

MFD-AC-CP4, MFD-CP4, MFD-80 Power Supply/Communication Module



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Original Operating Instructions

The German-language edition of this document is the original operating manual.

Translation of the original operating manual

All editions of this document other than those in German language are translations of the original German manual.

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See revision protocol in the "About this manual" chapter

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Danger!

Dangerous electrical voltage!

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighbouring units that are live.
- Follow the engineering instructions (AWA) of the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalisation. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.

- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).

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About This Manual

This manual describes the installation, commissioning and operation of the display/operator system.

List of revisions

This 02/08 edition has been completely revised compared to the previous edition of 10/04. This edition now also covers the easySafetycontrol relay.
The 09/10 edition has been changed to include the Eaton designations.

Target group

This display/operator device must only be mounted and connected by qualified electrical personnel or a person familiar with the electrical installation.

A specialist knowledge of electrical engineering is needed for commissioning. Plant sections may be damaged if the display/operator system is incorrectly connected or incorrectly programmed.

Other manuals

The description of the devices that have a terminal for the display/operator system is provided in separate manuals (formerly Manual AWB):

- easy500/700 (MN05013003Z-EN; previous description AWB2528-1508GB)
- easy800 (MN04902001Z-EN; previous description AWB2528-1423GB)
- MFD-Titan, multi-function display (MN05002001Z-EN; previous description AWB2528-1480GB)
- easySafety (MN05013001Z-EN; previous description AWB2528-1599en).

All manuals are available on the Internet for download as PDF files. Go to <http://www.eaton.com> → Support and enter the document number in the Quick Search field.

Writing Conventions

Symbols used in this manual have the following meanings:

► indicates actions to be taken.

**Caution!**

Warns of a hazardous situation that could result in damage to the product or components.

**Warning!**

Warns of the possibility of serious damage and slight injury.

**Danger!**

Indicates the risk of major damage to property, or serious or fatal injury.



Draws your attention to interesting tips and supplementary information.

For greater clarity, the name of the current chapter is shown in the header of the left-hand page and the name of the current section in the header of the right-hand page. This does not apply to pages at the start of a chapter and empty pages at the end of a chapter.

Device designation

The following short names for equipment types are used in this manual, as far as the description applies to all of these types:

- MFD-...-CP4 for
 - MFD-AC-CP4
 - MFD-CP4

- MFD-...-CP4-500 for
 - MFD-AC-CP4-500
 - MFD-CP4-500

- MFD-...-CP4-800 for
 - MFD-AC-CP4-800
 - MFD-CP4-800

1 About the Display/Operator System

Components of the display/operator system

The display/operator system described here consists of the MFD-CP4 power supply/communication module, the MFD-80.. display/operator unit and the MFD-CP4-...-CAB connecting cable.

The following tables shows the individual components of the display/operator system with their type designations.

Table 1: Components of the display/operator system with type designation

Display/operator unit	Power supply unit/communication module	Connecting cable	Connected device
MFD-80 MFD-80-B	MFD-..-CP4-500	MFD-CP4-500-CAB5	easy500, easy700
	MFD-..-CP4-800	MFD-CP4-800-CAB5	easy800, easySafety, MFD-..CP8-.../CP10...

Proper use

The display/operator system must only be run if it is properly mounted and installed:

- The installation must comply with regulations for electromagnetic compatibility (EMC).
- MFD-CP4 is designed to be installed in an enclosure, switch cabinet or distribution board.
- If the display/operator system is switched on, the controlled devices should not respond in an uncontrolled manner, e.g. uncontrolled motor startups.
- To display graphics use the CP4 together with the MFD-..-CP8-.../CP10...

System overview

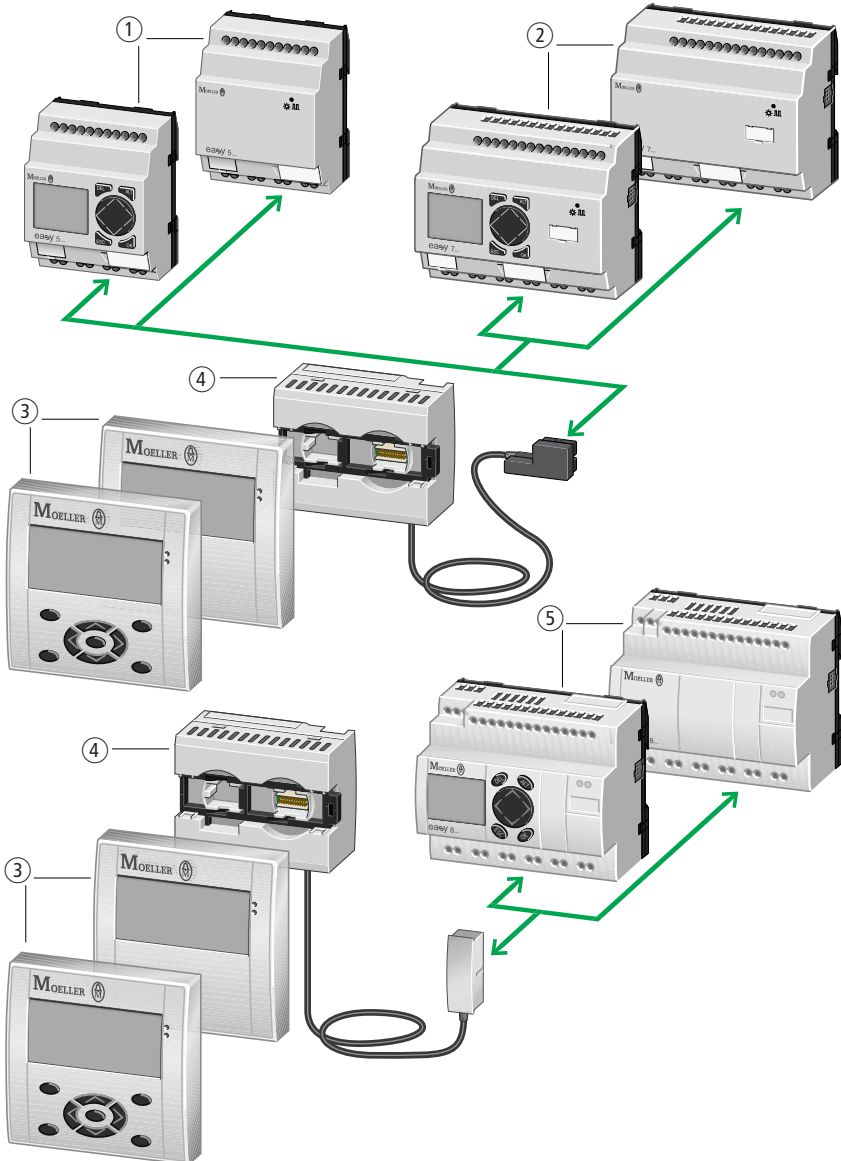


Figure 1: System overview (Legend → page 7)

Legends to Figure1:

- ① easy500 basic units
- ② easy700 basic units
- ③ MFD80-B/MFD-80 multi-function display
- ④ Power supply unit/communication module with MFD-..-CP4-500 (above) or MFD-..-CP4-800 (below) connecting cable
- ⑤ easy800 basic units

The display/operator **system** consists of the power supply unit/communication module and the display/operator **unit**.

Display/keypad

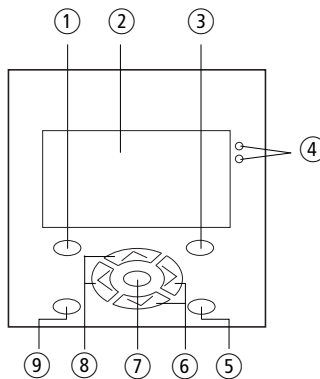
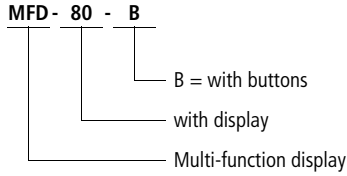


Figure 2: Display/keypad

- ① DEL pushbutton
- ② Graphic display
- ③ ALT button
- ④ LEDs for signalling
- ⑤ Mode pushbutton
- ⑥ Right, down cursor buttons
- ⑦ OK button
- ⑧ Left, up cursor buttons
- ⑨ ESC button

Key to part numbers



Power supply unit/communication module

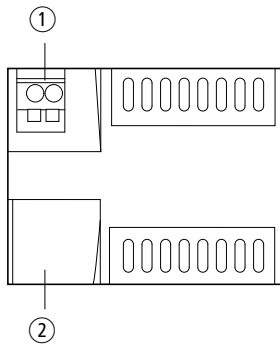
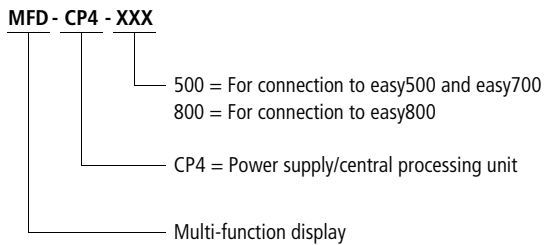


Figure 3: Power supply unit/communication module

- ① Supply voltage
- ② Serial interface for point-to-point connection

Key to part numbers



2 Device application

The display/operator system enables you to externally carry out the same display/operator functions of an easy500, easy700, easy800, easySafety or an MFD (MFD...CP8/CP10 or MFD...CP8/CP10 with MFD-80-B). If, for example, one of the devices is fitted in the control cabinet, the display/operator unit can be installed in the control cabinet door to provide display and operator functions. A cable is used to connect up the devices. The device can operate as a stand-alone device in the control cabinet or can be a station on the easyNet.

Connecting the display/operator system with a single device

You can access a single device with the display/operator system. By connecting the display/operator system to a device, it is possible to also transfer the display content of this device to the display of the display/operator system. The buttons on the display/operator system can be used to control the device.

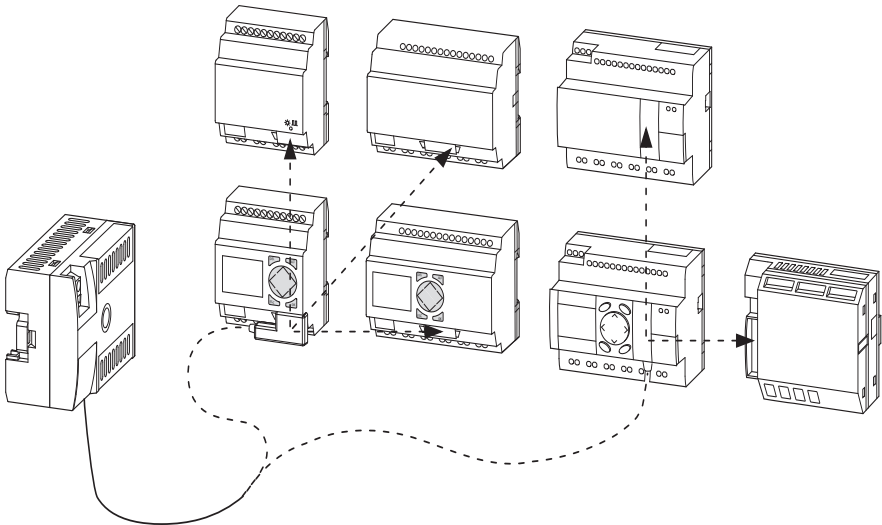


Figure 4: Display/operator system connected with a single device

Connecting display/operator system with easyNet station

The display/operator system enables you to access all stations via the easyNet, apart from easySafety devices.

To do this connect the display/operator system to a station and select the station on the display/operator system via <COM -> Station ID>. You can then communicate with the selected station via the display/operator system.

Simultaneous operation of several terminal connections between two NET stations is possible.



Do not allow terminal mode access to a NET station from two sides as this will cause a fault on the NET. This also applies to simultaneous access to a device via the NET and via easySoft-Pro or an MFD-CP8/CP10-...-NT in terminal mode.

Table 2: Permissible and impermissible access options in Terminal mode (see also Figure5)

Connection	Access permitted/not permitted	Explanation
1 + 2, 1 + 4	Not permissible	Simultaneous access to a NET station from 2 sides
2 +3	Not possible	In terminal mode, the display/operator system establishes only one connection at a time.
5	Not permissible	Terminal mode through the NET to easySafety
1 + 3, 3 + 4	Permissible	Simultaneous operation of several terminal connections to different stations
6	Permissible	Local terminal operation to a device that is also a NET station

Connecting the display/operator system with a single device

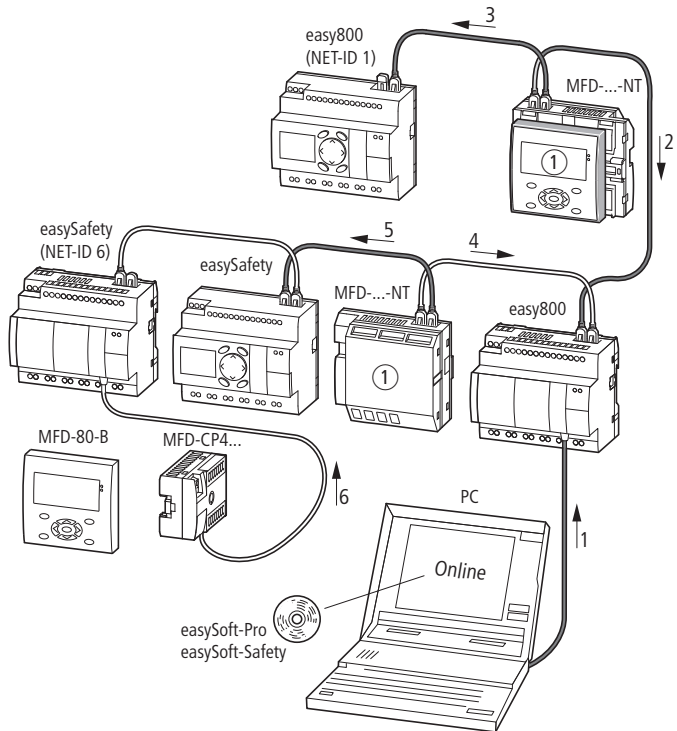


Figure 5: Access options in terminal mode
(see also Table 2)

① Terminal Mode

Connection faulty

Connection
establishment
in progress...

If the connection between the display/operator system and the station is faulty or interrupted, the display/operator system tries to re-establish the connection. It displays the message "Connection establishment in progress...". However, this message can also indicate an incorrect setting on the interface (COM) of the display/operator system.

Graphic mode on the remotely operated MFD

If you connect a display/operator system with an MFD (MFD-80-B with MFD...CP8/CP10) in graphic mode, the following display is shown on the display/operator system:

```
The remote device
is in
Graphic mode
```

You can terminate graphic mode from the display/operator system by pressing ALT + ESC. The same thing can be achieved by pressing the "*" button on the remotely operated MFD device as long another function was not assigned to this button (→ section "Special function", page 36).

3 Installation

The MFD-CP4 must only be installed and connected up by trained electricians or a person familiar with the installation of electrical equipment. The MFD-CP4 is installed in the following order:

- Mounting,
- Connecting the serial interface,
- Connecting the power supply.

Mounting

Install the display/operating unit in the front of a control cabinet, a service distribution board, operator panel or in an enclosure. You can protect the display/operating unit with a protective diaphragm or cover, depending on the environment in which it is to be used. This must be fitted before the MFD-CP4 is mounted and is therefore described in the next section.

The MFD-CP4 power supply/communication module must be mounted in such a way that all the terminals are protected against direct contact, liquids and dust during operation.

For sufficient heat circulation around the device, the rear of the MFD-CP4 and the terminals must have a clearance of at least 3 cm from the wall or adjacent devices.

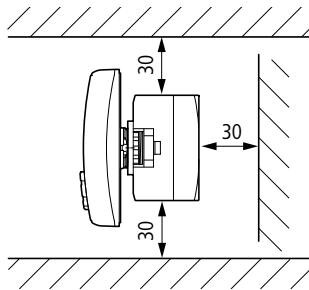


Figure 6: Minimum clearance for mounting

Fitting the protective diaphragm

For special applications such as in the food industry, the keypad must be protected against the ingress of dust, liquids etc. In this case fit the protective diaphragm over the display/operating unit.



Fit the protective diaphragm before mounting the display/operating unit.

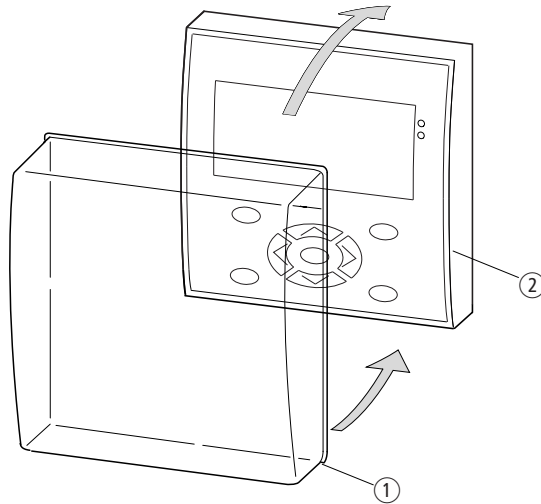


Figure 7: Fitting the protective diaphragm

- ① Protective diaphragm
- ② Display and operating unit



Danger!

Ensure that the membrane fits snugly in the groove of the display/operator unit. Otherwise a proper seal cannot be guaranteed and particles may enter underneath the membrane. This may cause malfunctions in the keypad.

In food industry applications, there is the risk of bacteria building up underneath the membrane.

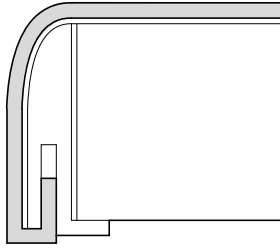


Figure 8: Correct location of the protective diaphragm



If the protective diaphragm has to be replaced, the display/operating unit has to be removed. Replace the diaphragm and refit the device.

Mounting the protective cover

The protective cover is provided for using the device in aggressive environments. This protects the display and the operating unit against mechanical damage or destruction. Protection type to IP65 is maintained.

The protective cover can be opened so that the operating unit can be used.

The protective cover can be closed with a sealing facility to provide protection against unauthorized operation.



Fit the protective cover before mounting the display/operating unit.

► First remove the front frame before mounting.

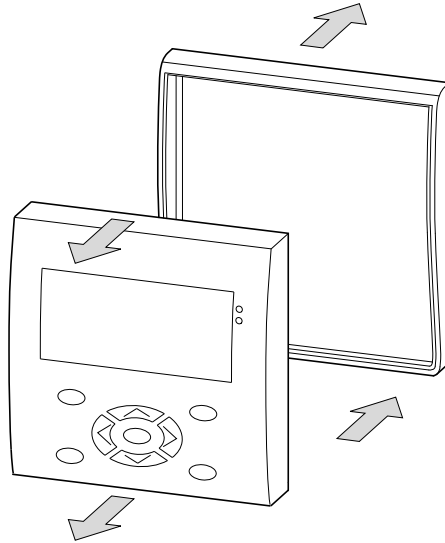


Figure 9: Removing the front frame

The protective cover can be mounted in two different positions.

► Choose the position that is most suitable for the application at hand and your requirements.

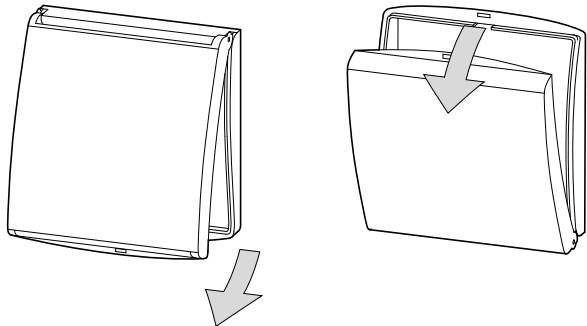


Figure 10: Position of the protective cover

- Mount the protective cover as shown in the figure.

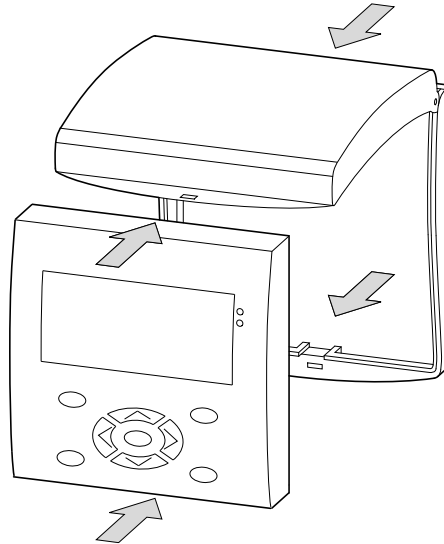


Figure 11: Mounting the protective cover

Sealing the protective cover

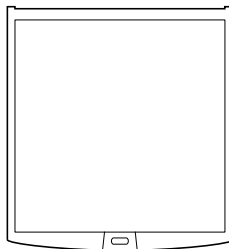


Figure 12: Sealing the protective cover

The grip handle of the protective cover is provided with holes that can be used in any mounting position. You can fit a wire or similar material through these holes in order to seal the cover. If the wire is provided with a lead seal, the cover is sealed. The cover can then only be opened by breaking the seal or the wire.

Mounting the display/operating unit (front mounting)



The protective diaphragm or the protective cover must be fitted beforehand.

- ▶ Drill and punch out two 22.5 mm diameter holes in the front plate. The diameter is the same as is normally required for control circuit devices.



Observe the following technical requirements:

- The hole spacing is 30 mm.
- The maximum thickness of the front plate for mounting the power supply/CPU module must not be more than 6 mm.
- Ensure minimum clearances for the power supply/CPU module → page 13
- In order to ensure protection to IP65, the surface of the mounting front must be even and smooth.

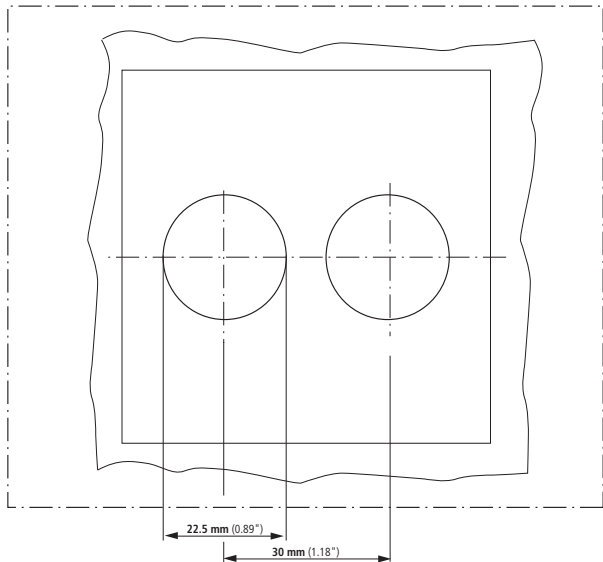


Figure 13: Drill holes for the MFD

- ▶ Fit the display/operator unit in the punched fixing holes.

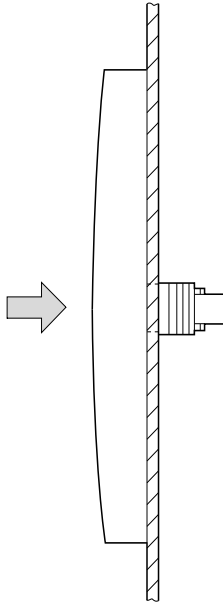


Figure 14: Mounting the display/operator unit

- ▶ Tighten the display/operating unit with the M22-MS mounting ring tool (→ figure 15).

The tightening torque must be between 1.2 and 2 Nm



Ensure that the correct torque is used.
If the tightening torque is too low or high, this may impair the seal.

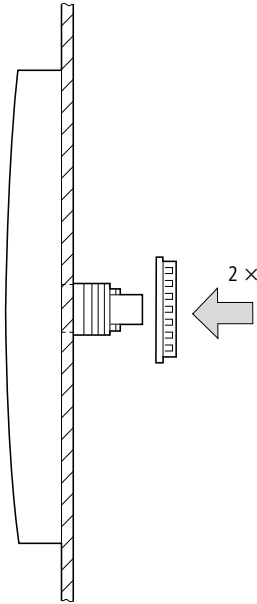


Figure 15: Screw fastening the display/operator unit

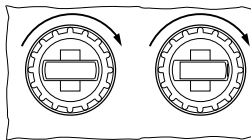


Figure 16: Rear of the mounted display/operator unit

Removing the display/operator unit (front mounting)

- Unscrew the fixing element and remove the display/operator unit.

Mount power supply unit/communication module

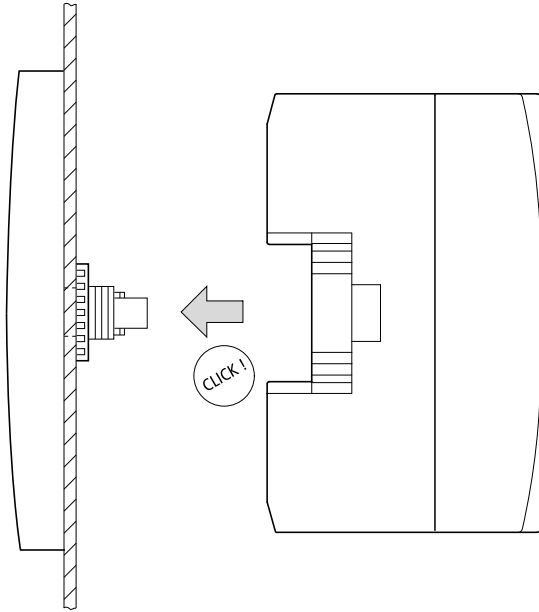


Figure 17: Mount power supply unit/communication module

Removing the power supply/communication module

Use a screwdriver with a 3.5 x 0.6 mm slot width.

- ▶ Insert the screwdriver into the strap of the fixing shaft catch. **1**
- ▶ Lever out the slide catch. **2**
- ▶ Pull out the power supply/CPU module from the fixing shafts. **3**

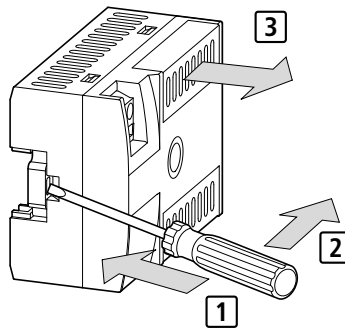


Figure 18: Releasing the fixing shaft

Connections

Terminations

The MFD-CP4 is fitted with cage clamp terminals for connecting the power supply and the connection cable to the serial interface.

Tool for cage clamp terminals

Slot-head screwdriver, width 3.5 x 0.6 mm.

Connection cross-sections of the MFD cage clamp terminal cables

- Power supply terminal:
0.08 to 2.5 mm² (AWG 28 –12)
- Interface terminal:
0.14 to 0.5 mm² (AWG 26 – 20)

Connecting the power supply



The required connection data for the MFD-CP4 is provided in the Section "Technical data", page 39.

Power supply MFD-CP4/MFD-AC-CP4

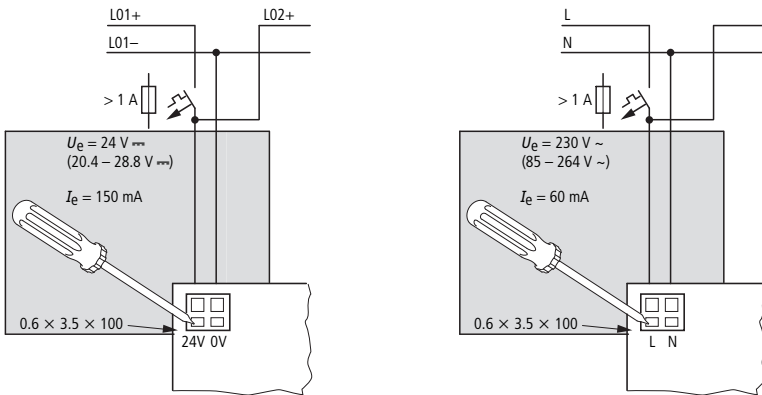


Figure 19: Power supply on the MFD



The MFD-CP4 is protected against polarity reversal. Ensure the correct polarity of the terminals to ensure that the MFD-CP4 functions correctly.

Cable protection

Provide cable protection (F1) of at least 1 A (slow) on the MFD-CP4.



When the MFD-CP4 is switched on for the first time, its power supply circuit behaves like a capacitor. Use a suitable device for switching on the power supply and do not use any reed relay contacts or proximity switches.

With the power supply ensure that the response threshold for the short-circuit current is higher than the inrush current of the MFD-...-CP4.

Connecting cable

The MFD-CP4 is provided with a serial interface. The easy500, easy700, easy800, easySafety or MFD-CP8/CP10... can be connected to this interface.

Selecting connection cables

Different connecting cables are required depending on which device is connected to the MFD-..-CP4:

Table 3: Selecting connection cables

MFD-..-CP4 connected to ...	Connection cable
easy500	MFD-CP4-500-CAB5
easy700	
easy800 (from device version 04)	MFD-CP4-800-CAB5
MFD-..-CP8... ; MFD-..-CP10...	
easySafety	

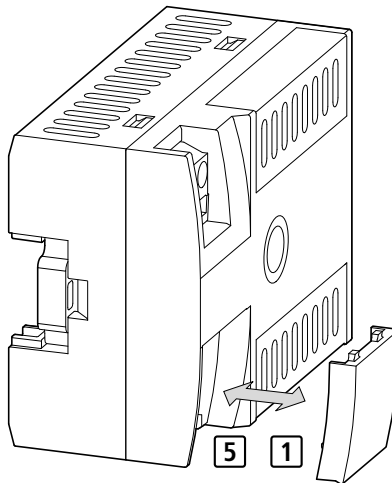
The MFD-CP4-500-CAB5 and MFD-CP4-800-CAB5 connection cables are 5 m long.



In order to ensure correct EMC, the MFD-CP4-500-CAB5 and MFD-CP4-800-CAB5 connection cables must not be lengthened.

Connecting the connection cable

- ▶ Remove the interface cover carefully **1**.
- ▶ Use a screwdriver to press down the recess next to the terminal **2** and connect the wires of the connection cable to the terminals in the order stated **3**. Proceed accordingly in the reverse order to remove the connection cable **4**.
- ▶ Refit the interface cover **5**.



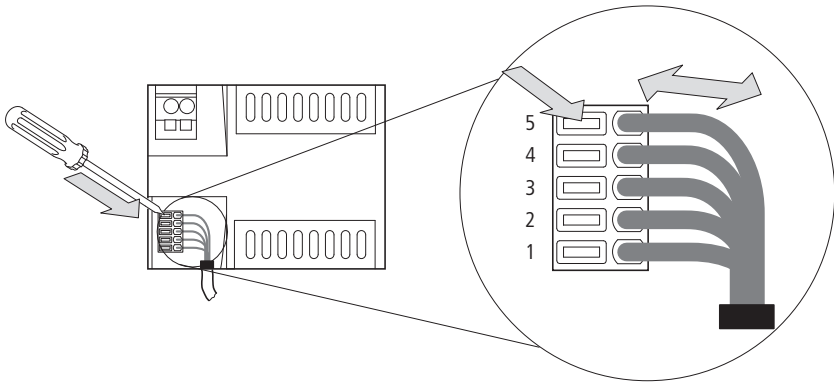


Figure 20: Connecting the connection cable

X1 = grey, X2 = brown, X3 = yellow, X4 = white, X5 = green

► Fit the connection cable plug into the easy basic device.

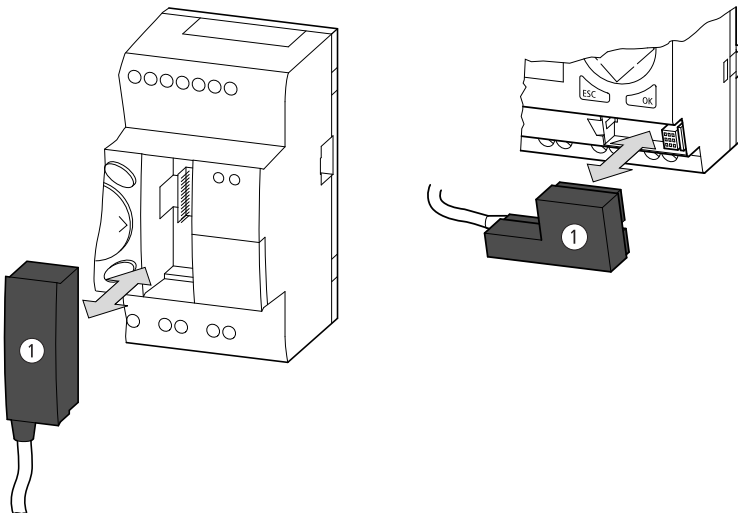


Figure 21: Fitting the connection plug ① to the easy basic unit

Left: easy800, easySafety (analog at MFD)

Right: easy500, easy700

4 Commissioning

Switch-on

Before switching on check that the power supply and the connection cable are properly connected:

- Terminal +24 V: Voltage +24 V
- Terminal 0 V: Voltage 0 V



Warning!

The station connected with the display/operator system may be far or invisible from your actual location. Terminal mode gives you all the access rights that you would also be given "locally". Check the controlled system when you carry out a mode change and device settings.

You can also carry out settings locally on the device whilst you are operating a device remotely via the keypad. In this case, the local operation on the device is always faster than the remote operation in Terminal mode. Bear in mind that this may lead to conflicts that may trigger faults or unforeseen events.

Initial Commissioning

When you switch on the display/operator system for the first time, you will be asked to select the menu language.

- ▶ Select the required menu language and confirm the setting by pressing the OK button.
- ▶ Press ESC to exit language selection.



If you do not set the language, the display/operator system will display this language menu every time you switch on, and wait for you to select a language.

You can change the language setting at a later time as required (→ section "Setting the menu language", page 34).

Connection
establishment
in progress...

As soon as you connect the display/operator system to the device (e.g. easy800 or easySafety) via a connection cable and switch it on, it will try to establish a connection to this connected device, due to the preset NET-ID.

If the connected device is a single device, a 0 must be entered in the display/operator system as the station ID. The connection cannot be established if another number is entered.

If the connected device is a station on the easyNet, the display/operator system connects to the easyNet station with the station ID entered in the display/operator system:

If ID = 0 is entered, the connection is made to the device (e.g. easy800 or easySafety) that is connected to the display operator system via the connection cable – irrespective of its NET-ID.

Entering a new station ID connects the display/operator system with the selected station.



The connection is not possible if the selected easyNet station is an easySafety device.

As soon as the connection is established, the display/operator system is in Terminal mode. In this mode, it takes on the information of the device display and shows it on the display of the display/operator system.

You only set the baud rate on the display/operator system. The connected device will adapt itself automatically!

5 Setting the properties of the display/operator system

Operating buttons

The buttons of the display/operating unit have the following functions:



Move to next menu level
Call menu item
Activate, change, store entries



Move to previous menu level
Cancel entries since last **OK**



^ v Change menu item
Change value
< > Change place



Toggling between Terminal mode and Local mode.

Terminal/local mode

You can choose between Terminal and Local modes:

In Terminal mode, the display/operator system communicates with the connected device, e.g. easy800. The display and button functions of the easy800 are taken over by the display/operator system.

When the display/operator system is in Local mode, you can set the connection and the properties of the display/operator system.

Connection (COM menu item)

- Station ID = 0, 1 - 8
 - 0: The display/operator system communicates with the actual connected device.
 - 1 - 8: Selecting the stations (-ID) on the easyNet
- Baud rate: 9600 (19200) baud

Properties of the display/operator system

- Contrast
- Backlight
- Menu language: adaption to the language

Switching between Terminal/Local mode

If Terminal mode is active, you can switch to Local mode by pressing the "*" button.

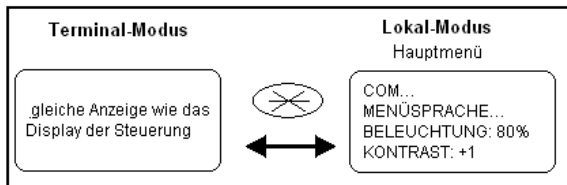


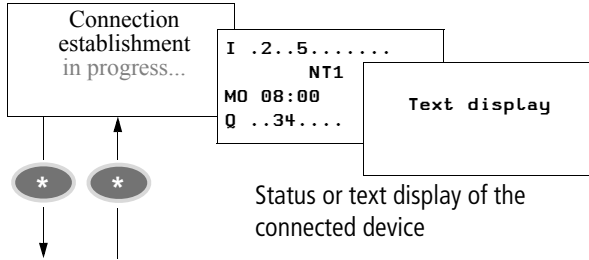
Figure 22: Toggling Terminal mode ↔ Local mode

Changing to Terminal mode can only be carried out from the main menu of Local mode.

Terminal/local mode overview

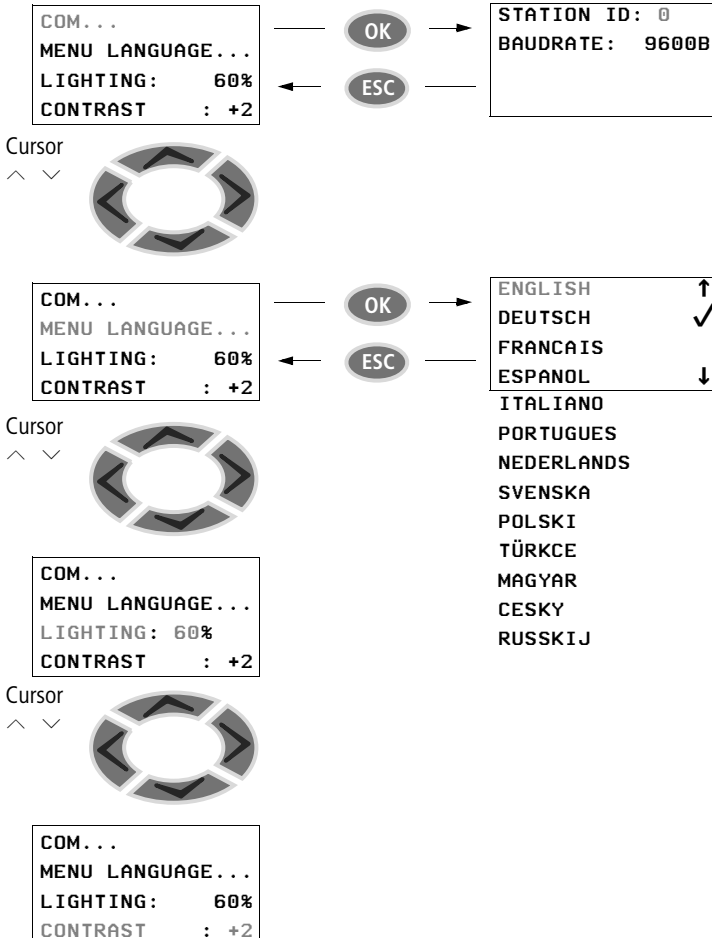
The following overview shows the menu structure and the operation for selecting the parameters. In Terminal mode, the display of an easy800 was selected as an example.

Terminal mode display



Local mode (main menu)

Current selection flashes in menu



Settings in local mode

```
COM...
MENU LANGUAGE...
LIGHTING: 60%
CONTRAST: +2
```

```
STATION ID: 0
BAUDRATE: 9600B
```

Station ID selection

If the main menu of the display/operator system is not active, press the "*" button to enter the menu.

- ▶ Select the COM menu item and press the **OK** button.

The Station ID menu will appear.

- ▶ Press the **OK** button and select the station number with ^ and v.
- ▶ Confirm with **OK**.



Select the station ID 0 if you wish to connect a single device.

Select a station ID 1 to 8 if you wish to connect an easyNet station with this ID.

```
STATION ID: 0
BAUD
RATE: 9600B
```

- ▶ Press the **OK** button and select the baud rate using ^ and v.
- ▶ Confirm with **OK**.



The transfer rate for easy500 and easy700 is limited to 9600 baud. The maximum baud rate for easy800, easySafety and MFD-CP8/CP10 is 19200 baud.

```
COM...
MENU LANGUAGE...
LIGHTING: 60%
CONTRAST: +2
```

- ▶ Exit the COM menu with **ESC**.

You can exit the main menu at any time by pressing the "*" button, apart from when the display/operator system is in Entry mode. The display/operator system is switched to Terminal mode.

```
Connection
  establishme
nt
in progress...
```

When the main menu is left, the tries to establish connection to the selected device. The status and text display of the remotely operated device is displayed as soon as the connection can be established.

Setting the menu language

If the main menu of the display/operator system is not active, press the "*" button to enter the menu.

```
COM...
MENU LANGUAGE...
LIGHTING: 60%
CONTRAST: +2
```

- ▶ Use the ^ and v buttons to select the Menu language menu item.
- ▶ Confirm with **OK**.

```
ENGLISH      ↑
DEUTSCH      ✓
FRANCAIS
ESPANOL      ↓
```

- ▶ Use the cursor buttons ^ or v to select the language required.
 - English
 - German
 - French
 - Spanish
 - Italian
 - Portuguese
 - Dutch
 - Swedish
 - Polish
 - Turkish
 - Hungarian
 - Czech
 - Russian
- ▶ Press **OK** to confirm your choice and press **ESC** to exit the menu.

Changing the light

If the main menu of the display/operator system is not active, press the "*" button to enter the menu.

```
COM...
MENU LANGUAGE...
LIGHTING: 60
CONTRAST: +2
```

- ▶ Use the ^ and v buttons to select the Lighting menu item.

The cursor moves to the percentage value of the lighting.



When Selection mode is active, the cursor appears as black flashing rectangle. Pressing **OK** will activate Edit mode in which the cursor will disappear and the number will flash. In Edit mode, use the ^ and v buttons to change the value. The changes are displayed immediately.

```
COM...
MENU LANGUAGE...
LIGHTING: 70%
CONTRAST: +2
```

- ▶ Press **OK**.

Now change the value in 10 % steps with the ^ and v buttons.

- ▶ Press the ^ or v buttons to change the value.
- ▶ Press **OK** or **ESC** to exit Edit mode.

Changing the contrast

If the main menu of the display/operator system is not active, press the "*" button to enter the menu.

```
COM...
MENU LANGUAGE...
LIGHTING: 70%
CONTRAST : 2
```

- ▶ Use the ^ and v buttons to select the Contrast menu item.

The cursor moves to the percentage value of the contrast.



When Selection mode is active, the cursor appears as black flashing rectangle. Pressing OK will activate Edit mode in which the cursor will disappear and the number will flash. In Edit mode, use the ^ and v buttons to change the value. The changes are displayed immediately.

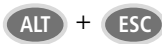
- ▶ Confirm with **OK**.

```
COM...
MENU LANGUAGE...
LIGHTING: 70%
CONTRAST : +1
```

Use the ^ and v buttons to change the value between -2 and +2 in increments of 1.

- ▶ Press the ^ or v buttons to change the value.
- ▶ Press **OK** or **ESC** to exit Edit mode.

Special function

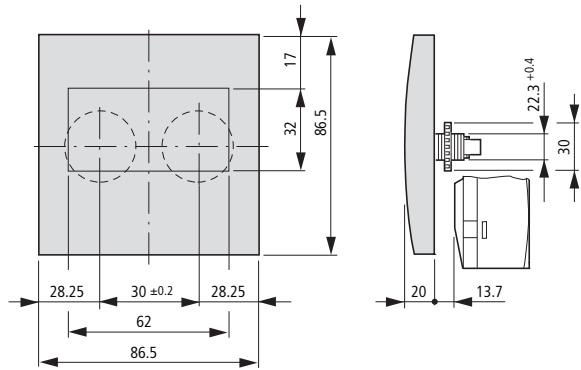


If th display/operator system is connected with an MFD in graphic mode, you can terminate the graphic mode of this device by pressing the ALT and ESC buttons simultaneously. This function can also be performed on the MFD device by pressing the "*" .

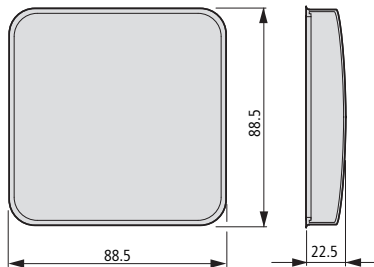
Appendix

Dimensions

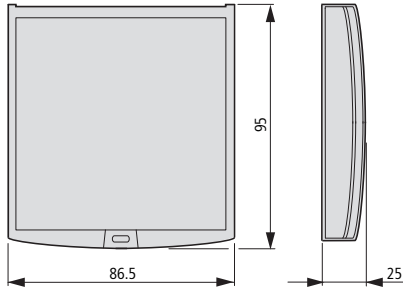
MFD-80.. display/operating unit



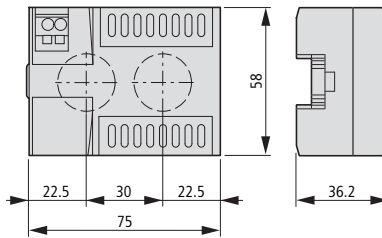
MFD-80-XM protective diaphragm



MFD-80-XS protective cover



MFD-CP4 Power supply/communication module



Technical data**General ambient conditions**

Climatic conditions		
(damp heat constant to IEC 60068-2-78; cyclical to IEC 60068-2-30) (cold to IEC 60068-2-1, heat to IEC 60068-2-2)		
Operating ambient temperature Installed horizontally/vertically	°C, (°F)	–25 to 55, (–13 to 131)
Condensation		Prevent condensation by means of suitable measures
Display legibility	°C, (°F)	–5 to 50, (23 to 122)
Storage/transport temperature	°C, (°F)	–40 to 70, (–40 to 158)
Relative humidity (IEC 60068-2-30), non-condensing	%	5 to 95
Air pressure (in operation)	hPa	795 up to 1080
Ambient mechanical conditions		
Pollution degree		
Power supply unit/CPU		2
Display/operating unit		3
Degree of protection (EN 50178, IEC 60529, VBG4)		
Power supply unit/CPU		IP20
Display/operating unit		IP65
Display/operating unit with protective cover		IP65
Display/operating unit with protective diaphragm		IP65
Vibration (IEC 60068-2-6)		
Constant amplitude 0.15 mm	Hz	10 up to 57
Constant acceleration, 2 g	Hz	57 up to 150
Shocks (IEC 60068-2-27) semi-sinusoidal 15 g/11 ms	Shocks	18
Drop (IEC 60068-2-31)	Drop height	mm 50
Free fall, when packed (IEC 60068-2-32)	m	1

Electromagnetic compatibility (EMC)		
Electrostatic discharge (ESD), (IEC/EN 61000-4-2, severity level 3)		
Air discharge	kV	8
Contact discharge	kV	6
Electromagnetic fields (RFI), (IEC/EN 61000-4-3)	V/m	10
Radio interference suppression (EN 55011, EN 55022), limit class		B
Fast transient burst (IEC/EN 61000-4-4, severity level 3)		
Supply cables	kV	2
Signal cables	kV	2
High energy pulses (Surge) MFD (IEC/EN 61000-4-5, severity level 2), power cable symmetrical	kV	MFD-80...: 1 MFD-..-CP40...: 0.5
Line-conducted interference (IEC/EN 61000-4-6)	V	10
Insulation resistance		
Overvoltage category		II
Clearance in air and creepage distances		EN 50178, UL 508, CSA C22.2, No 142
Insulation resistance		EN 50178
Tools and cable cross-sections		
Power supply terminal		
Solid and flexible with ferrule, minimum to maximum	mm ²	0.08 up to 2.5
	AWG	28 up to 12
Interface terminal		
Flexible, tin-coated, minimum to maximum	mm ²	0.14 up to 0.5
	AWG	26 up to 20
Slot-head screwdriver, width	mm	3.5 × 0.5
	inch	0.14 × 0.02

MFD-80.. display/operating unit

Front dimensions W × H × D		
With buttons	mm	86.5 × 86.5 × 21.5
	inches	3.41 × 3.41 × 0.85
Without buttons	mm	86.5 × 86.5 × 20
	inches	3.41 × 3.41 × 0.79
Overall dimensions with fixing shaft W × H × D		
With buttons	mm	86.5 × 86.5 × 43
	inches	3.41 × 3.41 × 1.69
Thickness of fixing wall (minimum; maximum)	mm	1; 6
	inches	0.04; 0.24
Weight	g	130
	lb	0.287
Mounting		2 22.5 mm (0.886 in) holes Display fastened with two fixing rings
Maximum tightening torque of the fixing rings [Nm]		1.2 up to 2
Power supply		By means of MFD-CP4 power supply/communication module
LCD display		
Type		Graphic/monochrome
Visible area W x H	mm	62 × 33
Size of pixels	mm	0.4 × 0.4
Number of pixels (W x H)		132 × 64
Spacing (pixel centre to pixel centre)	mm	0.42
LCD backlight		yes
Backlight color		Yellow/green
Backlight can be switched on and off in the visualization application via LE1.		yes
LEDs		
Number of LEDs		2

Operator buttons	
Number	9
Pushbutton illumination (LED)	
Number	5
Color	green

MFD-XM-80 protective diaphragm

Dimensions B × H × T	mm	88 × 88 × 25
	inches	3.46 × 3.46 × 0.98
Weight	g	25
	lb	0.055
Mounting		Is fitted over the display/function keys (with silver bezel)

MFD-XS-80 protective cover

Dimensions B × H × T	mm	86.5 × 94 × 25
	inches	3.41 × 3.41 × 0.98
Weight	g	36
	lb	0.079
Mounting		Is fitted over the display/function keys (without silver bezel)

MFD...-CP4 power supply unit/communication module

Dimensions B × H × T	mm	75 × 58 × 36.2
	inches	2.95 × 2.28 × 1.43
Weight	g	164
	lb	0.362
Mounting		Plug-fitted to the display fixing shaft
Current supply		
Rated voltage		
Nominal value	V DC, (%)	24, (+20, -15)
Permissible range	V DC	20.4 to 28.8
Ripple	%	≤ 5
Input current		
with 24 V DC, MFD-CP4, MFD-80., normally	mA	150
Voltage dips, IEC/EN 61131-2	ms	10
Heat dissipation		
with 24 V DC, MFD-CP4, MFD-80., normally	W	3.6

MFD-AC-CP4... power supply unit/communication module

Dimensions B × H × T	mm	107.5 × 90 × 30
Weight	kg	0.14
Mounting		Fitted on the fixing shaft of the display or on top-hat rail according to IEC/EN 60715, 35 mm deep (without display)
Current supply		
Rated operational voltage	V	100/110/115/120/230/240 AC (+10/-15 %)
Permissible range	V AC	85 – 264
Ripple	%	–
Frequency	Hz	50/60 (± 5 %)
Input current		
at 115/120 V AC 60 Hz	mA	Normally 90
at 230/240 V AC 50 Hz		part no. 60
at 24 V DC		–
Voltage dips, IEC/EN 61131-2	ms	10
Heat dissipation		
at 115/120 V AC	VA	part no. 11
at 230/240 V AC		part no. 15
at 24 V DC		–

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