

# SIEMENS



Operating Instructions

# SINAMICS

## SINAMICS IOP-2

Intelligent Operator Panel 2  
Intelligent commission/configuration tool

Edition

09/2017

[www.siemens.com/drives](http://www.siemens.com/drives)



# SIEMENS

## SINAMICS

### Intelligent Operating Panel 2 (IOP-2)

#### Operating Instructions




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Edition 09/2017, Firmware IOP-2 V2.0 SP1

## Legal information

### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.
<b>NOTICE</b>
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

### Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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### Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

### Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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# Changes in this manual

## Changes to this manual - Edition 09/2017

The IOP-2 updated has incorporated a major redesign of almost all the user screens, to present a better user experience. Listed below are the specific changes that have been incorporated in this new version of the IOP-2.

### New functions

- Fieldbus Interface Settings Wizard - this allows the user to setup the necessary addressing information for a PROFINET or Ethernet/IP connection on an industrial network.


 Fieldbus Interface Settings (Page 35)

- Support - this new function allows the user to access Siemens Customer Support sites and information, including a function that will find the Local Siemens Partner responsible for your region.

 Support (Page 55)

### Revised chapters


- Menu structure - The menu structure has been updated to incorporate the changes in the IOP-2 features.

 Menu structure (Page 19)

- Upgrading the IOP-2 firmware - revised to cater for changes in the upgrading process.

 Upgrading the IOP-2 firmware (Page 27)

- Status-screen wizard - Trend View has been updated, it now displays a more accurate Trend View screen.


 Figure 8-2 Trend information file (Page 63)






# Fundamental safety instructions

## 2.1 General safety instructions

 <b>WARNING</b>
<b>Danger to life if the safety instructions and residual risks are not observed</b>
If the safety instructions and residual risks in the associated hardware documentation are not observed, accidents involving severe injuries or death can occur.
<ul style="list-style-type: none"><li>• Observe the safety instructions given in the hardware documentation.</li><li>• Consider the residual risks for the risk evaluation.</li></ul>

 <b>WARNING</b>
<b>Malfunctions of the machine as a result of incorrect or changed parameter settings</b>
As a result of incorrect or changed parameterization, machines can malfunction, which in turn can lead to injuries or death.
<ul style="list-style-type: none"><li>• Protect the parameterization (parameter assignments) against unauthorized access.</li><li>• Handle possible malfunctions by taking suitable measures, e.g. emergency stop or emergency off.</li></ul>

## 2.2 Warranty and liability for application examples

The application examples are not binding and do not claim to be complete regarding configuration, equipment or any eventuality which may arise. The application examples do not represent specific customer solutions, but are only intended to provide support for typical tasks. You are responsible for the proper operation of the described products. These application examples do not relieve you of your responsibility for safe handling when using, installing, operating and maintaining the equipment.

## 2.3 Industrial security

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### Note

#### Industrial security

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions only represent one component of such a concept.

The customer is responsible for preventing unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit:

Industrial security (<http://www.siemens.com/industrialsecurity>).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed at:

Industrial security (<http://www.siemens.com/industrialsecurity>).

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### WARNING

#### Unsafe operating states resulting from software manipulation

Software manipulations (e.g. viruses, trojans, malware or worms) can cause unsafe operating states in your system that may lead to death, serious injury, and property damage.

- Keep the software up to date.
- Incorporate the automation and drive components into a holistic, state-of-the-art industrial security concept for the installation or machine.
- Make sure that you include all installed products into the holistic industrial security concept.
- Protect files stored on exchangeable storage media from malicious software by with suitable protection measures, e.g. virus scanners.

## Safety notes

### 3.1 Warnings and cautions

#### Warnings and cautions

** DANGER****Ensuring a safe and stable state**

During commissioning of the converter 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.

** WARNING****The converter will stop if the IOP-2 is removed when in Hand mode**

When the IOP-2 is in Hand mode, that is, when the command source is switched to Hand and all OFF and RUN commands are given via the IOP-2 buttons.

When in the Hand mode, if the IOP-2 is removed from the converter, the converter will stop within a few seconds of the IOP-2 being removed.

Before removing the IOP-2, ensure that the IOP-2 is placed in AUTO mode and receiving its command source from the PLC.

**Note**

- The IOP-2 can be fitted to and removed from the converter while power is applied.
- The IOP-2 will set the USS PZD (P2012) length to 4 when connected to the converter.

*3.1 Warnings and cautions*

# Overview

## 4.1 Introduction

### Compatibility

The Intelligent Operator Panel 2 (IOP-2) has been designed to enhance the interface and communications capabilities of SINAMICS Inverters.


The IOP-2 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\*

\*Denotes Control Units that require the IOP-2 Hand-Held Kit to connect the IOP to the Control Unit.

Hand-Held Kit order number: 6SL3255-0AA00-4HA1.

Optical cable order number: 3RK1922-2BP00

For information on firmware and language upgrades, please see  Upgrading the IOP-2 firmware (Page 27).

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### Note

#### IOP functional support

- Drives with SINAMICS firmware prior to version 4.4 will not be supported by the IOP-2. Drives with GP firmware prior to version 3.4 are not fully supported by the IOP-2.
  - The actual menu structure and functionality of the IOP-2 will be influenced by the following factors:
    - The software version and type of Control Unit to which the IOP-2 is fitted.
    - The firmware and software version of the IOP-2.
    - The selected functional group filtering of the parameters.
-

## 4.2 Layout and functions

### Overview

The physical layout of the IOP-2 is shown below:

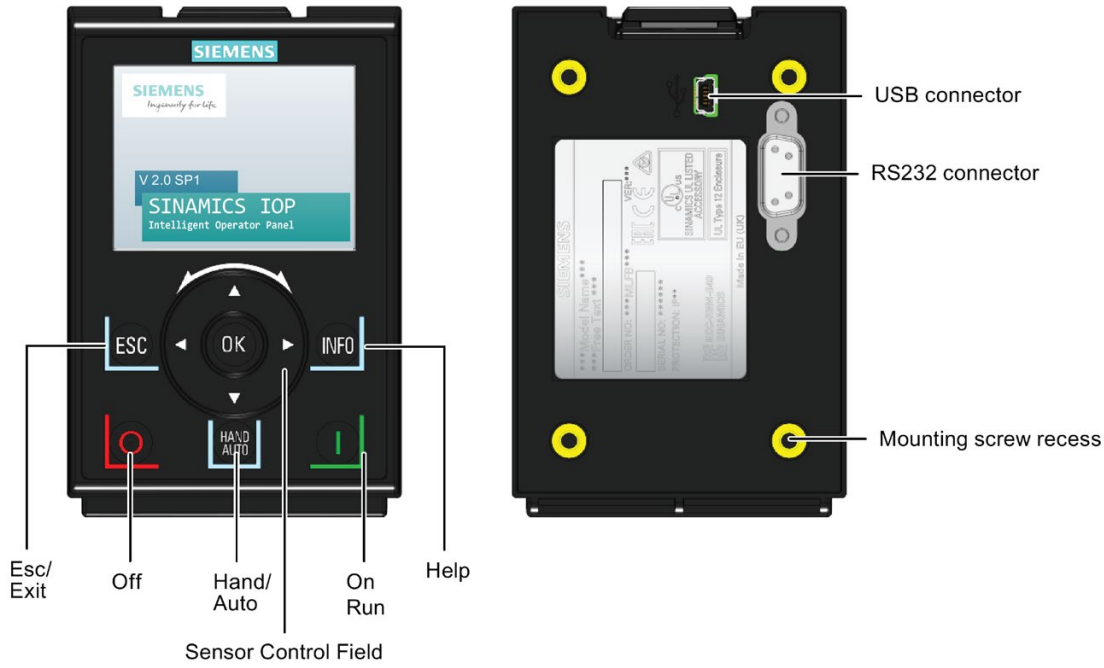








Figure 4-1 Layout of the IOP-2

The IOP-2 is operated by using a Sensor Control Field and five additional buttons. The specific functions of the Sensor Control Field and buttons are shown in the table below.

Table 4- 1 Function of the IOP-2 controls

Key	Function
	<p>The Sensor Control Field has the following functions:</p> <ul style="list-style-type: none"> <li>• In a menu, sliding your finger around the Sensor Control Field changes the selection.</li> <li>• When a selection is highlighted, pressing the OK button in the centre of the Sensor Control Field confirms the selection.</li> <li>• When editing a parameter, sliding your finger around the Sensor Control Field changes the displayed value; clockwise increases the value and anti-clockwise decreases the displayed value.</li> <li>• When editing parameter or search values there is a choice to edit individual digits using the arrow keys or an entire value using the Sensor Control Field. The speed with which you slide your finger around the Sensor Control Field increases or decreases the speed of movement of the cursor.</li> <li>• The Sensor Control Field has integrated arrows which can be used to navigate through the menus and individual digits in the inputs fields.</li> </ul>
	<p>The ON key has the following functions:</p> <ul style="list-style-type: none"> <li>• In AUTO mode can be changed by pressing the HAND/AUTO key.</li> <li>• In HAND mode the converter is started - the converter status icon starts turning.</li> </ul> <p>Notes:</p> <p>For Control Units with firmware versions less than 4.0: When running in AUTO mode, HAND mode cannot be selected unless the converter is stopped.</p> <p>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.</p> <p>When the converter is running in HAND mode, the motor stops when switched to AUTO.</p>
	<p>The OFF key has the following functions:</p> <ul style="list-style-type: none"> <li>• If pressed for longer than 3 seconds the converter 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.</li> <li>• If pressed for less than 3 seconds the following actions will be performed: <ul style="list-style-type: none"> <li>– 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 converter will not be stopped.</li> <li>– If in HAND mode the converter will perform an OFF1; the motor will come to a standstill in the ramp-down time set in parameter P1121.</li> </ul> </li> </ul>
	<p>The ESC key has the following functions:</p> <ul style="list-style-type: none"> <li>• If pressed for less than 3 seconds the IOP-2 returns to the previous screen or if a value has been edited, the new value is not saved.</li> <li>• If pressed longer than 3 seconds the IOP-2 returns to the status screen.</li> </ul> <p>When using the ESC key in the parameter editing mode, no data is saved unless the OK key is pressed first.</p>

Key	Function
	<p>The INFO key has the following functions:</p> <ul style="list-style-type: none"><li>• Displays additional information for the currently selected item.</li><li>• Pressing the INFO key again will display the previous screen.</li><li>• Pressing the INFO key during power-up of the IOP-2 will place the IOP-2 in DEMO mode. To exit DEMO mode, power-cycle the IOP-2.</li></ul>
	<p>The HAND/AUTO key switches the command source between HAND and AUTO mode.</p> <ul style="list-style-type: none"><li>• HAND sets the command source to the IOP-2.</li><li>• AUTO sets the command source to an external source, for example, fieldbus.</li></ul>

### Locking and unlocking the keypad

The keypad can only be locked once the power-up cycle has been completed. If the keys are activated before the power-up cycle is completed, the IOP-2 will enter the DEMO mode.

To lock the IOP-2 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.

### DEMO mode

DEMO mode allows the IOP-2 to be used for demonstration purposes without affecting the converter to which it is connected. Menus can be navigated and functions selected, but all communications with the converter are blocked to ensure that the converter does not react to any commands issued from the IOP-2.

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-2 must be power cycled again to exit the DEMO mode.
















## 4.3 Screen icons

### Overview

The IOP-2 displays a number of icons at the top right-hand edge of the display to indicate various states or current conditions of the converter. These icons are explained in the table below.

Table 4- 2 Screen icons

Function	Icon	Remarks
Command source		Auto - the converter receives the command signals from the network controller
	JOG	Displayed when the JOG function is active
		Hand - the converter is under control of the IOP-2
Inverter status		
		Icon rotates when the motor is running
Fault pending		
Alarm pending		
Saving to RAM		Indicates that all recent changes to parameters have been saved in RAM only. In the event of a power failure, then all recent changes saved to RAM will be lost. To prevent loss of parameter data a RAM-to-ROM save must be performed.
PID autotuning		
Hibernation mode		
Write Protection		Parameters cannot be modified.
Know How Protection		Parameters cannot be viewed or modified.
ESM		Essential Services Mode
Battery condition		The battery status is only shown when the IOP-2 Hand-held kit is used.

### Screen faults and alarm indicators

When a fault or an alarm is active on the converter the top label on the screen will turn red. The top label will remain red until the fault or warning has been acknowledged or rectified.

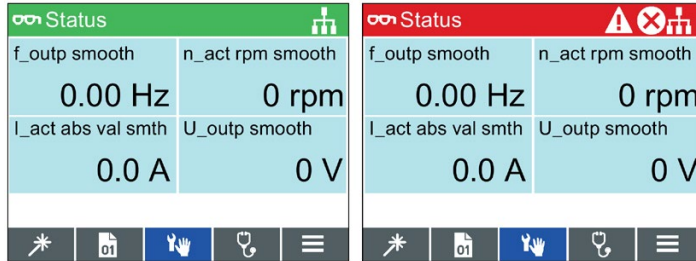


Figure 4-2 Fault and alarm notifications

### Use of screen colours

A brief explanation of the use of the different colours on the screen is given below:

- Red** Error status: Indicates a fault is active and the Control Unit is in an error condition.
- White** Neutral status: The IOP-2 has no connection to the Control Unit.
- Green** Run status: The converter is running with no active faults. Active alarms will be displayed on the status bar.
- Blue** Blue denotes the selected item on the screen.

## 4.4 Menu structure

### Overview

The Menu structure of the IOP-2 is shown in the figure below.

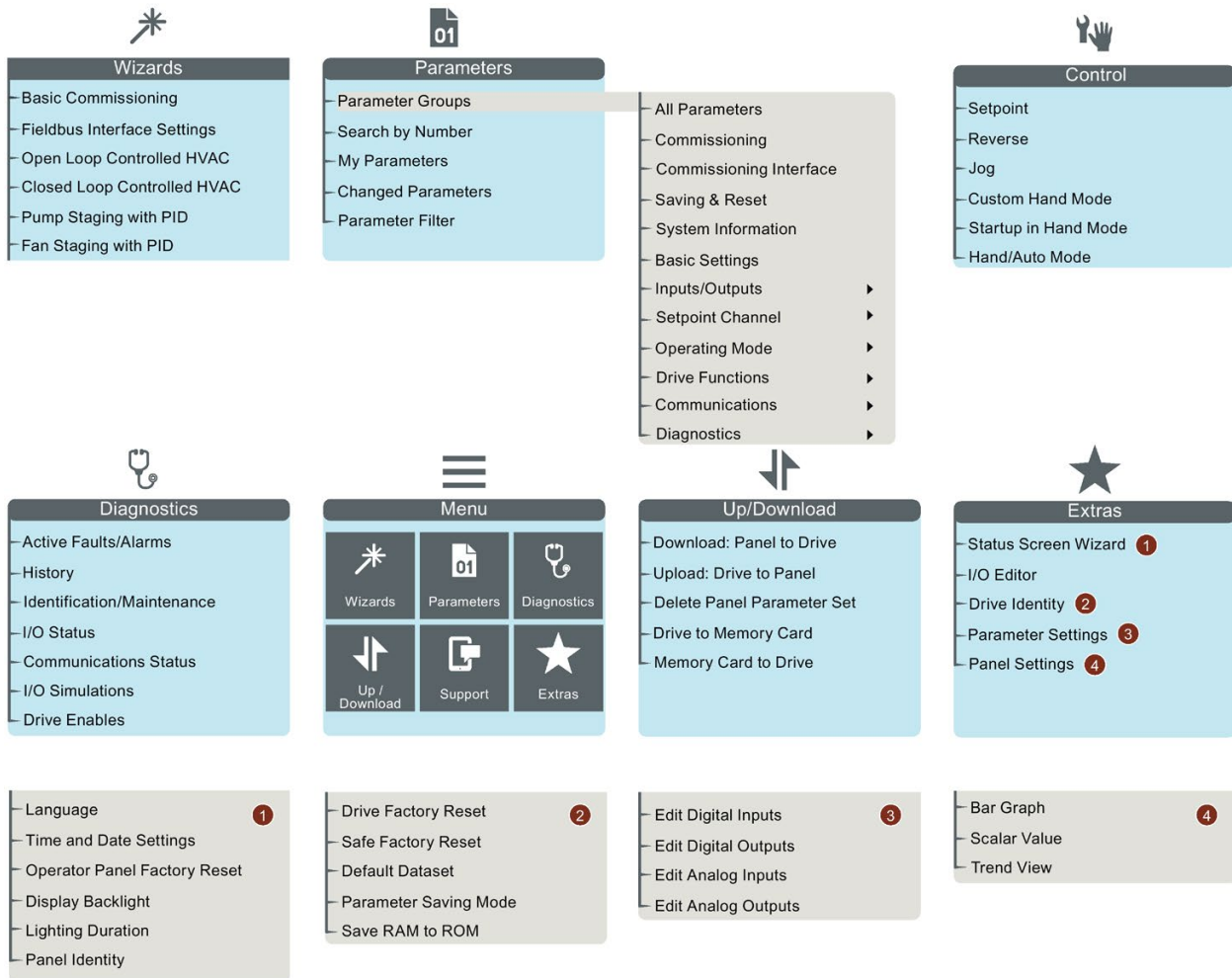


Figure 4-3 IOP-2 menu structure



# Installation

## 5.1 Fitting the IOP-2

### Fitting the IOP-2 to the Control Unit

#### Note


#### IOP-2 power supply

The IOP-2 has no internal power supply and derives its power directly from the Control Unit of the converter through the RS232 interface. The IOP-2 can also be connected to a PC and derives its power through the USB connection.

To fit the IOP-2 to the converter Control Unit the following procedure should be performed:

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

To use the IOP-2 with a decentralized drive, for example an ET200pro FC-2, an IOP-2 Handheld kit is required and an optical cable. The IOP-2 Handheld kit and optical cable are fitted as shown in the following figure.

The order details of both the IOP-2 Handheld kit and the optical cable are given in the  Introduction (Page 13).

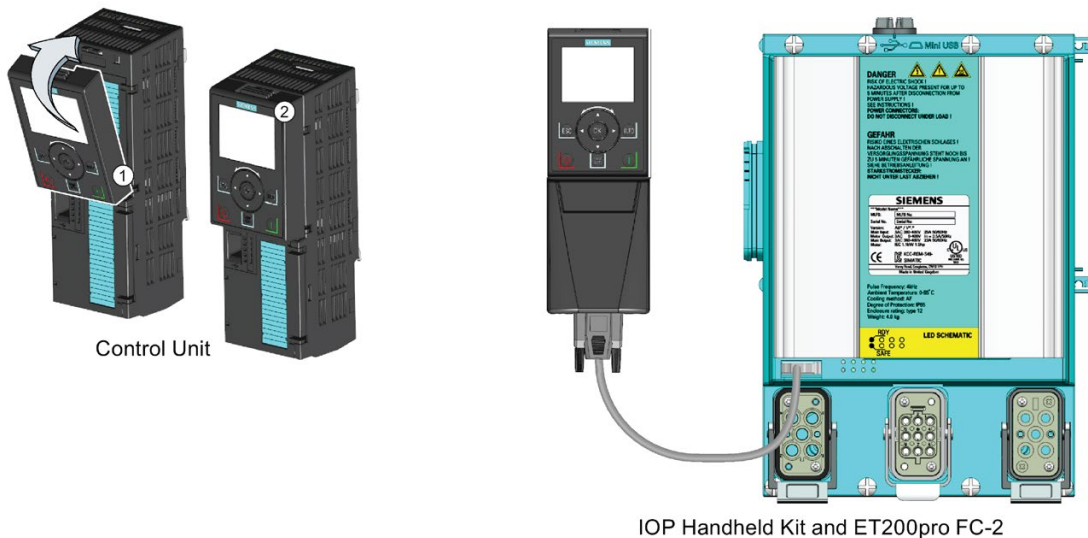


Figure 5-1 Fitting IOP-2 on CU and ET200pro FC-2

## 5.2 Initial set-up

### Initial set-up sequence

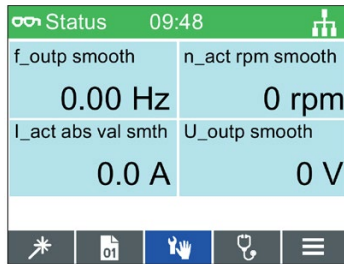
Once the IOP-2 is fitted and powered-up it will automatically detect the type of Control Unit and Power Module to which it has been fitted. On first-time use, the IOP-2 automatically displays the option to select the default language and allow the time and date to be set (if the Control Unit to which the IOP-2 is fitted has a real-time clock). The procedure is outlined below.



Splash screen is displayed

Select the required language

Select the required wizard or press ESC



Status screen is displayed

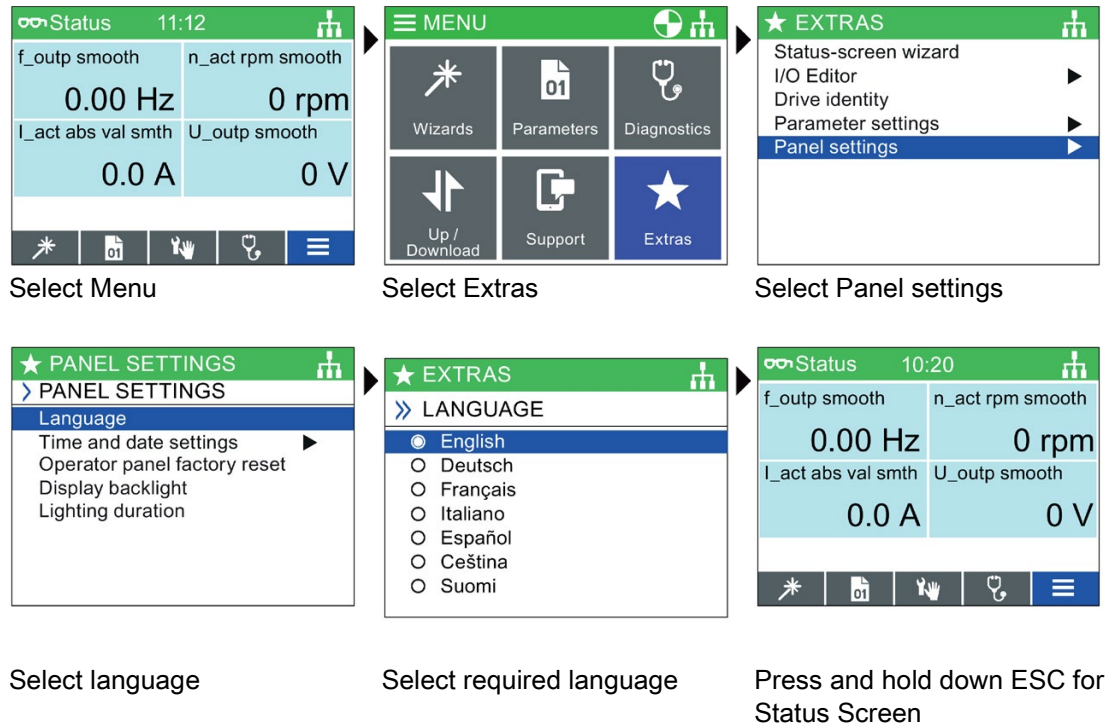
#### Note

The IOP-2 is delivered with all available languages and wizards, although the number of wizards will depend on the type of Control Unit that is being used. For information on Firmware upgrades, please see Upgrading the IOP-2 firmware (Page 27).

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 Menu (Page 59).

## Language selection

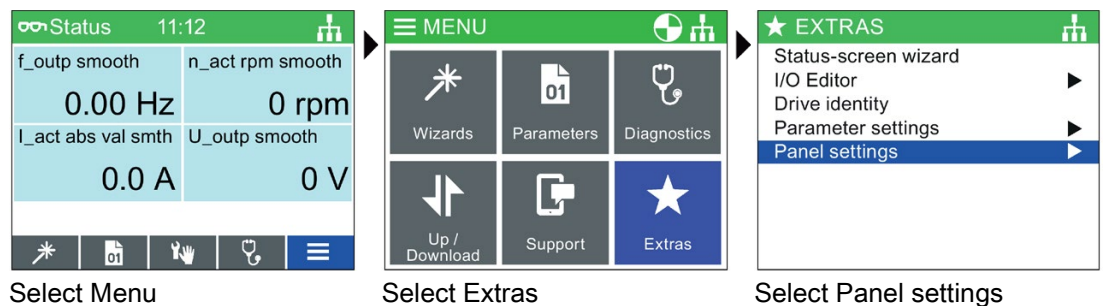
The IOP-2 on first start-up will display the language screen for the user to select their required language, should you wish to select your language manually, the following actions should be performed:

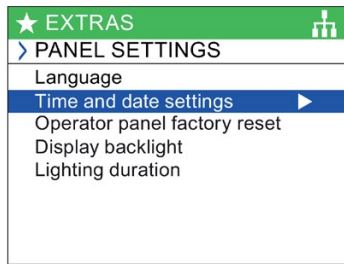


All available languages are delivered with the IOP-2.

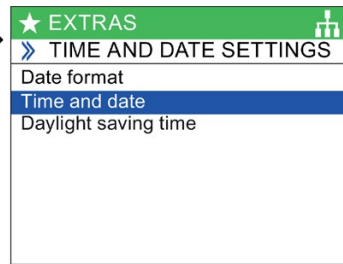
## Setting time and date

When the IOP-2 is first fitted to a Control Unit, which has a real-time clock, it will automatically display the time and date screen. Should you wish to manually set the time on the IOP-2, the following actions should be performed:





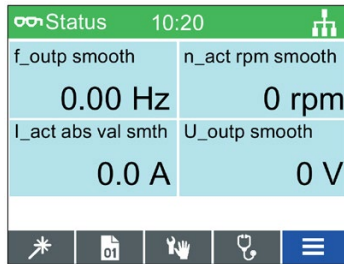
Select Time and date settings



Set the Time and date settings



Set time and date settings

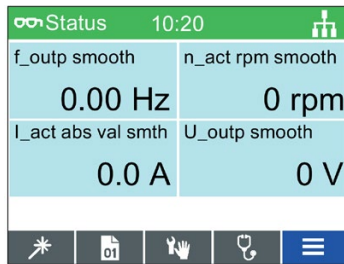


Press and hold down ESC for Status Screen

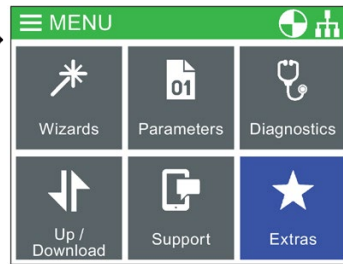
The settings for time are normally done on the Control Unit if it has a Real-time Clock (RTC). If the Inverter has an RTC the IOP-2 will take its settings from the Control Unit.

### Lighting duration

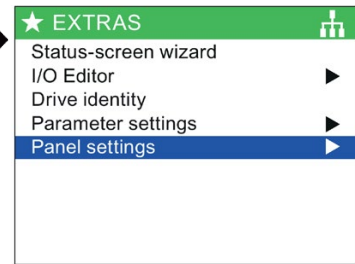
To set the length of time that the display remains lit, the following actions should be performed:



Select Menu

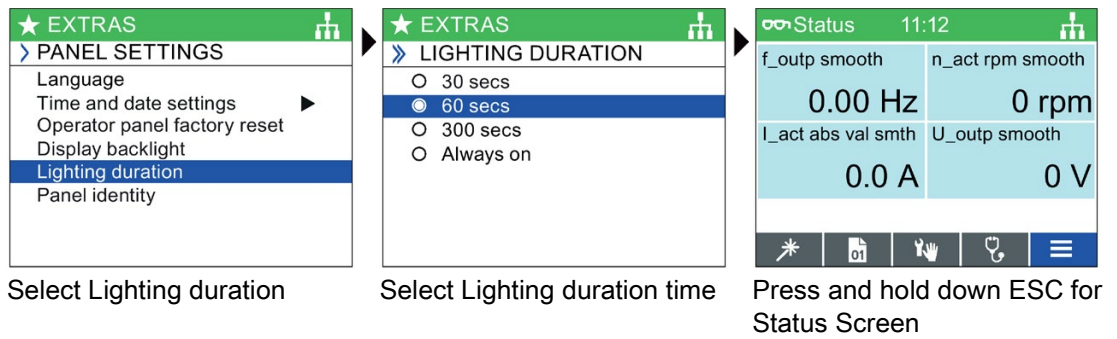


Select Extras



Select Panel settings





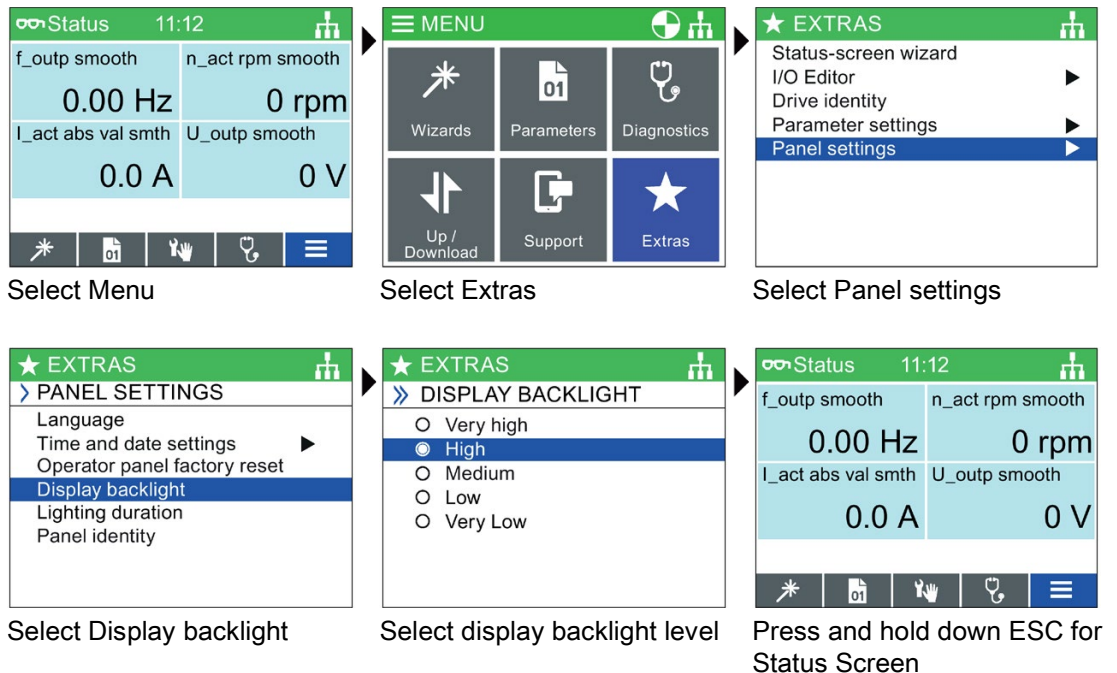
**Note**

**Screen will flash when an active fault condition exists**

When an active fault condition exists on the IOP-2, if no key has been pressed for more than one minute then the screen will start to flash on and off. The screen will dim a few seconds prior to the lighting duration time-out period. If the screen is set to never dim, that is, it has been set to "Always on" the screen will not dim.

**Display backlight**

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




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.

## 5.3 User definable labels on status screen

### User definable labels

User defined labels allow the user to customize the labels that appear on the status screen of the IOP-2.

There are a maximum of four labels that can be defined and they are located on the IOP-2 in the "cps" folder. The IOP-2 must be connected to the PC via the USB connection and in "Mass Storage" mode to access the files on the IOP-2. The files are basic text files and can be opened with any basic text editor. The default label names are "default", when the labels have the "default" text, the IOP-2 will ignore the labels. There are the following restrictions when creating your own labels:

- A maximum of 20 characters for each label name.
- The characters that can be used conform to the normal windows file naming conventions.
- The number of labels are restricted depending on the type of status screen view that is selected in the "Status screen wizard". See  Extras Menu (Page 59).

The four files are named:

- BotLeft.txt
- BotRight.txt
- TopLeft.txt
- TopRight.txt

The file names relate to the area of the status where they will appear.

Simply selected the file you wish to use as a label; open it with a text editor, change the name and then save it back to the same location in the IOP-2 file system. If the file name itself is changed the IOP-2 will not recognize the label.

An example of the status screen with new label names (using all four text files) is shown in the figure below.

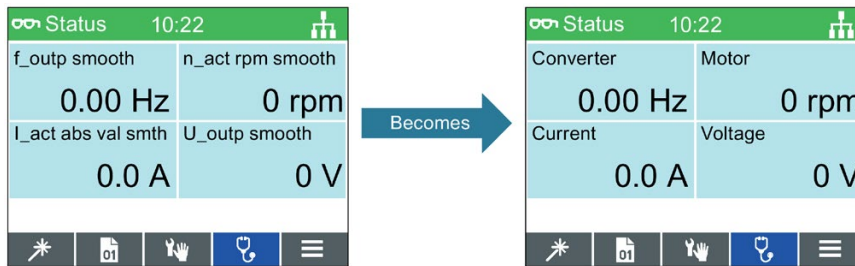


Figure 5-2 Example of defining your own labels

## 5.4 Upgrading the IOP-2 firmware

### Upgrading the IOP-2 firmware

The IOP-2 contains firmware, which can be upgraded by the user by means of a firmware upgrade. To perform the upgrade of the IOP-2 firmware the following steps should be performed.

1. Plug the IOP-2 into a PC using the USB connection. Note: Connect the IOP-2 only to an internal USB interface. Do not use an USB interface which is connected to your PC externally (e.g. via a docking station, external USB-Hub or desktop PCs with front sockets).
2. The IOP-2 will automatically enter the "Mass Storage" mode.
3. Open the file explorer on the PC.
4. Navigate to the IOP-2 (removable media). Note: Back up data (e.g., readme, parameter records) that you will need later on the connected PC.
5. Format the IOP-2. Set the size of the allocation units to 2048 bytes.
6. Go to the Service and Support site at the link shown below.
7. Download the zip file with the current firmware of the IOP-2 into a folder on the PC and unpack it into a separate directory.
8. Copy the downloaded files from the PC directory directly into the IOP-2 folder (the copying process takes approximate 6 minutes).
9. When the copying has been completed, wait approximate 5 seconds before disconnecting the IOP-2 from the USB port. The new firmware is now available on the IOP-2 and you can now connect the IOP-2 to a SINAMICS G inverter.
10. When you turn on the SINAMICS G inverter, the IOP-2 will automatically upgrade.

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#### Note

##### English language is mandatory

The English language file is essential to the correct functioning of the IOP-2 and therefore cannot be deleted.

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The IOP-2 firmware files can be downloaded from the Siemens Service and Support website at the following link:



IOP-2 firmware download: IOP-2 Firmware upgrade  
(<http://support.automation.siemens.com/WW/view/en/67273266>)

### Reading the OSS License

The IOP-2 contains open-source software (OSS). The OSS comprises open-source text and satisfies special license terms. If you wish to read the license terms, see: `efs/readme_OSS.zip` on the IOP-2.



## Wizards menu

### Overview

The IOP-2 wizards are question-driven environment that assist the user to set-up various functions and applications of the converter.

#### WARNING

##### **Motor Identification (Motor ID) function will run automatically**

Using the "Standard Drive Control" or "Dynamic Drive Control" basic commissioning, the Motor ID function, if selected, is activated at the end of the commissioning wizard.

The motor identification (motor ID) function, after basic commissioning, upon the first startup, will start automatically after approx. 8 to 30 s and accelerate the motor to the setpoint speed.

This action must be taken into account when basic commissioning has been completed to ensure that the first ON/RUN command when given for your application, does not produce an unpredicted or unsafe effect on personnel, equipment or premises.

#### WARNING

##### **Safe and stable state of the converter**

During commissioning of the converter 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.

### IOP Wizards Manual

The wiring diagrams and additional information for the configuration of the drives when using the IOP Wizard is given in the IOP Wizard Manual.

This manual is available for download at the following link:



IOP Wizard Manual (<https://support.industry.siemens.com/cs/de/en/view/109483443>)

## 6.1 Example Wizard

### Overview of wizards

The following example of how wizards work on the IOP-2 are purely for demonstration purpose only.

#### CAUTION

##### **Before commissioning an application**

Prior to using 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 wizard

The basic commissioning wizard is all the user needs 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.

As from SINAMICS firmware V4.7 SP3 three new SINAMICS application classes are offered for commissioning SINAMICS G120 drives, which are automatically preset independently of the SINAMICS G120 Power Module used.

#### **Standard Drive Control**

- Standard Drive Control is preset for the Power Modules PM240, PM240-2 and G120C in frame sizes FSA-C. This application class can, for example, be used for the following applications:
  - Pumps, fans and compressors with flow characteristic
  - Wet or dry beam technology, mills, mixers, kneaders, crushers, agitators
  - Horizontal conveyor technology (conveyor belts, roller conveyors, chain conveyors)
  - Basic spindles

#### **Dynamic Drive Control**

- Dynamic Drive Control is preset for the Power Modules PM240, PM240-2 and PM330 in frame sizes  $\geq$  FSD. This application class can, for example, be used for the following applications:
  - Pumps and compressors with displacement machine
  - Rotary furnaces
  - Extruders
  - Centrifuges

### Expert

- Expert is fixed assigned to the Power Modules PM230, PM250 and PM260 as soon as for G120D, G110M and ET200pro FC-2. This setting corresponds to the existing wizard and will also be assigned to existing projects. It allows to flexibly parameterize the drive, but requires a detailed understanding of the drive.

#### WARNING

##### Motor data identification (motor ID)

When selecting motor data identification (motor ID) with subsequent ramp-up to the setpoint speed (p1900 = 11 or 12; 12 = standard setting based on SINAMICS Firmware V4.7 SP3 with "Standard Drive Control" and "Dynamic Drive Control"), the motor is, upon the first Power ON command, directly accelerated to the setpoint speed, following a short delay time caused by the motor ID (approx. 15 to 30 s). From SINAMICS Firmware V4.7 SP6 the default setting for p1900 = 2.

### 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 the 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.

For more detailed information of the application classes, see the document at the link below:



Application classes (<https://support.industry.siemens.com/cs/ww/en/view/109480663>)

### 6.1.1 Basic commissioning with the IOP-2

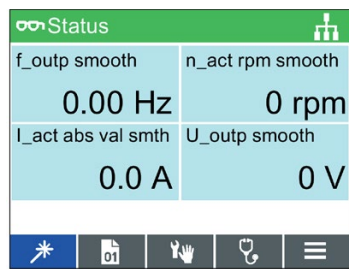
#### Basic commissioning wizard

**NOTICE**

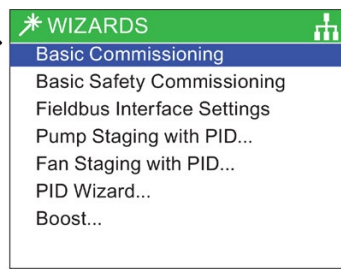
**Requirements prior to using the Basic Commissioning Wizard**

- The user must be fully conversant with all safety instructions as detailed in the "Fundamental Safety Instructions" section of the Operating Instructions for your converter.
- The converter must be installed and checked as per the relevant instructions in the "Installation" sections of the converter Operating Instructions.
- 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.
- The information required to be input into the Basic Commissioning Wizard can be found on the motor rating label, an example of which is included in the Operating Instructions for your converter.
- If the motor is to operate with the "87 Hz characteristic", you need to connect the motor in Delta ( $\Delta$ ), this is shown in the "Installation" section of the Operating Instructions for your converter.
- 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.

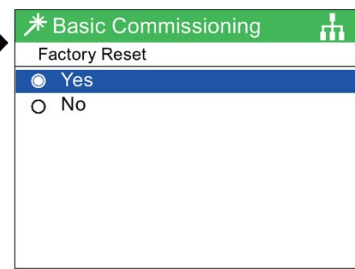
This example shows the commissioning steps using the "Standard Drive Control" method.



Select Wizards



Select required Commissioning wizard

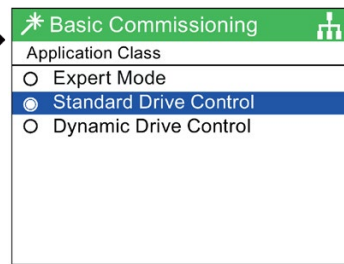


Select Factory Reset (yes or no)

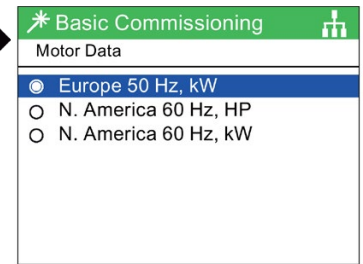




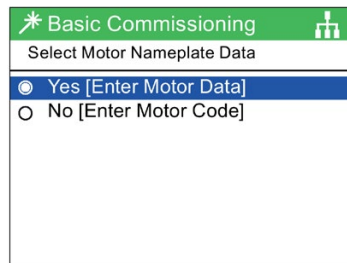
Select Continue



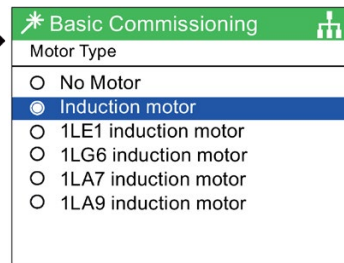
Select Application Class



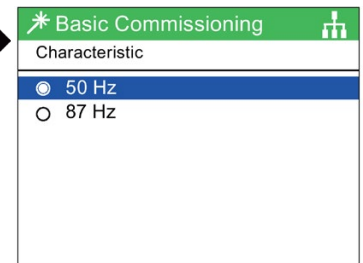
Select Motor Data



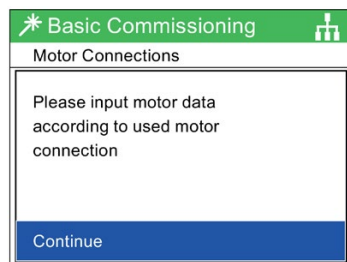
Select Enter Motor Data



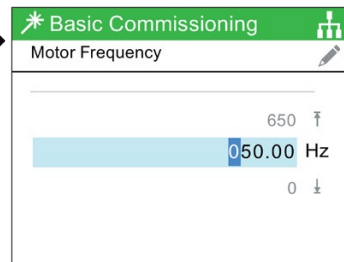
Select Motor Type



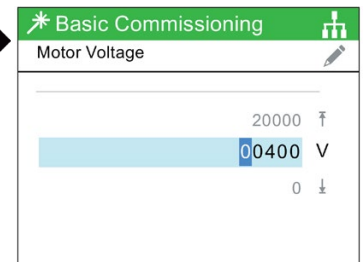
Select Characteristic



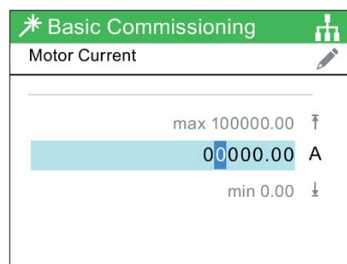
Select Continue



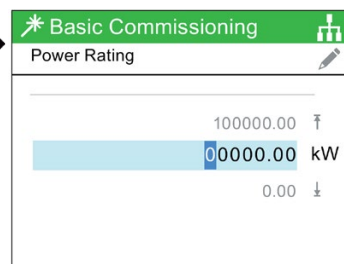
Input Motor Frequency



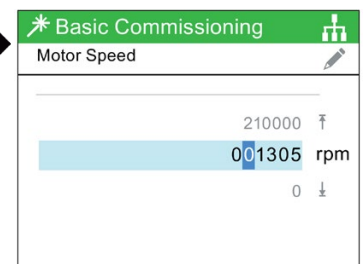
Input Motor Voltage



Input Motor Current

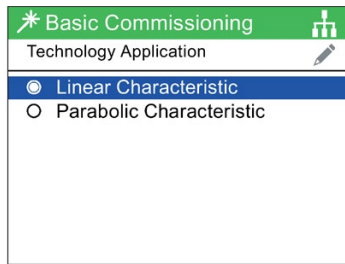


Input Power Rating

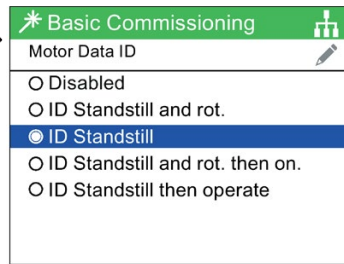


Input Motor Speed

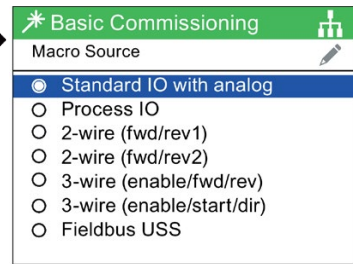
6.1 Example Wizard



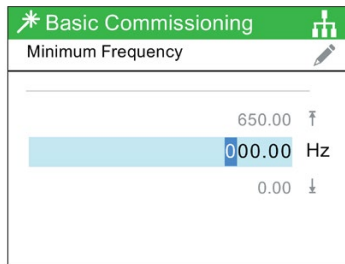
Select Technology Application



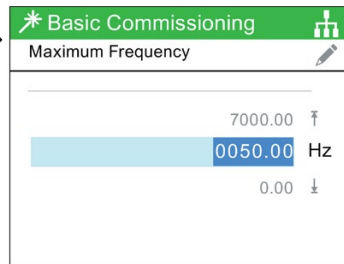
Select required Motor Data ID function



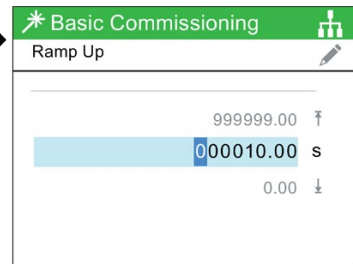
Select Macro Source



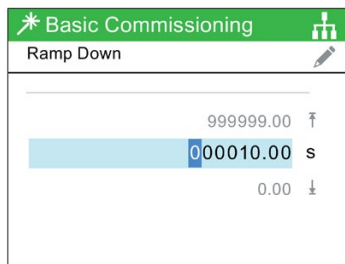
Input the Minimum Frequency



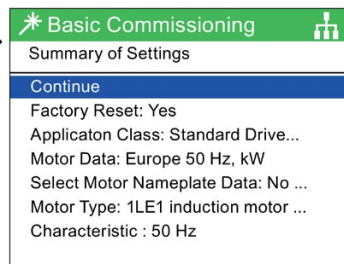
Input Maximum Frequency



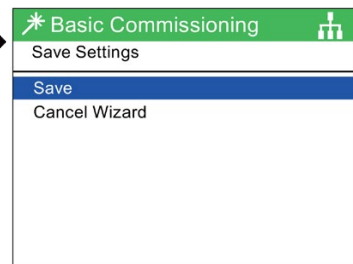
Input Ramp-up time



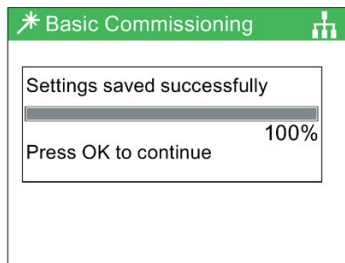
Input Ramp-down time



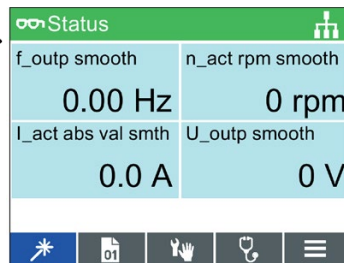
Summary of Settings - Select Continue



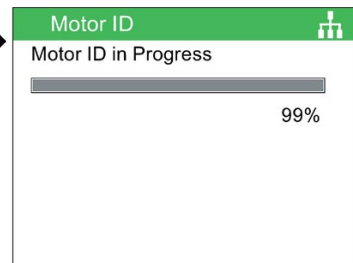
Save Settings



Settings saved



Status Screen displayed



On first ON command - Motor ID is performed

## 6.1.2 Fieldbus Interface Settings

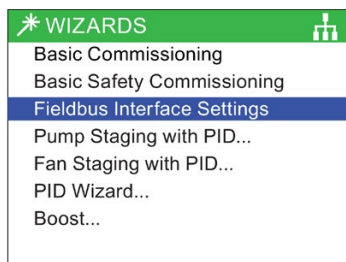
### Overview

The Fieldbus Interface Settings wizard allows the user to set up the necessary addressing information for a PROFINET or Ethernet/IP connection on an industrial network.

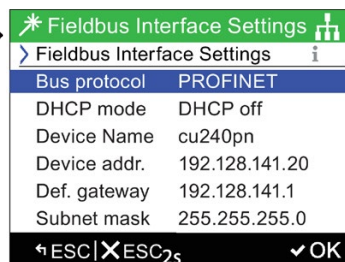
The user is presented with a number of screens which allow all the bus protocol settings to be configured. The following configuration information can be set with this wizard:

- Bus Protocol
  - The bus protocol are standard rules and structure that control the communications on a network, their are three selections available, none, PROFINET and Ethernet/IP
- DHCP mode
  - The Dynamic Host Configuration Protocol (DHCP) is a standardized network protocol used on Internet Protocol (IP) networks. The DHCP is controlled by a DHCP server that dynamically distributes network configuration parameters, such as IP addresses, for interfaces and services.
- Device Name
  - Each PROFINET device has a name associated with it. The name is normally used to describe its position or purpose in the process. PROFINET names are similar to DNS names in that the name is broken into components, each separated by a period.
- Device Address (Device addr.)
  - Each PROFINET device has an Internet Protocol (IP) address. The IP address is used for initiating the connection and for sending configuration parameters to the IO Device.
- Default gateway (Def. gateway)
  - A default gateway serves as an access point or IP router that a networked computer uses to send information to a computer in another network or the internet.
- Subnet mask
  - Subnet mask is a mask used to determine what subnet an IP address belongs to. An IP address has two components, the network address and the host address.

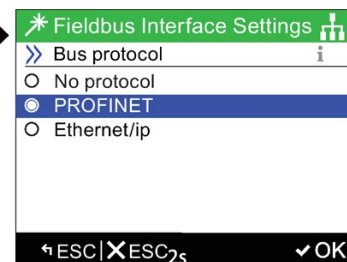
Shown below is basic example of how the Fieldbus Interface Settings wizard functions.



Select "Fieldbus Settings"

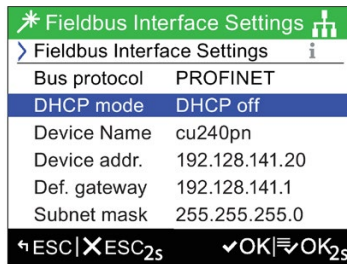


Select PROFINET

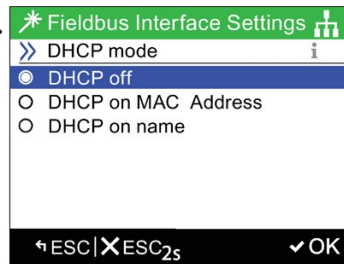


Select PROFINET bus protocol

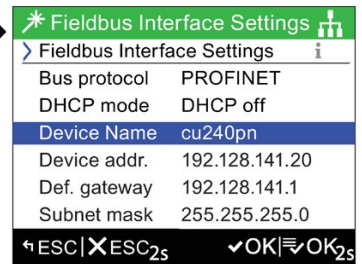
6.1 Example Wizard



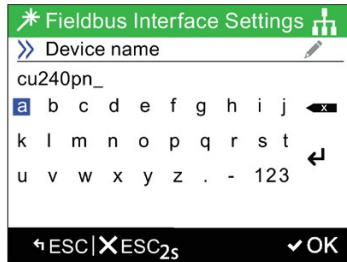
Select DHCP mode



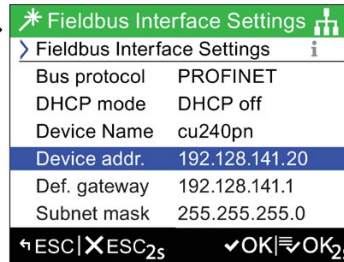
Select the required DHCP mode



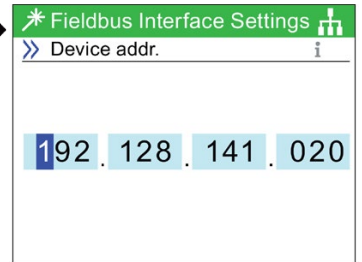
Select Device Name



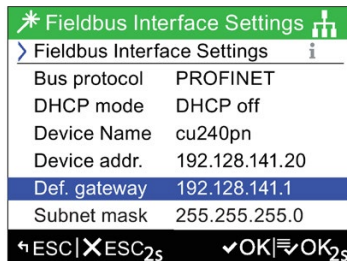
Enter the Device Name



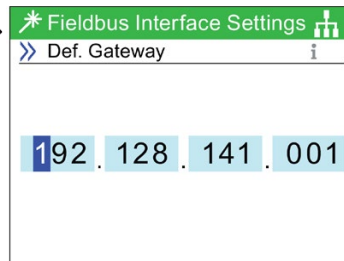
Select Device Address



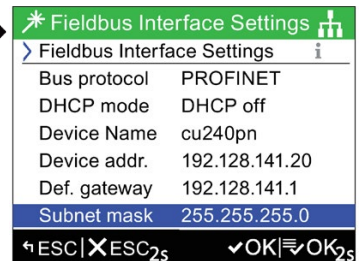
Enter the Device Address



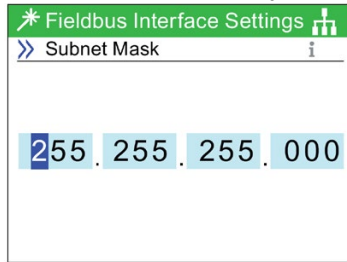
Select Default Gateway



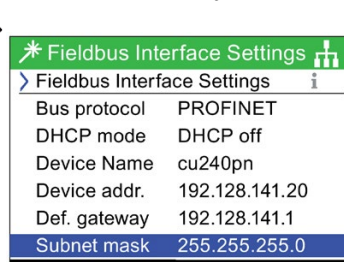
Enter the Gateway address



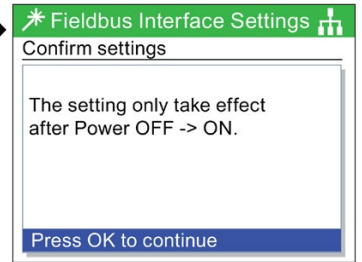
Select Subnet Mask



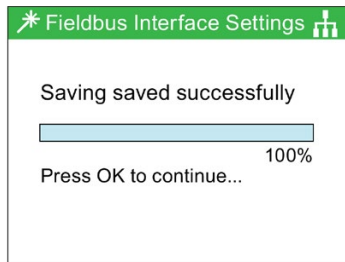
Enter the Subnet Mask



Press OK for 2 seconds or longer



Confirm save of settings



Settings successfully saved

#### NOTICE

##### **Valid and correct data input**

When inputting data into the Fieldbus Wizard, it is essential that all the information provided by the user is valid and correct. If the incorrect or invalid data is provided then the Fieldbus function will not work correctly. Further information is provided on each screen via the INFO button.

All changes made to the Fieldbus Wizard settings must conform to the data and naming conventions as stipulated by the Administrator of your Automation network.



# Control menu

## 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.

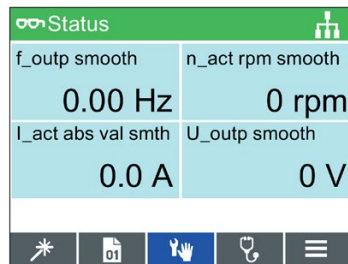


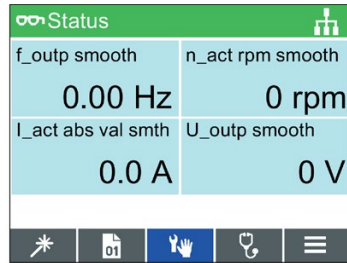
Figure 7-1 Select Control Menu

## 7.1 Setpoint

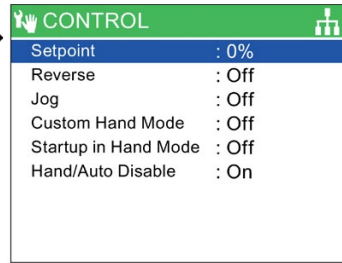
### Setting the Setpoint

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

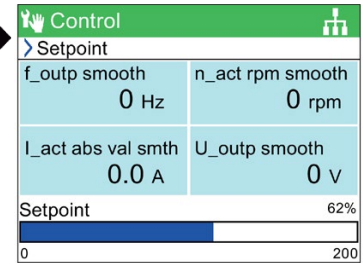
To change the setpoint, the following actions should be performed:



Select Control



Select Setpoint



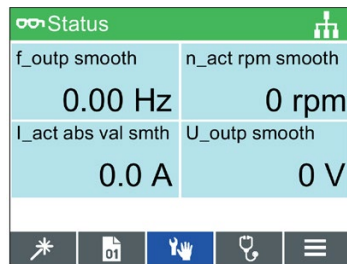
Use Touch-wheel to set the Setpoint

## 7.2 Reverse

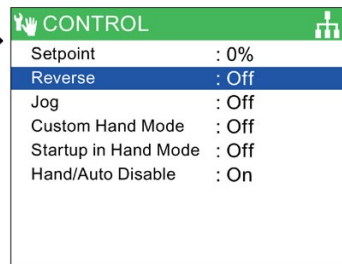
### Setting Reverse

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

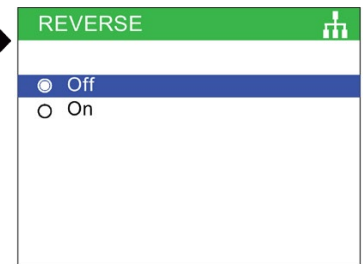
To reverse the direction of the motor, the following actions should be performed:



Select Control



Select Reverse






Select Off or On

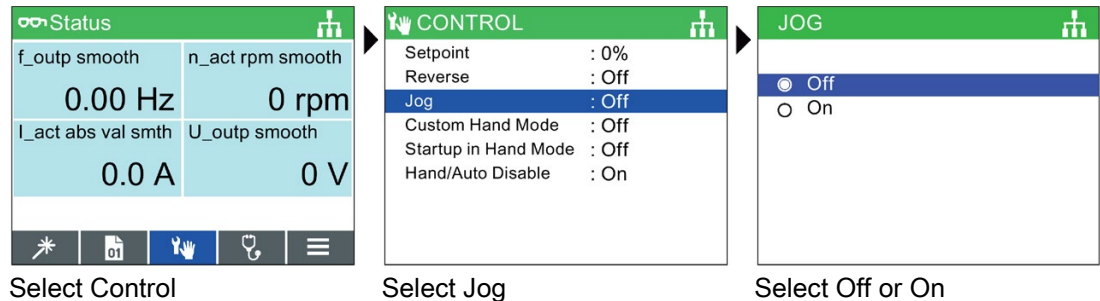


## 7.3 Jog

### Setting 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:



#### 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.

## 7.4 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 2 (IOP-2).

When the custom hand mode has been set, the IOP-2 Sensor Control Field can be used as the setpoint source.

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

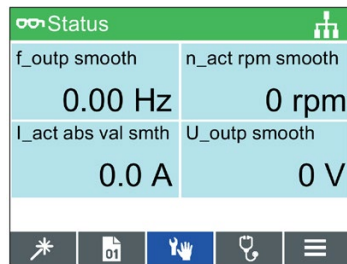
A breakdown of all the interconnection inputs are given in the table below.

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

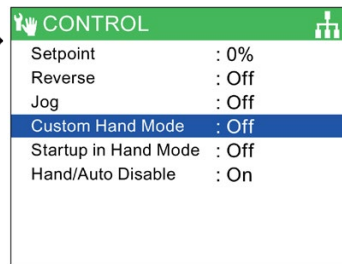
Table 7- 1 Interconnection inputs for Status Word 1 in Custom Hand mode

Standard interconnection				
r8540	STW 1 from IOP-2	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-2	Connector Inputs (CI)	p8543	Effective speed setpoint in Custom Hand mode
	N_soll OP	->		Speed setpoint

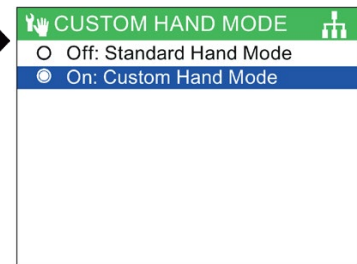
Setting up Custom Hand mode example



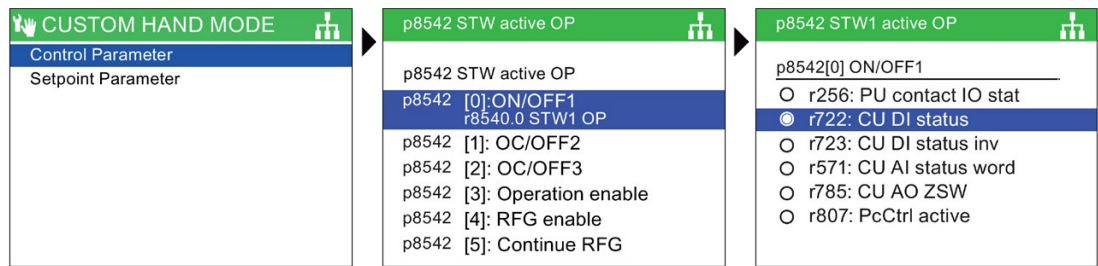
Select Control



Select Custom Hand Mode



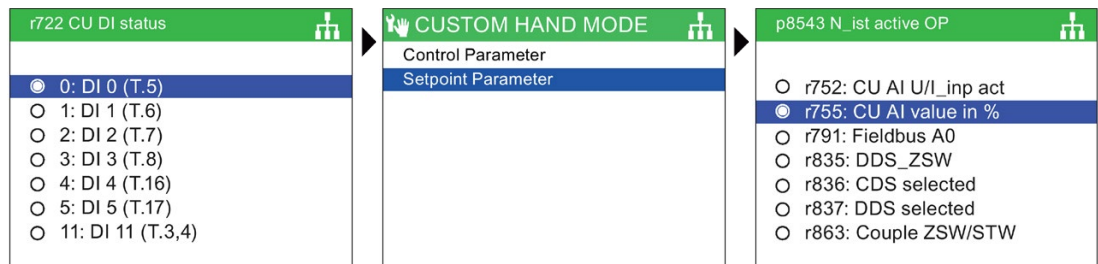
Select Custom Hand Mode On



Select Control Parameter

Select required function

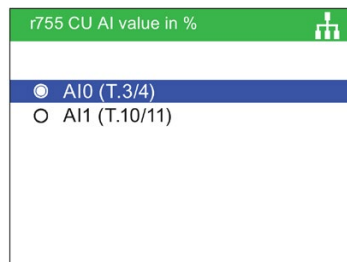
Select source of command signal



Select the input that will receive command signal

Select Setpoint Parameter

Select the setpoint signal source



Select the input to receive the setpoint signal

Once the setpoint signal input has been selected, the IOP-2 will return to the Setpoint selection screen then press ESC for >3 secs, to return to the status screen.

In this example, 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.

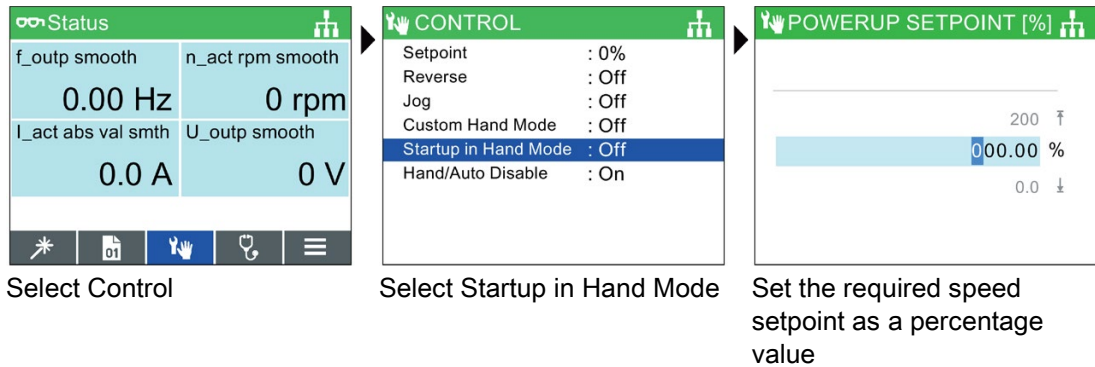
## 7.5 Startup in Hand mode

### Overview

Startup in Hand mode allows the converter, under the control of the Intelligent Operator Panel (IOP-2), to startup in Hand mode automatically. The command source is then taken from the off and on buttons of the IOP-2.

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

### Setting up Startup in Hand mode example



The IOP-2 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-2.

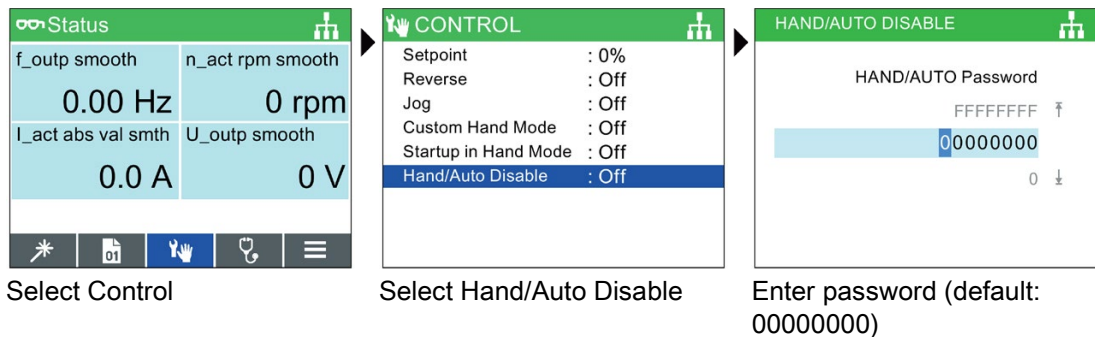
## 7.6 HAND/AUTO disable

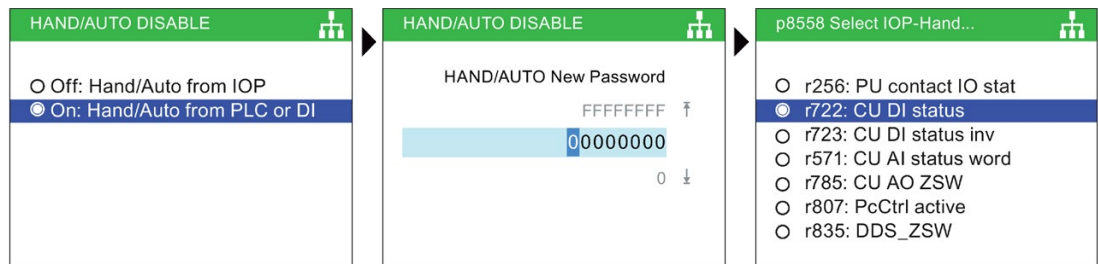
### Overview

The HAND/AUTO disable function disables the HAND/AUTO key on the Intelligent Operator Panel (IOP-2) and pressing the key will not produce any action by the IOP-2.

An example of setting up the Hand/Auto disable mode is given in the instructions below.

### Setting up the HAND/AUTO disable function

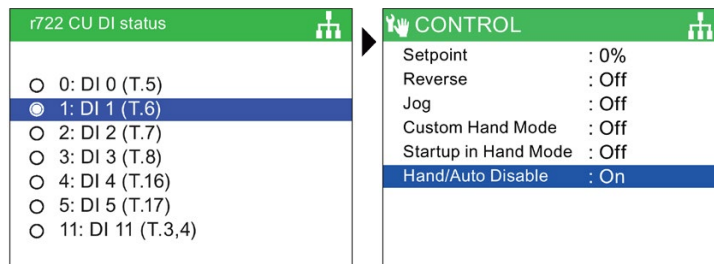




Select On: Hand/Auto from PLC or DI

Enter password again or create a new password

Select signal source



Select input to receive control signal

Press ESC to return to Control Menu

The HAND/AUTO button is now disabled and local control of the IOP-2 cannot be activated by the HAND/AUTO button. In this example, the converter is now setup to receive the HAND/AUTO command from Digital Input 1 (DI1).

#### 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-2 has been performed. When the HAND/AUTO disable function is turned off, again, a power-cycle of the IOP-2 is required to complete the deactivation of the function.



# Menu

## 8.1 Menu overview


### Overview

The "Menu" is selected from the five menu options at the bottom of the IOP-2 screen.

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

- Wizards
- Parameters
- Diagnostic
- Up/Download
- Extras

By sliding your finger around the Sensor Control Field or using the arrow keys, the required function can be highlighted. Pushing the OK confirms the selection and further sub-menus will be displayed. Pressing ESC once will return the IOP-2 to the previous screen, a longer press will return the display to the "Status" screen.

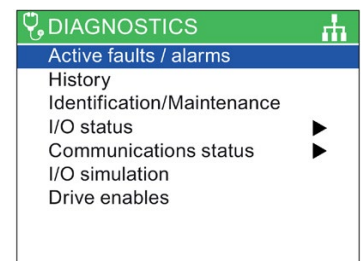
For information on the IOP-2 compatibility, see  Introduction (Page 13).

## 8.2 Diagnostics

### Diagnostics menu

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

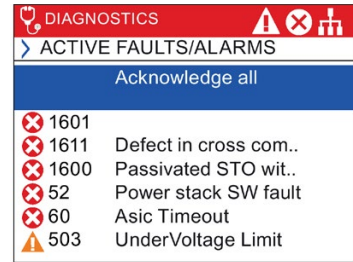
- Active faults/alarms
- History
- Identification/Maintenance
- I/O status
- Communications status
- I/O simulation
- Drive enables



### Active faults/alarms

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

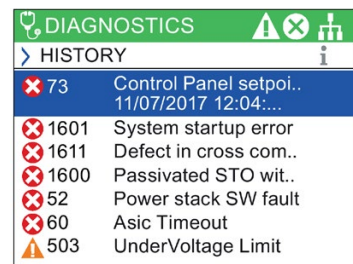
Each fault and alarm can be selected and by pressing the INFO key or the OK key, an explanation of the fault or alarm will be displayed.



### History

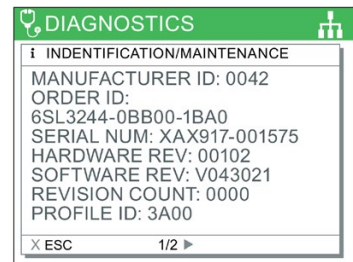
When this option is selected the screen will display a list of all previous faults and alarms with the time that they occurred.

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.



### Identification/Maintenance

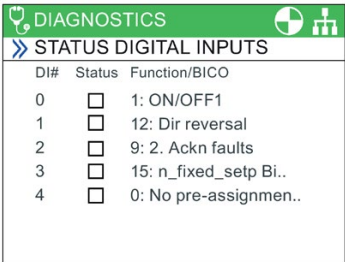
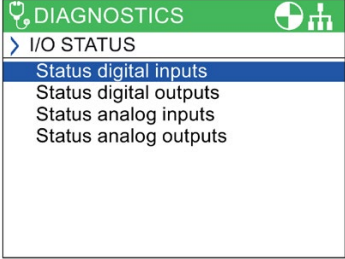
Displays specific technical information regarding the Control Unit and Power Module to which the IOP-2 is attached will be displayed. The actual information displayed depends on the type of Control Unit and Power Module to which the IOP-2 is connected.





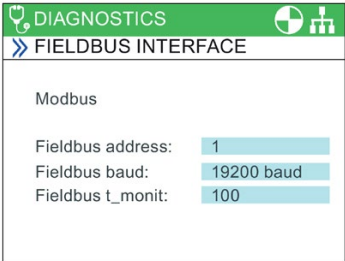
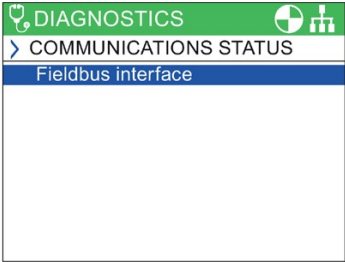
### I/O status

This option displays a list of the digital and analog inputs and outputs of the converter 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

This 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**

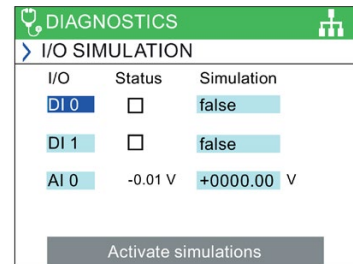
**Loss of control of the converter**

If the converter is started using the I/O simulation and the IOP-2 is removed from the converter it will not be possible to stop the converter running the motor. If the I/O simulation is activated, then only the I/O simulation can be used to stop the converter.

The IOP-2 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 simulation can be overridden and made high.



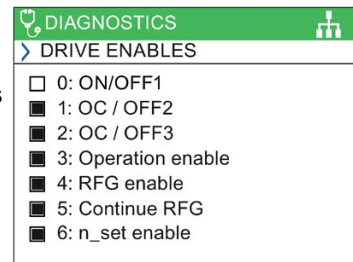
The screen presents the following options:

- 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.

Drive enables

The drive enables screen displays a list of all the current enabling signals for the converter. 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.



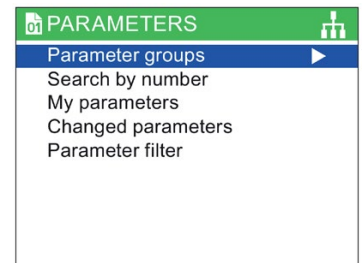
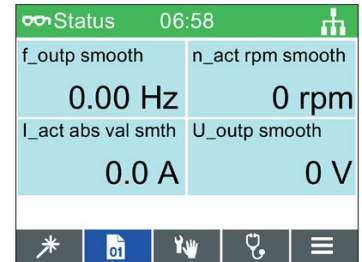
## 8.3 Parameters

### Parameter menu

For information on IOP-2 compatibility, see  Introduction (Page 13).

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

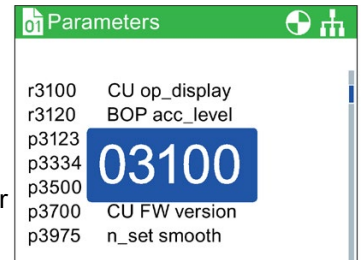
- Parameter groups
- Search by number
- My parameters
- Changed parameters
- Parameter filter



### Fast scroll

When searching through any large parameter list, the Fast scroll function will automatically start when the user slides their finger around the Sensor Control Field in a fast motion.

A large blue box will appear on the screen, showing the current parameter number, with each scroll the number will increase by 100. When the user stops scrolling, the parameter number nearest to the number displayed will be selected.



### Parameter groups

#### *All parameters*

This option allows the user access to the individual parameters of the converter. The default filter is "Standard" which allows the user access to the most frequently used parameters.

#### *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 converter. Each parameter displays its currently set value and these can be modified if required.

*System information*

This screen displays all the parameters that contain system information regarding the converter. 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 available parameters to configure the digital and analog I/Os.

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.

*Setpoint channels*

This option allows the user to display and modify the setpoint parameters.

*Operating mode*

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

*Drive functions*

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

It is important that if any parameters concerning the above mentioned functions are to be modified, that the converter/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 converter. The parameters can be viewed to confirm their settings and values, they can also be modified if they are not read-only parameters.

*Diagnostics*

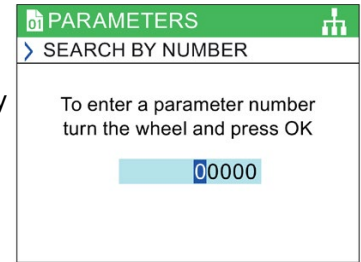
This option allows the user direct access to the parameters that monitor the state of the system.

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

## Search by number

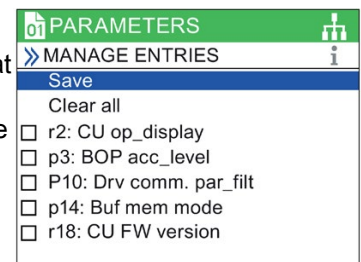
This option allows the user to search for a specific parameter number.

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.

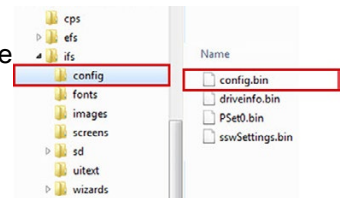


### Copying the "My Parameters" list to another IOP-2

When a "My Parameters" list is created, it saves the lists in the **config.bin** file on the IOP-2.

To copy the config.bin, the following procedure should be performed:

1. Connect the IOP-2 via the USB to your PC (the IOP-2 will enter "Mass Storage" mode).
2. Navigate to the **config** folder (shown in the screenshot and highlighted in red).
3. Copy the **config.bin** file to a suitable location on your PC.
4. Disconnect the IOP-2 and connect a new IOP-2 and copy the **config.bin** file to the new IOP-2.

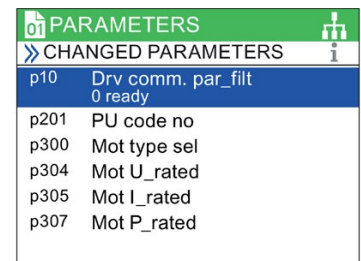


## Changed parameters

When the "Changed parameters" option is selected the IOP-2 will search the converter parameter list for all the parameters that have had their values changed from the factory default settings.

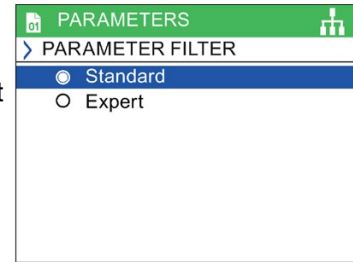
Once the search is complete, the screen will present a list of all parameters that have changed values.

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



## Parameter filter

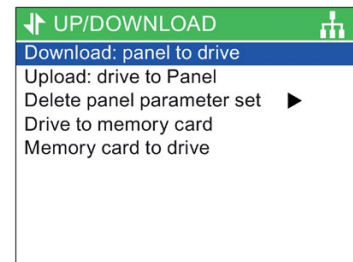
This option allows the user to select the parameter access level. Standard is the default access level, which gives the user access to the most frequently used parameters. Expert level gives access to all available parameters.



## 8.4 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.



### WARNING

#### Unexpected behaviour of converter

During the transfer of data to and from the converter, 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 converter is performed prior to any further parameterization or giving the converter 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:



Safety Integrated Function Manual  
<http://support.automation.siemens.com/WW/view/en/50736819>

## 8.5 Support

### Overview

The Support function on the IOP-2 allows the user to access Siemens Customer Support assistance and information in a number of ways depending upon the individual requirements.

#### Industry Online Support

The Online Support option gives the user the ability to gather technical information about the connected whole system, or an individual component of the system, such as Order number, Serial number, firmware version, active alarms.

When the generate 2D matrix code is scanned (in the example below, using the Siemens app) the user is presented with all the available technical information for their device, for example, Serial numbers, Version numbers, FAQs, Manuals, Certificates, Product Notes, Downloads and Application examples, plus the ability to initiate a Technical Support request.

#### Local Siemens Partner Support

This option takes user to the Siemens online Industrial automation help site.

After completed some very simple dropdown menu selections, the contact details of the Local Siemens Partner for your region is display.

#### Download the Siemens App

You can download the necessary Siemens app using the menu item "Download the Siemens App" which will take you to the appropriate Siemens site that will direct the user to the correct site for either Android or iPhone Smartphone platforms.

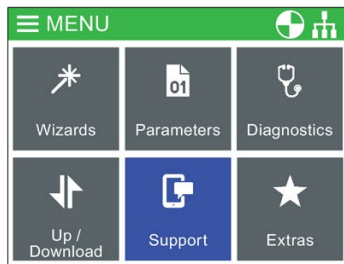
The Siemens mobile app site is given at the link below:



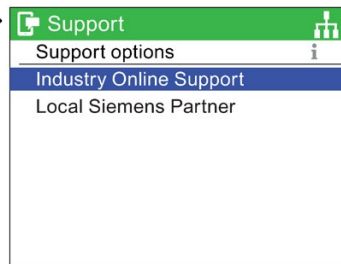
Siemens mobile app (<https://support.industry.siemens.com/cs/ww/en/sc/2067>)

#### Industry Online Support example

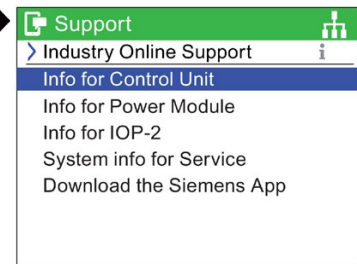
A brief example of the various options are shown below:



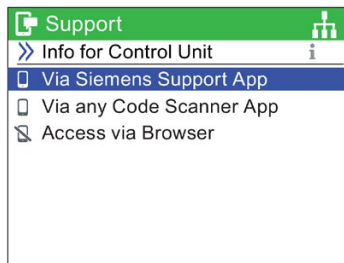
Select "Support" option from menu



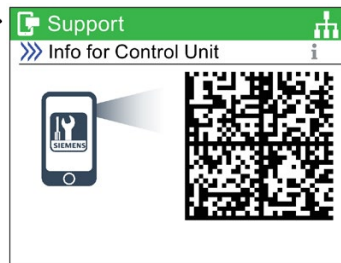
Select "Industry Online Support"



Select the information you wish to provide



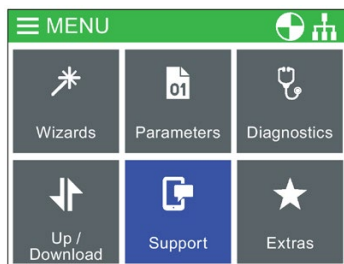
Select the device used to scan the code



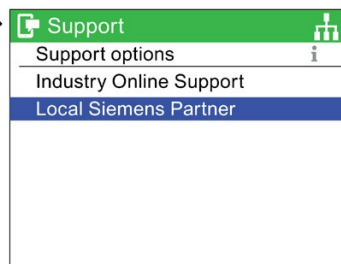
Scan the code

Once scanned with the Siemens app, the user is presented with the product information for their device. The product information includes, Serial numbers, Version numbers, FAQs, Manuals, Certificates, Product Notes, Downloads and Application examples, plus the ability to initiate a Technical Support request.

### Local Siemens Partner example



Select "Support" option from menu



Select "Local Siemens Partner"



Scan the QR code

When the QR code is scanned, the user is taken to the Siemens Industrial support site. After selecting the correct country, region, the user is given the contact details of their Local Service Partner.



## 8.6 Customer parameter sets

### Overview

Custom parameter sets can now be created and stored on the Intelligent Operator Panel (IOP-2).

The IOP-2 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-2 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-2.

This is due to the specialized nature of the IOP-2's internal memory system.

##### Standard parameter set access

New standard parameter sets can be uploaded from the drive to the IOP-2, 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-2 automatically looks at the "cps" folder. If the "cps" folder is empty, it will then search the "ifs/config" folder.

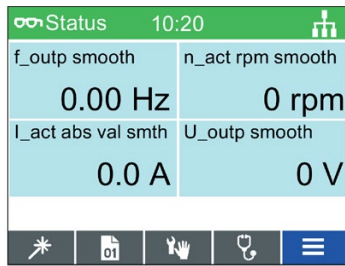
---

### Creating a custom parameter set

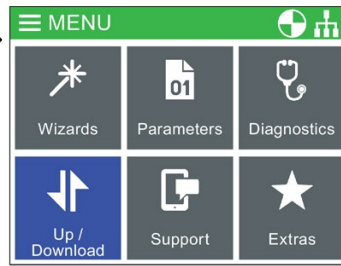
This procedure makes the following assumptions:

- 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-2 under Parameter Set 0 (although the user can assign their parameter set any of the available parameter set numbers).

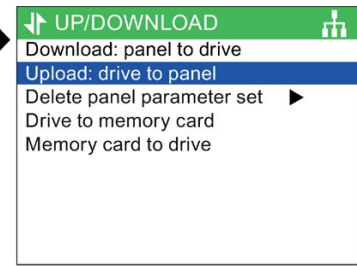
8.6 Customer parameter sets



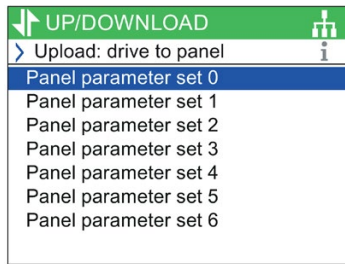
Select Menu



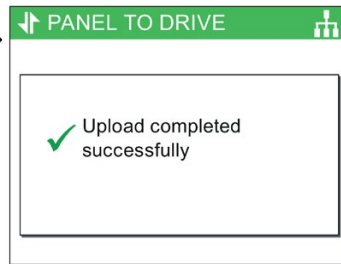
Select Up/Download



Select Upload: Drive to Panel

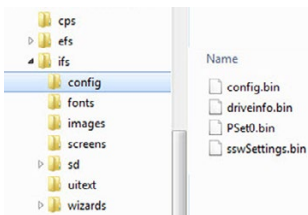


Select parameter set to upload to the IOP-2

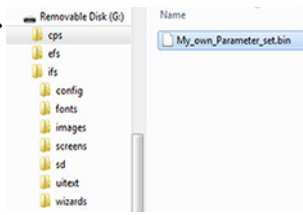


Screen displays successful upload

- Disconnect the IOP-2 from the Control Unit
- Connect IOP-2 to PC using USB cable
- IOP-2 enters Mass Storage device mode
- Open Windows explorer on the PC

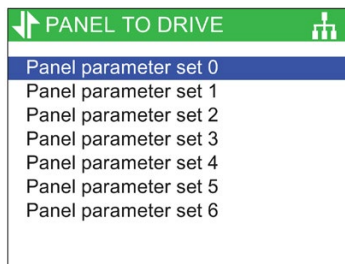


Copy the "PSet0.bin" file to the "CPS" folder



Rename the "PSet0.bin" file to "My\_own\_Parameter\_set.bin"

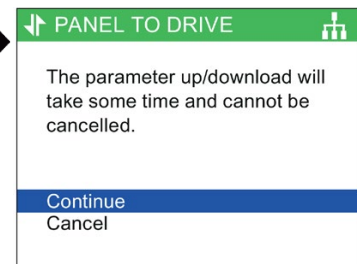
- Disconnect the IOP-2 from the PC and reconnect the IOP-2 to the Control Unit.



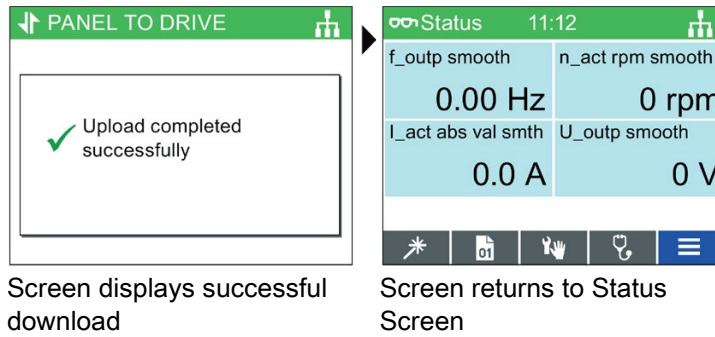
Select Download: Panel to drive



Select your parameter set and press OK



Select continue to commence download



## Copying IOP-2 parameter sets

When you have saved a number of parameter sets to an IOP-2, it is possible to copy your saved parameter sets to another IOP-2 using the simple process outlined below.

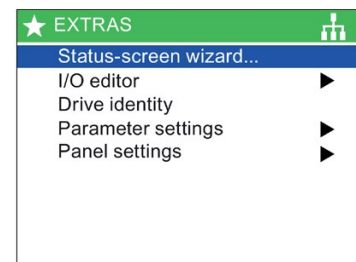
1. Connect the IOP-2 via the USB connector to a PC.
2. The IOP-2 will enter the "Mass Storage Device" Mode.
3. On the PC, navigate to the "ifs/config" folder.
4. Select the parameter sets you require and save them to a new folder on the local drive of the PC.
5. Disconnect the IOP-2 from the PC.
6. Connect another IOP-2 and copy the saved parameter sets to the "ifs/config" on the new IOP-2.

This procedure can be repeated for any number of IOP-2s.

## 8.7 Extras Menu

### Overview

The Extras menu presents a number of options for the configuration of the IOP-2, these are explained in this section.



### Status-screen wizard

#### Scalar value

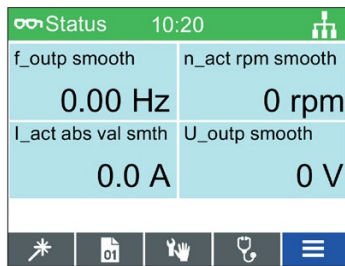
The bar graph (default status screen) and the Scalar value are setup using a similar procedure. The example below show how to setup the Scalar value status screen.

#### Note

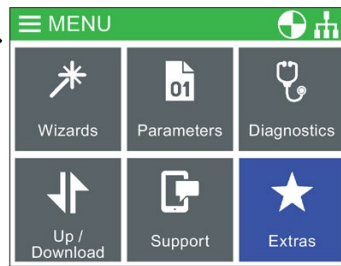
#### Scalar view limits for the SINAMICS G110D

Normally, four values can be displayed on the IOP-2 in scalar view, but when using the IOP-2 in conjunction with the SINAMICS G110D only two values can be displayed on the IOP-2 screen.

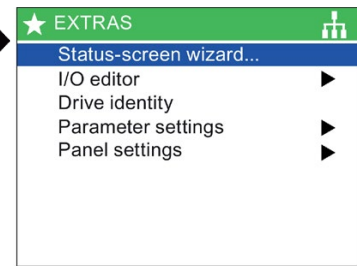
The status-screen wizard allows the user to configure the information displayed on the status screen. By default it displays output voltage and output frequency of the converter. These can be changed by using the wizard to select other physical values of the converter. Displayed units of value can be 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.



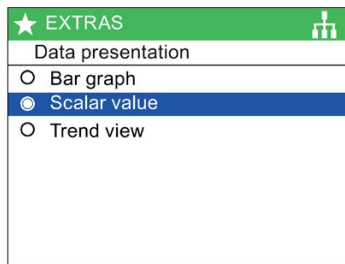
Select Menu



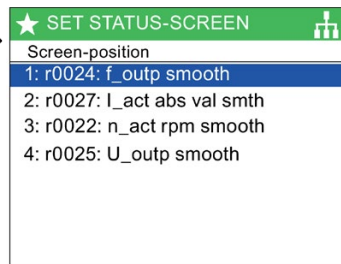
Select Extras



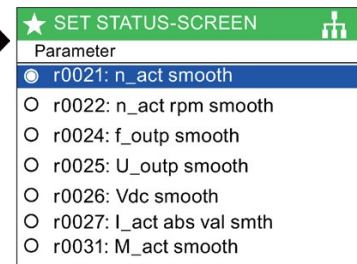
Select Status-screen wizard



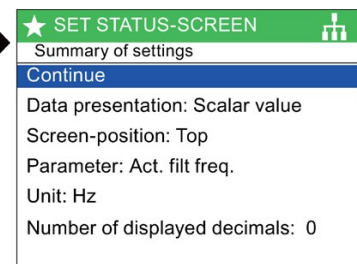
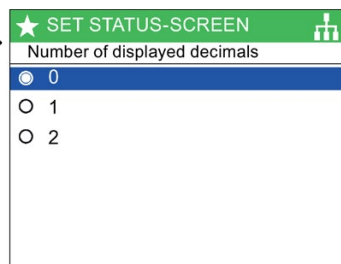
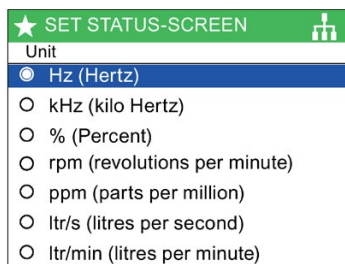
Select Scalar value



Select the screen position of the values or select "Empty" to leave it blank



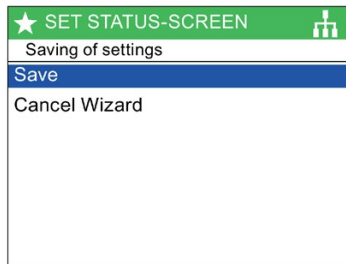
Select the parameters to be displayed



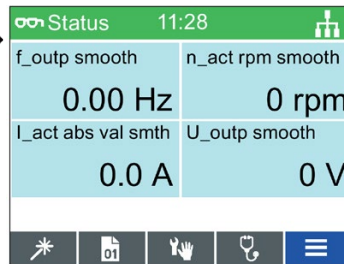
Select the unit of measure

Select the decimal places

Confirm settings

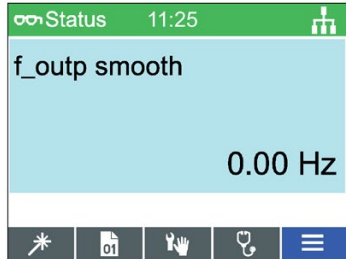


Save settings

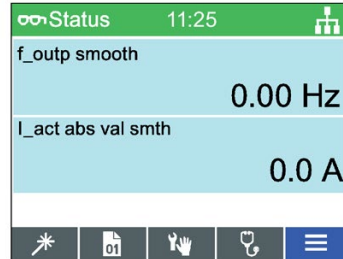


Scalar status screen displayed

The Scalar view Status screen will change the size and position of the information shown on the IOP-2 depending on the number of values that are displayed. In the figure below, the various screen display options are shown.



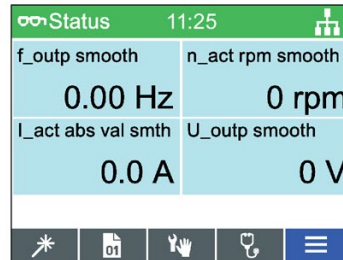
Scalar display 1 value



Scalar display 2 values



Scalar display 3 values



Scalar display 4 values

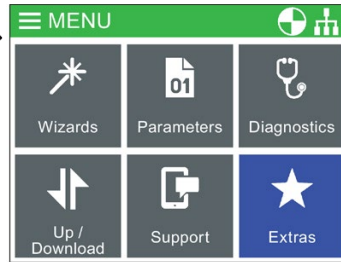
Figure 8-1 Status screen Scalar views

**Trend view**

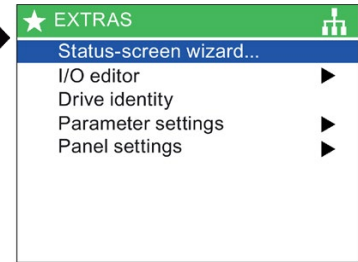
The Trend view allows the user to configure real-time monitoring of the converter and display the desired values in the form of a graph. To setup the Trend view, the following steps should be performed.



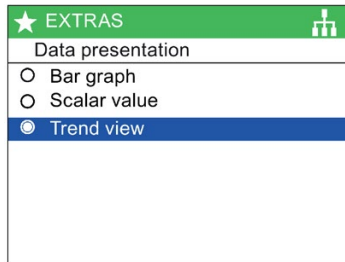
Select Menu



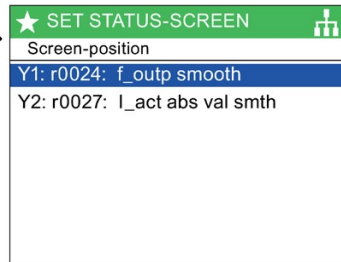
Select Extras



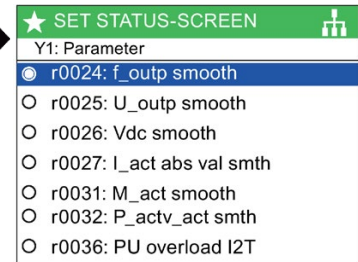
Select Status-screen wizard



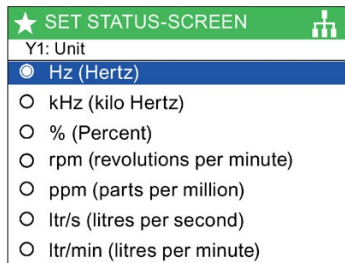
Select Trend view



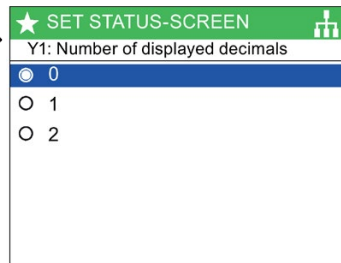
Select screen position



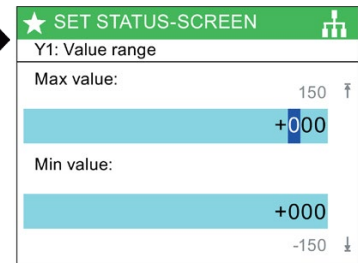
Select parameter to be displayed



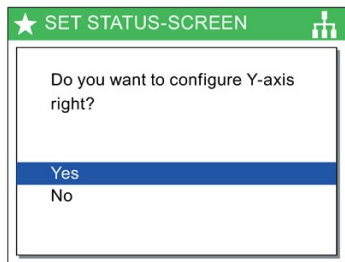
Select Unit of measure



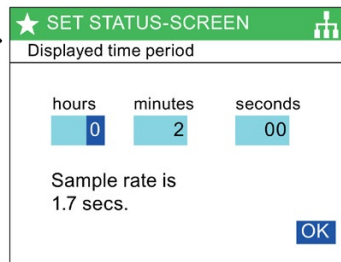
Select decimal places of displayed values



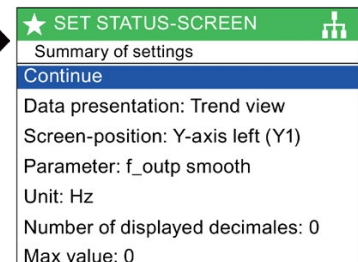
Select value range



Configure Y-axis



Configure displayed time period



Select Continue



View mode is activate by a long press of the OK button, when in Trend View. A vertical line will appear on the screen like an oscilloscope and allows the user to measure any given point on the graph by rotating the Sensor Control Field left or right. With a long press of the **INFO** button, the graph data is written to a Trend information file on the IOP-2. 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         0.000
24         0.000         0.000
  
```

To access the Trend Information file, navigate to the following directory on the IOP:  
/efs/health/TrendSample.txt

Figure 8-2 Trend information file

## I/O Editor

The I/O Editor allows the user to configure the digital and analog inputs and outputs of the converter.

An example of how the configuration of the inputs and outputs is given in the procedure below. It should be noted that the following screens are for demonstration purposes only and



the actual screens may vary depending on the type and firmware of the converter that is being used.

**⚠ CAUTION**

**Changing pre-assigned input and output settings**

Some inputs and outputs may already be assigned a function, it is recommended that these assignments are not changed, unless it is required for a particular type of application.

If the pre-assigned inputs/outputs are changed, it is essential that the application is checked to ensure it will function correctly and as expected.

**⚠ CAUTION**

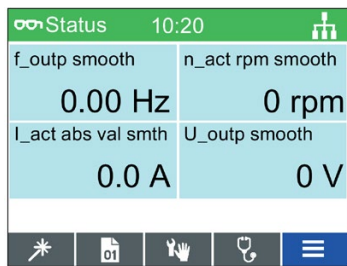
**Removal of the ON/OFF command**

If removing the ON/OFF command from a digital input (p0840), the indices will be changed to 1, thereby resetting this parameter.

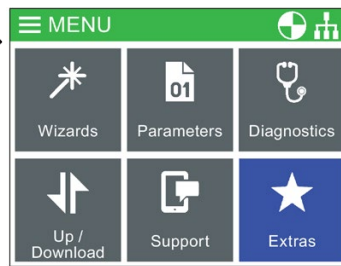
This will make the ON/OFF function of the converter not operate correctly, or as anticipated by the user.

Please ensure that during the commissioning of the converter the ON/OFF command functions properly and as expected for your specific application.

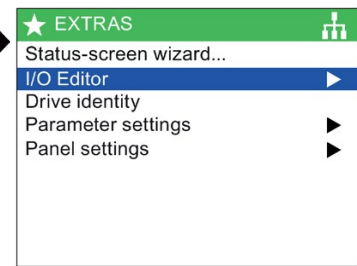
**Editing the inputs and outputs**



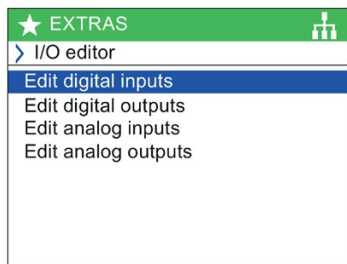
Select Menu



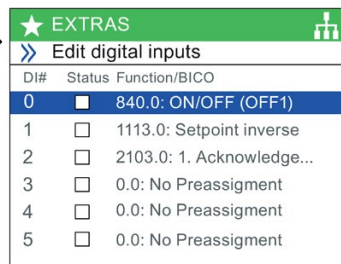
Select Extras



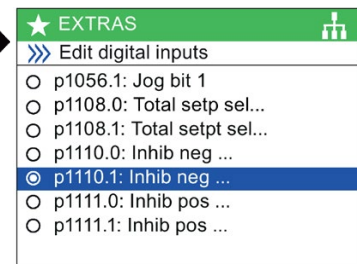
Select I/O Editor



Select I/O to be configured



Set the actual I/O



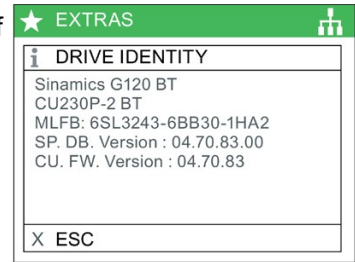
Select the function of the I/O

When the final selections have been made, press ESC twice to return to the I/O Editor screen to configure another input or output or a long press of ESC to return to the general status screen.



### Drive identity

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



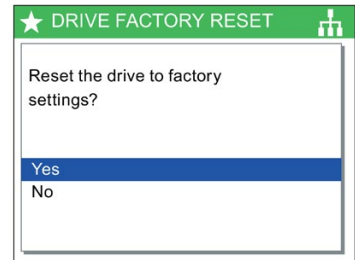
### Parameter settings

#### Drive factory reset

There are two factory reset options:

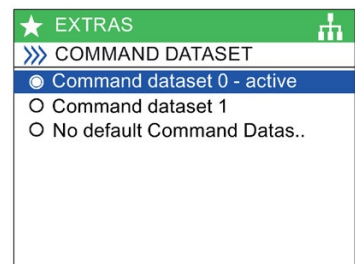
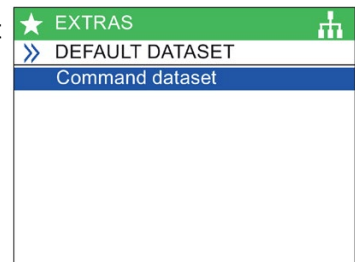
*Factory reset* - This option reset all parameters to their factory default settings. Any safety parameters that have been modified will not be reset.

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



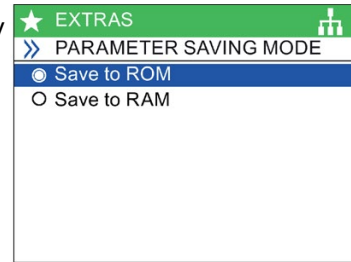
#### Default dataset

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.



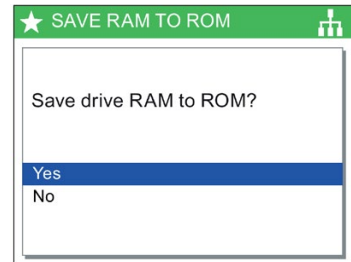
### Parameter saving mode

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



### Save RAM to ROM

This option allows the user to manually save all drive data from the converters internal memory to the internal non-volatile memory - thus data save will be retained within the converter 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-2. This option 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-2 and a PC.



For details of selecting this function see  Initial set-up (Page 22)

### Time and date settings (including Daylight savings time)

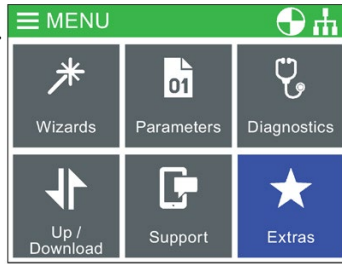
If the CU to which the IOP-2 is fitted has a real-time clock, then the option to set the correct date and time (including daylight savings time is presented in the "Panel settings" menu.

The Time and date settings allow you to setup up the following:

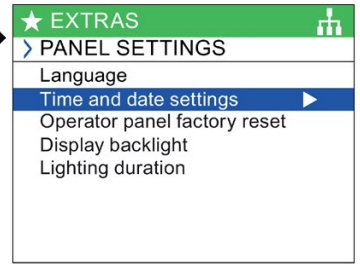
- **Date format**- This allows the date format to be select either DD/MM/YY or MM/DD/YY.
- **Time and date settings**- This allows the user to set the required date and time of the internal real-time clock of the Control Unit.
- **Daylight saving time**- This allows the user to setup the daylight saving time difference on the Control Unit (CU230P-2) real-time clock. The daylight saving time is set to take into account not only the time difference but also the date and time of the change to and from daylight saving time. The setup of the DST function is shown in the following procedure.



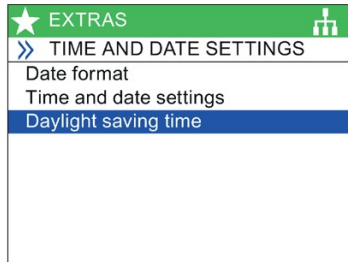
Select Menu



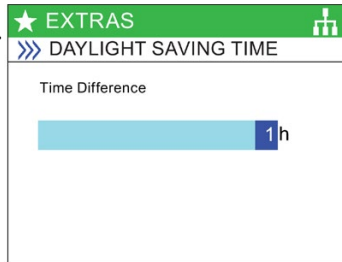
Select Extras



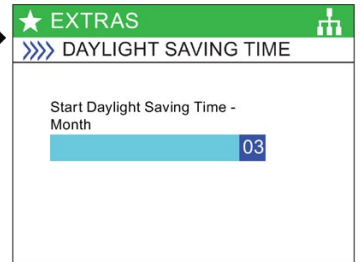
Select Time and date settings



Select Daylight saving time



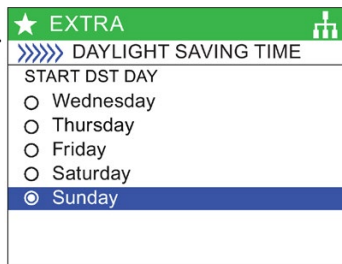
Set DST time difference



Set month DST starts



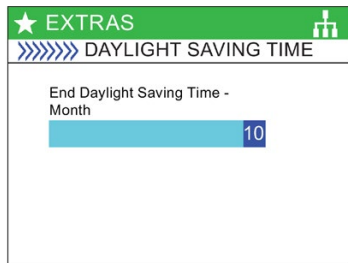
Set week DST starts



Set day DST starts



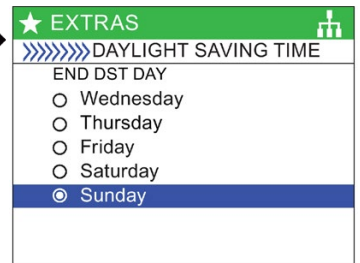
Set time DST starts



Set month DST ends



Set week DST ends



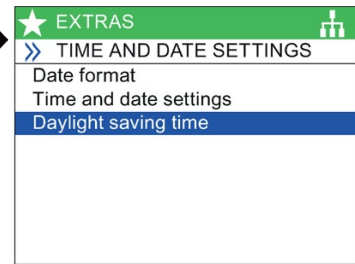
Set day DST ends



Set time DST ends



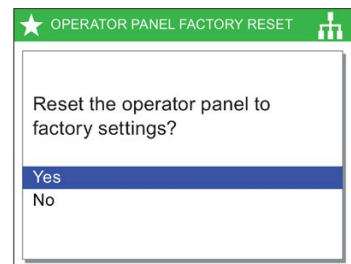
Set date and time



IOP-2 returns to previous screen (this may take a few seconds)


### Operator panel factory reset

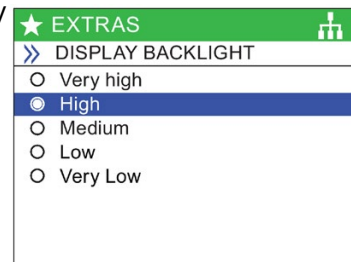
This option resets the IOP-2 to its default factory settings. All previous settings stored on the IOP-2 will be lost. Any parameter sets stored on the IOP-2 will not be deleted.



### Display backlight


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

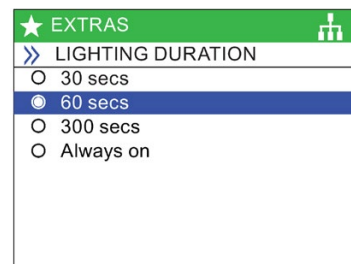
For details of selecting this function see  Initial set-up (Page 22)



### 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.

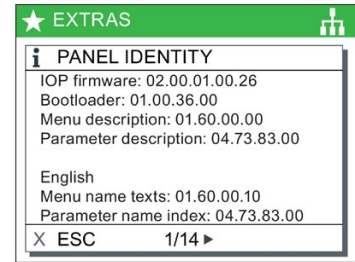
For details of selecting this function see  Initial set-up (Page 22)



## Panel identity

The panel identity screen displays the following technical information regarding the IOP-2:

- IOP-2 firmware version
- Bootloader version
- menu description version
- Parameter description version
- Menu texts version
- Parameter name index version
- Wizard description version.





## Options

### 9.1 Door mounting kit

#### Door mounting kit

To allow the IOP-2 to be mounted into the door of a cabinet, the door mounting kit (DMK) has been designed. This will allow the IOP-2 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.

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:

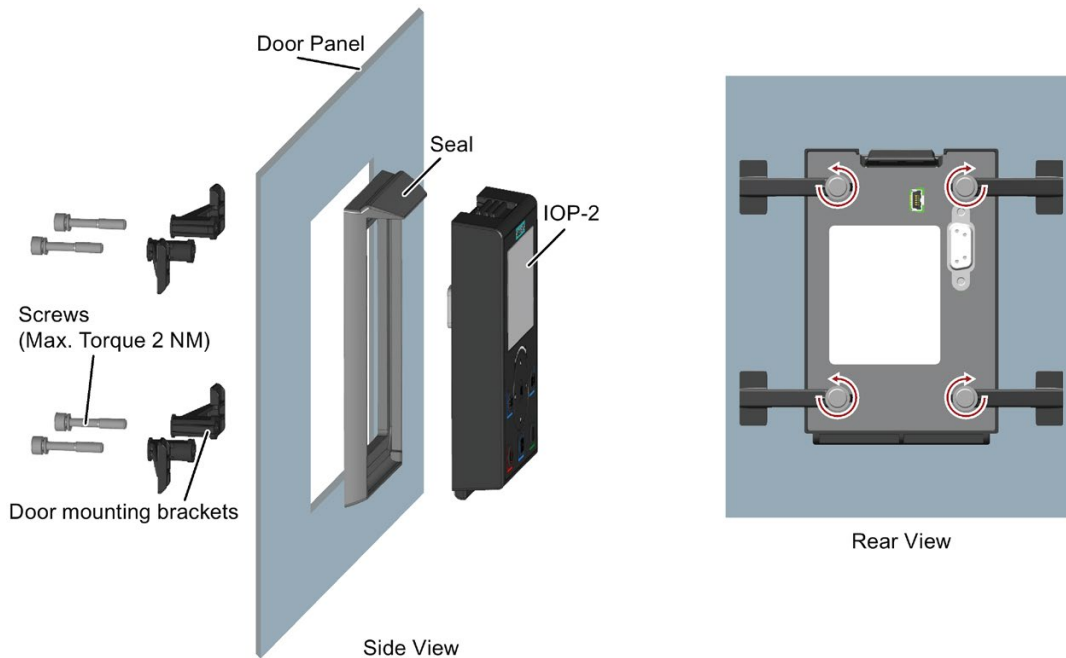
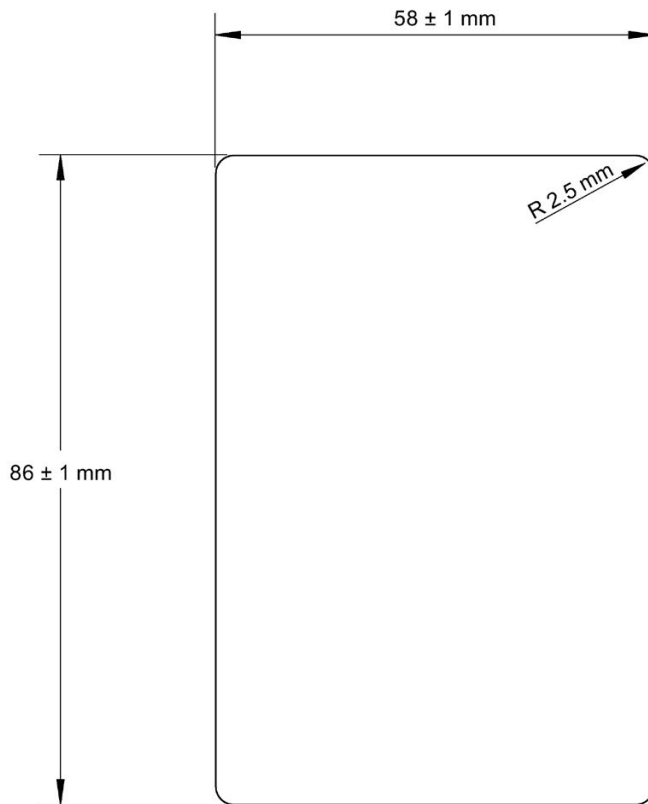


Figure 9-1 Installation of Door mounting kit

9.1 Door mounting kit



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 9-2 IOP-2 DMK drill pattern (Scale 1:1)

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

The IOP-2 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)



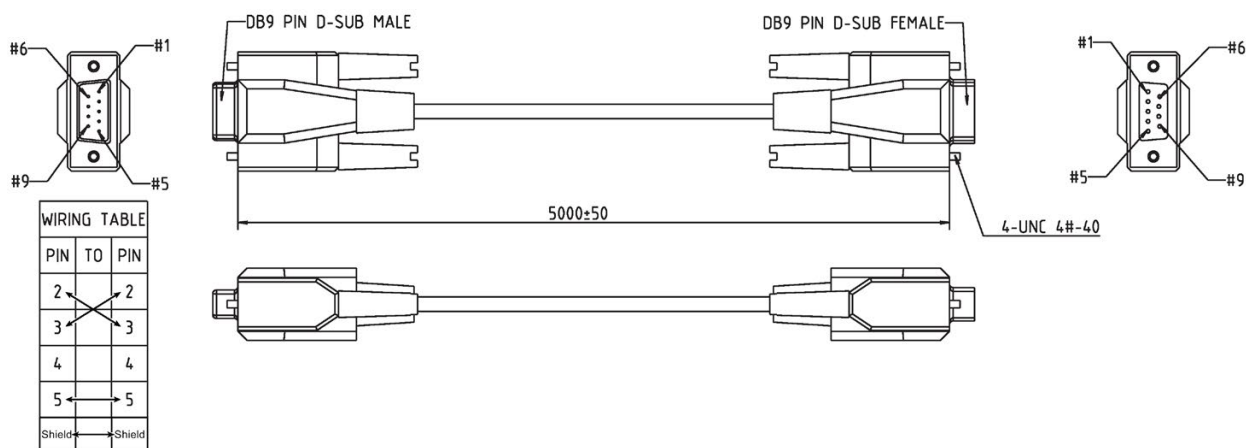


Figure 9-3 Standard RS232 null-modem cable Specifications


## 9.2 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-2. The use of any other power supply units could seriously damage the hand-held kit.

 <b>CAUTION</b>
<b>General precautions</b> <ul style="list-style-type: none"><li>• There is a risk of explosion if battery is replaced by incorrect type.</li><li>• 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.</li><li>• If a cell or a battery has leaked or vented, it should be replaced immediately using protective gloves.</li><li>• 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.</li><li>• 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.</li></ul>

**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-2 has been designed for use within a Class A Industrial environment only.

**Disposal of batteries**

The batteries supplied with the IOP-2 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-2 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-2 has no internal power source, so to increase the IOP-2's versatility, the hand-held device has been designed.

The complete list of converters that work with the IOP-2 are listed in  Introduction (Page 13). The following list comprises the converters that require the hand-held kit because the IOP-2 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

Table 9- 1 Hand-held device order information

Order number	Item quantity	Item	Remarks
6SL3255-0AA00-4HA1	1	IOP-2	
	1	Hand-held module	
	1	Power supply unit	
	4	Rechargeable batteries	1.2 V 2100 mAh NiMH (see note below)
	1	RS232 cable	3 m

**Note****Battery order information**

The batteries supplied with the IOP-2 Hand-held Kit should be replaced with exactly the same type of batteries. The batteries that have been tested for use with the IOP-2 are given below:

Company: GP Batteries

Order Number: GP210AAHC



The batteries can be ordered from the following website: GP Batteries (<http://www.gpbatteries.com/INT/index.php>)

The layout of the IOP-2 hand-held device is shown in the figure below.

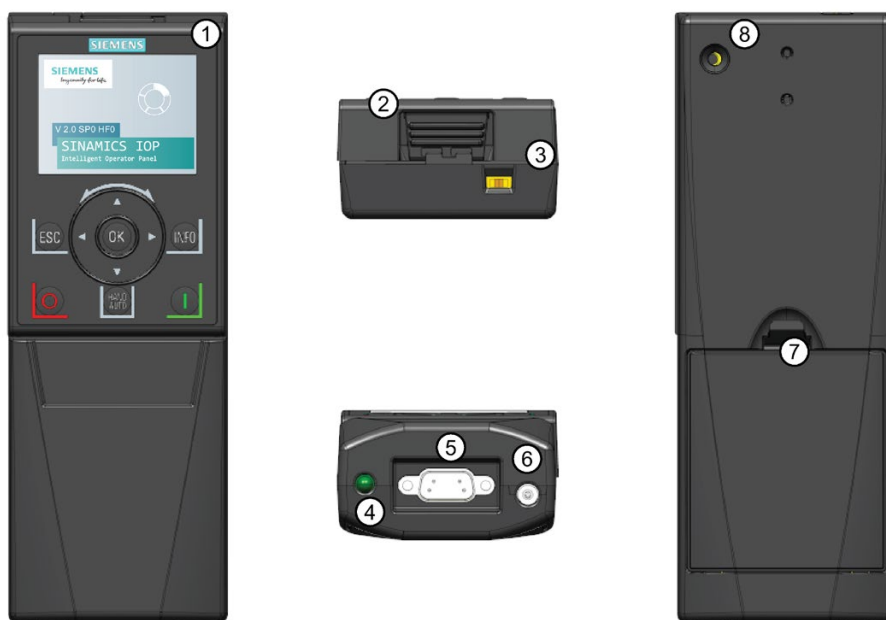


Figure 9-4 IOP-2 Handheld kit layout

1. Intelligent Operator Panel (IOP-2)
2. IOP-2 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-2 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.



Remove battery cover



Insert batteries



Replace battery cover

Figure 9-5 Installing batteries for handheld kit

## Technical data

### 10.1 Technical specifications

#### IOP-2-2 Technical data

Table 10- 1 IOP-2 and Door mounting kit specifications

Feature	IOP-2 only	Door mounting kit
Protection	Depending upon the Control Unit IP rating to a max. of IP55 / UL Type 12 enclosure	
Dimensions (HxWxD)	106.86 mm x 70 mm x 19.65 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. 1 Nm to 1.25 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	Relative humidity <95% non-condensing	

Table 10- 2 Hand-held specifications

Feature	IOP-2 Hand-held kit
Protection	IP20
Dimensions (HxWxD)	195.04 mm x 70 mm x 37.58 mm
Net weight	0.724 Kg (0.1.59 lbs)
Gross weight	0.970 Kg (2.14 lbs) - Includes 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 <95% non-condensing



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## Further information

SINAMICS converters:  
[www.siemens.com/sinamics](http://www.siemens.com/sinamics)

Safety Integrated:  
[www.siemens.com/safety-integrated](http://www.siemens.com/safety-integrated)

PROFINET:  
[www.siemens.com/profinet](http://www.siemens.com/profinet)

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Subject to change without prior notice

For additional  
information on  
SINAMICS  
IOP-2, scan the  
QR code.

