

Operating Manual (Edition 04/2004)

sinamics

AOP30 Operator Panel
SINAMICS G130

SIEMENS

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1. Safety Information

1.1 Definitions and Warnings

Qualified Personnel

For the purpose of this documentation and the product warning labels, a “qualified person” is someone who is familiar with the installation, mounting, start-up, operation and maintenance of the product. He or she must have the following qualifications:

- Trained or authorized to energize, de-energize, ground, and tag circuits and equipment in accordance with established safety procedures.
- Trained in the proper care and use of protective equipment in accordance with established safety procedures.
- First aid training.



DANGER

“Danger” indicates that death, severe personal injury, or substantial property damage will result if proper precautions are not taken.



WARNING

“Warning” indicates that death, severe personal injury, or substantial property damage can result if proper precautions are not taken.



CAUTION

“Caution” with a warning triangle indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

“Caution” without a warning triangle indicates that material damage can result if proper precautions are not taken.

IMPORTANT

“Important” indicates that an unwanted result or situation can result if the appropriate advice is not taken into account.

NOTE

“Note” indicates important information about the product or respective part of the documentation that is essential to highlight.



WARNING

Hazardous voltages are present in this electrical equipment during operation. Non-observance of the warnings can result in severe personal injury or property damage.

Only qualified personnel should work on or around the equipment.

This personnel must be thoroughly familiar with all warning and maintenance procedures described in this documentation.

The successful and safe operation of this device is dependent on correct transport, proper storage and installation, as well as careful operation and maintenance.

National safety guidelines must be observed.

1.2 Safety and Operating Instructions



DANGER

This equipment is used in industrial high-voltage installations. During operation, this equipment contains rotating and live, bare parts. For this reason, they could cause severe injury or significant material damage if the required covers are removed, if they are used or operated incorrectly, or have not been properly maintained.

When the machines are used in non-industrial areas, the installation location must be protected against unauthorized access (protective fencing, appropriate signs).

Prerequisites

Those responsible for protecting the plant must ensure the following:

- The basic planning work for the plant and the transport, assembly, installation, commissioning, maintenance, and repair work is carried out by qualified personnel and/or checked by experts responsible.
- The operating manual and machine documentation are always available.
- The technical data and specifications regarding the applicable installation, connection, environmental, and operating conditions are always observed.
- The plant-specific assembly and safety guidelines are observed and personal protection equipment is used.
- Unqualified personnel are forbidden from using these machines and working near them.

This operating manual is intended for qualified personnel and only contain information and notes relating to the intended purpose of the machines.

The operating manual and machine documentation are written in different languages as specified in the delivery contracts.

NOTE

The services and support provided by the SIEMENS service centers are recommended for planning, installation, commissioning, and servicing work.

Components that can be Destroyed by Electrostatic Discharge (ESD)



CAUTION

The board contains components that can be destroyed by electrostatic discharge. These components can be easily destroyed if not handled properly. If you do have to use electronic boards, however, please observe the following:

- You should only touch electronic boards if absolutely necessary.
- When you touch boards, however, your body must be electrically discharged beforehand.
- Boards must not come into contact with highly insulating materials (such as plastic parts, insulated desktops, articles of clothing manufactured from man-made fibers).
- Boards must only be placed on conductive surfaces.
- Boards and components should only be stored and transported in conductive packaging (such as metalized plastic boxes or metal containers).
- If the packaging material is not conductive, the boards must be wrapped with a conductive packaging material (such as conductive foam rubber or household aluminum foil).

The necessary ESD protective measures are clearly illustrated in the following diagram:

- a = conductive floor surface
- b = ESD table
- c = ESD shoes
- d = ESD overall
- e = ESD chain
- f = cabinet ground connection
- g = contact with conductive flooring

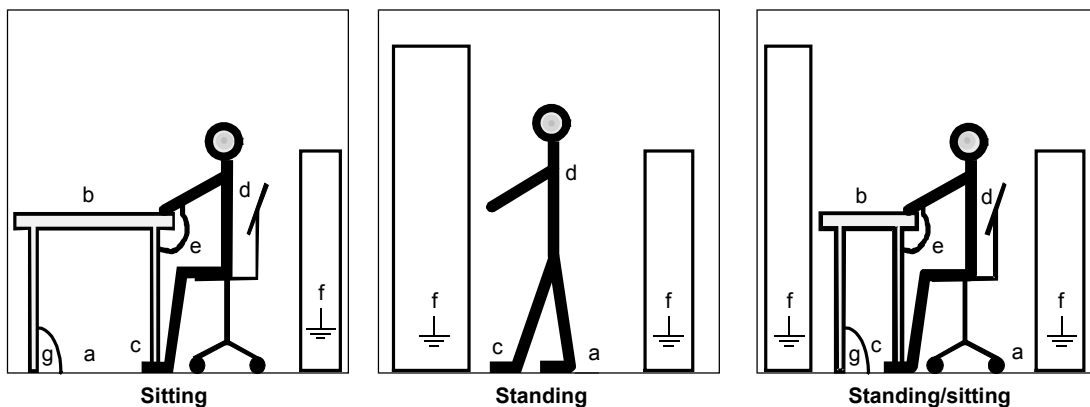


Fig. 1-1 ESD protective measures

2. General

Description

The user-friendly AOP30 operator panel is an optional input/output device for SINAMICS G130 converters. The operator panel can be used for commissioning, operation, and diagnostic purposes.

The AOP30 communicates with the SINAMICS drive via a serial interface (RS232) with PPI protocol. The interface is a point-to-point connection. During communication, the AOP30 is the master and the connected drive is the slave.

Structure

The AOP30 is an operator panel with a graphical display and a touch-sensitive keypad. An RS232 interface is used as the interface to the drive unit. The device can be installed in a cabinet door (thickness: between 2 mm and 4 mm).

Features

- Display with green backlighting (resolution: 240 x 64 pixels)
- 26-key touch-sensitive keypad
- Connection for a 24 V DC power supply
- RS232 interface
- Time and date memory powered by internal battery backup
- 4 LEDs indicate the operating status of the drive unit:
 - RUN: green
 - ALARM: yellow
 - FAULT: red
 - LOCAL/REMOTE: green

3. Mechanical Installation

The following diagrams and descriptions explain the conditions and procedures involved in the mechanical installation of the AOP30 operator panel.

Dimension Drawing

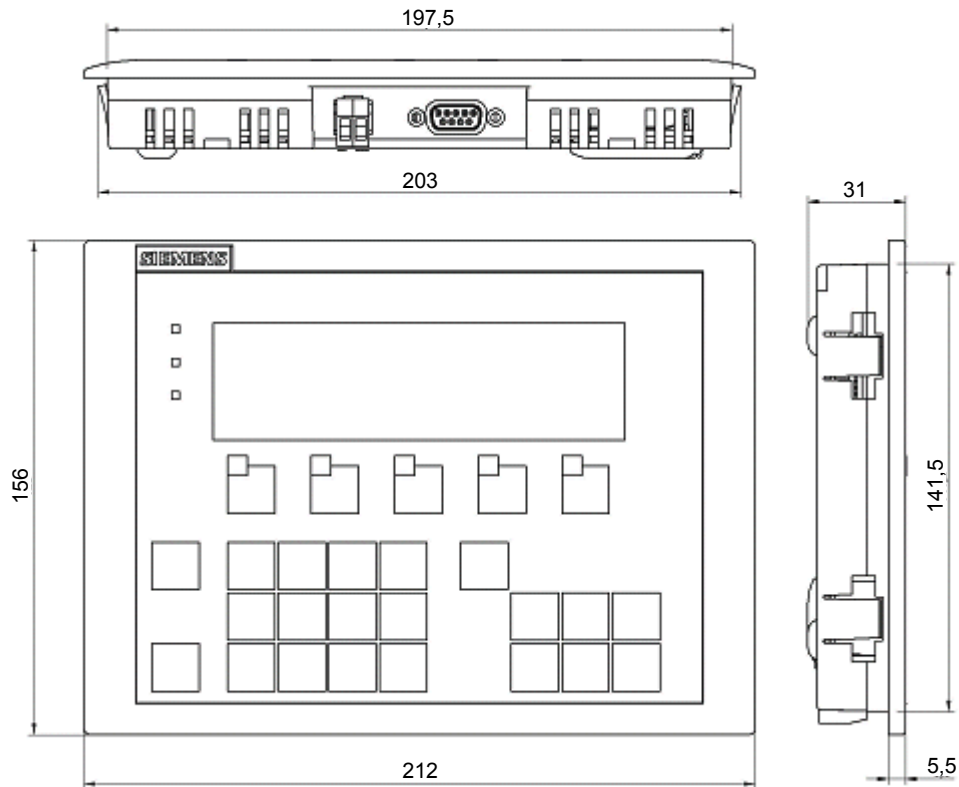


Fig. 3-1 Dimension drawing of the AOP30 operator panel

Installing the Operator Panel (Cabinet Door Thickness: 2 mm)

1. Cut out a 141.5 mm x 197.5 mm section in the cabinet door.
2. Insert the AOP30 operator panel through this section from the outside.
3. Apply pressure to the four corners until the snap-in lugs lock into position.

Installing the Operator Panel (Cabinet Door Thickness: 2 mm to 4 mm)

The following images show the tensioning elements for the AOP30 operator panel for installation in cabinet doors (thickness: 2 mm to 4mm).



Fig. 3-2 Tensioning elements for the AOP30 operator panel for installation in cabinet doors (thickness: 2 mm to 4mm)

1. Cut out a 141.5 mm x 197.5 mm section in the cabinet door.
2. Insert the AOP30 operator panel through this section from the outside.
3. Hook the tensioning elements into the openings provided.
4. Tighten the screws by hand to secure the tensioning elements.

CAUTION

Make sure that the screws for the tensioning elements are not too tight, otherwise the operator panel housing may be damaged.

4. Connection

Interfaces

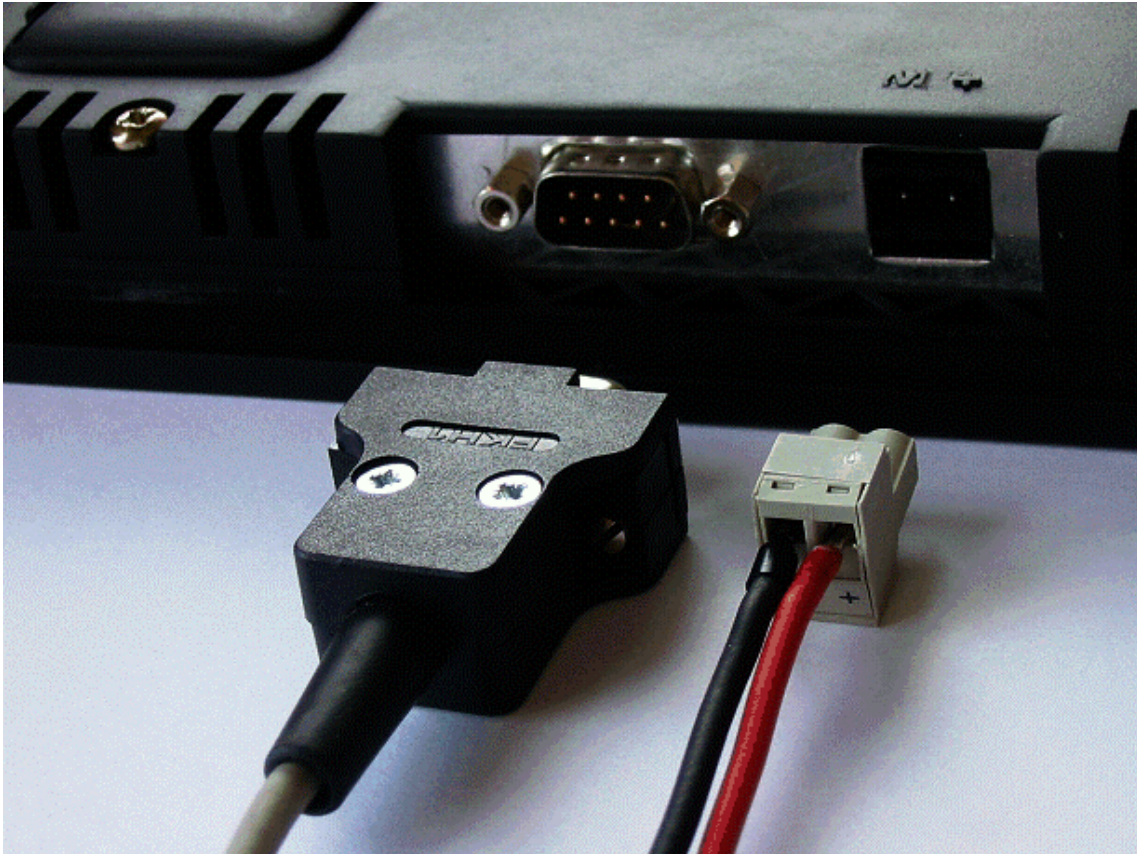


Fig. 4-1 AOP30 interfaces

X524: Power Supply

Table 4-1 Power supply terminals

Terminal	Designation	Technical specifications
+	P24	24 V DC power supply
M	M	Ground

Max. connectable cross-section: 2.5 mm² (AWG 12)

X540: Serial Interface (RS232)

Table 4-2 Serial interface (RS232) X540

Pin	Designation	Technical specifications
2	RxD	Receive data
3	TxD	Transmit data
5	Ground	Ground reference
Plug type: 9-pin SUB-D female		

NOTE

The maximum cable length is 10 m.

To ensure noise-free communication, you are advised to use a shielded cable and connect the cable shield to both connector housings.

CAUTION

On the operator panel electronics, a connected cable shield is connected to the signal and P24 ground. If the power supply is connected with incorrect polarity, the P24 supply via the shield and signal ground will short-circuit.

Connection

The AOP30 is connected as follows:

1. Connect the power supply cable to the interface for the electronics power supply (X524).
2. Connect the standard cable to the serial RS232 interface (X540).

5. Control via the Operator Panel

5.1 Operator Panel (AOP30): Overview

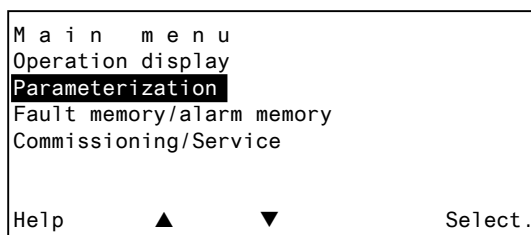
Description

The operator panel is used for...

- Parameterization (commissioning)
- Monitoring status variables
- Controlling the drive
- Diagnosing faults and alarms

All the functions can be accessed via a menu.

Your starting point is the main menu, which you can always call up using the yellow MENU key:



The dialog screen for the main menu can be called up at any time using the "MENU" key.

To navigate within the main menu options, choose "F2" or "F3".

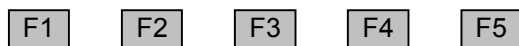


Fig. 5-1 Main menu

5.2 Menu Structure of the Operator Panel

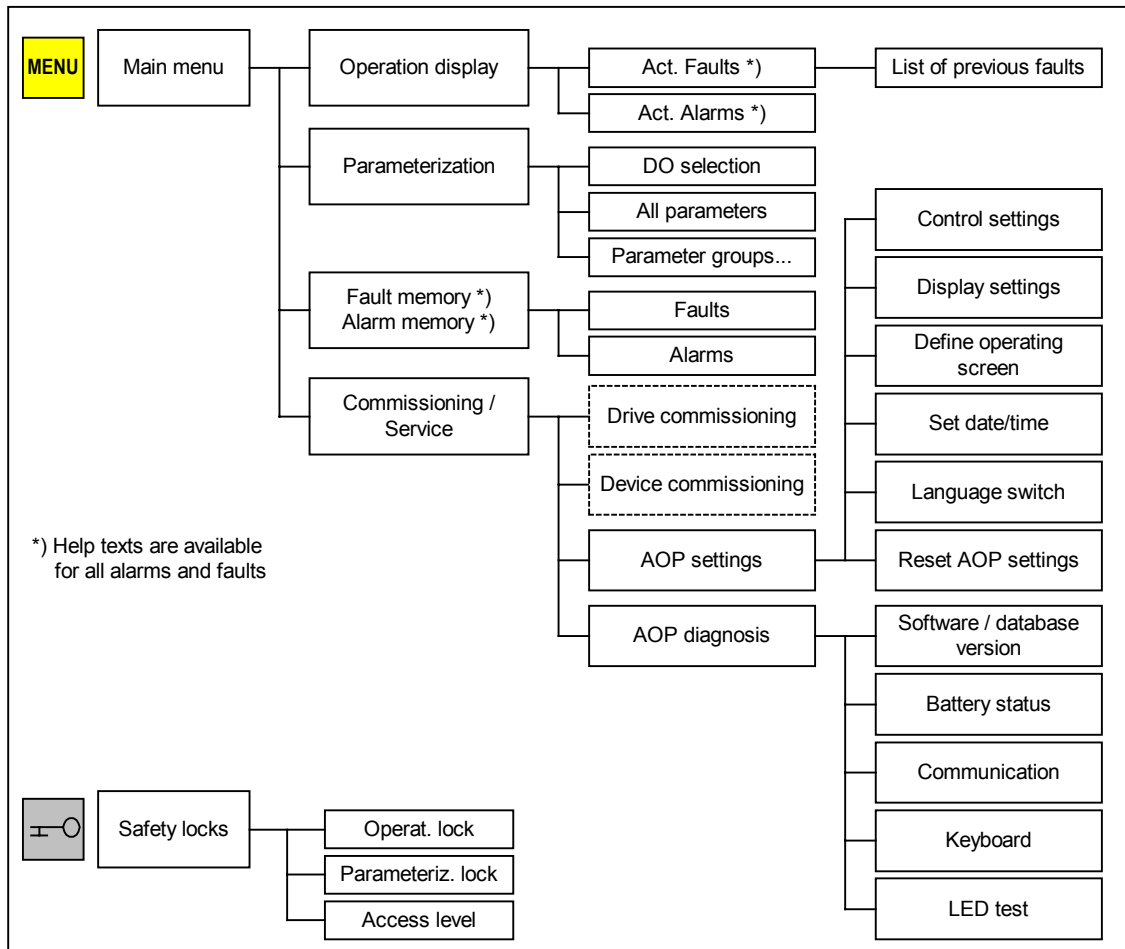


Fig. 5-2 Menu structure of the operator panel

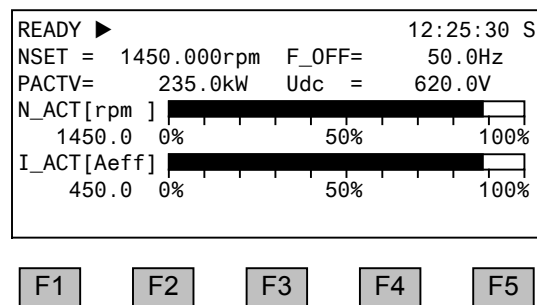
5.3 Operation Screen Menu

Description

The operation screen displays the most important status variables for the drive unit: In its condition on delivery, it displays the operating status of the drive, the direction of rotation, the time, as well as four drive variables (parameters) numerically and two in the form of a bar display for continuous monitoring.

You can call up the operation screen in one of three ways:

1. After the power supply has been switched on and the system has ramped up.
2. If you do not make any entries for two minutes, the system calls up the operation screen automatically.
3. By pressing the MENU key twice and then F5 "OK".



If a fault occurs, the system automatically displays the fault screen (see 5.8).

In LOCAL control mode, you can choose to enter the setpoint numerically (F2: setpoint).

Settings

When you choose Commissioning / service → AOP settings → Define operation screen, you can adjust the display type and the values displayed as required.

See 5.6.3

5.4 Parameterization Menu

You can adjust the chassis unit settings in the parameterization menu.

The drive software is modular. The individual modules are called DO ("DriveObject").

The following DOs are available in the G130:

- CU General parameters for the electronics module (CU320)
- Vector Drive control
- TM31 (optional) Terminal module TM31

Parameters with identical functions may exist with the same parameter number in more than one DO (e.g. p0002).

The AOP30 is used for operating devices that comprise more than one drive (in this respect, a regulated infeed is also a "drive") so that attention is focused on one drive (i.e. the "current" drive). You can switch between the drives either in the operation screen or in the main menu. The corresponding function key is labeled "Drive".

This drive determines the following:

- Operation screen
- Fault and alarm displays
- Parameterization

Depending on your requirements, you can choose between two AOP display types:

1. All parameters

All the parameters for the current drive (see above), the CU, and all the other device DOs are displayed in a list (as with older drives). The DO to which the parameter currently selected belongs (inverted) is displayed in curly brackets in the top left of the screen.

You can also select parameters for just one function group from this complete list.

2. DO view

In this display, you can pre-select a DO so that only the parameters for this DO are listed. This display is indicated by the text "DO" next to the DO designator in curly brackets.

(The expert list in STARTER is only displayed in the DO view.)

In both cases, the set access level and the selected parameter group govern which parameters are displayed. You can set the access level in the menu for inhibit functions, which can be called up using the key button.

The parameters for access levels 1 and 2 are sufficient for simple applications. The default setting is 1 Standard.

At access level 3 (experts), you can change the structure of the function by interconnecting BICO parameters. For this reason, this access level is password protected (password: "47").

The parameter list displays more options than there are function keys. You can use the "<<" key to change the function of the keys. To return from the second menu, press F5 (">>"). Once a function is complete, the system automatically returns to the main menu.

F1 "Help", F2 "DS Select", and F3 "EEPROM" are available in the extended menu.

In the DS Selection menu (data set selection), you can choose which of the data sets chosen is currently DISPLAYED.

Data set parameters are indicated by a "c", "d", "m", or "e" between the parameter number and parameter designator. The second line from the top (aligned right) shows which data sets are currently displayed.

5.5 Menu: Fault/Alarm Memory

Faults

Shows which faults are currently present (max.: 8).

To select one of the faults, choose F2. To call up a description of causes and possible remedies, choose F1 "Help". The fault value, which allows more effective diagnosis, is specified in the second line in Help.

To acknowledge the fault, choose F5 "Ack.". Once you have successfully acknowledged the fault, the system returns to the calling screen. If the fault cannot be acknowledged, the fault screen continues to be displayed.

To display the last eight faults, choose F3 "Old". The system then displays seven acknowledged faults (1st – 7th fault).

Alarms

Displays the current content of the alarm buffer. Alarms present at the time the screen was opened are displayed accordingly.

To refresh the display, choose F5: "Refresh". To delete the alarm buffer and rebuild it so that it only contains the currently active alarms, choose F3 "Delete".

5.6 Menu: Commissioning/Service

5.6.1 Drive Commissioning

This option enables you to re-commission the drive from the main menu.

5.6.2 Device Commissioning

In this menu, you can enter the device commissioning status directly. This is the only way that you can reset parameters to the factory setting for example.

You can use this menu to create motor data sets in subsequent drive software versions.

5.6.3 AOP30 Settings

Control Settings

This defines the settings for the control keys in LOCAL mode.

See 5.7.

Display Settings

In this menu, you set the lighting, brightness, and contrast for the display.

Defining the Operation Screen

In this menu, you can switch between four operation screens. You can set the parameters that are to be displayed.

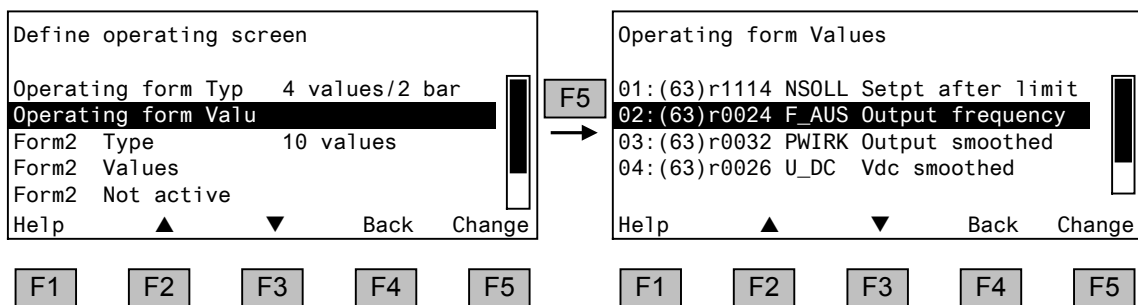


Fig. 5-3 Defining the operation screen

The following image shows how the entries are assigned to the screen positions:

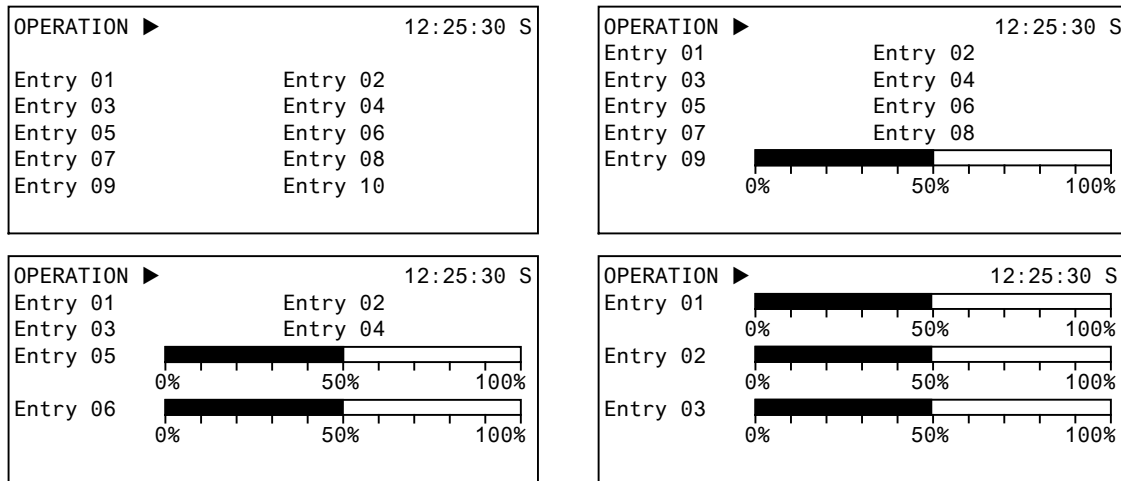


Fig. 5-4 Position of the entries in the operation screen

Lists of Signals for the Operation Screen

Vector Object

Table 5-1 List of signals for the operation screen –vector object

Signal	Parameters	Short name	Unit	Scaling (100 % = ...), see Table 5-2
Factory setting (entry no.)				
Speed setpoint upstream of ramp-function generator (1)	r1114	NSETP	1/min	p2000
Output frequency (2)	r0024	F_OUT	Hz	Reference frequency
Power smoothed (3)	r0032	P_ACT	kW	r2004
DC link voltage smoothed (4)	r0026	UDC	V	p2001
Actual speed smoothed (5)	r0021	N_ACT	1/min	p2000
Absolute actual current smoothed (6)	r0027	I_IST	A	p2002
Motor temperature (7)	r0035 ¹	T_MOT	°C	Reference temperature
Converter temperature (8)	r0037	T_LT	°C	Reference temperature
Actual torque smoothed (9)	r0031	M_ACT	Nm	p2003
Converter output voltage smoothed (10)	r0025	C_OUT	V	p2001
For diagnostic purposes				
Speed setpoint smoothed	r0020	NSETP	1/min	p2000
Control factor smoothed	r0028		%	Reference control factor

¹ If a temperature sensor has not been installed, a value of –200°C is displayed.

Signal	Parameters	Short name	Unit	Scaling (100 % = ...), see Table 5-2
Field-producing current component	r0029		A	p2002
Torque-producing current component	r0030		A	p2002
Converter overload Degree of thermal overload	r0036		%	100 % = Shutdown
Speed setpoint after filter	r0062	N_ACT	1/min	p2000
Actual speed smoothed	r0063	N_ACT	1/min	p2000
Control deviation	r0064		1/min	p2000
Slip frequency	r0065		Hz	Reference frequency
Output frequency	r0066		Hz	Reference frequency
Output voltage	r0072	UACT	V	p2001
Control factor	r0074		%	Reference control factor
Torque-generating actual current	r0078		A	p2002
Actual torque value	r0080		Nm	p2003
For further diagnostic purposes				
Fixed speed setpoint effective	r1024		1/min	p2000
Active motor potentiometer setpoint	r1050		1/min	p2000
Resulting speed setpoint	r1119		1/min	p2000
Speed controller output	r1508		Nm	p2003
I component of speed controller	r1482		Nm	p2003
PROFIBUS setpoint	r2050		1/min	p2000
Analog input 0 [V, mA]	r4052[0]	V, mA	V: 100 V / mA: 100 mA	
Analog input 1 [V, mA]	r4052[1]	V, mA	V: 100 V / mA: 100 mA	
Analog input 0, scaled	r4055[0]	%	V: 100 V / mA: 100 mA	
Analog input 1, scaled	r4055[1]	%	V: 100 V / mA: 100 mA	

Scalings for Vector Object

Table 5-2 Scalings for vector object

Variable	Scaling parameter	Default for quick commissioning
Reference speed	100 % = p2000	p2000 = Maximum speed (p1082)
Reference voltage	100 % = p2001	p2001 = 1000 V
Reference current	100 % = p2002	p2002 = Current limit (p0640)
Reference torque	100 % = p2003	p2003 = 2 x rated motor torque
Reference power	100 % = r2004	$r2004 = \frac{p2003 \times p2000 \times \pi}{30}$
Reference frequency	$100 \% = \frac{p2000}{60}$	
Reference control factor	100 % = Maximum output voltage without overload	
Reference flux	100 % = Rated motor flux	
Reference temperature	100% = 100 °C	

TM31 Object

Table 5-3 List of signals for the operation screen – TM31 object

Signal	Parameter s	Unit	Scaling (100 % = ...)
Analog input 0 [V, mA]	r4052[0]	V, mA	V: 100 V / mA: 100 mA
Analog input 1 [V, mA]	r4052[1]	V, mA	V: 100 V / mA: 100 mA
Analog input 0, scaled	r4055[0]	%	V: 100 V / mA: 100 mA
Analog input 1, scaled	r4055[1]	%	V: 100 V / mA: 100 mA

Setting the Date/Time

In this menu, you set the date and time.

Setting the Operating Language

In this menu, you can select the active language.

You have a choice between the two languages currently stored in the operator panel.

If the language you require is not available, you can load it separately (see Section 6.2).

Resetting AOP Settings

This menu option allows you to reset the following settings to the AOP factory settings:

- Language
- Display (brightness, contrast)
- Operation screen
- Control Settings

The settings are not effective until the power supply is next switched on.

IMPORTANT

When you reset parameters, all settings that are different to the factory settings are reset immediately. This may cause the cabinet unit to switch to a different, unwanted operational status.

For this reason, you should always take great care when resetting parameters.

5.6.4 AOP30 Diagnosis

Software/Database Version

You can use this menu to display the firmware and database versions.

The database version must be compatible with the drive software status (you can check this in parameter r0018).

Battery Status

In this menu, you can display the battery voltage numerically (in Volts) or as a bar display. The battery ensures that the data in the database and the current time are retained.

When the battery voltage is represented as a percentage, a battery voltage of ≤ 2 V is equal to 0%, and a voltage of ≥ 3 V to 100%.

The data is secure up to a battery voltage of 2 V.

- If the battery voltage is ≤ 2.45 V, the message "Replace battery" is displayed in the status bar.
- If the battery voltage is ≤ 2.30 V, the system displays a popup window with the following information "Warning: weak battery".
- If the battery voltage is ≤ 2 V, the system displays a popup window with the following information: "Warning: battery is empty".
- If the time and/or database are not available after the system has been switched off for a prolonged period due to the voltage being too low, the loss is established by means of a CRC check when the system is switched on again. This triggers a message instructing the user to replace the battery and then load the database and/or set the time.

For instructions on changing the battery, see Section 6.1.

Communication

In this menu, you can call up information on the communications status between the AOP and the drive.

Key Test

In this screen, you can check that the keys are functioning properly. Keys that you press are represented on a symbolic keyboard on the display. You can press the keys in any order you wish. You cannot exit the screen (F5 – "back") until you have pressed each key at least once.

NOTE

You can also exit the key test screen by pressing any key and keeping it pressed.

LED Test

In this screen, you can check that the 4 LEDs are functioning properly.

5.7 Operation via the Operator Panel (LOCAL Mode)

You activate the control keys by switching to LOCAL mode. If the green LED in the LOCAL/REMOTE key does not light up, the key is not active.

5.7.1 LOCAL/REMOTE Key



Activate LOCAL mode: press the LOCAL key

LOCAL mode: LED lights up

REMOTE mode: LED does not light up: the ON, OFF, JOG, direction reversal, faster, and slower keys are not active.

Settings: Menu: Commissioning / Service – AOP Settings – Control Settings

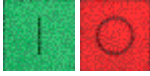
Save LOCAL mode (factory setting: yes)

- **Yes:** "LOCAL" or "REMOTE" operating mode is saved when the supply voltage is switched off, and restored when the supply voltage is switched back on.
- **No:** "LOCAL" or "REMOTE" operating mode is not saved. "REMOTE" is active when the supply voltage is switched back on.

LOCAL/REMOTE also during operation (factory setting: no)

- **Yes:** You can switch between LOCAL and REMOTE when the drive is switched on (motor is running).
- **No:** Before the system switches to LOCAL, a check is carried out to determine whether the drive is in the operational status. If so, the system does not switch to LOCAL and outputs the message "Local not possible". Before the system switches to REMOTE, the drive is switched off and the setpoint is set to 0.

5.7.2 ON Key/OFF Key



ON key: always active in LOCAL when the operator input inhibit is deactivated.

OFF key: in the factory setting, acts as OFF1 = ramp-down at the deceleration ramp (p1121); when n = 0: voltage disconnection (only if a main contactor is installed).

The OFF key is only active in LOCAL mode.

Settings: Menu: Commissioning / Service – AOP Settings – Control Settings

Red OFF key acts as: (factory setting: OFF1)

- **OFF1:** Ramp-down on the deceleration ramp (p1121)
- **OFF2:** Immediate pulse block, motor coasts to a standstill
- **OFF3:** Ramp-down on the emergency stop ramp (p1135)

5.7.3 Switching Between Clockwise and Counter-Clockwise Rotation



Settings: Menu: Commissioning / Service – AOP Settings – Control Settings

Switching between CW/CCW (factory setting: no)

- **Yes:** Switching between CW/CCW rotation by means of the CW/CCW key possible in LOCAL mode
- **No:** The CW/CCW key has no effect in LOCAL mode

For safety reasons, the CW/CCW key is disabled in the factory setting (pumps and fans must normally only be operated in one direction).

In the operation status in LOCAL mode, the current direction of rotation is indicated by an arrow next to the operating mode.

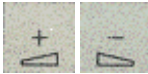
NOTE

You have to make additional settings when switching between CW/CCW rotation.

5.7.4 Jog (Reserved for Future Use)





5.7.5 Increase Setpoint / Decrease Setpoint



You can use the “increase” and “decrease” keys to set the setpoint with a resolution of 1 % of the maximum speed.
(e.g. if the resolution is 15 min^{-1} at $p1082 = 1500 \text{ min}^{-1}$)

You can also enter the setpoint numerically. To do so, press F2 in the operation screen. The system displays an inverted edit field for entering the required speed. Enter the required value using the numeric keypad. Press F5 OK to confirm the setpoint.

When you enter values numerically, you can enter any speed between the minimum speed (p1080) and the maximum speed (p1082).

Setpoint entry in LOCAL mode is unipolar. You can change the direction of rotation by pressing the  key (see ).

- CW rotation and "Increase key" mean:
The displayed setpoint is positive and the output frequency is increased.
- CCW rotation and "Increase key" mean:
The displayed setpoint is negative and the output frequency is increased.

5.7.6 AOP Setpoint

Settings: Menu: Commissioning / Service – AOP Settings – Control Settings

Save AOP setpoint (factory setting: no)

- **Yes:** In LOCAL mode, the last setpoint (once you have released the INCREASE or DECREASE key or confirmed a numeric entry) is saved. The next time you switch the system on in LOCAL mode, the saved value is selected. This is also the case if you switched to REMOTE in the meantime or the power supply was switched off. When the system is switched from REMOTE to LOCAL mode while the drive is switched on (motor is running), the actual value that was last present is set as the output value for the AOP setpoint and saved. If the system is switched from REMOTE to LOCAL mode while the drive is switched off, the AOP setpoint that was last saved is used.

- **No:** When you switch the system on in LOCAL mode, setpoint 0 is always selected. When the system is switched from REMOTE to LOCAL mode while the drive is switched on (motor is running), the actual value that was last present is set as the output value for the AOP setpoint.

AOP ramp-up time (factory setting: 20 s)

AOP ramp-down time (factory setting: 20 s)

- **Recommendation:** set as ramp-up/ramp-down time (p1120 / p1121). Changing the ramp-up/ramp-down times does not affect the settings for parameters p1120 and p1121 because this is an AOP-specific setting.

NOTE

The internal drive ramp-function generator is always active.

5.7.7 Timeout Monitoring

Settings: Menu: Commissioning / Service – AOP Settings – Control Settings

Timeout monitoring (factory setting: 3000 ms)

The monitoring time continuously monitors communication between the operator panel and drive.

If, when the drive is in LOCAL mode, no communication signal has been received once the monitoring time has elapsed, the drive is stopped with OFF1 and fault F1030 ("control priority monitoring: sign-of-life failure") is displayed.

5.7.8 Operator Input Inhibit/Parameterization Inhibit



To prevent users from accidentally actuating the control keys and changing parameters, you can activate an operator input / parameterization inhibit using a key pushbutton. Two key icons appear in the top right of the display when these inhibit functions are enabled.

Table 5-4 Display for operator input / parameterization inhibit

Inhibit type	Online operation	Offline operation
No inhibit		
Operator input inhibit		
Parameterization inhibit		
Operator input inhibit + parameterization inhibit		

Settings

Operator input inhibit (factory setting: no)

- **Yes:** The parameters can still be viewed, but a parameter value cannot be saved (message in the status bar: "Operator input inhibit – parameterization disabled"). The OFF key (red) is enabled. The LOCAL, REMOTE, ON (green), JOG, CW/CCW, INCREASE, and DECREASE keys are disabled.

Parameterization inhibit (factory setting: no)

- **Yes:** Parameters cannot be changed unless a password is entered. The parameterization process is the same as with the operator input inhibit. If you try to change parameters, the message "Parameterization inhibit – no change rights" is displayed in the status bar. All the control keys can, however, still be actuated.

NOTE

If you have forgotten your password, you can switch off the parameterization inhibit as follows:

1. Switch off the power supply
 2. Disconnect the RS232 data cable
 3. When switching the power supply back on, press the key pushbutton and hold down for 20 s.
 4. When the key symbol in the top right of the display disappears, the access protection function has been reset.
-

Access level (standard factory setting):

The different parameters required for this complex application are filtered so that they can be displayed as clearly as possible. You select them according to the access level.

An expert level, which must only be used by expert personnel, is required for certain actions. You need a password to activate this level. To activate expert mode, enter code number "47".

The "Expert" access level is not stored permanently, which means that it must be reactivated every time the power is switched on.

5.8 Faults and Alarms

Indicating Faults and Alarms

If a fault occurs, the drive displays the fault and/or alarm on the operator panel. Faults are indicated by the red "FAULT" LED and a fault screen is automatically displayed. You can use the F1 Help function to call up information about the cause of the fault and how to remedy it. You can use F5 Ack. to acknowledge a stored fault.

Any alarms are displayed by the yellow "ALARM" LED. The system also displays a note in the status bar providing information on the cause.

What is a Fault?

A fault is a message from the drive indicating an error or other exceptional (unwanted) status. This could be caused by a fault within the converter or an external fault triggered, for example, from the winding temperature monitor for the asynchronous motor. The faults are displayed and can be reported to a higher-level control system via PROFIBUS. In the factory default setting, the message "converter fault" is also sent to a relay output. Once you have rectified the cause of the fault, you have to acknowledge the fault message.

What is an Alarm?

An alarm is the response to a fault condition identified by the drive. It does not result in the drive being switched off and does not have to be acknowledged. Alarms are "self acknowledging", that is, they are reset automatically when the cause of the alarm has been eliminated.

Fault and Alarm Displays

Every fault and alarm is entered in the fault/alarm buffer along with time the error occurred and the time it was rectified. The time stamp relates to the relative system time in milliseconds (r0969).

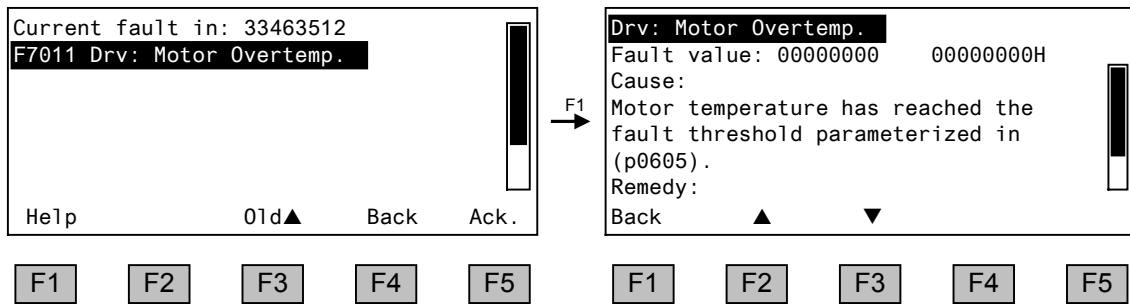


Fig. 5-5 Fault screen

You can use F5 Ack. to acknowledge a stored fault.

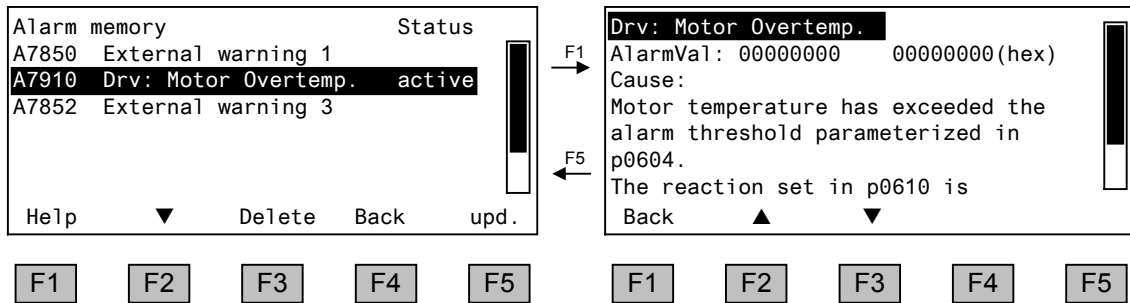


Fig. 5-6 Alarm screen

5.9 Saving the Parameters Permanently

Description

If parameters have been changed using the operator panel (confirm with OK in the Parameter Editor), the new values are initially stored in the volatile memory (RAM) of the converter. An "S" flashes in the top right of the AOP display until they are saved to a permanent memory. This indicates that at least 1 parameter has been changed and not yet stored permanently.

Two methods are available for permanently saving parameters that have been changed:

- The parameter list contains additional function key assignments. You can use the "<<" key to change the function of the keys. In the extended menu, you can save the data by choosing F3 "EEPROM".
- When confirming a parameter setting with OK, press the OK key for > 1 s. The system displays a message asking you whether the setting is to be saved in the EEPROM.
If you press "Yes", the system saves the setting in the EEPROM. If you press "No", the setting is not saved permanently and the "S" starts flashing.

In both cases, **all** changes that have not yet been saved permanently are stored in the EEPROM.

5.10 Parameterization Errors

If an error occurs while parameters are being read or written, this is indicated in the status bar on the operator panel (the eighth or lowest line in the operation screen, or the seventh line in all other screens).

The system displays:

Parameter write error (d)pxxxx.yy:0xnn

and a plain-text explanation of the type of parameterization error.

6. Maintenance and Servicing

6.1 Replacing the Backup Battery

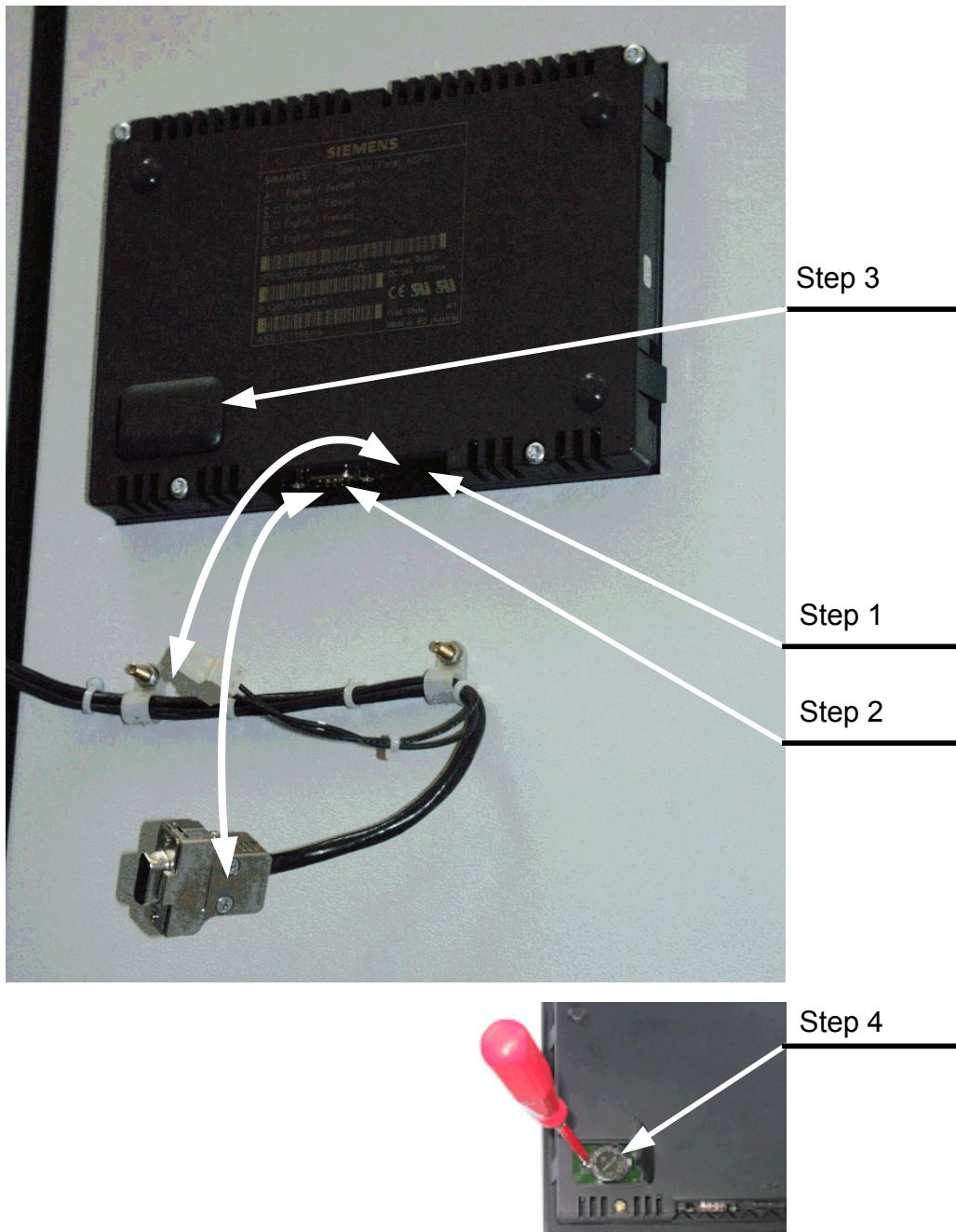


Fig. 6-1 Replacing the backup battery

Replacing the Battery

1. Disconnect the 24 V DC power supply cable.
2. Disconnect the communication cable on the operator panel.
3. Open the cover of the battery compartment.
4. Remove the old battery.
5. Insert the new battery.
6. Carry out any other work by reversing the sequence.

Table 6-1 Technical data for the backup battery

Type	CR2032 3V lithium battery
Manufacturer	Maxell, Sony, Panasonic
Rated capacity	220 mAh
Maximum permissible charging current	10 mA (restricted to <2 mA in operator panel)
Self-discharge at 20°C	1 %/year
Service life (in backup mode)	> 1 year at 70°C; >1.5 years at 20 °C
Service life (in operation)	> 2 years



WARNING

To ensure that no data is lost when you replace the battery, you must replace the battery within one minute.

6.2 Load the New Operator Panel Firmware and Database from the PC.

Description

You have to load the database for the operator panel each time you require a language other than that stored in the operator panel, or if the chassis unit firmware has been upgraded to a new version to improve performance or rectify problems.

The load program LOAD_AOP30 and the database files can be found on the CD.

Procedure for Loading the Database

1. Establish the RS232 connection from the PC to the AOP30.
2. Connect the 24 V power supply.
3. Start the LOAD_AOP30 program on the PC.
4. Choose the PC interface (COM1, COM2).
5. Depending on the language you require, choose a file (e.g. AOP30_DB.V02.10.36.V01.03.02.E.D.CBIN) and open it to start loading the database.
6. Once the firmware has been loaded, "Database loaded" is displayed on the AOP30.
7. Switch the power on (switch the power supply off and then back on).

Procedure for Loading Firmware and the Database

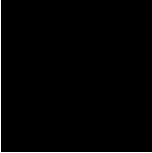
1. Establish the RS232 connection from the PC to the AOP30.
2. Connect the 24 V power supply.
3. Start the LOAD_AOP30 program on the PC.
4. Choose the PC interface (COM1, COM2).
5. Choose and open the firmware (AOP30.H86).
6. Follow the instructions in the status window of the program and connect the power supply for the AOP30 while pressing the red key (O).
7. The load procedure is started automatically.
8. If a current database has not been loaded, the system switches to the "loading database" screen once the loading procedure has finished
9. Depending on the language you require, choose a file (e.g. AOP30_DB.V02.10.36.V01.03.02.E.D.CBIN) and open it to start loading the database.
10. Once the firmware has been loaded, "Database loaded" is displayed on the AOP30.
11. Switch the power on (switch the power supply off and then back on).

7. Technical Specifications

Table 7-1 Technical specifications

Power supply	24 V DC (20.4 V to 28.8 V)
Current requirements - Without backlighting - With maximum backlighting	<100 mA <200 mA
Data interface	RS232 interface, PPI protocol
Backup battery	3 V lithium CR2032
Operating temperature	0 to 55°C
Temperature during storage/transportation	-25 to +70°C
Degree of protection	IP20 (inside cabinet) IP55 (outside cabinet)
Certification	CULus CE
Dimensions	See Fig. 3-1
Weight	0.55 kg





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P.O. Box 4743, D – 90025 Nuremberg

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www.ad.siemens.de

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Doc. no.: A5E00331451A
Printed in Germany