



Hardware and Engineering

MI4 Display and Operator Panels

05/01 AWB-C27-1293GB

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See list of modifications on Page 3

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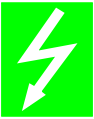
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Warning!

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 50 110-1/-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 do 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 60 364-4-41 (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 60 204-1 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

List of Modifications to the manual AWB-C27-1293GB

The following major changes have been made since edition 09/99:

Edition Date	Page	Keywords	New	Modification	Omitted
05/01	Complete manual	New devices, additional data interfaces (Siemens MPI, DeviceNet, CANopen)	×		

MI4 documentation

This manual describes MI4 series display units and operator panels.

Additional manuals for the MI4 include the following:

Training Guide (AWB27-1302GB)

User Interface for MI4-CFG-1-GB Configuration Software (AWB-C27-1294GB)

Supplement manual for MI4-CFG-1-GB with new functions from version 2.0 (AWB-C2700-1411GB)

MI4-PLC Communication:

Application module and function blocks (AWB-C27-1303GB)

Symbols used

The following symbols are used in this manual:

► Indicates action to be taken.



| Provides useful tips and additional information.

1 Display Units And Operator Panels

Panel overview

The display units and operator panels are divided into three groups:

Text operator panels

These are distinguished by

- the type of display (text-based/graphics-capable),
- the size of the display,
- the number of interfaces,
- the number of keys.

In addition, a hand-held unit and a device with prepunched holes for electromechanical control circuit devices are available.

Graphic operator panels with LCD display

These are distinguished by

- the size and type of display (colour or monochrome),
- the number of keys.

Touch panels

These are distinguished by

- the size and type of display (colour or monochrome),
- the number of additional buttons.

Depending on the device type, inputs are made either using a keypad or a touch screen. In the latter case, only slight pressure on the display triggers a function (resistive touch technology).

All graphic/text/touch operator panels are equipped with interfaces for configuration with a PLC or a PC. Most of the units have a serial printer port.

Features

Overview

Table 1: Features of the text operator panels

MI4	Display				Operator panel			Interfaces ¹⁾			Plug-in interface modules				
	LC display, text-based	LC display, graphics-capable	Rows x characters	Resolution in pixels	Numeric keypad	F-keys with LED, labelling facility	Total number of keys	Sucom A/configuration (PLC-PORT)	Sucom A (PLC-PORT)	Configuration/printer (PC/PRINTER-PORT)	Sucomet K (AUX-PORT) ²⁾	PROFIBUS DP (AUX-PORT)	MPI (AUX-PORT)	DeviceNet (AUX-PORT)	CANopen (AUX-PORT)
Text operator panel (not graphics-capable)															
MI4-100-KC1	✓	-	2 × 20	-	-	4	11	✓	-	-	✓	✓	✓	✓	✓
MI4-101-KC1	✓	-	2 × 20	-	-	4	11	✓	-	-	✓	✓	✓	✓	✓
MI4-100-KE1	✓	-	2 × 20	-	✓	9	19	✓	-	-	✓	✓	✓	✓	✓
MI4-101-KE1	✓	-	2 × 20	-	✓	9	19	✓	-	-	✓	✓	✓	✓	✓
MI4-110-KE1	✓	-	4 × 20	-	✓	9	19	-	✓	✓	✓	✓	✓	✓	✓
MI4-111-KE1	✓	-	4 × 20	-	✓	9	19	-	✓	✓	✓	✓	✓	✓	✓
MI4-130-KH1	✓	-	4 × 40	-	✓	16	35	-	✓	✓	✓	✓	✓	✓	✓
MI4-131-KH1	✓	-	4 × 40	-	✓	16	35	-	✓	✓	✓	✓	✓	✓	✓
Text operator panel (graphics-capable)															
MI4-110-KC1	-	✓	4 × 20	120 × 32		4	11	✓		-	✓	✓	✓	✓	✓
MI4-110-KG2	-	✓	4 × 20	120 × 32	✓	12	35	✓		-	✓	✓	✓	✓	✓
MI4-110-KG1	-	✓	4 × 20	120 × 32	✓	12	35	-	✓	✓	✓	✓	✓	✓	✓
MI4-140-KF1 hand-held	-	✓	8 × 20	120 × 64	✓	9	27	-	✓	✓	✓	-	✓	-	-
MI4-140-KI1	-	✓	8 × 40	240 × 64	✓	23	47	-	✓	✓	✓	✓	✓	✓	✓
MI4-140-KJ1 ³⁾	-	✓	8 × 40	240 × 64	✓	23	47	-	✓	✓	✓	✓	✓	✓	✓

1) For explanation, see legend on next page

2) The MI4-101-KC1, MI4-1x1-KE1 and MI4-131-KH1 units are supplied with a fitted Sucomet-K interface.

3) Electromechanical keypads can be fitted

Table 2: Features of the graphic operator panels

MI4	Display					Control panel				Inter- faces ¹⁾		Plug-in interface modules				
	LCD passive monochrome	LCD passive colour	Rows x characters	Display size in inches	Resolution in pixels	Resistive touch	Numeric keypad	F-keys with LED, labelling facility	Total number of keys	Sucom A (PLC PORT)	Configuration/printer (PC/PRINTER PORT)	Suconet K (AUX PORT) ²⁾	PROFIBUS DP (AUX PORT)	MPI (AUX PORT)	DeviceNet (AUX PORT)	CANopen (AUX PORT)
MI4-151-KF1	✓		16 × 40	5.6	320 × 240		✓	10	37	✓	✓	✓	✓	✓	✓	✓
MI4-451-KF1		✓	16 × 40	5.6	320 × 240		✓	10	37	✓	✓	✓	✓	✓	✓	✓
MI4-150-KI1	✓		16 × 40	5.6	320 × 240		✓	33	57	✓	✓	✓	✓	✓	✓	✓
MI4-450-KI1		✓	16 × 40	5.6	320 × 240		✓	33	57	✓	✓	✓	✓	✓	✓	✓

1) A PC for uploading or downloading the configuration or a printer can be connected to the PC/PRINTER PORT.

To the PLC PORT, the PLC for data transfer with the Sucom A protocol is connected. On devices without PC/PRINTER PORT, the PC or printer can also be connected to this port with an adapter.

To the AUX PORT, the PLC for data transfer using the respective bus protocol is connected.

2) The MI4-151-KF1 and MI4-451-KF1 units are supplied with a fitted Suconet-K interface.

Table 3: Features of the touch operator panels

MI4	Display						Control panel			Inter- faces ¹⁾		Plug-in interface modules				
	LCD passive monochrome	LCD passive colour	LCD active TFT	Rows x characters	Display size in inches	Resolution in pixels	Resistive touch	F-keys with LED, labelling facility	Total number of keys	Sucom A (PLC PORT)	Configuration/printer (PC/PRINTER PORT)	Suconet K (AUX PORT) ²⁾	PROFIBUS DP (AUX PORT)	MPI (AUX PORT)	DeviceNet (AUX PORT)	CANopen (AUX PORT)
MI4-151-TA1	✓			16 × 40	5.6	320 × 240	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-451-TA1		✓		16 × 40	5.6	320 × 240	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-161-TC1	✓			25 × 80	9.5	640 × 400	✓	2	9	✓	✓	✓	✓	✓	✓	✓
MI4-471-TC1			✓	30 × 80	10.4	640 × 480	✓	2	9	✓	✓	✓	✓	✓	✓	✓
MI4-150-TA1	✓			16 × 40	5.6	320 × 240	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-450-TA1		✓		16 × 40	5.6	320 × 240	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-550-TA1			✓	16 × 40	5.6	320 × 240	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-160-TA1	✓			30 × 80	9.6	640 × 480	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-470-TA1		✓		30 × 80	10.4	640 × 480	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-570-TA1			✓	30 × 80	10.4	640 × 480	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-580-TA1			✓	40 × 100	12.1	800 × 600	✓	–	–	✓	✓	✓	✓	✓	✓	✓
MI4-590-TA1			✓	48 × 128	15	1024 × 768	✓	–	–	✓	✓	✓	✓	✓	✓	✓

1) A PC for uploading or downloading the configuration or a printer can be connected to the PC/PRINTER PORT.

To the PLC PORT, the PLC for data transfer with the Sucom A protocol is connected. On devices without PC/PRINTER PORT, the PC or printer can also be connected to this port with an adapter.

To the AUX PORT, the PLC for data transfer using the respective bus protocol is connected.

2) The MI4-151-TA1, MI4-451-TA1, MI4-161-TC1 and MI4-471-TC1 units are supplied with a fitted Suconet-K interface.

2 Engineering

Connections

Power supply and grounding

- ▶ Connect the units as shown in the following diagrams.

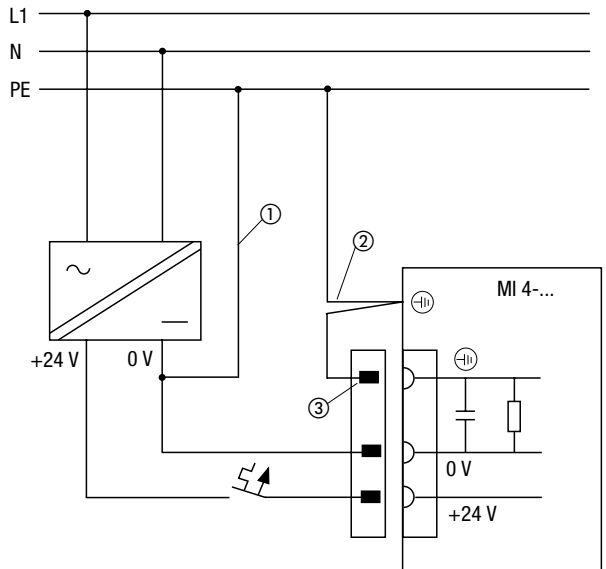


Figure 1: Connection diagram

- ① Earth connection for 0 V line
- ② Device housing earth connection
- ③ Power supply plug earth connection



For further explanation of the diagram legend, see page 10.

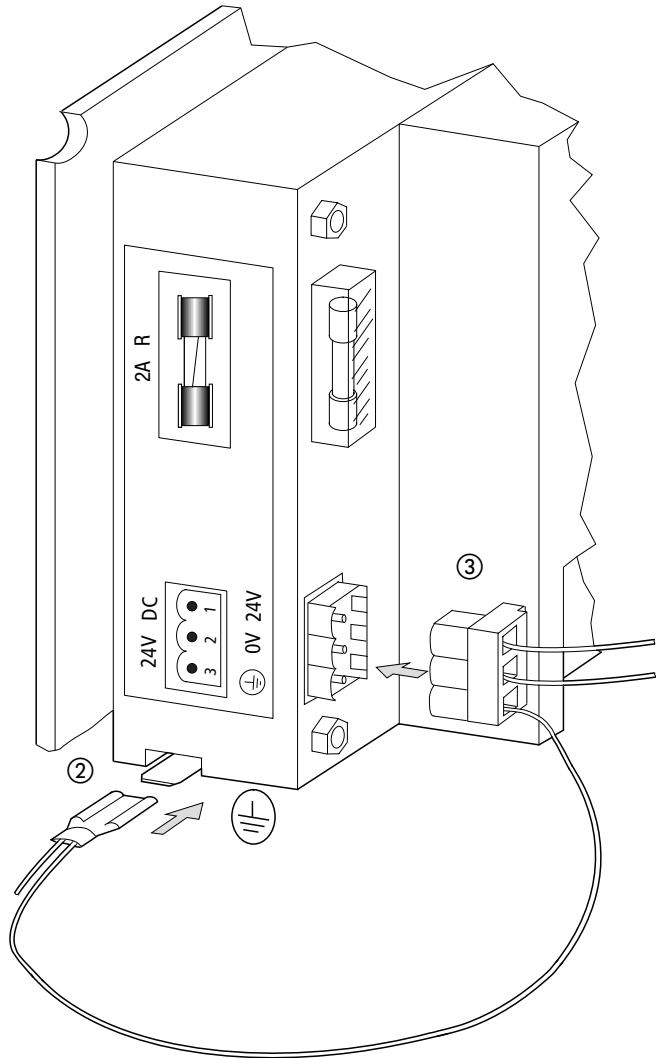


Figure 2: Connecting the power supply and earthing



Not all devices are fitted with a 2 A fuse.

① **Earthing the 0 volt cable (see Fig. 1)**

The units can be operated earthed or unearthed. An isolation monitoring device must be used for unearthed operation.

② **Panel housing earth connection**

The panel housing must always be earthed. The earth connection is located next to the connector sockets for the power supply. It is indicated by a sticker bearing the symbol for earth. Use a 6.3 mm fast-on plug for the power connection.

③ **Power supply plug earth connection**

In all cases, connect the earth connection of the plug to earth. It is connected internally to the 0 V plug connection through a capacitor-resistor combination (10 nF, 100 V/1 M Ω).

Data plug earthing

The data plug housings for MI4 units are earthed.

Data connections

MI4 units are equipped with several connection ports. The panels differ in their housing design, electrical data and the protocol they use. The following illustrations show the pin and socket assignments of the cable connections to the PC, printer and PLC.



If you are not using standard cables, you may only allocate those cable plug pins or sockets required for the interface in question. Otherwise, malfunctions may occur.

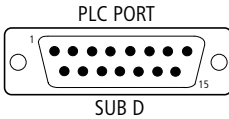
Overview

Use the table to determine the required connection type:

Connection type	MI4-PORT	Page
MI4 to PLC through		
Sucom A	PLC	12
Suconet K	AUX	13
PROFIBUS-DP	AUX	15
Siemens MPI	AUX	17
DeviceNet	AUX	18
CANopen	AUX	19
MI4 to PC or printer	PC/PRINTER	21
	PLC (with adapter)	22
MI4 (hand-held) to PLC through		
Sucom A	CN3	26
Suconet K	CN1	26
Siemens MPI	CN1	26
MI4 (hand-held) to PC or printer	CN2	26

Connecting MI4 to PLC SUCOM-A protocol

For serial communication with various PLC systems, use the PLC PORT of the MI4. The PLC PORT supports RS 232, RS 485, RS 422 and Current Loop 20 mA. Please use only the specified data cable.



Pin	Function
1	Frame Earth
2	RxD
3	TxD
4	+5 V output (≤ 100 mA)
5	GND
6	CHA-
7	CHB-
8	Tx+ 20 mA
9	Tx- 20 mA
10	RTS
11	CTS
12	Rx+ 20 mA
13	Rx- 20 mA
14	CHA+
15	CHB+

① Connection to the data plug housing

■ Plug □ Socket

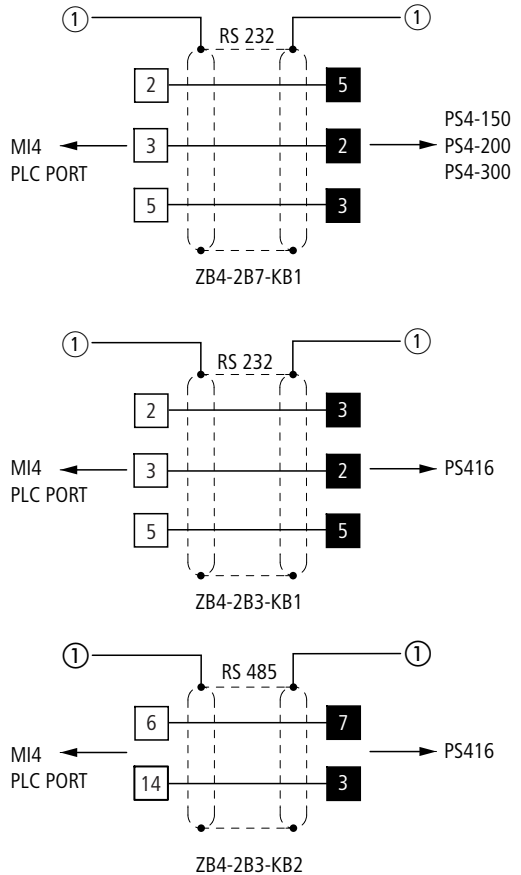


Figure 3: Sucom A communication cable

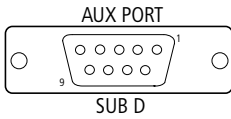
Suconet K protocol

Precondition: To operate MI4 units with Suconet K, the ZB4-501-IF1 interface module must be connected. The following MI4 units are delivered in that state:

MI4-101-KC1	MI4-151-KF1	MI4-161-TC1
MI4-101-KE1	MI4-451-KF1	MI4-471-TC1
MI4-111-KE1	MI4-151-TA1	
MI4-131-KH1	MI4-451-TA1	

For all other devices, the Suconet K interface module must be ordered and fitted separately (see Section “Interface module”, page 30).

The connection to a PLC with the Suconet K protocol is made through the AUX PORT of the MI4. The AUX PORT supports RS 485 communication.



3	A
7	B

- ① Connection to the data plug housing
- Plug

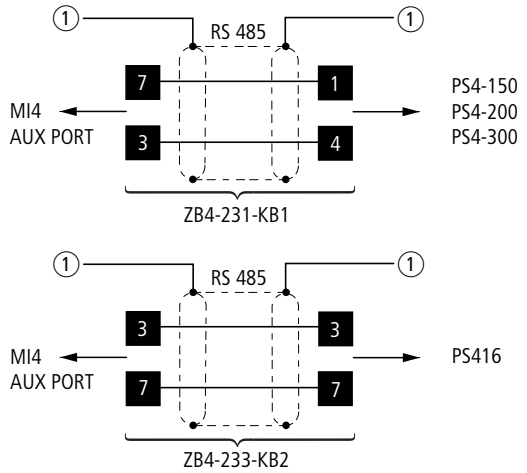


Figure 4: Assignment of the Suconet K communication cable (cable with plug)



Bus termination with Suconet K

If the MI4 is the last station on a Suconet line, a bus terminating resistor should be provided for this device. The bus terminating resistor for the MI4 is supplied as a plug and can be ordered under the type designation ZB4-043-AD1 (Order No. 203512).

PROFIBUS-DP protocol

Precondition: To use the MI4 units with PROFIBUS-DP, the ZB4-504-IF1 interface module must be connected (see Section “Interface module”, page 30).

All MI4 panels from the listed serial numbers onwards can be fitted with the ZB4-504-IF1 PROFIBUS-DP interface:

Table 4: MI4 units compatible with PROFIBUS-DP

Panel	PROFIBUS-DP compatible from serial number
MI 4-100-KC1	51
MI 4-100-KE1	102
MI 4-101-KC1	181
MI 4-101-KE1	215
MI 4-110-KE1	76
MI 4-111-KE1	295
MI 4-130-KH1	40
MI 4-131-KH1	81
MI 4-151-KF1	59
MI 4-151-TA1	55
MI 4-161-TC1	99
MI 4-451-KF1	100
MI 4-451-TA1	110
MI 4-471-TC1	12

The connection to a PLC with the PROFIBUS-DP protocol is made through the AUX PORT of the MI4. The AUX PORT supports RS 485 communications.

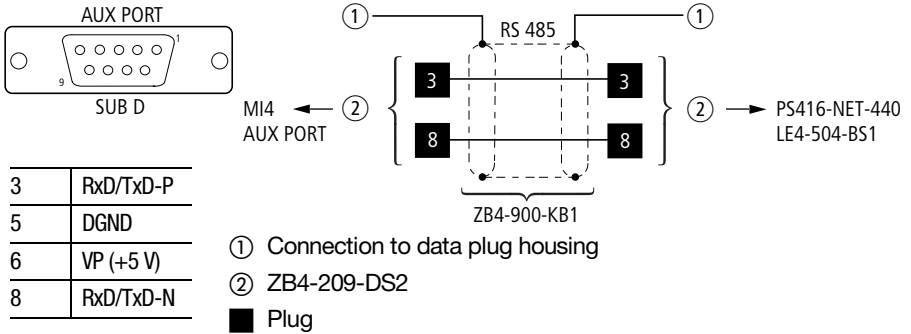


Figure 5: PROFIBUS-DP communication cable



Non-designated pin connectors may not be assigned because they are specified in the PROFIBUS-DP standard.

Cables and plugs must be ordered and assembled separately.

	Type designation	Article No.
Cable	ZB4-900-KB1	206983
Plug	ZB4-209-DS2	206982

Siemens MPI

Precondition: For communication through MPI, the firmware version of the MI4 units must be 4.25 or later. In addition, the ZB4-505-IF1/-IF2 interface module (with/without potential isolation) must be connected (see Section “Interface module”, page 30).

The connection to a PLC with the MPI protocol is made through the AUX PORT. The MI4 AUX PORT supports RS 485 communication.

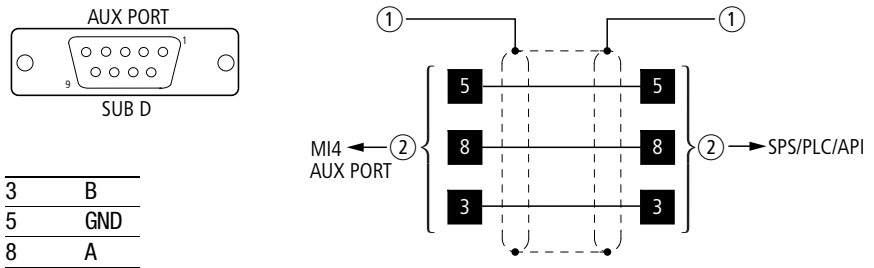


Figure 6: Siemens MPI communication cable

- ① Connection to data plug housing
- ② ZB4-209-DS2 plug
- Plug



For communication through MPI, the PROFIBUS-DP cable can also be used.

DeviceNet

Precondition: For communication through DeviceNet, the firmware version of the MI4 units must be 4.40 or later. In addition, the ZB4-506-IF1 interface module must be connected (see Section “Interface module”, page 30).

The connection to a PLC with the DeviceNet protocol is made through the AUX PORT of the MI4. The AUX PORT supports RS 485 communications.

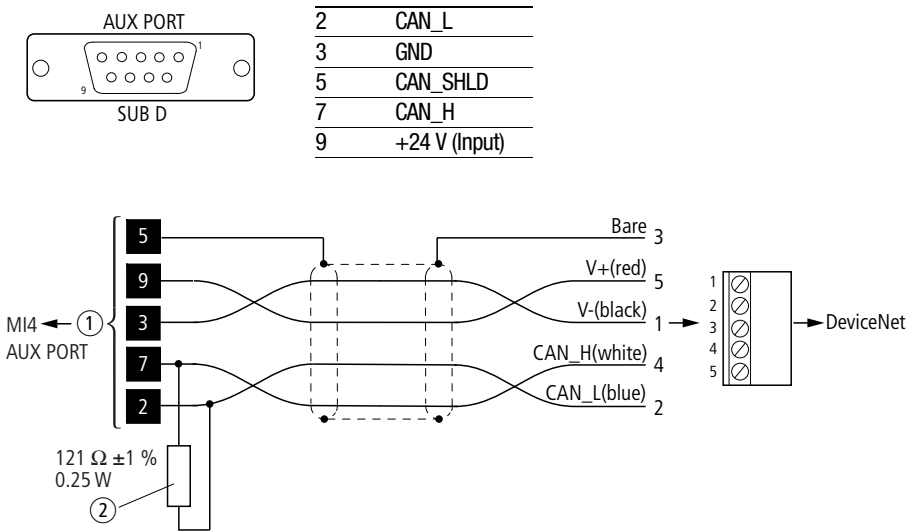


Figure 7: DeviceNet communication cable

- ① ZB4-209-DS1 plug
- ② Bus terminating resistor

CANopen

Precondition: For communication through CANopen, the firmware version of the MI4 units must be 4.40 or later. In addition, the ZB4-507-IF1 interface module must be connected (see Section “Interface module”, page 30).

The connection to a PLC with the CANopen protocol is made through the AUX PORT of the MI4. The AUX PORT supports RS 485 communications.

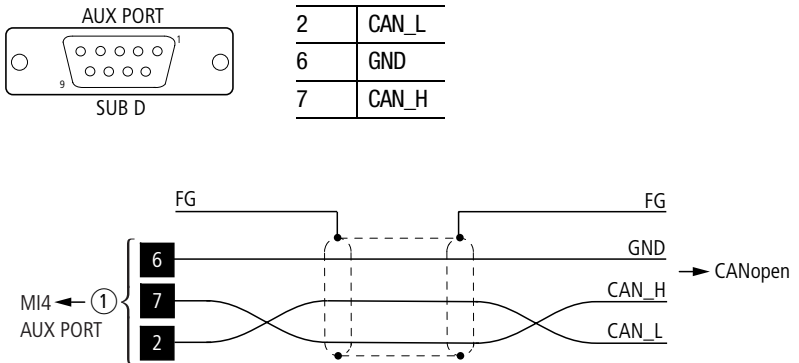


Figure 8: CANopen communication cable

① ZB4-209-DS1

Connecting a PC or printer to the MI4

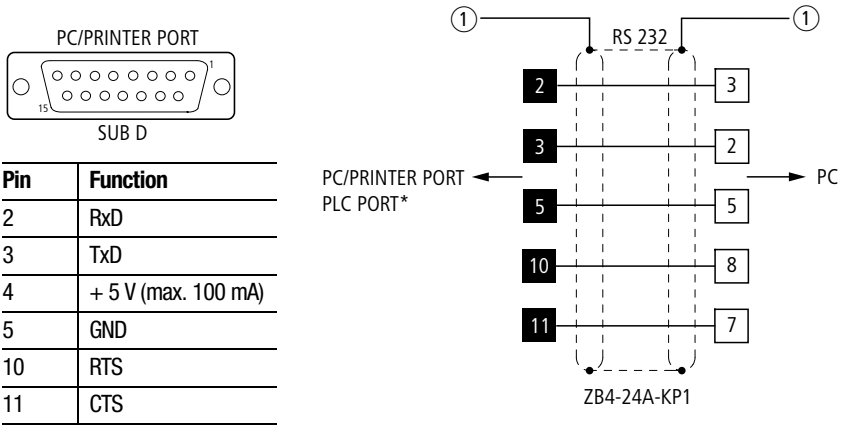
Depending on the device model, PCs are connected either to the PC/PRINTER PORT or the PLC PORT of the MI4. The different connection types are described in the following sections.

The PC is connected to the interface for uploading or downloading the configuration. To be configured with a PC, the MI4 panels must be in configuration mode.

Projects can also be downloaded to the graphic or touch operator panels' SSFDC memory card through the ZB4-510-EG1 SSFDC charging device. This has the advantage that the download is very fast.

The printer can be connected only to the PC/PRINTER PORT. To connect a printer, set the communication parameters in the MI4 Configurator under "Project → Report On Panel Printer → Printer Setup".

PC-/PRINTER PORT



① Connection to the data plug housing

* On MI4 units without PC/PRINTER PORT, the PC is connected to the PLC PORT (see next section)

■ Plug □ Socket

Figure 9: Assignment of the programming cable

PLC PORT

On the following units, connect the PC to the PLC PORT:

MI4-100-KC1, MI4-101-KC1, MI4-110-KC1

MI4-100-KE1, MI4-101-KE1

MI4-110-KG1

Use the ZB4-24A-KP1 standard cable to connect the PC. The required adapter is supplied as standard with the cable.

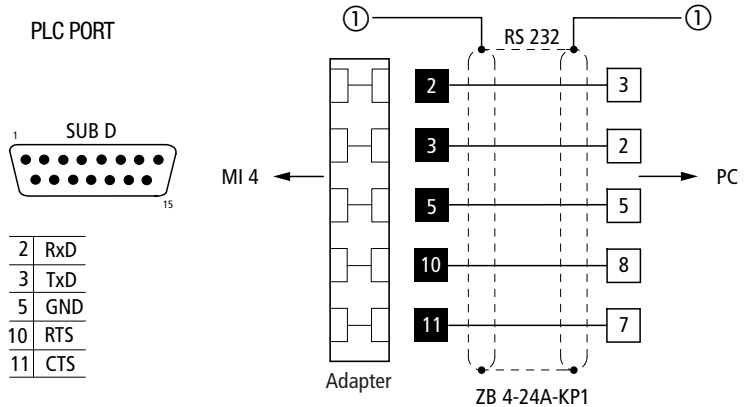


Figure 10: MI4 – PC connection with adapter

① Connection to the data plug housing

■ Plug □ Socket

Data interfaces of MI4-140-KF1 (hand-held)

Arrangement and assignment of the adapter extensions

The adapter extensions in the MI4 hand-held are arranged as shown in the diagram below. For the assignments of the adapter extensions, see Table 5:

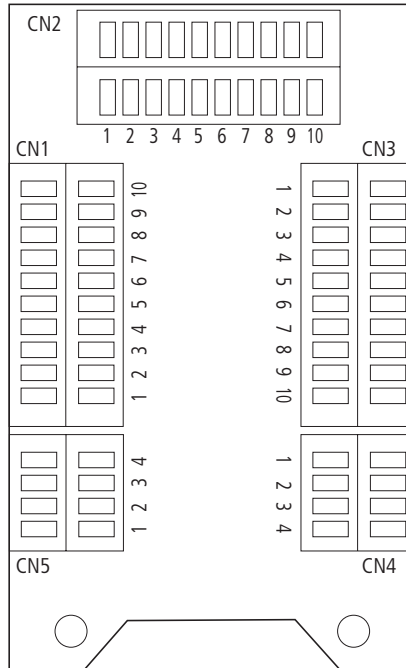


Figure 11: Arrangement of the adapter extensions in the MI4-140-KF1

Table 5: Assignment of the adapter extensions in the MI4 hand-held



The green fields indicate the adapter number used for each connection.

Plug No.	CN1 (AUX PORT) ¹⁾		CN2 (PC/PRINTER PORT)	CN3 (PLC PORT)	CN4 Power	CN5 Additional signals
	Suconet K	MPI				
1	GND (brown/pink)		Reserved	Reserved	+24 V DC (red)	DM1 (blue)
2	+5 V output (max. 100 mA) (orange/pink)		Reserved	Reserved	Common (black)	DM2 (blue/black)
3			Reserved	Reserved	Reserved	–
4		A	Reserved	Reserved	PE	–
5	A (yellow/pink)	B (yellow/pink)	+ 5 V output (max. 100 mA) (green)	+ 5 V output (max. 100 mA) (red)	–	–
6	B (green/pink)		GND (grey)	GND (black)	–	–
7			RxD (orange)	RxD (blue/red)	–	–
8			CTS (brown)	CTS (purple/red)	–	–
9			TxD (white)	TxD (blue/black)	–	–
10			RTS (pink)	RTS (purple/black)	–	–

1) The assignment of the AUX PORT depends on the connected interface module. Currently, these are the interface modules for Suconet K and Siemens MPI (electrically isolated). For further information, please read the next section.

Delivery state

As supplied, the MI4 hand-held is prewired for Suconet K and Sucom A communication. The unit is supplied with a 5 m long cable.

Data interfaces of
MI4-140-KF1 (hand-held)

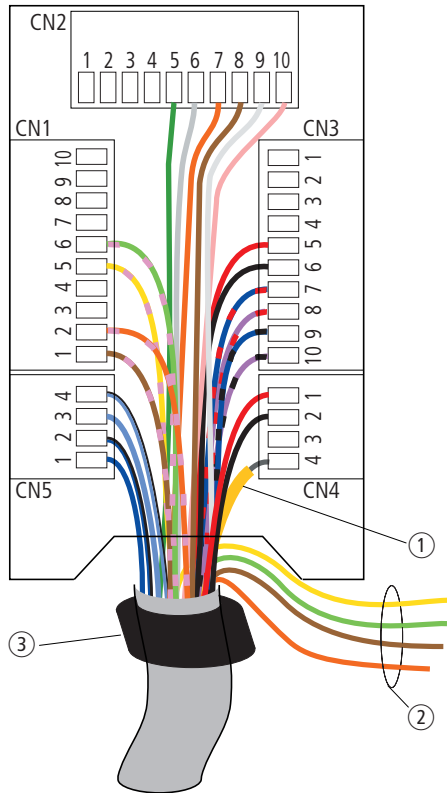


Figure 12: Wiring of the MI4 hand-held as supplied

- ① PE, cable screen
- ② Emergency-Stop switch, only for voltages up to 48 V DC (wire yellow and green cable and brown and orange cable together)
- ③ Ferrite ring required for fault-free device function

Connect MI4 (hand-held) to PLC

Connect MI4 (hand-held) to PLC

Sucom A (through CN3)

PLC connection through Sucom A is preset (see Section “Delivery state” above). The terminal assignment on the PLC side is identical to that of the PLC PORT; see page 12.

Suconet K (through CN1)

PLC connection through Suconet K is preset (see Section “Delivery state” above). The terminal assignment on the PLC side is identical to that of the AUX PORT; see page 13.

Siemens MPI (through CN1)

If the ZB4-505-IF1 MPI communication cable is connected, the CN1 AUX PORT must be rewired as follows:

Plug No. 6 (green/pink) to plug No. 4 (see Section “Delivery state” above)

The terminal assignment on the PLC side is identical to that of the AUX PORT; see page 17.

Connecting the MI4 (hand-held) to PC or printer (through CN2)

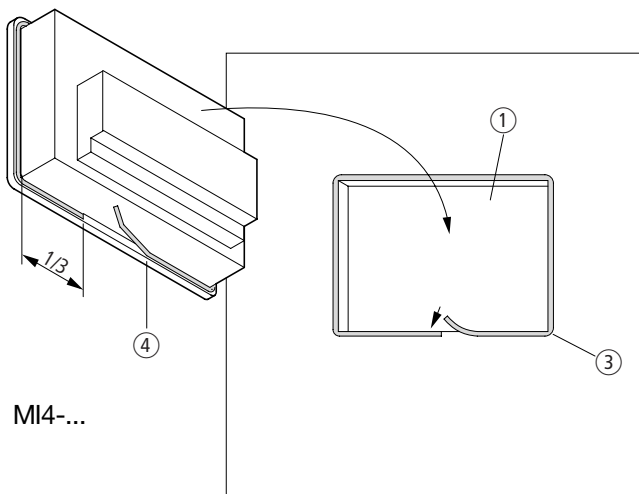
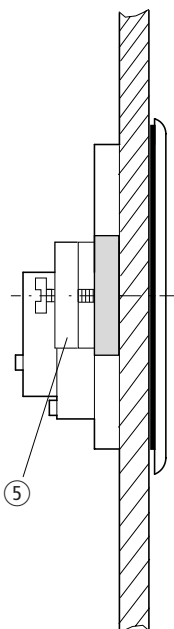
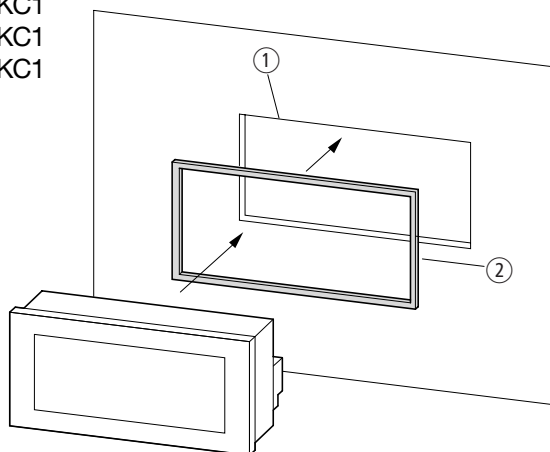
The PC connection is preset (see Section “Delivery state” above).

The terminal assignment on the PC side is identical to that of the PC/PRINTER PORT or the PLC-PORT; see page 21.

3 Installation

MI4

MI4-110-KC1
MI4-100-KC1
MI4-101-KC1

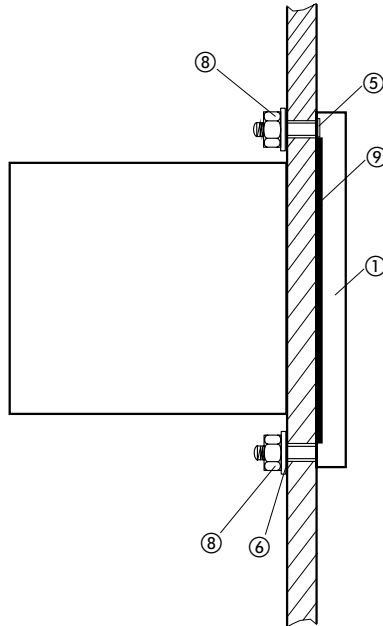


- ① Installation cut-out
- ② Rectangular gasket
- ③ Narrow gasket
- ④ Wide gasket (prefitted on some devices)
- ⑤ Clamping bracket (if not present, see next page)

MI4-...

MI4

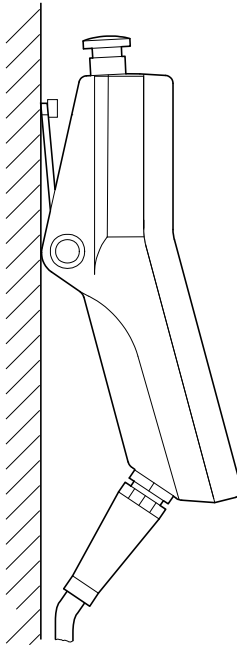
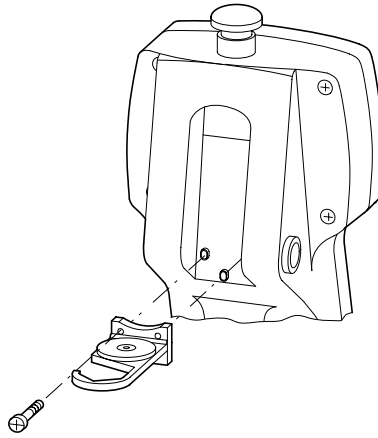
Devices without clamping bracket are mounted with a frame and four screws.



- ① Frame
- ⑤ Gaskets
- ⑥ Washers
- ⑧ Nuts
- ⑨ Gasket

The drilling dimensions are listed in the table on page 52.

**MI4-140-KF1
(hand-held)**



Interface module

MI4...



During installation of the interface module, the MI4 must be voltage-free and its reverse side freely accessible.

- ▶ Remove the fixing screws on the back of the MI4 and lift off the cover. On some models, the cover has to only be levered off with a screwdriver.
- ▶ If a module is already fitted, remove it.
- ▶ Plug the required interface module into the red connector.
- ▶ Refit the back cover with the two screws, or snap the cover back into place.
- ▶ Attach the accompanying marking label over the plate labelled AUX PORT.

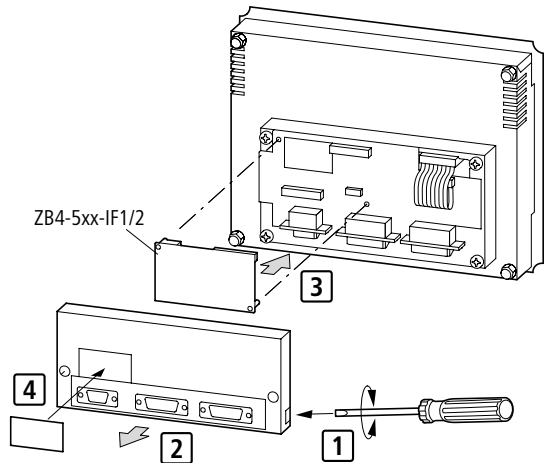
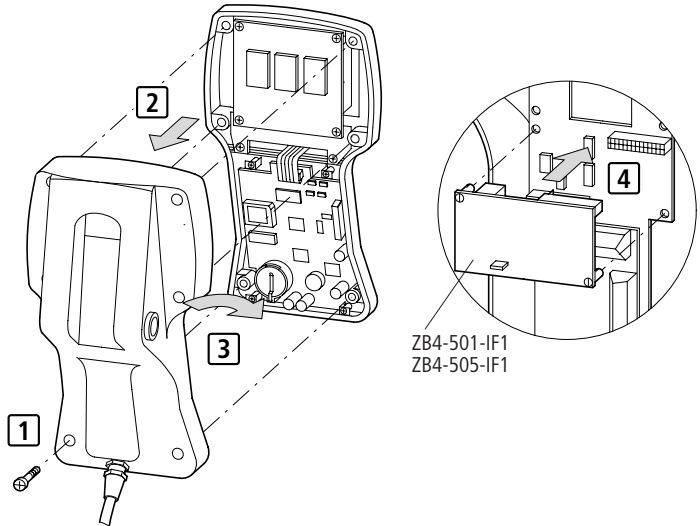


Figure 13: Installing the interface module

MI4-140-KF1 (hand-held)

- ▶ Undo the screws and remove the back of the housing.
- ▶ Turn the back of the housing towards you and replace the interface module.



Replacing the battery

The battery is used for maintaining the following data in the event of a power supply failure:

Real-time clock (date and time)

Events list

Recipes



The MI4-101-KC1, MI4-100-KC1, MI4-101-KE1, MI4-100-KE1, MI4-110-KC1 and MI4-110-KG2 units are not battery backed-up.

The battery life is about one year. The MI4 units indicate a low battery charge level in several ways:

Flashing red front plate “FAULT”, “FLT” or  LEDs (depending on device model)

Display in the system menu in the “Battery” field (BATTERY OK or LOW)

Indication in the control panel status word, bit S 6 (bit S 6 = signal 1)

Replace the battery immediately if any of these displays is activated. Battery type: Duracell DL 2430 (ZB4-280-BT1, Order No. 203515).

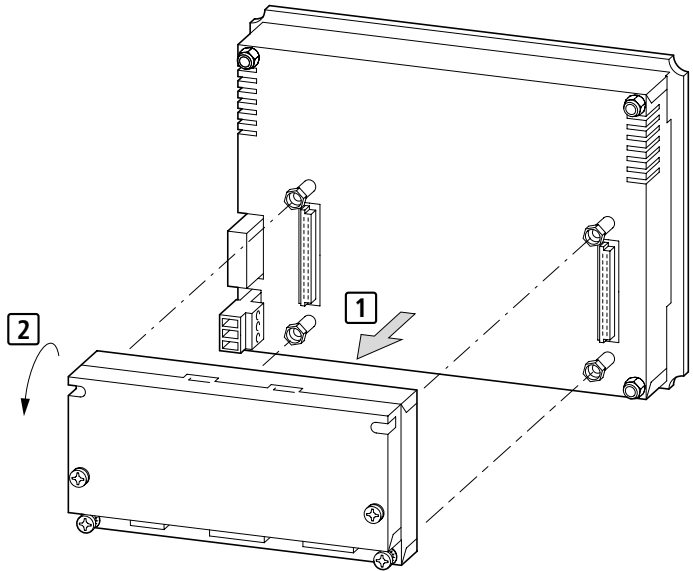


An internal capacitor will maintain the power supply for 30 seconds while the battery is being replaced. If this time is exceeded, data will be lost.

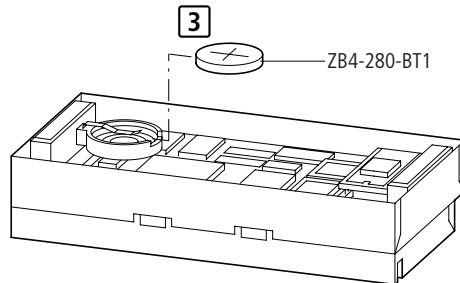
Replacing the battery of the MI4

- ▶ Switch off the power supply to the device.
- ▶ Undo the four screws at the back of the expansion housing.
- ▶ Remove the housing.

Replacing the battery



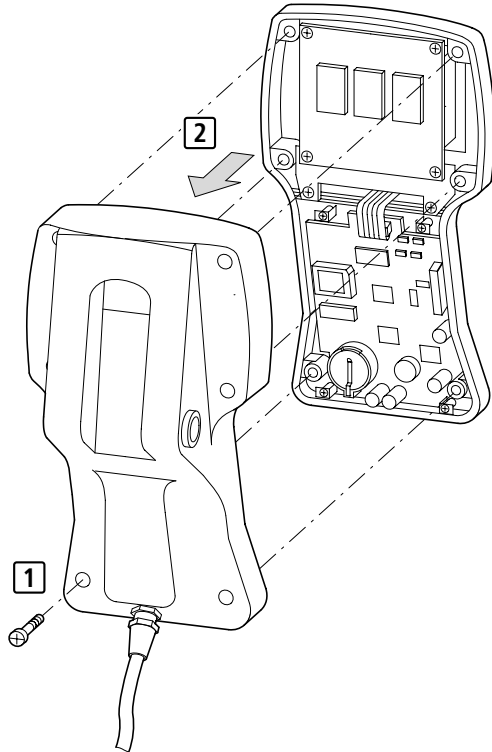
- ▶ Replace the battery.



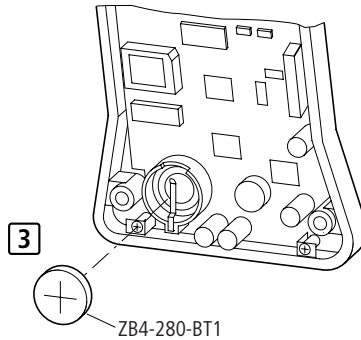
- ▶ Screw the housing back in place.
- ▶ Switch the power supply back on and check the battery voltage.

Replacing the battery of the MI4 hand-held

- ▶ Switch off the power supply.
- ▶ Undo the four screws at the back.
- ▶ Remove the housing.



- ▶ Replace the battery (see next page).
- ▶ Screw the housing back in place.
- ▶ Switch the power supply back on and check the battery voltage.



Insert labels

The insert labels are used for labelling the keys. You can write on the labels and slide them beneath the keys (row of keys). The insertion slit for the labels is at the rear of the front panel. Depending on the device type, two different labelling strip kits are available:

ZB4-301-BS1 (Order No. 206859) for ...	ZB4-301-BS2 (Order No. 230610) for ...
MI4-100-KC1	MI4-110-KC1
MI4-101-KC1	MI4-110-KG1
MI4-100-KE1	MI4-110-KG2
MI4-101-KE1	MI4-140-KI1
MI4-110-KE1	MI4-140-KJ1
MI4-130-KH1	MI4-150-KI1
MI4-131-KH1	MI4-450-KI1
MI4-151-KF1	MI4-150-TA1
MI4-451-KF1	MI4-450-TA1
MI4-151-TA1	MI4-550-TA1
MI4-451-TA1	MI4-160-TA1
MI4-161-TC1	MI4-470-TA1
MI4-471-TC1	MI4-570-TA1
	MI4-580-TA1
	MI4-590-TA1

Protective film

On delivery, blank label strips are fitted to each unit.

With the accompanying labelling software, you can create user-specific labels and then print them on a laser printer. The labelling software is included as standard with the MI4 Configurator V. 1.02 and higher.

Protective film

Protective film for the display is available for touch panels. This can be simply applied to the display front and is easily removed again.

	Type designation	Article No.
MI4-151/451-TA1	ZB4-501-GZ1	203514
MI4-161/471-TC1	ZB4-501-GZ2	203515
MI4-150/450/550-TA1	ZB4-501-GZ3	230611
MI4-160/470/570-TA1	ZB4-501-GZ4	230612
MI4-580-TA1	ZB4-501-GZ5	230613
MI4-590-TA1	ZB4-501-GZ6	230614

4 Operation

Ambient conditions

Do not expose the equipment to direct sunlight for extended periods, as this could result in premature aging of the membrane. Do not let the equipment come into contact with corrosive substances.

Servicing and maintaining the panels

Do not use tools to operate the keyboard (screwdriver or similar). To clean the equipment, use a soft cloth and a neutral soap product. Do not use solvents.

Configuration

Irrespective of the MI4 model, configuration of the MI4 panels is always carried out using the MI4 configurator software. The completed configuration is loaded into the MI4. The following conditions apply:

The MI4 unit is in configuration mode¹⁾ (delivery state).

The PC is connected to the MI4 unit.

The PC port (PORT) COM 1, COM 2, COM 3 or COM 4 must first be selected in the Configurator “Options/Communication” menu and the communications parameters “Baud rate”, “Parity” and “Stop bit” specified. Transfer rates of 9600, 19200 and 38400 bit/s

can be preselected:

1) If the device is not already in configuration mode, do the following: Press the Enter key for three seconds and, in the menu, select Config. On touch operator panels, touch the screen for three seconds and select Config.










With the ZB4-510-EG1 SSFDC downloader (Order No. 230617), which can be connected to the PC's parallel port, the configuration settings can be downloaded to the SSFDC memory card in just a few seconds.

Key functions

This section contains a listing of the possible key functions of all MI4 panels.

Table 6: Possible key functions and their meaning

Keys/symbols	Designation	Function
	ESC	Returns to page mode without selecting ROW or EXIT in the system menu
	PG_UP	In page mode, this function can be defined with the help of the macro editor
	PG_DOWN	
	HOME	
Enter	–	Depending on the mode
Clr	–	
Info	–	Help
Clear	–	Delete
Ins	–	Insert
	DATIME	Date/time
	PASSWORD	Enter password
	PRINT	Print
±	–	+/- Input a positive or negative value

With the numeric keys 0 to 9, you can input numerical values. Some of the keys contain an additional symbol. Depending on the operating mode, either the numeric keypad or the symbols are active.

Key functions depending on the operating mode

The functions are dependent on the operating mode. Only the **standard** functions are described here. These functions – with the exception of functions available in configuration mode – can be modified, deleted or extended in the MI4 Configurator using the keyboard macro editor.



Some panels do not have a “Clear” key; the corresponding function can, however, be called up by simultaneously pressing the “←” and “→” keys.

Configuration mode (CONFIG)

Enter ¹	View the type and version of the communication driver
Enter	Pressed for 2 seconds: Return to application mode, provided a communication driver which is ready for operation and a valid project have been saved in the device (the key must be pressed for two seconds).

¹If you have programmed the Enter key by mistake, change to configuration mode as follows:

On MI4 with touchscreen: With a finger of the left hand, press the centre of the left half of the touchscreen. Keep the finger on the touchscreen and switch the power supply on. With a finger of the right hand, tap the right half of the touchscreen once every second until configuration mode is selected.

On MI4 without touchscreen: Keep any three keys pressed at the same time and switch the 24 V power supply on. Keep the keys pressed until the MI4 is in configuration mode.

Page mode (PAGES)

↑	Scroll page up
↓	Scroll page down
←	Previous page
→	Next page
Enter	Pressed for 2 seconds: Recall the command menu
Ins1)	Data input mode
Prn ¹⁾	Print page/cancel printing

- 1) Not all models have this key. The corresponding function can be assigned with the keyboard macro editor.

Command menu (COMMAND)

↑	Selection up
↓	Selection down
←	Selection left
→	Selection right
Enter	Activate selection
Clear	Return to page mode

System menu (SYSTEM)

↑	Selection up
↓	Selection down
←	Activate command
→	Activate command
Enter	Return to page mode if EXIT was selected
Clear	Return to page mode

- 1) Numeric keys are not available on all models. A numeric value can be entered in these cases using the arrow keys and the keyboard macro editor. To do this, use the left and right arrow keys to select the required digits and change them with the up and down arrows.

Data entry mode**Select a data input field:**

↑	Go to field in the previous row
↓	Go to field in the next row
←	Previous field
→	Next field
Ins (0 to 9) ¹⁾	Preselection of data input field
Enter	Select field for data input
Clear	Cancel input and return to page mode

Value input:

↑	Increase value/scroll up ASCII character set/select previous message
↓	Reduce value/scroll down ASCII character set/select next message
←	Move cursor to the left in ASCII fields
→	Move cursor to the right in ASCII field
0 to 9 ¹⁾	Numerical input
Enter	Confirm input and return to page mode
Clear	Cancel input and return to page mode

1) If not present, see legend on page 42

Alarm mode (ALARMS)

↑	Previous alarm in the list
↓	Next alarm in the list
Enter	Confirm current alarm (press for 2 seconds)
Clear	Return to page mode
Prn ¹⁾	Print/cancel alarm list

1) Not all models have this key. The corresponding function can be defined with the keyboard macro editor.

Events mode (EVENTS)

↑	Scroll up
↓	Scroll down
Clear	Return to page mode
Prn ¹⁾	Print/close event list

1) Not all models have this key. The corresponding function can be defined with the keyboard macro editor.

Password input mode (PASSWORD)

↑	Increases number
↓	Decreases number
←	Next number
0 to 9 ¹⁾	Input of numerical password
Enter	Confirms password
Clear	Cancel input

1) If not present, see legend on page 42

Time and date input mode (TIME)

↑	Increase field value
↓	Decrease field value
Enter	Select field
Clear	Return to page mode

Direct page selection mode (DIRECT PAGE SELECTION)

←	Decreases page
→	Increases page
0 to 9 ¹⁾	Page number input
Enter	Confirm input, go to selected page
Clear	Cancel input, return to page mode

1) If not present, see legend on page 42

Direct access mode (ACCESS)

The status of individual marker bytes is shown in hexadecimal and binary format.

←	Decrease offset
→	Increase offset
0 to 9	Numerical offset input
Enter	Select next page, confirm offset input
Clear	Cancel numerical offset input and return to page mode

Special features of models MI4-151-KF1 and MI4-451-KF1

In addition to the ten function keys (which have insert labels) these two models have another four function keys located on the left of the display. Their numbering is shown in the following drawing.

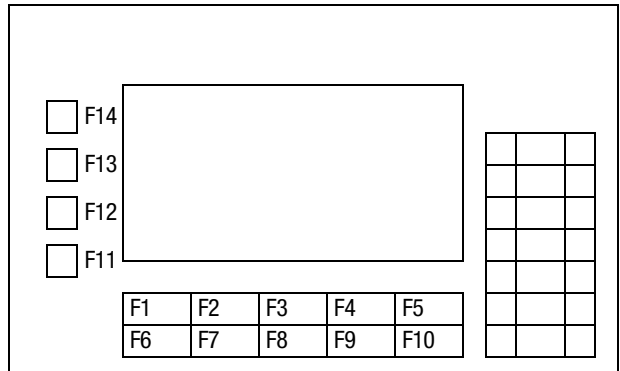


Figure 14: Additional function keys

Special features of models MI4-161-TC1/ MI4-471-TC1

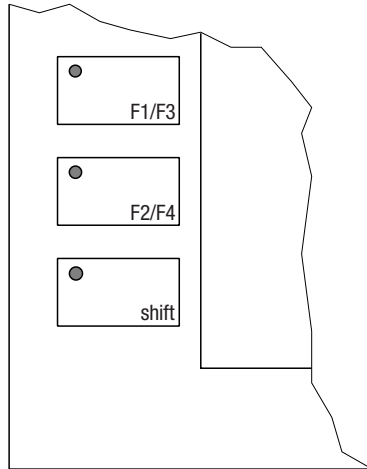


Figure 15: Additional function keys of MI4-161-TC1/
MI4-471-TC1

The configuration of the function keys is shown in the diagram.

When the shift function is inactive, the top two function keys are configured as F1 and F2.

When shift is activated they are configured as F3 and F4.

The shift function is activated or deactivated with the Shift key. An illuminated LED in the shift key indicates the activated state.

The LEDs of the two function keys can be configured as required.

LED indicators**MI4-100-KC1/MI4-101-KC1****MI4-151-KF1/MI4-451-KF1****MI4-161-TC1/MI4-471-TC1**

Designation	Colour	Status	Function
DL FL(T) (one LED)	–	Off	No key pressed/hardware OK
	Green	Flashing	Communication error
		On	Key pressed
	Red	Flashing	Battery low
		On	Hardware fault

MI4-100-KE1/MI4-101-KE1**MI4-110-KE1/MI4-111-KE1****MI4-130-KH1/MI4-131-KH1**







Designation	Colour	Status	Function
DL	Green	Off	No key pressed
		Flashing	Communication error
		On	Key pressed
FLT/fault	Red	Off	Hardware OK
		Flashing	Battery low
		On	Hardware fault

MI4-151-TA1/MI4-451-TA1

Designation	Colour	Status	Function
DL	Green	Off	No keys pressed
		On	Key pressed

Various models

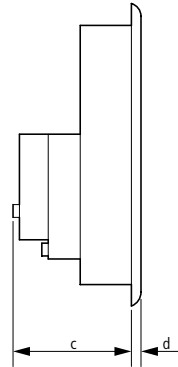
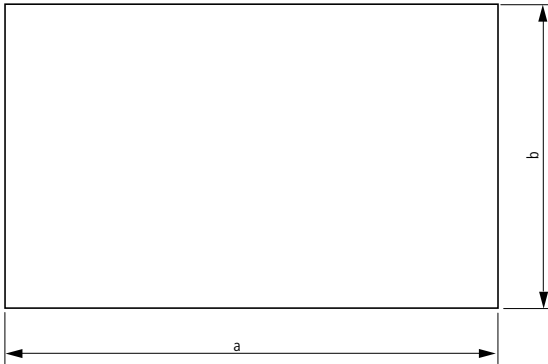
LED indicators which are marked with a symbol or text:

Symbol	Designation	Colour	Status	Function
	Alarm	Red	Off	No alarm active
			On	Alarm active
			Flashing	Alarm (confirmation required)
	Com	Green	On	Communication error
			Flashing	Communication error
	–	Green	–	Programmable with macro editor
	Run	Green	Off	Hardware fault
			On	OK
	Fault	–	Off	Hardware OK
			On	Hardware fault
			Flashing	Battery low
		Red	Off	Hardware OK
			On	Hardware fault
			Flashing	Battery low
		Green	Off	No key pressed
			On	Key pressed

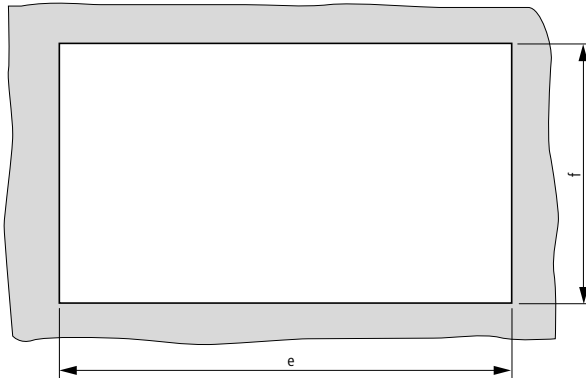
Appendix

Dimensions

Device dimensions



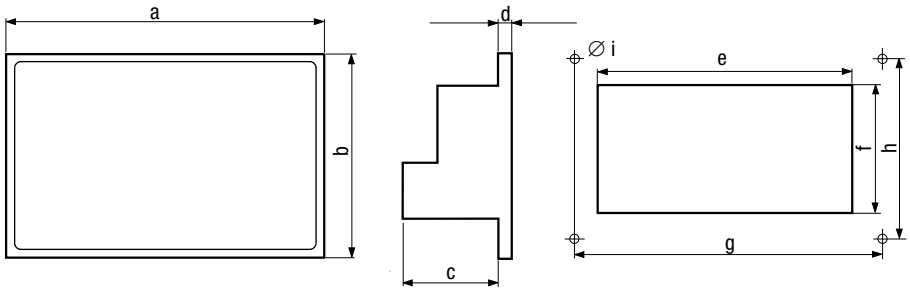
Fitting dimensions



Dimensions

	a	b	c	d	e	f
MI4-110-KC1	149	109	60	5	136	96
MI4-110-KG1	141	176	76	5	128	163
MI4-110-KG2	141	176	76	5	128	163
MI4-140-KI1	220	176	71	5	207	163
MI4-140-KJ1	275	220	77	5	262	207
MI4-150-KI1	275	220	80	5	262	207
MI4-450-KI1	275	220	80	5	262	207
MI4-150-TA1	187	147	91	5	176	136
MI4-450-TA1	187	147	91	5	176	136
MI4-550-TA1	187	147	91	5	176	136
MI4-160-TA1	287	232	91	5	276	221
MI4-470-TA1	287	232	91	5	276	221
MI4-570-TA1	287	232	91	5	276	221
MI4-580-TA1	337	267	91	5	326	256
MI4-590-TA1	392	307	101	5	381	296

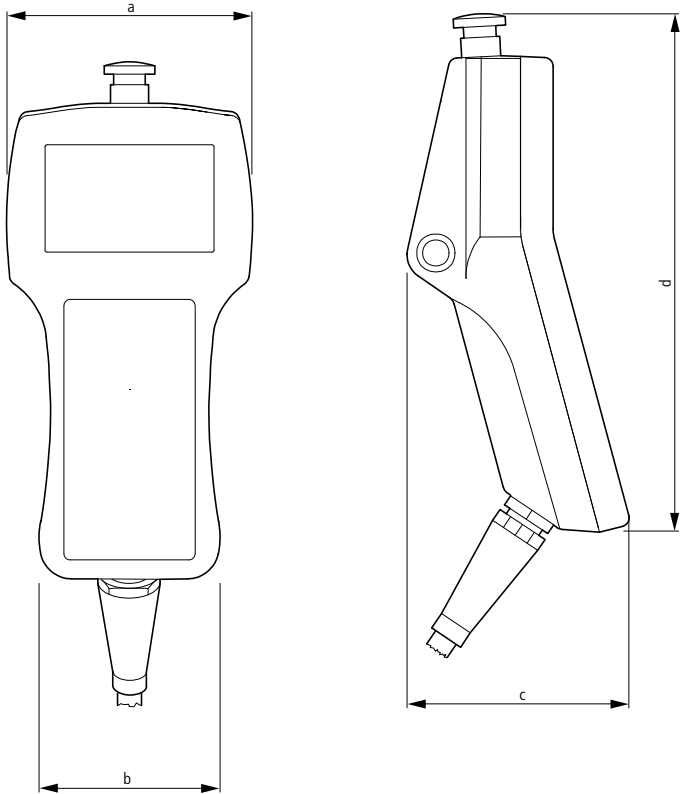
Dimensions



Panel	Unit dimensions in mm				Panel cutout in mm		Drilling dimensions [mm]		
	a	b	c	d	e	f	g	h	i
MI 4-100-KC1¹⁾ MI 4-101-KC1¹⁾	149	109	64	5	136	96	–	–	–
MI 4-100-KE1 MI 4-101-KE1	195	98	74	8	174	78	184	87	4.2
MI 4-110-KE1 MI 4-111-KE1	195	98	74	8	174	78	184	87	4.2
MI 4-130-KH1¹⁾ MI 4-131-KH1¹⁾	311	165	80	9	292	147	–	–	–
MI 4-151-KF1 MI 4-451-KF1	216	168	74	8	195	147	205	157	4.2
MI 4-151-TA1 MI 4-451-TA1	216	168	74	8	195	147	205	157	4.2
MI 4-161-TC1¹⁾ MI 4-471-TC1¹⁾	311	220	80	9	292	202	–	–	–

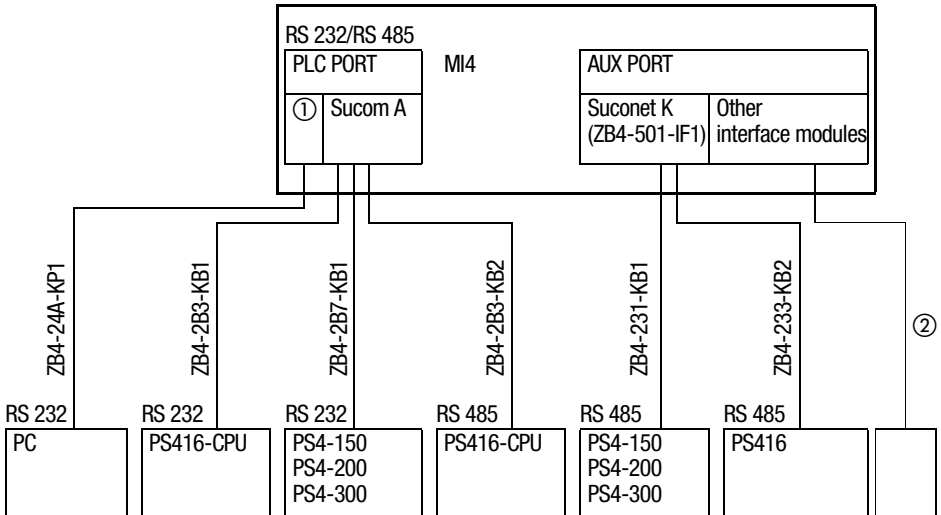
- 1) These models are secured with screw brackets and have a fixed frame; the remaining models have a free frame and are fastened with four screws.

MI4-140-KF1



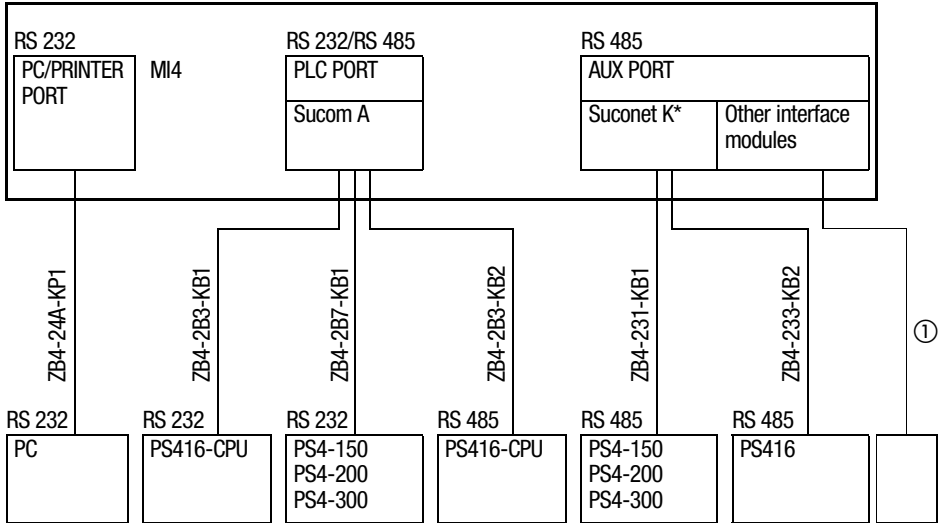
a	b	c	d
116	86	102	239

Communication cables Text operator panel (without PC/PRINTER PORT)



- ① Adapter, supplied as standard with ZB4-24A-KP1 cable.
- ② Other interface module can be connected in place of the Suconet K interface module:
 - PROFIBUS-DP ZB4-504-IF1
 - Siemens MPI ZB4-505-IF1/-IF2
 - DeviceNet ZB4-506-IF1
 - CANopen ZB4-507-IF1
 For cable assignments of these interfaces, see section "Engineering". For an overview, see page 11.

**Text operator panel (with PC/PRINTER PORT)
Graphic/touch operator panel**



- ① Other interface modules can be connected in place of the Suconet K module:
- | | |
|-------------|------------------|
| PROFIBUS-DP | ZB4-504-IF1 |
| Siemens MPI | ZB4-505-IF1/-IF2 |
| DeviceNet | ZB4-506-IF1 |
| CANopen | ZB4-507-IF1 |
- For cable assignments of these interfaces, see section "Engineering". For an overview, see page 11.

* The following units are supplied with a fitted Suconet-K interface (ZB4-501-IF1):

- MI4-101-KC1
- MI4-101-KE1/MI4-111-KE1
- MI4-131-KH1
- MI4-151-KF1/MI4-451-KF1
- MI4-151-TA1/MI4-451-TA1
- MI4-161-TC1/MI4-471-TC1

Technical data

General	
Standards	EN 61 131-2, EN 50 178
Shock resistance	15 g/11 ms
Vibration resistance	Constant 1g, f = 0 to 150 Hz
Cable cross-section	0.22 to 1.5 mm ²
EMC	See below
Ports	
PC/PRINTER PORT	
Type	RS 232
Transmission rate	600 to 38400 kbit/s
Plug type	15-pin, Sub-D socket
PLC PORT PLC/PC PORT	
Type	RS 232, RS 485
Plug type	15-pin, Sub-D plug
AUX PORT	
Type	Depending on connected interface module
Plug type	9-pin, Sub-D socket

General electromagnetic compatibility (EMC) data for automation devices

Emitted interference	EN 55 011/22 Class A		
Interference immunity			
ESD	EN 61 000-4-2	Contact discharge Air discharge	4 kV 8 kV
RFI	EN 61 000-4-3	AM/PM	10 V/m
Burst	EN 61 000-4-4	Network/digital I/O Analog I/O, field bus	2 kV 1 kV
Surge	EN 61 000-4-5	Digital O/O, asymmetrical Network DC, asymmetrical Network DC, symmetrical Network AC, asymmetrical Network AC, symmetrical	0.5 kV 1 kV 0.5 kV 2 kV 1 kV
Line-conducted interference	EN 61 000-4-6	AM	10 V

Text operator panel (not graphics-capable)

	M14-...	101-KC1	100-KE1	101-KE1	110-KE1	111-KE1	130-KH1	131-KH1
Display	Monochrome LCD	Monochrome LCD	Monochrome LCD	Monochrome LCD	Monochrome LCD	Monochrome LCD	Monochrome LCD	Monochrome LCD
Backlighting	LED	LED	LED	LED	LED	LED	LED	LED
Contrast adjustment	Software	Software	Software	Software	Software	Software	Software	Software
Graphics capability	No	No	No	No	No	No	No	No
Number of colours/ grey levels	–	–	–	–	–	–	–	–
Rows x characters	2 x 20	2 x 20	2 x 20	2 x 20	4 x 20	4 x 20	4 x 40	4 x 40
Display dimensions in mm	80 x 16	80 x 16	72 x 16	72 x 16	72 x 24	72 x 24	138 x 28	138 x 28
Scaleable font	No	No	No	No	No	No	No	No
User-definable characters	8	8	8	8	8	8	8	8
Keys								
Numeric keypad	–	–	Yes	Yes	Yes	Yes	Yes	Yes
F-keys (with LED), labelling facility	4	4	9	9	9	9	16	16
Total no. of user- programmable keys	10	10	19	19	19	19	35	35
User LEDs	4	4	9	9	9	9	16	16
Touch function	–	–	–	–	–	–	–	–

	MI4-...	101-KC1	100-KE1	101-KE1	110-KE1	111-KE1	130-KH1	131-KH1
Memory								
Flash project memory	128 kb (32 kb reserved for protocol)							
Recipe memory	-	-	-	-	16 kb	16 kb	16 kb	16 kb
Project memory expansion	-	-	-	-	512 kb	512 kb	512 kb	512 kb
Special features								
Battery	-	-	-	-	Yes	Yes	Yes	Yes
Number of alarm messages	256	256	256	256	1024	1024	1024	1024
Number of history memory messages	-	-	-	-	256	256	256	256
Number of variables per page	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Password	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Real-time clock	Yes, without battery back-up							
Screen saver	-	-	-	-	-	-	-	-
Buzzer	-	-	-	-	-	-	-	-
Printer port	-	-	-	-	Yes	Yes	Yes	Yes

	M14-... 100-KC1	101-KC1	100-KE1	101-KE1	110-KE1	111-KE1	130-KH1	131-KH1
Ports								
RS 232C/RS 485 combination port for:								
- Sucom A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Configuration	Yes	Yes	-	-	Yes	Yes	-	-
RS232C port for:								
- Configuration	-	-	-	-	Yes	Yes	Yes	Yes
- Printer connection	-	-	-	-	Yes	Yes	Yes	Yes
1 fieldbus interface, plug-in modules for:								
- Suconet K	Yes	Yes, plugged in	Yes	Yes, plugged in	Yes	Yes, plugged in	Yes	Yes, plugged in
- PROFIBUS-DP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Siemens MPI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- DeviceNet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- CANopen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power supply								
Rated voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Permissible range (V DC)	20.4 to 28.8	20.4 to 28.8	20.4 to 28.8	20.4 to 28.8	20.4 to 28.8	20.4 to 28.8	20.4 to 28.8	20.4 to 28.8
Reverse polarity protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rated current	250 mA	250 mA	250 mA	250 mA	250 mA	250 mA	400 mA	400 mA
Fuses	Electronic	Electronic	2 A replaceable	2 A replaceable	2 A replaceable	2 A replaceable	2 A replaceable	2 A replaceable

	MI4-... 100-KC1	101-KC1	100-KE1	101-KE1	110-KE1	111-KE1	130-KH1	131-KH1
General								
Weight in kg	0.8		1	1	1	1	1.9	1.9
Degree of protection (front) IP65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ambient temperature in °C	0 – 50	0 – 50	0 – 50	0 – 50	0 – 50	0 – 50	0 – 50	0 – 50
Storage temperature in °C	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70
Keyboard lifespan (keystrokes)	> 3 million	> 3 million	> 3 million	> 3 million	> 3 million	> 3 million	> 3 million	> 3 million
Touchscreen lifespan (operations)	–	–	–	–	–	–	–	–
Cable cross-section in mm ²	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5
Connection type: Plug-in screw terminal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions W x H x D in mm	149 x 109 x 64	149 x 109 x 64	195 x 98 x 74	195 x 98 x 74	195 x 98 x 74	195 x 98 x 74	311 x 165 x 80	311 x 165 x 80

Graphics-capable text operator panel

	M14-... 110-KC1	110-KG2	110-KG1	140-KF1	140-KI1	140-KJ1
Display	Monochrome LCD	Monochrome LCD	Monochrome LCD	Monochrome LCD	Monochrome LCD	Monochrome LCD
Backlighting	LED	LED	LED	LED	LED	LED
Contrast adjustment	Software	Software	Software	Software	Software	Software
Graphics capability	Yes	Yes	Yes	Yes	Yes	Yes
Number of colours/grey levels	–	–	–	–	–	–
Rows x characters	4 x 20	4 x 20	4 x 20	8 x 20	8 x 40	8 x 40
Resolution in pixels	120 x 32	120 x 32	120 x 32	120 x 64	240 x 64	240 x 64
Display dimensions	70 x 21 mm	70 x 21 mm	70 x 21 mm	66 x 33 mm	127 x 34 mm	127 x 34 mm
Scaleable font	Yes	Yes	Yes	Yes	Yes	Yes
User-definable characters	256	256	256	256	256	256
Keys						
Numeric keypad	–	Yes	Yes	Yes	Yes	Yes
F-keys (with LED), labelling facility	4	12	12	9	23	23
Total number of user-programmable keys	11	35	35	27	46	46
Electromechanical keypads can be fitted	–	–	–	–	–	Yes
User LEDs	4	13	13	21	24	32
Touch function	–	–	–	–	–	–

	M14-...	110-KG2	110-KG1	140-KF1	140-KI1	140-KJ1
Memory						
Flash project memory	512 kb	512 kb	512 kb	512 kb	512 kb	512 kb
Recipe memory	–	–	16 kb	16 kb	16 kb	16 kb
Project memory expansion	–	512 kb	512 kb	–	512 kb	512 kb
Special features						
Battery	–	–	Yes	Yes	Yes	Yes
Number of alarm messages	256	256	1024	1024	1024	1024
Number of history memory messages	–	–	256	256	256	256
Number of variables per page	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Password	Yes	Yes	Yes	Yes	Yes	Yes
Real-time clock	Yes, without back-up	–	Yes	Yes	Yes	Yes
Screen saver	–	–	–	–	–	–
Buzzer	–	–	–	–	–	–
Printer port	–	–	Yes	Yes	Yes	Yes

	M14-...	110-KG2	110-KG1	140-KF1	140-KI1	140-KJ1
Ports						
RS232C/RS485 combination port for:						
- Sucom A	Yes	Yes	Yes	Yes	Yes	Yes
- Configuration	Yes	Yes	-	-	-	-
RS232C port for:						
- Configuration	-	-	Yes	Yes	Yes	Yes
- Printer connection	-	-	Yes	Yes	Yes	Yes
1 fieldbus interface, plug-in modules for:						
- Suconet K	Yes	Yes	Yes	Yes	Yes	Yes
- PROFIBUS-DP	Yes	Yes	Yes	No	Yes	Yes
- Siemens MPI	Yes	Yes	Yes	Yes	Yes	Yes
- DeviceNet	Yes	Yes	Yes	No	Yes	Yes
- CANopen	Yes	Yes	Yes	No	Yes	Yes
Power supply						
Rated voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Permissible range (V DC)	18 to 30	18 to 30	18 to 30	18 to 30	18 to 30	18 to 30
Reverse polarity protection	Yes	Yes	Yes	Yes	Yes	Yes
Rated current	250 mA	300 mA	300 mA	300 mA	400 mA	400 mA
Fuses	Electronic	Electronic	Electronic	Electronic	Electronic	Electronic

	M14-...	110-KG2	110-KG1	140-KF1	140-KI1	140-KJ1
	110-KC1	110-KG2	110-KG1	140-KF1	140-KI1	140-KJ1
General						
Weight in kg	1	1.1	1.1	1.5 incl. cable	2	2
Degree of protection (front) IP65	Yes	Yes	Yes	Yes	Yes	Yes
Ambient temperature in °C	0 – 50	0 – 50	0 – 50	0 – 50	0 – 50	0 – 50
Storage temperature in °C	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70
Keyboard lifespan (keystrokes)	> 3 million	> 3 million	> 3 million	> 3 million	> 3 million	> 3 million
Touchscreen lifespan (operations)	–	–	–	–	–	–
Cable cross-section in mm ²	1 x 1.5	1 x 1.5	1 x 1.5	Open cable end	1 x 1.5	1 x 1.5
Connection type, plug-in screw terminal	Yes	Yes	Yes	–	Yes	Yes
Dimensions in mm	149 x 109 x 60	141 x 176 x 76	141 x 176 x 76	116 x 239 x 102	220 x 176 x 71	275 x 220 x 77

Graphic operator panels

	M14-151-KF1	M14-451-KF1	M14-150-K11	M14-450-K11
Display	Monochr. LCD	Colour LCD-STN	Monochrome LCD	Colour LCD-STN
Backlighting	CCFL	CCFL	CCFL	CCFL
Contrast adjustment	Autom.	Autom.	Software	Software
Graphics capability	Yes	Yes	Yes	Yes
Number of colours/grey levels	–	16	–	16
Rows x characters	16 x 40	16 x 40	16 x 40	16 x 40
Resolution in pixels	320 x 240	320 x 240	320 x 240	320 x 240
Display dimensions in mm	121 x 91/5.6"	121 x 91/5.6"	121 x 91/5.6"	121 x 91/5.6"
Scaleable font	Yes	Yes	Yes	Yes
User-definable characters	256	256	256	256
Keys				
Numeric keypad	Yes	Yes	Yes	Yes
F-keys (with LED), labelling facility	10	10	33 (24 – 33 no LED)	
Total number of user-programmable keys	37	37	56	56
User LEDs	10	10	24	24
Touch function	–	–	–	–
Memory				
Flash project memory	512 kb (64 kb reserved for protocol)	8 MB SSFDC card	8 MB SSFDC card	8 MB SSFDC card
Recipe memory	32 kb	32 kb	32 kb	32 kb
Project memory expansion	512 kb	512 kb	–	–

	MI4-151-KF1	MI4-451-KF1	MI4-150-K11	MI4-450-K11
Special features				
Battery	Yes	Yes	Yes	Yes
Number of alarm messages	1024	1024	1024	1024
Number of history memory messages	1024	1024	1024	1024
Number of variables per page	Unlimited	Unlimited	Unlimited	Unlimited
Password	Yes	Yes	Yes	Yes
Real-time clock	Yes	Yes	Yes	Yes
Screen saver	Yes	Yes	Yes	Yes
Buzzer	–	–	–	–
Printer port	Yes	Yes	Yes	Yes
Ports				
RS232C/RS485 combination port for:				
- Sucom A	Yes	Yes	Yes	Yes
- Configuration	–	–	–	–
RS232C port for:				
- Configuration	Yes	Yes	Yes	Yes
- Printer connection	Yes	Yes	Yes	Yes
1 fieldbus interface, plug-in modules for:				
- Suconet K	Plugged in	Plugged in	Yes	Yes
- PROFIBUS-DP	Yes	Yes	Yes	Yes
- Siemens MPI	Yes	Yes	Yes	Yes
- DeviceNet	Yes	Yes	Yes	Yes

	MI4-151-KF1	MI4-451-KF1	MI4-150-K11	MI4-450-K11
- CANopen	Yes	Yes	Yes	Yes
Power supply				
Rated voltage	24 V DC	24 V DC	24 V DC	24 V DC
Permissible range	20.4 to 28.8 V DC	20.4 to 28.8 V DC	18 to 30 V DC	18 to 30 V DC
Reverse polarity protection	Yes	Yes	Yes	Yes
Rated current	500 mA	500 mA	600 mA	600 mA
Fuses	2 A replaceable	2 A replaceable	2 A replaceable	2 A replaceable
General				
Weight in kg	1.4	1.4	1.9	1.9
Degree of protection (front) IP65	Yes	Yes	Yes	Yes
Ambient temperature in °C	0 – 50	0 – 50	0 – 50	0 – 50
Storage temperature in °C	-20 to +70	-20 to +70	-20 to +70	-20 to +70
Keyboard lifespan (keystrokes)	> 3 million	> 3 million	> 3 million	> 3 million
Touchscreen lifespan (operations)	–	–	–	–
Cable cross-section in mm ²	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5
Connection type (plug-in screw terminal)	Yes	Yes	Yes	Yes
Dimensions W x H x D in mm	216 x 168 x 74	216 x 168 x 74	275 x 220 x 80	275 x 220 x 80

Touch operator panels

		MI4-...							
		151-TA1/ 451-TA1	161-TC1	471-TC1	150-TA1/ 450-TA1/ 550-TA1	160-TA1	470-TA1/ 570-TA1/	580-TA1	590-TA1
Display		Monochr. LCD/ colour LCD STN	Monochrome LCD	Colour LCD TFT	Monochr. LCD/ colour LCD STN/colour LCD TFT	Monochr. LCD	Color LCD STN/colour LCD TFT	Colour LCD TFT	Colour LCD TFT
Backlighting		CCFL	CCFL	CCFL	CCFL	CCFL	CCFL	CCFL	CCFL
Contrast adjustment		Autom.	Software	Software	Software/ Software/-	Software	Software/-	-	-
Graphics capability		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of colours/grey levels		-/16	256	256	-/16/256	-	256	256	256
Rows x characters		16 x 40	25 x 80	30 x 80	16 x 40	30 x 80	30 x 80	40 x 100	48 x 128
Resolution in pixels		320 x 240	640 x 400	640 x 480	320 x 240	640 x 480	640 x 480	800 x 600	1024 x 768
Display dimensions in mm		121 x 91/ 5.6"	194 x 121 9.6"	212 x 159 10.4"	121 x 91/ 5.6"	196 x 147.6/ 9.6"	218 x 159/ 10.4"	246 x 184/ 12.1"	304 x 228/ 15"
Scaleable font		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
User-definable characters		256	256	256	256	256	256	256	256
Keys									
Numeric keypad		-	-	-	-	-	-	-	-
F-keys (with LED), labelling facility		-	2	2	-	-	-	-	-

	MI4-...							
	151-TA1/ 451-TA1	161-TC1	471-TC1	150-TA1/ 450-TA1/ 550-TA1	160-TA1	470-TA1/ 570-TA1/	580-TA1	590-TA1
Total no. of user-programmable keys	-	9	9	-	-	-	-	-
User LEDs	-	3	3	-	-	-	-	-
Touch function	Resistive	Resistive	Resistive	Resistive	Resistive	Resistive	Resistive	Resistive
Memory								
Flash project memory	512 kb	512 kb	8 MB SSFDC card	8 MB SSFDC card	8 MB SSFDC card	8 MB SSFDC card	8 MB SSFDC card	8 MB SSFDC card
	64 kb reserved for protocol)							
Recipe memory	32 kb	32 kb	32 kb	32 kb	32 kb	32 kb	32 kb	32 kb
Project memory expansion ¹	512 kb	512 kb	512 kb	-	-	-	-	-
Special features								
Battery ²	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of alarm messages	1024	1024	1024	1024	1024	1024	1024	1024
Number of history memory messages	1024	1024	1024	1024	1024	1024	1024	1024
Number of variables per page	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Password	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Real-time clock	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Screen saver	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Buzzer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Printer port	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

MI4-...		151-TA1/ 451-TA1	161-TC1	471-TC1	150-TA1/ 450-TA1/ 550-TA1	160-TA1	470-TA1/ 570-TA1/	580-TA1	590-TA1
Ports									
RS232C/RS485 combination port for:									
- Sucom A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Configuration	-	-	-	-	-	-	-	-	-
RS232C port for:									
- Configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Printer connection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1 fieldbus interface, plug-in modules for:									
- Suconet K	Plugged in	Plugged in	Plugged in	Plugged in	Yes	Yes	Yes	Yes	Yes
- PROFIBUS-DP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Siemens MPI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- DeviceNet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- CANopen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power supply									
Rated voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Permissible range (V DC)	20.4 to 28.8	20.4 to 28.8	20.4 to 28.8	20.4 to 28.8	18 to 30	18 to 30	18 to 30	18 to 30	18 to 30
Reverse polarity protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rated current	500 mA	600 mA	1000 mA	1000 mA	600 mA	600 mA	700	800	1200 mA
Fuses	2 A replaceable				Electronic	Electronic	Electronic	Electronic	Electronic

		MI4-...							
		151-TA1/ 451-TA1	161-TC1	471-TC1	150-TA1/ 450-TA1/ 550-TA1	160-TA1	470-TA1/ 570-TA1/	580-TA1	590-TA1
General									
Weight in kg	1.4	2.7	2.7	2.7	1.4	2.25	2.25	2.85	3.85
Degree of protection (front) IP65	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ambient temperature	0 – 50 °C	0 – 50 °C	0 – 50 °C	0 – 50 °C	0 – 45 °C	0 – 45 °C	0 – 45 °C	0 – 45 °C	0 – 45 °C
Storage temperature in °C	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70	-20 to +70
Keyboard lifespan (keystrokes)	-	-	-	-	-	-	-	-	-
Touchscreen lifespan (operations)	> 1 million	> 1 million	> 1 million	> 1 million	> 3 million	> 3 million	> 3 million	> 3 million	> 3 million
Cable cross-section in mm ²	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5	1 x 1.5
Connection type (plug-in screw terminal)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions W x H x D in mm	216 x 168 x 74	311 x 220 x 80	311 x 220 x 80	311 x 220 x 80	187 x 147 x 96	287 x 232 x 96	287 x 232 x 96	337 x 267 x 96	392 x 307 x 106

- 1 Upgradeable with ZB4-512-SF1 memory module
- 2 3 V lithium, non-rechargeable, lifespan about 1 year, replaceable, replacement item ZB4-280-BT1

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