unit.
6. Connect the IOP to the PC using the appropriate USB cable.

   The IOP will entered the "Mass Storage" device mode.

7. Open Windows File Explorer and select the "**Removable Disk**", in this example it is **(G:).**



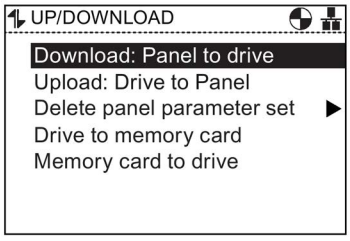
8. Copy the "**PSet0.bin**" file to the "**CPS**" folder



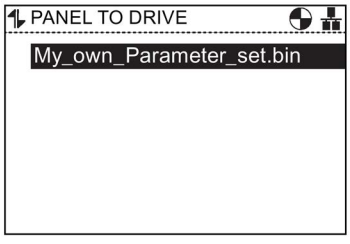
9. Rename the "**PSet0.bin**" file to "**My_own_Parameter_set.bin**"
   Note: The file name can be up to 96 ANSI characters long.

10. Disconnect the IOP from the PC and reconnect the IOP to the Control Unit.

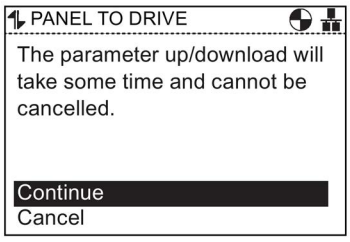
11. Navigate to the "**Up/Download**" and select "**Download: Panel to drive**".



12. Select "**My_own_Parameter_set.bin**".



13. The IOP will display a warning, select "**Continue**" .



14. The parameters will then be downloaded to the converter and the IOP will notify the user that the download has been successful.

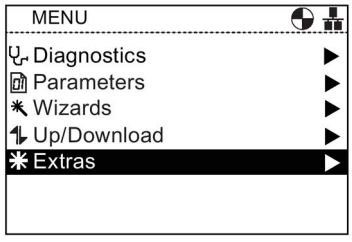


6.6 Extras

Overview

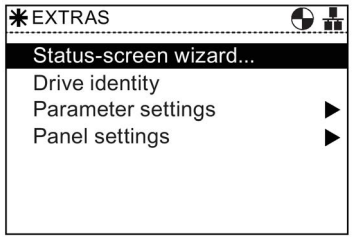
The Extras menu presents a number of options for the configuration of the IOP, these are:

- Status-screen wizard
- I/O Editor
- Drive identity
- Parameter settings
- Panel settings



Status-screen wizard

The status-screen wizard allows the user to configure the information displayed on the status screen. By default it displays output voltage and output frequency of the Inverter. These can be changed by using the wizard to select other physical values of the Inverter. Displayed units of value can be specifically adapted using known conversion factors and with the addition of an offset value to allow the units of measure to be displayed as required for the users application.



Scalar value

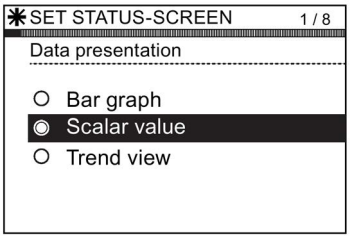
The bar graph (default status screen) and the Scalar value are setup using a similar procedure. The example below show how to setup the Scalar value status screen.

Note

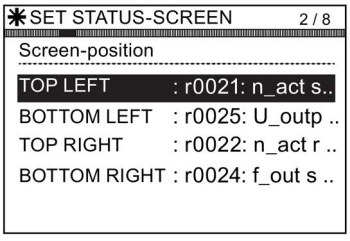
Scalar view limits for the SINAMICS G110D

Normally, four values can be displayed on the IOP in scalar view, but when using the IOP in conjuction with the SINAMICS G110D only two values can be displayed on the IOP screen.

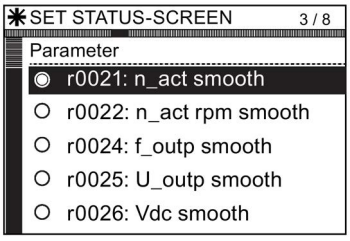
1. From the Set Status-Screen menu select "Scalar Value".



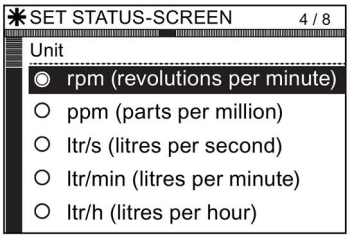
2. Select the screen position of the displayed values



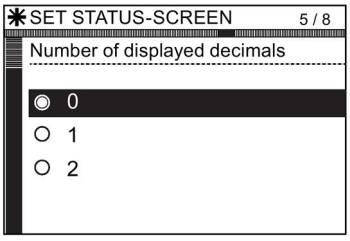
3. Select the parameter values that should be displayed on the status screen.



4. Select the required units of measure to be displayed on the status screen.

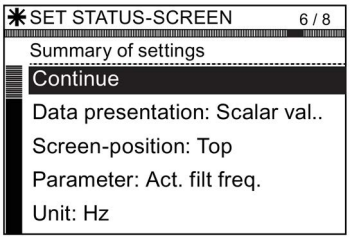


5. Select the required number of decimal places to be displayed for the choosen units of measure.



6. On completion of the user selections, a summary of the settings is displayed.

   If the settings are correct, then select "Continue" to move to the next step.

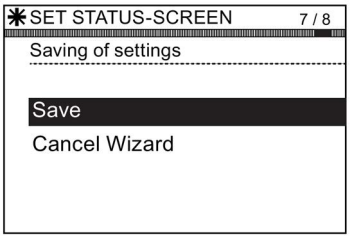


7. The option to save the settings is displayed.

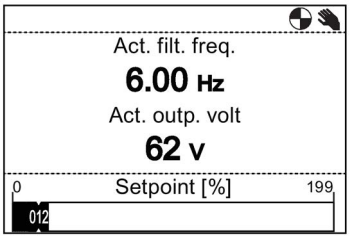
   Select "Save" to save the settings, or select "Cancel Wizard" to exit the Wizard.

   If "Cancel Wizard" is selected, no changes will be saved and the Status Screen will remain unchanged from any previously set configuration.

   If "Save" has been selected, all changes will be saved.



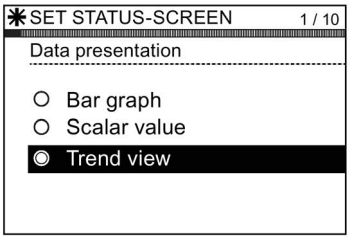
8. When the save has completed successfully, the screen will automatically return to the status screen and display the new status screen as configured in the wizard.



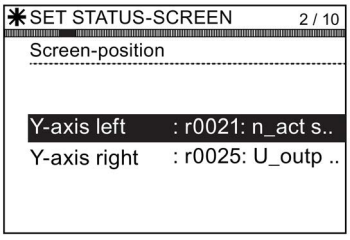
Trend view

The Trend view allows the user to configure real-time monitoring of the Inverter and display the desired values in the form of a graph. To setup the Trend view, the following steps should be performed.

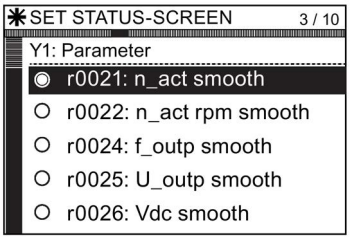
1. From the Set Status-Screen menu select "Trend View".



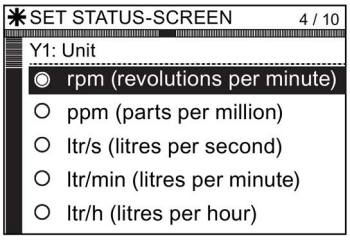
2. Slect the screen position of the displayed values.



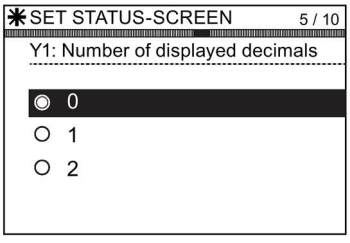
3. Select the parameter values that should be displayed on the status screen.



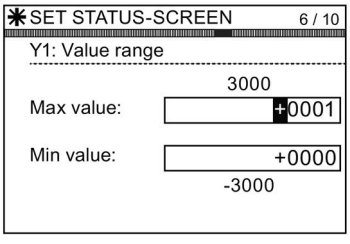
4. Select the required units of measure to be displayed on the status screen.



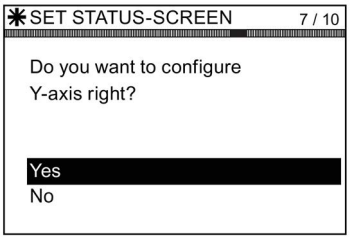
5. select the required number of decimal places to be displayed for the choosen units of measure.



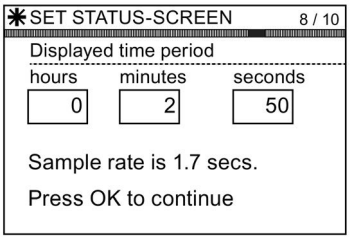
6. Set the range value of the Y1 axis.



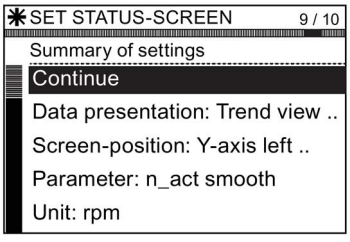
7. If required, the other axis (Y-axis right) can be configured.



8. Set the required time period for the displayed Trend View.

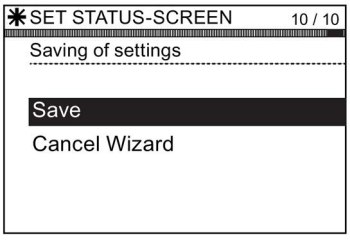


9. A summary of settings is displayed. If they are correct then select "Continue".

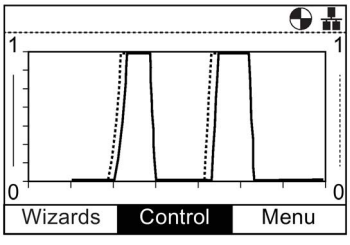


10. Select "Save" to save the settings, or select "Cancel Wizard" to exit the Wizard.

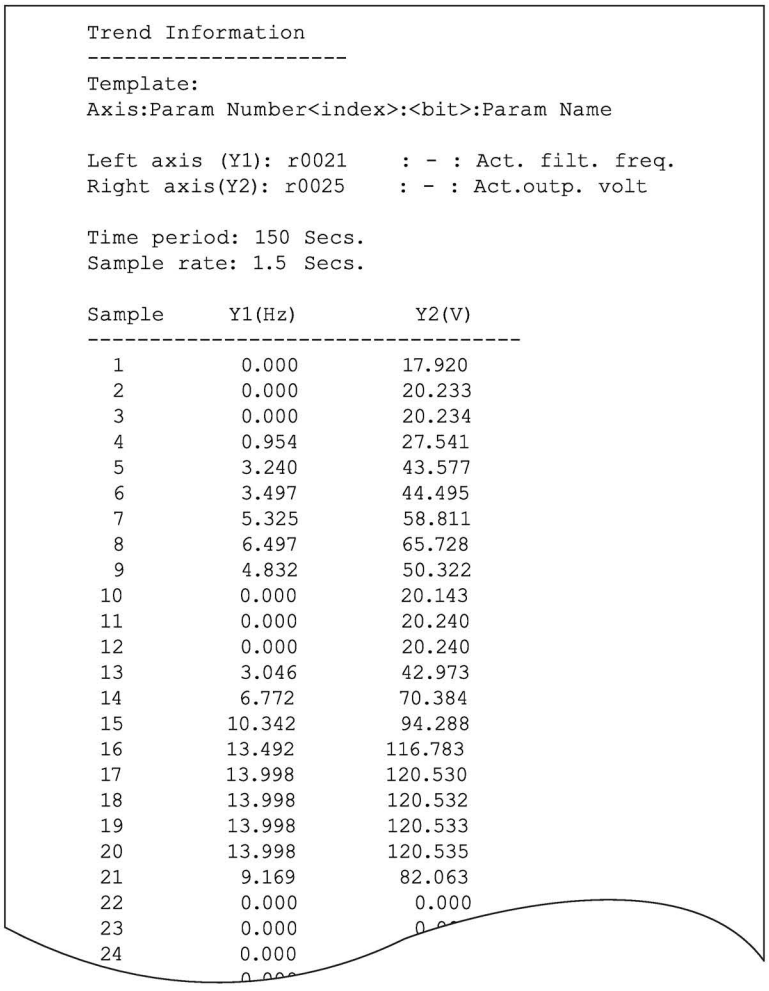
    If "Cancel Wizard" is selected, all changes will be cancelled and the Status Screen will return to the last set Status Screen settings.



When the save has completed successfully, the screen will automatically return to the Status Screen and display the new Status Screen as configured in the Wizard.



With a long press of the **INFO** button, the graph data is written to a Trend information file on the IOP. An example of the Trend information file and its location is given in the figure below.



```
Trend Information
---------------------
Template:
Axis:Param Number<index>:<bit>:Param Name

Left axis (Y1): r0021    : - : Act. filt. freq.
Right axis(Y2): r0025    : - : Act.outp. volt

Time period: 150 Secs.
Sample rate: 1.5 Secs.

Sample     Y1(Hz)          Y2(V)
-----------------------------------
  1          0.000         17.920
  2          0.000         20.233
  3          0.000         20.234
  4          0.954         27.541
  5          3.240         43.577
  6          3.497         44.495
  7          5.325         58.811
  8          6.497         65.728
  9          4.832         50.322
 10          0.000         20.143
 11          0.000         20.240
 12          0.000         20.240
 13          3.046         42.973
 14          6.772         70.384
 15         10.342         94.288
 16         13.492        116.783
 17         13.998        120.530
 18         13.998        120.532
 19         13.998        120.533
 20         13.998        120.535
 21          9.169         82.063
 22          0.000          0.000
 23          0.000          0.0
 24          0.000
             0.000
```

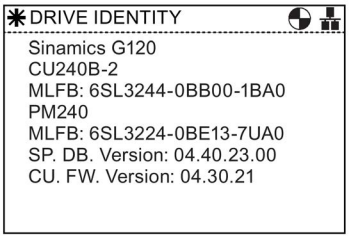
To access the Trend Information file, navigate to the following directory on the IOP:

/efs/health/TrendSample.txt

Figure 6-2 Trend information file

Drive identity

This option allows the user to display the technical details of the components that comprise the Inverter system. This includes the details of the Control Unit and Power Module. This is a read-only screen and cannot be modified.



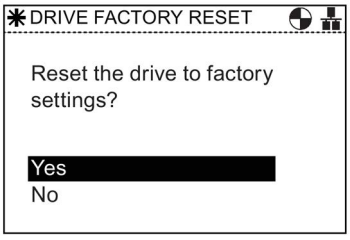
Parameter settings

Drive factory reset

There are two factory reset options:

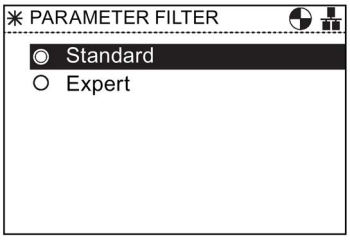
Factory reset - This option reset all parameters to there factory default settings. Any safety parameters that have been modified will not be reset.

Safety factory reset - This option reset all the drive parameters, including the safety parameters back to the factory default settings.



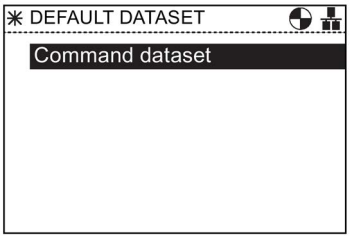
Parameter filter

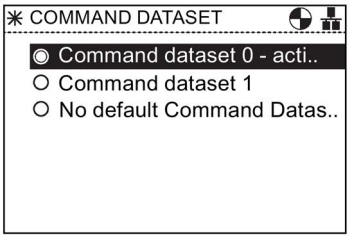
This option allows the user to select the parameter access level. Standard is the default access level, which gives the user access to the most frequently used parameters. Expert level gives access to all available parameters.



Default dataset

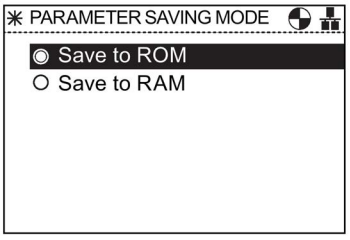
This option allows the user to determine which is the default command dataset when viewing or selecting a new default dataset from the options provided.





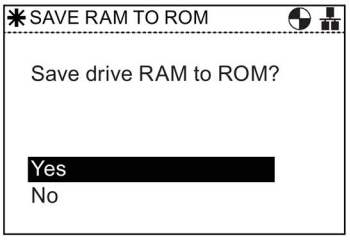
Parameter saving mode

This option allows the user to set the default location for any save function performed on the Inverter.



Save RAM to ROM

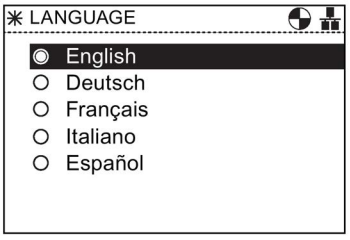
This option allows the user to manual save all drive data from the Inverters internal memory to the internal non-volatile memory - thus data save will be retained within the Inverter until it is overwritten.



Panel settings

Language

This option allows the user to select the language that is used to display information and text on the IOP. This options has been previously described in the initial set-up section of this manual. Languages can be added or deleted using the USB connection on the IOP and a PC.



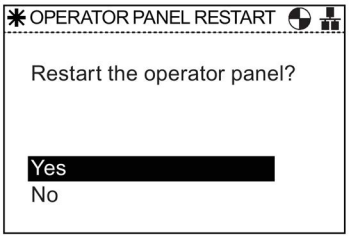
For details of selecting this function see Initial Set-up (Page 18)

The languages on the IOP can be managed using the IOP Updater software. For more information

see Firmware and language upgrade (Page 23).

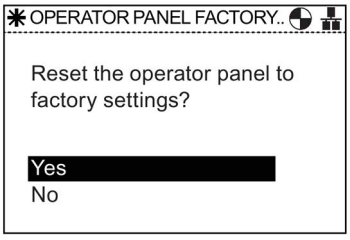
Operator panel restart

Should the user wish to restart the operator panel, this option allows the IOP to be restart without the loss of any settings.



Operator panel factory reset

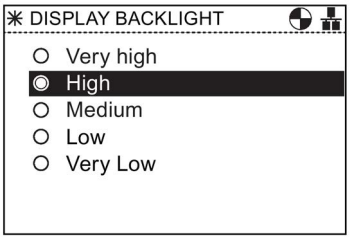
This option resets the IOP to its default factory settings. All previous settings stored on the IOP will be lost. Any parameter sets stored on the IOP will not be deleted.



Display backlight

This option allows the user to change intensity of the display lighting.

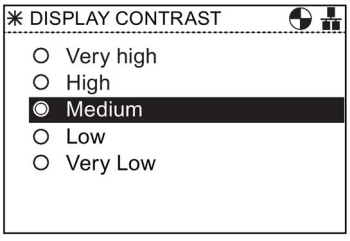
For details of selecting this function see Initial Set-up (Page 18)



Display contrast

This option allows the user to change the contrast between black and white on the display.

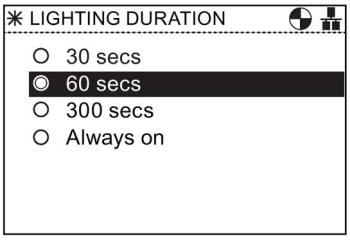
For details of selecting this function see Initial Set-up (Page 18)



Lighting duration

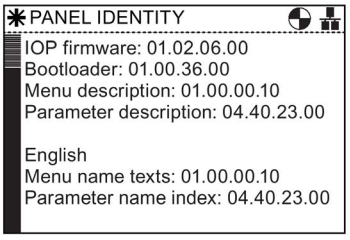
The backlight display, by default, is set to automatically turn off after 60 seconds from the last key press. This time can be adjusted to 30 seconds, 60 seconds, 300 seconds or permanently on.

For details of selecting this function see Initial Set-up (Page 18)



Panel identity

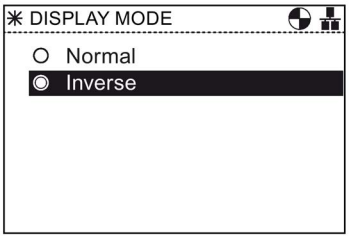
The panel identity screen displays the following technical information regarding the IOP:



- IOP firmware version
- menu description version
- Parameter description version
- Menu texts version
- Parameter name index version
- Wizard description version.

Display mode

Display mode allows the user to select the manner in which text is displayed.



- "Normal" displays black text on a white background.
- "Inverse" displays white text on a black background.

For details of selecting this function see Initial Set-up (Page 18)

6.7 Write Protection

Introduction

The write protection function has been designed to prevent the settings within the Inverter from being inadvertently changed. There is no password required to activate the write protection function.

Given in the table below is a list of the parameters that are excluded from write protection.

Table 6- 1 Parameters and functions excluded from write protection

Parameter	Function
p0003	Sets the access level to read and write parameters.
p0010	Sets the parameter filter to commission an Inverter.
p0124[0...n]	Identification of the Control Unit using an LED.
p0970	Initiates the reset of the Inverters parameters.
p0971	Saves parameters in the non-volatile memory of the Inverter.
p0972	Sets the required procedure to execute a hardware reset of the Inverter.
p2111	Maintains a count of the number of alarms that have occurred since the last reset.
p3950	Access to service parameters - only for service personnel and a password is required.
p3981	Used to acknowledge all active faults of the Inverter.
p3985	Sets the mode to change over the master control / LOCAL mode.
p7761	Activate/Deactivate write protection function.
p9400	Safely remove memory card.
p9484	BICO interconnection searches signal source.

Note

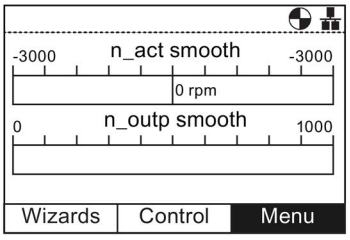
Fieldbus communications using CAN, BACnet and MODBUS

When using these fieldbus communications protocols it is still possible to change the parameter factory settings, even if the write protection function is active. To ensure that write protection, if required, is active over fieldbus communications, then parameter p7762 must be set to 1.

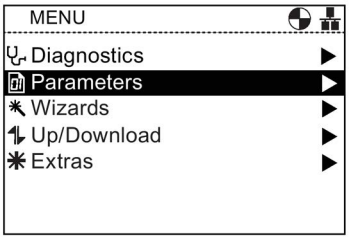
Activating/deactivating write protection

To activate or deactivate the write protection function, the following procedure must be performed:

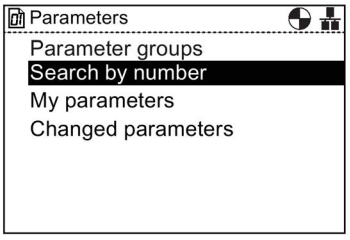
1. Select "Menu" from the main screen.



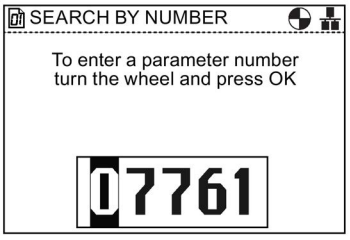
2. Select "Parameters" from the menu.



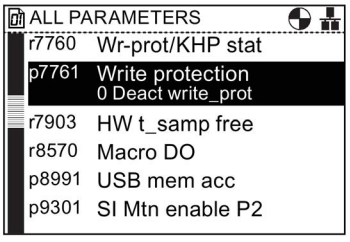
3. Select "Search by number" from the Parameters menu.



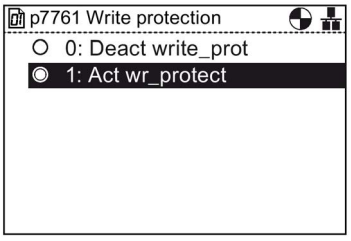
4. Input "07761" then press "OK".



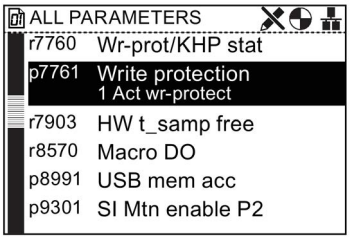
5. The screen will automatically display the parameter in the "All Parameters" menu. The write protection parameter is highlighted. Note that the current status of the write protection function is shown below the parameter name. Press "OK" to select the parameter.



6. Select "1: Act wr-Protect" to activate the write protection function.
   Press "OK" to confirm selection.



7. The screen returns to the "All Parameters" screen and the write protection parameter is highlighted, now showing the current status of the function as active.
   Press "ESC" twice to return to the "Status" screen.



To deactivate the write protection function follow the same procedure as shown above but select "0: Deact write-prot".

6.8 Know-how Protection

Introduction

Know-how Protection (KHP) has been designed to allow machine manufacturers to completely hide all the modified parameters of the Inverter. This means that not only can these parameters not be changed, they are not visible to the end-user of the system.

Note

Technical support for active KHP

If KHP is activated and technical support is required, this will only be possible with the consent of the machine manufacturer.

Given in the table below are the parameters that are excluded from the KHP function:

Table 6- 2 Parameters and functions excluded from write protection

Parameter	Function
p0010	Sets the parameter filter to commission an Inverter.
p0918	PROFIBUS address
p0970	Initiates a reset of the drive parameters.
p0971	Saves parameters in the non-volatile memory of the Inverter.
p2030	Fieldbus int protocol selected
p2042	PROFIBUS indent number
P7766 [0...29]	KHP Password input - activates/deactivates the KHP function.
p8929	PN remote controller number
p8991	USB memory access
p8999	USB functionality
p9930 [0...8]	System logbook activation
p9931 [0...129]	System logbook module selection
p9932	Save system logbook EEPROM

Know-how Protection (KHP) parameters

Listed below are all the parameters used to activate, deactivate and modify the KHP, including a brief description of their purpose.

Table 6- 3 Know-how Protection

Parameter	Function
P7763	KHP OEM exception list number of indices for p7764. Maximum value is 500.
P7764 [0...n]	KHP OEM exception list. Sets the parameters to be excluded from the KHP function.
P7765	KHP memory card copy protection. Activates/deactivates copy protection for the memory card.
P7766 [0...29]	KHP password input. Sets the password for KHP.
P7767 [0...29]	KHP new password. Allows a new or an initial password to be created for KHP.
P7768 [0...29]	KHP password confirmation.

Activating/deactivating Know-how protection (KHP) overview

Before the KHP function can be activated for the first time the following steps should be performed (a simplified flowchart to show the process is given in the figure below).

1. The Inverter must be commissioned for the application before even attempting to activate the KHP function.
2. The application, for which the Inverter has been commissioned, must be tested to ensure that all parameter settings functioning correctly.
3. Using parameter p7763, you must set the number of parameters that can be included in the exception list. The maximum number of parameters that can be included in this list is 500.
4. Using parameter p7764, you must define a list of the parameters you wish to exclude from the KHP function; this is known as the "exception list". The exception list parameters will be visible to the end-user and they can be modified.

⚠ CAUTION

Important information when implementing KHP

If parameter p7766 is not included or is removed from the exception list, a password can no longer be entered and KHP cannot be deactivated. If this occurs then the only way to access the parameters of the Inverter will be to perform a factory reset of all parameters.

5. Using parameter p7767, create a new password for the KHP function.
6. Using parameter p7768, confirm the password. Once this step has been completed the KHP function is activated.
7. The function can now be deactivated or activate by using only p7766 to input the password that has been created.

A complete example of all these individual steps is given below.

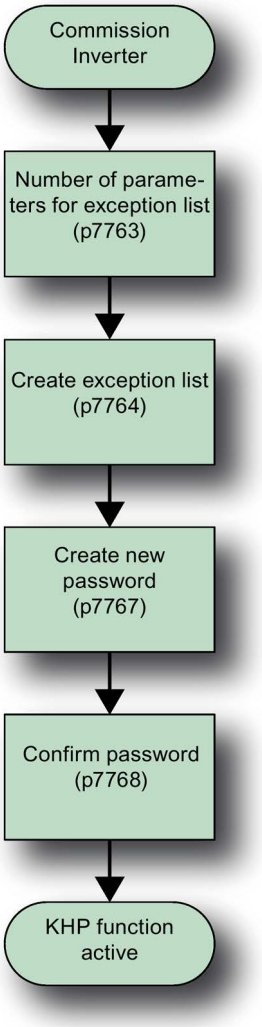
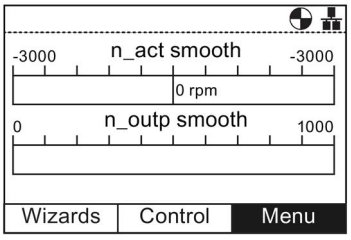


Figure 6-3 KHP function flowchart

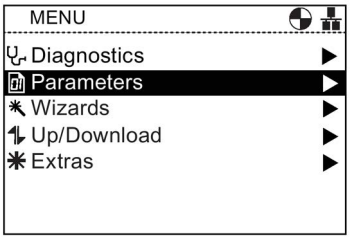
Setting up the exception list

As previously stated, after commissioning the Inverter and checking that parameters have been set correctly, the number of parameters to included in the exception list must be determined and set in parameter p7763. To set the number of parameters to be included in the exception list the following procedure must be performed. When establishing the first exception list, some parameters may already be entered into the exception list; under no circumstances should you remove these parameters from the exception list as these are essential parameters that must remain in the exception list.

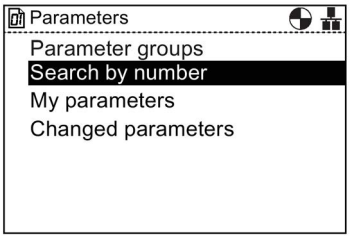
1. Select "Menu" from the main screen.



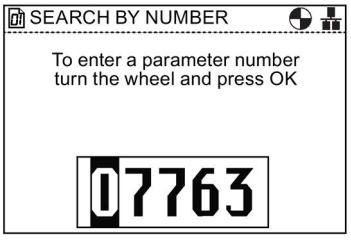
2. Select "Parameters" from the menu.



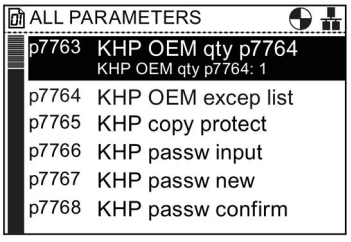
3. Select "Search by number" from the Parameters menu.



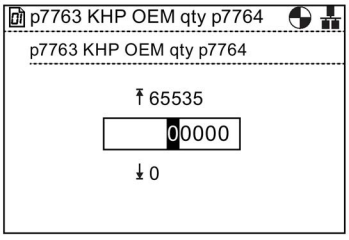
4. Input "07763" then press "OK"



5. Parameter p7763 is displayed. Press "OK" to edit the parameter.



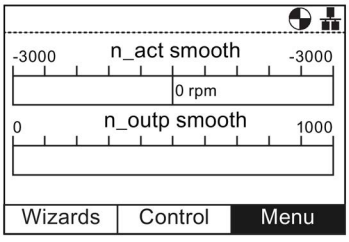
6. Input the number of parameters to be included in the exception list.
Important note: Although the maximum range shown on the screen is 65535, the maximum number of parameters in the exception list must not exceed 500.



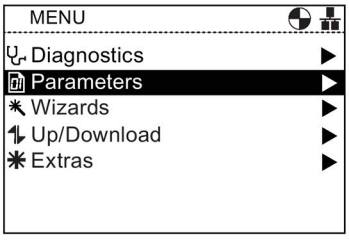
Creating the exception list

To create the list of parameters that will be included in the exception list, the following procedure should be performed:

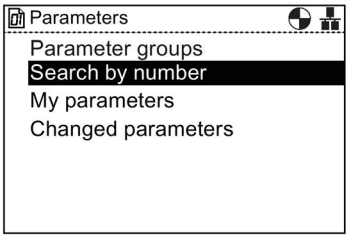
1. Select "Menu" from the main screen.



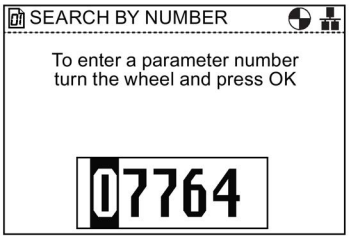
2. Select "Parameters" from the menu.



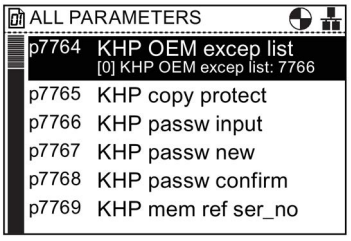
3. Select "Search by number" from the Parameters menu.



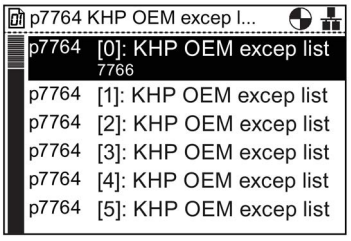
4. Input "07764" then press "OK"



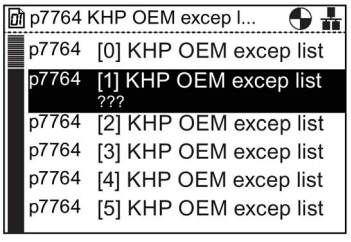
5. Parameter p7764 is displayed. Press "OK" to edit the parameter.



6. Indices "0" of P7764 is highlighted and shows that it already has the value 7766, which is the password entry parameter. This parameter must not be removed from the exception list.

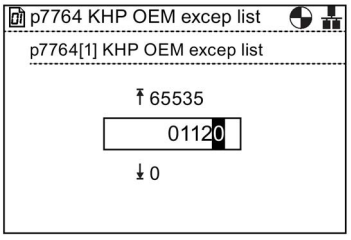


7. Scroll to the next Indices and press "OK"

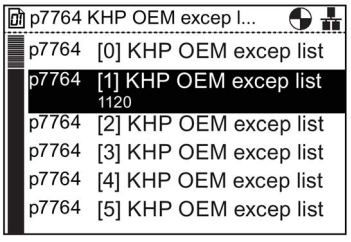


8. Input the parameter number to be added to the exception list. For example, 1120 for the ramp-up time parameter.

   Press "OK" after the final digit has been set.



9. The screen will return to the indices list of p7764 and show the new value for the indices. In this example p7764 [1] has a value of 1120.



10. Repeat steps 7 and 8 until all the excluded parameters have been entered.

    When the exception list is completed, use a long press of the "ESC" key will return the IOP to the status screen.

Setting the password

When setting the password for the KHP function the user should take note of the following guidlelines:

- The password can be up to thirty characters in length.
- Password entry must start with p7766 [0].
- No gaps are permissible in the password.
- Entering a password is completed when writing to p7766 [29]. Where the password is less than 30 characters in length, then p7766 [29] = 0 should be used to complete the password entry.

When entering the individual characters of the password in p7766 [0...29], each indices will contain only one character and it will be entered as a decimal code from the standard ASCII table.

For example, the password "MaC" would be entered as ASCII code in each individual indices of parameter p7766:

Character	ASCII code
M	77
a	97
C	67

It is recommend that only ASCII decimal codes between 32 and 126 are used for the password characters. An ASCII table is given in the figure below.

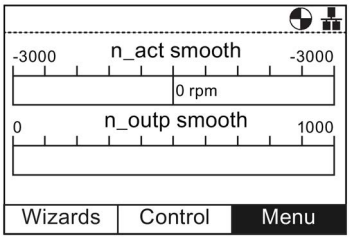
Code	Char	Code	Char	Code	Char
32	Space	64	@	96	`
33	!	65	A	97	a
34	"	66	B	98	b
35	#	67	C	99	c
36	$	68	D	100	d
37	%	69	E	101	e
38	&	70	F	102	f
39	'	71	G	103	g
40	(	72	H	104	h
41	)	73	I	105	i
42	*	74	J	106	j
43	+	75	K	107	k
44	,	76	L	108	l
45	-	77	M	109	m
46	.	78	N	110	n
47	/	79	O	111	o
48	0	80	P	112	p
49	1	81	Q	113	q
50	2	82	R	114	r
51	3	83	S	115	s
52	4	84	T	116	t
53	5	85	U	117	u
54	6	86	V	118	v
55	7	87	W	119	w
56	8	88	X	120	x
57	9	89	Y	121	y
58	:	90	Z	122	z
59	;	91	[	123	{
60	<	92	\	124	|
61	=	93	]	125	}
62	>	94	^	126	~
63	?	95	_		

Figure 6-4 ASCII decimal code table

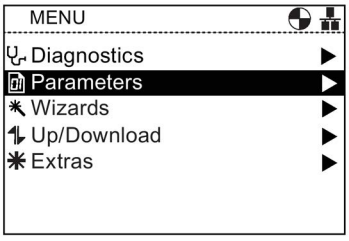
To set a new password the following procedure should be performed:

The example password given previously in this section will be used as the password that will be entered as the new password.

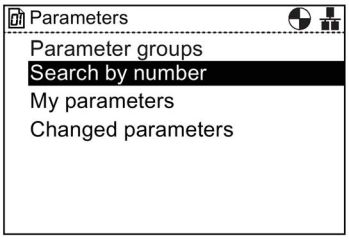
1. Select "Menu" from the main screen.



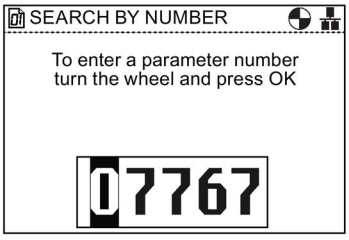
2. Select "Parameters" from the menu.



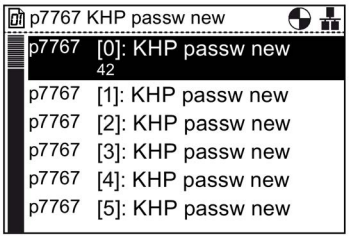
3. Select "Search by number" from the Parameters menu.



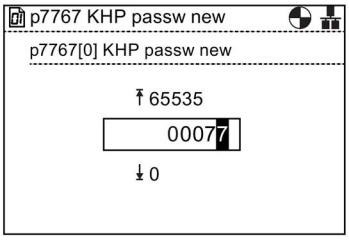
4. Input "07767" then press "OK"



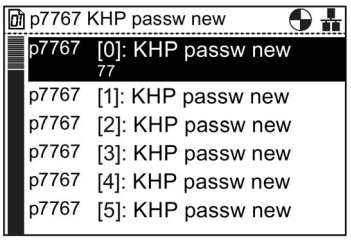
5. Parameter p7767 is displayed.
   Press "OK" to edit the [0] index of the parameter.



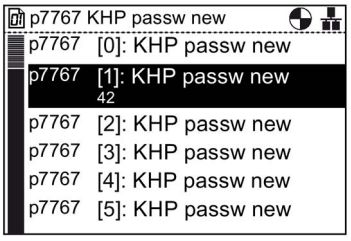
6. Enter the ASCII code for "M" (77), then press "OK"



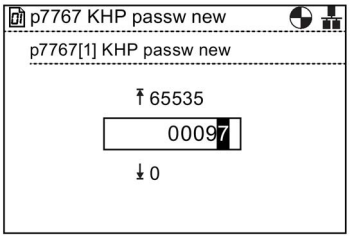
7. The screen will return to p7767 index 0 and shows the value previously set.



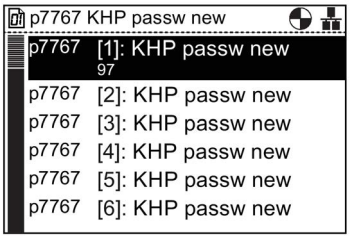
8. Select the next index and then press "OK" to edit the index.



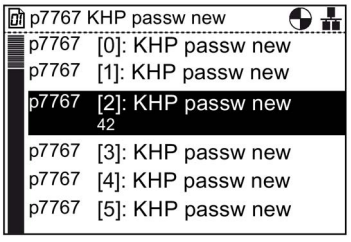
9. Enter the ASCII code for "a" (97), then press "OK"



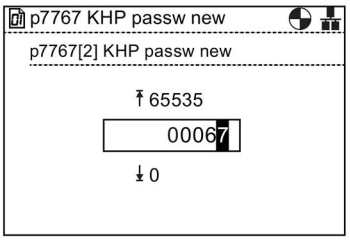
10. The screen will return to p7767 index 1 and shows the value previously set.



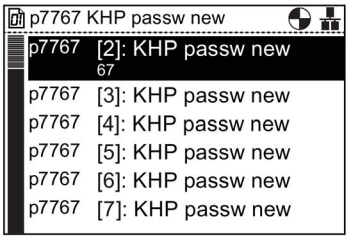
11. Select the next index and then press "OK" to edit the index.



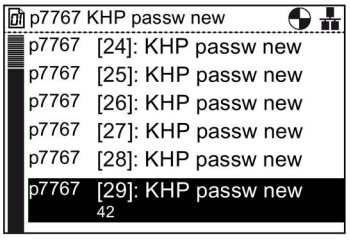
12. Enter the ASCII code for "C" (67), then press "OK"



13. The screen will return to p7767 index 2 and shows the value previously set.

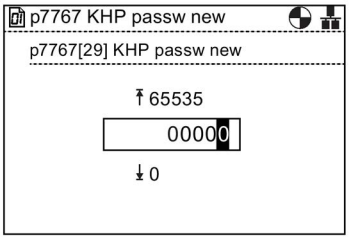


14. Scroll down to p7767 index 29 and then press "OK"

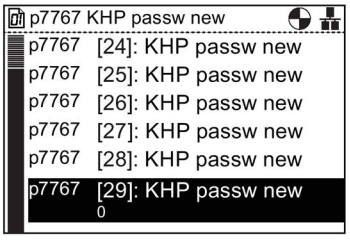


Because the password is less than 30 characters, p7767 index 29 must contain the value 0.

15. Ensure that all the digits are zero (0), then press "OK"



16. The screen will return to p7767 index 29 and shows the value previously set.



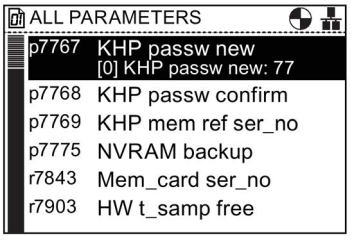
The password has now been set.

Press "ESC" to return to the "ALL PARAMETERS" list in preparation to confirm the new password.

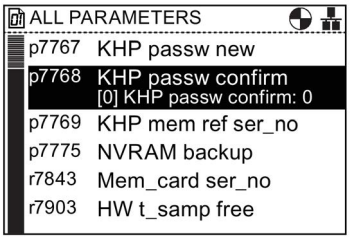
Confirming the password

Once the new password has been entered as shown above, the password needs to be confirmed using parameter p7768. To confirm the password, the following procedure should be performed:

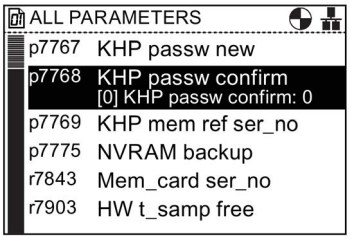
1. From the final screen of setting the password press "ESC" once to return to the "ALL PARAMETERS" screen.



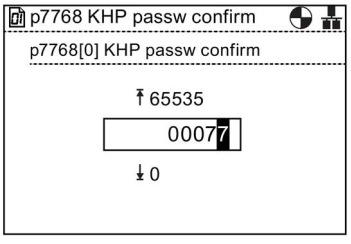
2. Scroll to parameter p7768.



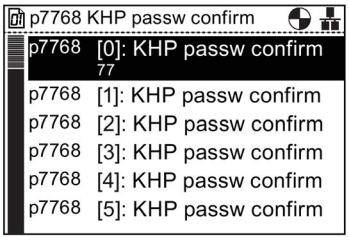
3. Press "OK" to access the parameter index 0.



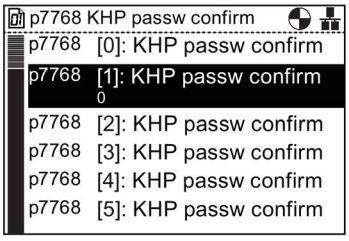
4. Enter the ASCII code for "M" (77), then press "OK"



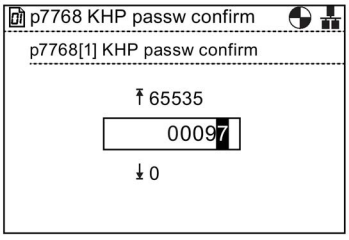
5. The screen will return to p7768 index 0 and shows the value previously set.



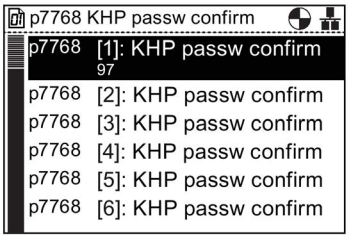
6. Select the next index and then press "OK" to edit the index.



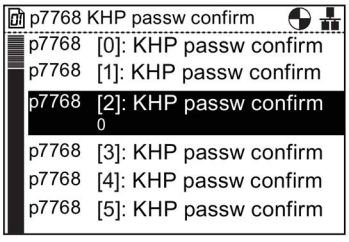
7. Enter the ASCII code for "a" (97), then press "OK"



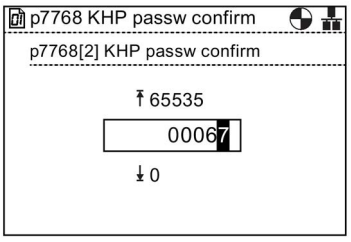
8. The screen will return to p7768 index 1 and shows the value previously set.



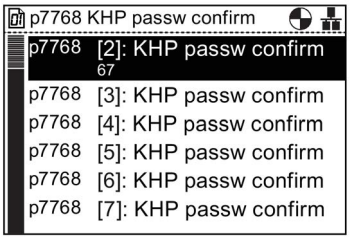
9. Select the next index and then press "OK" to edit the index.



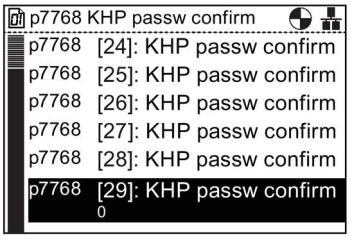
10. Enter the ASCII code for "C" (67), then press "OK"



11. The screen will return to p7768 index 2 and shows the value previously set.

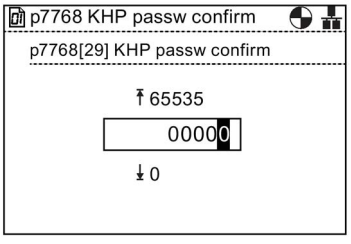


12. Scroll down to p7768 index 29, and press "OK"



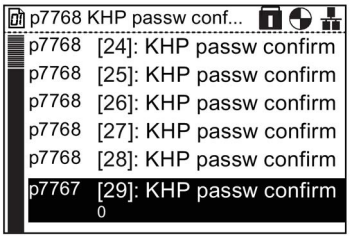
Because the password is less than 30 characters, p7768 index 29 must contain the value 0.

13. Ensure that all digits are zero (0) and then press "OK"



14. The screen will return to p7768 index 29 and shows the value previously set.

    KHP is now active and the padlock icon appears in the top right-hand side of the screen.



To deactive the KHP function input the password using p7766 (KHP passw input).

Options

7

7.1 Door mounting kit

Door mounting kit

To allow the IOP to be mounted into the door of a cabinet, the door mounting kit (DMK) has been designed. This will allow the IOP to be fitted to the front of a panel or door and be IP54 rated.

The fitting of the DMK is accomplished as shown in the figure below.

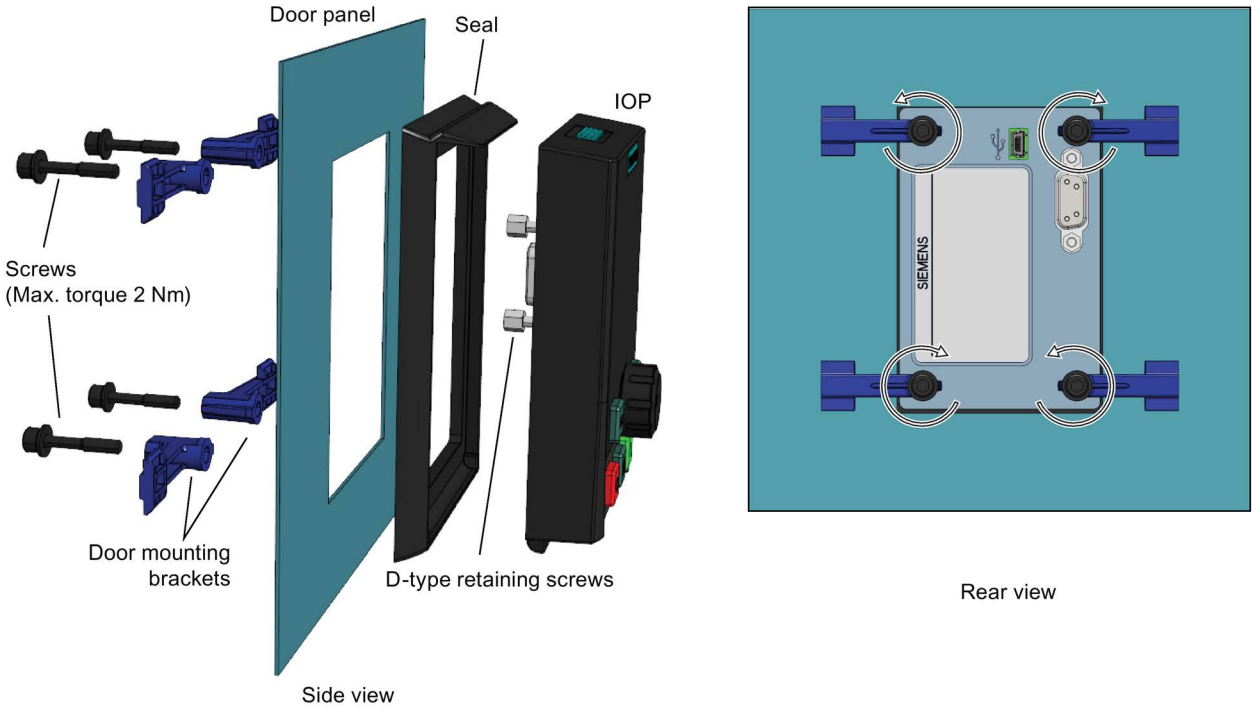
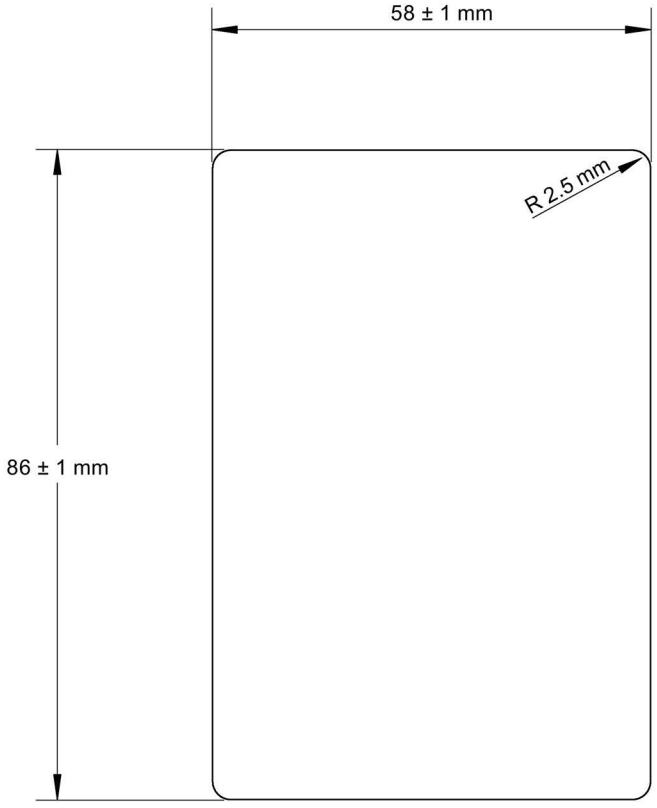


Figure 7-1 Installation of IOP door mounting kit

Prior to the installation of the DMK, it is necessary to create a hole in the panel or cabinet with the dimensions as shown in the figure below:



Scale 1:1

Notes:
1. The page must be printed at full size to maintain the 1:1 scale.
2. When printing from a PDF file do not select the "fit to page" option as this will reduce the page to 97% of the true size.

Figure 7-2 IOP DMK drill pattern (Scale 1:1)

The depth of the panel or cabinet door should be between 1 mm to 3 mm

The IOP Door Mounting Kit can be ordered using the following order number:

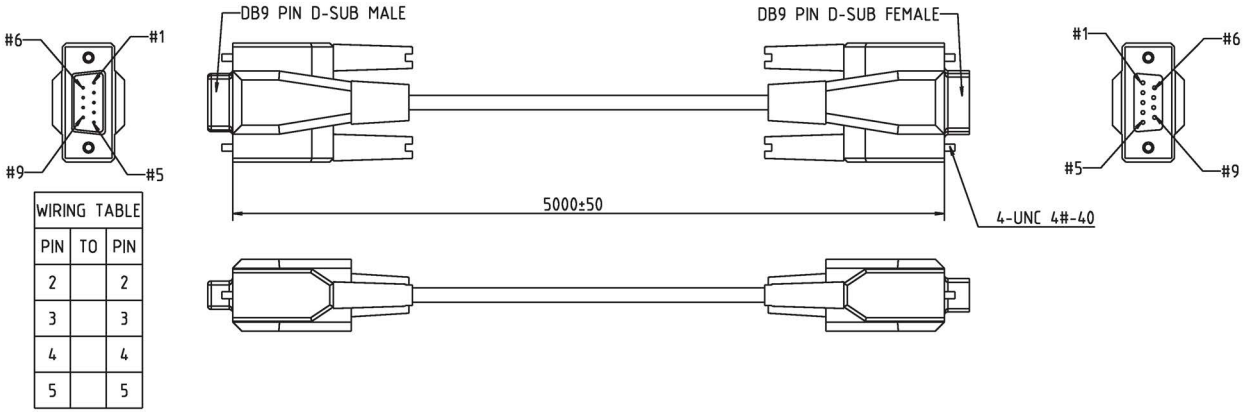
6SL3256-0AP00-0JA0

The DMK contains the following items:

- Door seal
- Door mounting brackets (x 4)
- Retaining screws (x 4)
- RS232 cable (5 m)

RS232 cable specifications

The RS232 cable can have a maximum length of 10 metres without restrictions. The RS232 cable can be longer than 10 metres and up to a maximum length of 15 metres, but the communications speed cannot excedd 57,600 bauds.



WIRING TABLE		
PIN	TO	PIN
2		2
3		3
4		4
5		5

Figure 7-3 9-way male to female D-Type cable Specifications

7.2 Hand-held device

hand-held device

⚠ WARNING

Charging unit

- The charging unit for the rechargeable batteries is contained within the hand-held device for the sole purpose of charging rechargeable batteries.
- The charging unit contained within the hand-held device should not be used with standard "AA" batteries as this will result in damage to the batteries and the hand-held device.
- Only the supplied power supply unit should be used with the IOP. The use of any other power supply units could seriously damage the hand-held kit.

⚠CAUTION

General precautions

- There is a risk of explosion if battery is replaced by incorrect type.
- Overcharging, short circuiting, reverse charging, mutilation, or incineration of the cells and the batteries must be avoided to prevent one or more of the following occurrences; release of toxic materials, release of hydrogen and/or oxygen gas, rise in surface temperature.
- If a cell or a battery has leaked or vented, it should be replaced immediately using protective gloves.
- If and when necessary, these cells or batteries must be replaced with identical new ones from the same manufacturer. If a cell or a battery to be replaced is connected with other cells or batteries in series, it is recommended that the other cells or batteries be replaced with new ones at the same time.
- Battery compartments containing these cells or batteries must be provided with means of ventilation to prevent possible accumulation of any released gases under abnormal conditions.

Note

Battery lifetime

With the supplied rechargeable batteries in a fully-charged state they should last for approximately 10 hours; the use of normal "AA" batteries may last considerably less time.

Industrial environment

The IOP has been designed for use within a Class A Industrial environment only.

Disposal of batteries

The batteries supplied with the IOP must be disposed of in accordance with local and national environmental policies.

Battery status

The battery status is displayed at the top right-hand corner of the IOP display.

Battery charging

If the batteries are put on charge and the batteries are fully discharged; the charging unit will enter a 'pre-charge' state. During the pre-charge state the LED will not be lit, therefore there may be a delay before the charging LED lights up.

The IOP has no internal power source, so to increase the IOP's versatility, the hand-held device has been designed.

The complete list of converters that work with the IOP are listed in Auto hotspot. The following list comprises the converters that require the hand-held kit because the IOP cannot be mounted directly on the converter:

- SINAMICS G120D-2 CU240D-2
- SINAMICS G120D-2 CU250D-2
- SINAMICS ET 200pro FC-2
- SINAMICS G110D

- SINAMICS G110M
- SINAMICS S110 CU305

Table 7- 1 Hand-held device order information

Order number	Item quantity	Item	Remarks
6SL3255-0AA00-4HA0	1	IOP	
	1	Hand-held module	
	1	Power supply unit	
	4	Rechargeable batteries	1.2 V 2100 mAh NiMH (see table below)
	1	RS232 cable	3 m

Note

Battery order information

The batteries supplied with the IOP Hand-held Kit should be replaced with exactly the same type of batteries. The batteries that have been tested for use with the IOP are given below:

Company: GP Batteries

Order Number: GP210AAHC

Website: GP Batteries (http://www.gpbatteries.com/INT/index.php)

The layout of the IOP hand-held device is shown in the figure below.

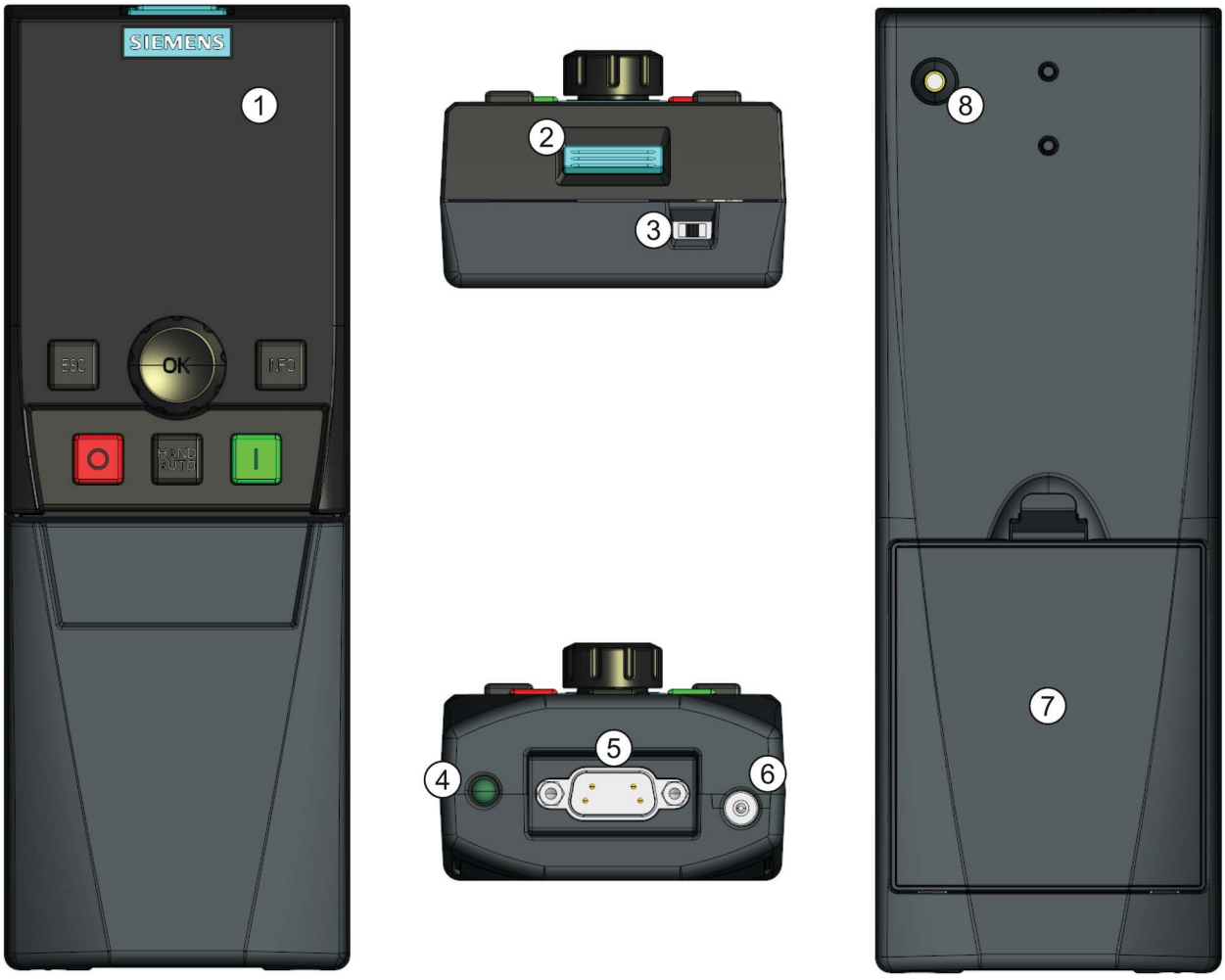


Figure 7-4 IOP hand-held kit layout

1. Intelligent Operator Panel (IOP)
2. IOP release catch
3. ON/OFF switch
4. Charging LED - ON when charging, OFF when charged
5. 9-pin Sub-D male connector (RS232)
6. Charging unit input
7. Battery compartment cover
8. IOP retaining screw

Fitting the batteries

The hand-held device is powered by four 'AA' rechargeable batteries; these batteries are supplied with the hand-held kit. The batteries are fitted as shown in the figure below.



Figure 7-5 Installing batteries for handheld kit

Technical data

8

IOP technical data

Table 8- 1 IOP and Door mounting kit specifications

Feature	IOP only	Door mounting kit
Protection	Depending upon the Control Unit IP rating to a max. of IP54	
Dimensions (HxWxD)	106.86 mm x 70 mm x 30.06 mm (Depth includes width of wheel)	
Net weight	0.134 Kg (0.295 lbs)	
Gross weight	0.206 Kg (0.454 lbs) - Includes packaging	
Screw torque	-	Max. 2 Nm
Operating ambient temperature	0 - 50 °C (32 - 122 °F) when directly connected to the converter. 0 - 55 °C (32 - 131 °F) when using the Door Mounting Kit.	
Transport and storage ambient temperature	-40 - +70 °C (-40 - 158 °F)	
Humidity	Maximum absolute humidity 25 g/m^3	

Table 8- 2 Hand-held specifications

Feature	IOP Hand-held kit
Protection	IP20
Dimensions (HxWxD)	195.04 mm x 70 mm x 47.99 mm
Net weight	0.724 Kg (0.1.59 lbs)
Gross weight	0.970 Kg (2.14 lbs) - Inlcudes packaging
Operating ambient temperature	0 - 40 °C (32 - 104 °F) [charging 10 - 40 °C]
Transport and storage ambient temperature	-20 - +55 °C (-4 - 131 °F)
Humidity	Relative humidity 90%

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Further Information

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