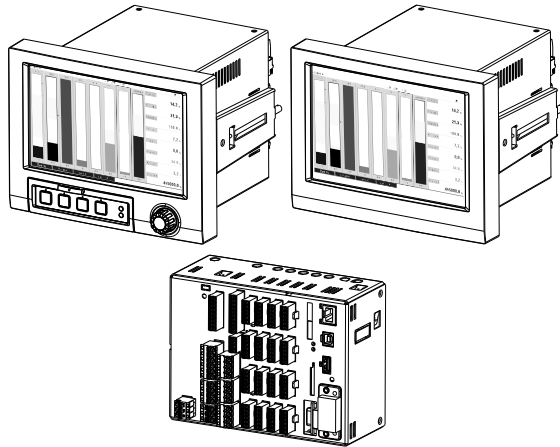


Brief Operating Instructions

Memograph M, RSG45

Advanced Data Manager

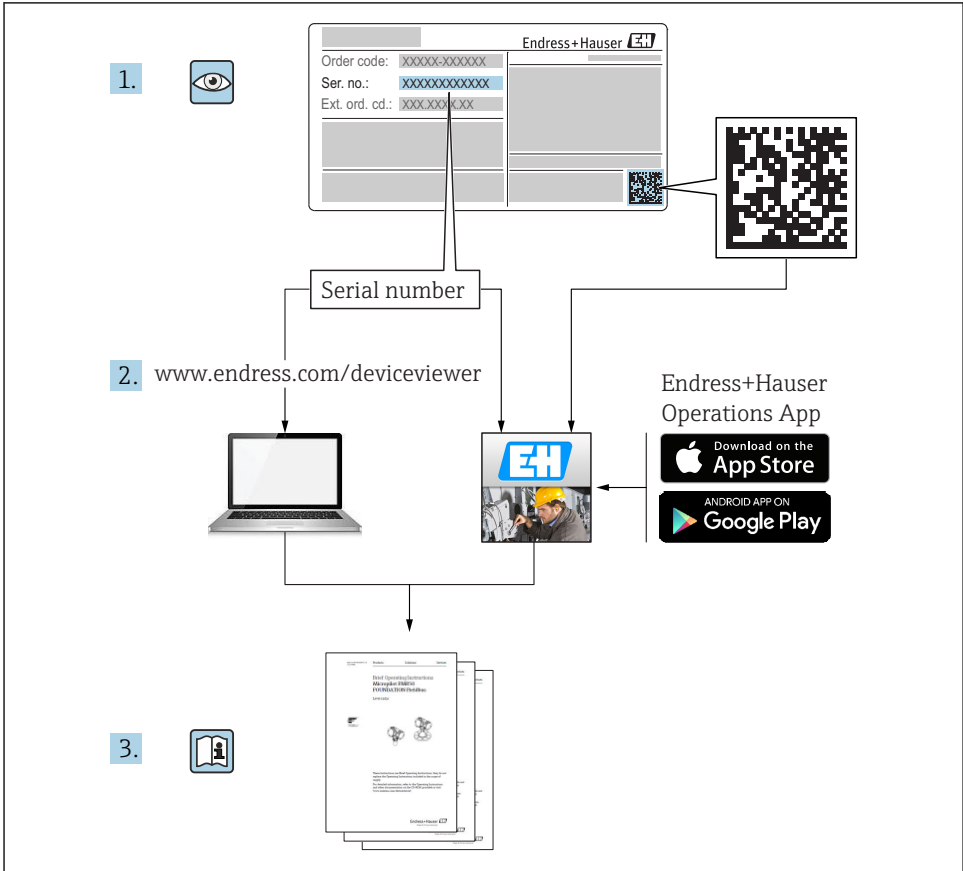


These Instructions are Brief Operating Instructions; they are not a substitute for the Operating Instructions pertaining to the device.

For detailed information, refer to the Operating Instructions and other documentation.

Available for all device versions via:

- Internet: www.endress.com/deviceviewer
- Smart phone/Tablet: Endress+Hauser Operations App



A0023555

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1 Document information

1.1 Document function





These instructions contain all the essential information from incoming acceptance to initial commissioning.

Integrated Operating Instructions











At the push of a button, the device displays operating instructions directly on the screen. This manual complements the operating instructions in the device and explains what is not directly described in the operating instructions.

1.2 Symbols used




1.2.1 Safety symbols

Symbol	Meaning
	DANGER! This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
	WARNING! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
	CAUTION! This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
	NOTE! This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Symbols for certain types of information

Symbol	Meaning	Symbol	Meaning
	Permitted Procedures, processes or actions that are permitted.		Preferred Procedures, processes or actions that are preferred.
	Forbidden Procedures, processes or actions that are forbidden.		Tip Indicates additional information.
	Reference to documentation.		Reference to page.
	Reference to graphic.		Series of steps.
	Result of a step.		Visual inspection.

1.2.3 Symbols in graphics

Symbol	Meaning
1, 2, 3,...	Item numbers
1. 2. 3. ...	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections
 A0013441	Flow direction
 A0011187	Hazardous area Indicates a hazardous area.
 A0011188	Safe area (non-hazardous area) Indicates a non-hazardous area.

1.3 Terminology

To improve clarity, abbreviations or synonyms are used in these instructions for the following terms:

- Endress+Hauser:
Term used in these instructions: "Manufacturer" or "Supplier"
- Memograph M RSG45:
Term used in these instructions: "Device" or "Measuring device"

1.4 Registered trademarks

HART®

Registered trademark of the HART FieldComm Group, Austin, USA

2 Basic safety instructions

Reliable and safe operation of the device is guaranteed only if the user reads these Operating Instructions and complies with the safety instructions they contain.



Requirements concerning operating staff to ensure compliance with FDA 21 CFR Part 11:

In order to fully comply with the requirements of 21 CFR Part 11, the operators/users must be properly trained.

2.1 Requirements concerning the staff

The staff must fulfill the following requirements for their tasks:

- ▶ Trained staff: Must have a qualification which corresponds to their function and tasks.
- ▶ Authorized by the plant operator.

- ▶ Familiar with the national regulations.
- ▶ Before starting their work: Must have read and understood all instructions in the operating manual and supplementary documentation as well as the certificate (depending on the application).
- ▶ Must comply with all instructions and the regulatory framework.

2.2 Designated use

This device is designed for the electronic capture, display, recording, analysis, remote transmission and archiving of analog and digital input signals.

- The manufacturer accepts no liability for damages resulting from incorrect use or use other than that designated. It is not permitted to convert or modify the device in any way.
- The device is designed for installation in a panel and must only be operated in an installed state.

2.3 Workplace safety

For work on and with the device:

- ▶ Wear the required personal protective equipment according to federal/national regulations.

2.4 Operational safety

Risk of injury.

- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for interference-free operation of the device.

Conversions to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers.

- ▶ If, despite this, modifications are required, consult with the manufacturer.

Repair

To ensure continued operational safety and reliability,

- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to repair of an electrical device.
- ▶ Use original spare parts and accessories from the manufacturer only.

Hazardous area

To eliminate a danger for persons or for the facility when the device is used in the hazardous area (e.g. explosion protection, pressure vessel safety):

- ▶ Based on the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area.
- ▶ Observe the specifications in the separate supplementary documentation that is an integral part of these Instructions.

2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EC directives listed in the device-specific EC Declaration of Conformity. The manufacturer confirms this by affixing the CE mark to the device.

2.6 Safety information for table version (option)

- The mains plug should only be inserted into a socket with a ground contact.
- The protective effect may not be suspended by an extension cable without a protective ground.
- Relay outputs: $U(\max) = 30 V_{\text{eff}}(\text{AC})/60 \text{ V}(\text{DC})$

2.7 IT security

The manufacturer only provides a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

3 Product description

3.1 Product design

This device is best suited for the electronic acquisition, display, recording, analysis, remote transmission and archiving of analog and digital input signals.

The device is intended for installation in a panel or cabinet. Operation in a desktop or field housing is possible as an option.

In addition, the "DIN rail" housing option is available for DIN rail mounting.

4 Incoming acceptance and product identification

4.1 Incoming acceptance

On receipt of the goods, check the following points:

- Is the packaging or the content damaged?
- Is the delivery complete? Compare the scope of delivery against the information on your order form.

4.2 Scope of delivery

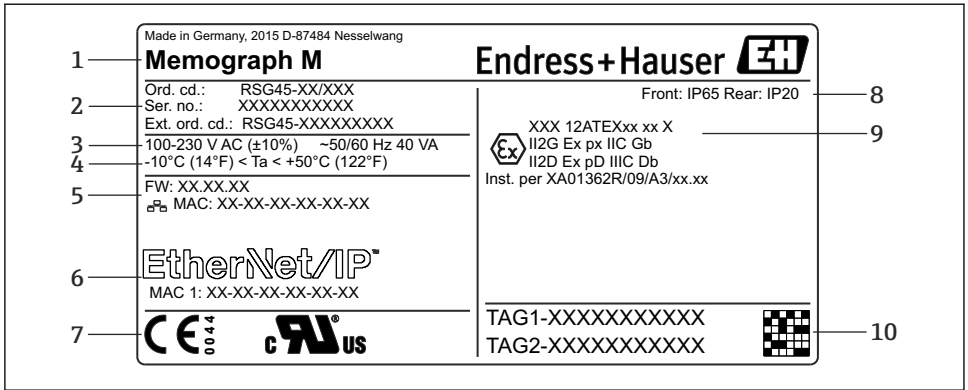
The scope of delivery of the device comprises:

- Device (with terminals, as per order)
- Panel-mounted device: 2 screw fastening clips
- Version with navigator and front interfaces or DIN rail version: USB cable
- Panel-mounted device: sealing rubber towards the panel wall
- "Industrial Grade" SD card, industry standard:
 - Panel-mounted device with navigator and front interfaces: card is located in the SD slot behind the flap on the front of the device (optional).
 - Panel-mounted device with stainless steel front and touchscreen: card is located in the device and cannot be replaced or retrofitted.
 - DIN rail version: card is located in the SD slot (optional).
- "Field Data Manager (FDM)" analysis software on DVD (Essential, Demo or Professional version, depending on order)
- Delivery note
- Multilanguage Brief Operating Instructions, hard copy
- Ex Safety Instructions, hard copy (optional)


4.3 Product identification

4.3.1 Nameplate

Compare the nameplate with the following diagram:



A0025806

 1 Device nameplate (example)

- 1 Device designation, manufacturer details
- 2 Order code, serial number, extended order code
- 3 Power supply, mains frequency and maximum power consumption
- 4 Ambient temperature range
- 5 Firmware version; MAC address (Ethernet)
- 6 Fieldbus interface with MAC address (optional)
- 7 Device approvals
- 8 Degree of protection of the device
- 9 Approval in hazardous area (optional) with number of the relevant Ex documentation (XA...)
- 10 TAG name (optional); 2D-matrix code

4.4 Storage and transport

Compliance with the permitted environmental and storage conditions is mandatory. For precise specifications, see the "Technical data" section of the Operating Instructions.

Please note the following:

- Pack the device so that is protected against impact for storage and transport. The original packaging provides optimum protection.
- The permitted storage temperature is -20 to +60 °C (-4 to +140 °F).

5 Installation


5.1 Installation conditions

NOTICE

Overheating due to buildup of heat in the device

- ▶ To avoid heat buildup, always ensure that the device is sufficiently cooled.

The device is designed for use in a panel or in the control cabinet.

 The device must be installed in a pressurized enclosure system for operation in the hazardous area. To ensure safe installation, it is essential to follow the installation instructions for the cabinet and the installation instructions in the Ex-related Safety Instructions (XA).


- Ambient temperature range: -10 to +50 °C (14 to 122 °F)
- Climate class as per IEC 60654-1: Class B2
- Degree of protection: IP65, NEMA 4 at front / IP20 rear of housing

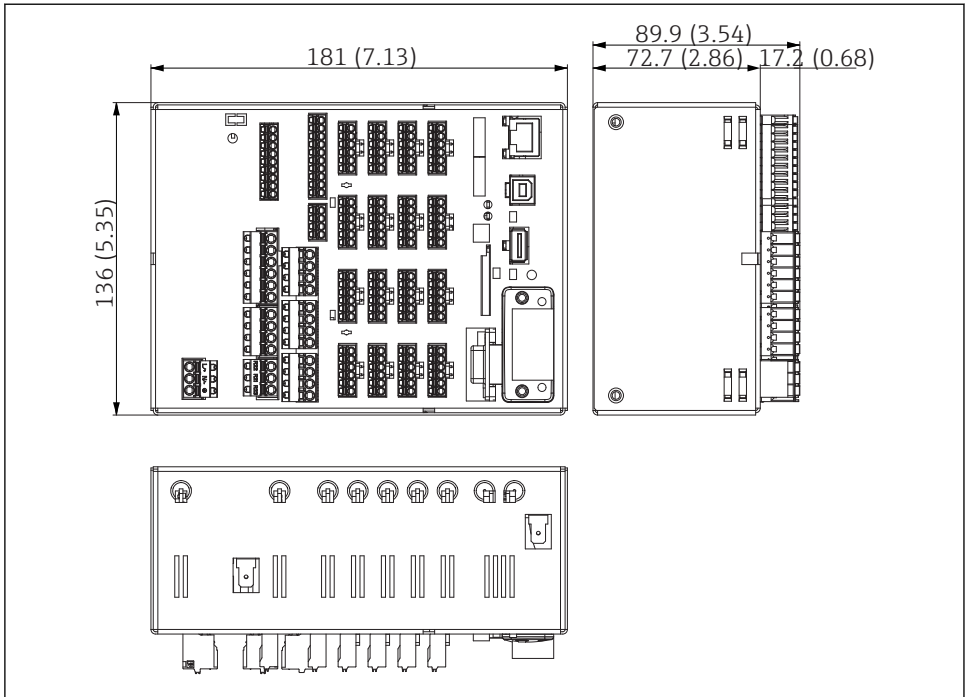
5.1.1 Installation dimensions for the panel-mounted device

- Installation depth (excluding terminal cover): approx. 159 mm (6.26 in) for device incl. terminals and fastening clips.
- Installation depth including terminal cover (option): approx. 198 mm (7.8 in)
- Panel cutout: 138 to 139 mm (5.43 to 5.47 in) x 138 to 139 mm (5.43 to 5.47 in)
- Panel thickness: 2 to 40 mm (0.08 to 1.58 in)
- viewing angle range: 50° in all directions from the display central axis
- A minimum distance of 12 mm (0.47 in) between the devices must be observed if aligning the devices vertically above one another or horizontally beside one another.
- The grid dimension of the panel cutouts for multiple devices must be at least 208 mm (8.19 in) horizontally and at least 162 mm (6.38 in) vertically (tolerance not considered).
- Securing to DIN 43 834

5.1.2 Mounting location and installation dimensions for the DIN rail version

The device without a display is designed for DIN rail mounting.

 The DIN rail device is **not** approved for operation in the hazardous area.



A0036528

2 DIN rail version, dimensions in mm (in).

Installation dimensions

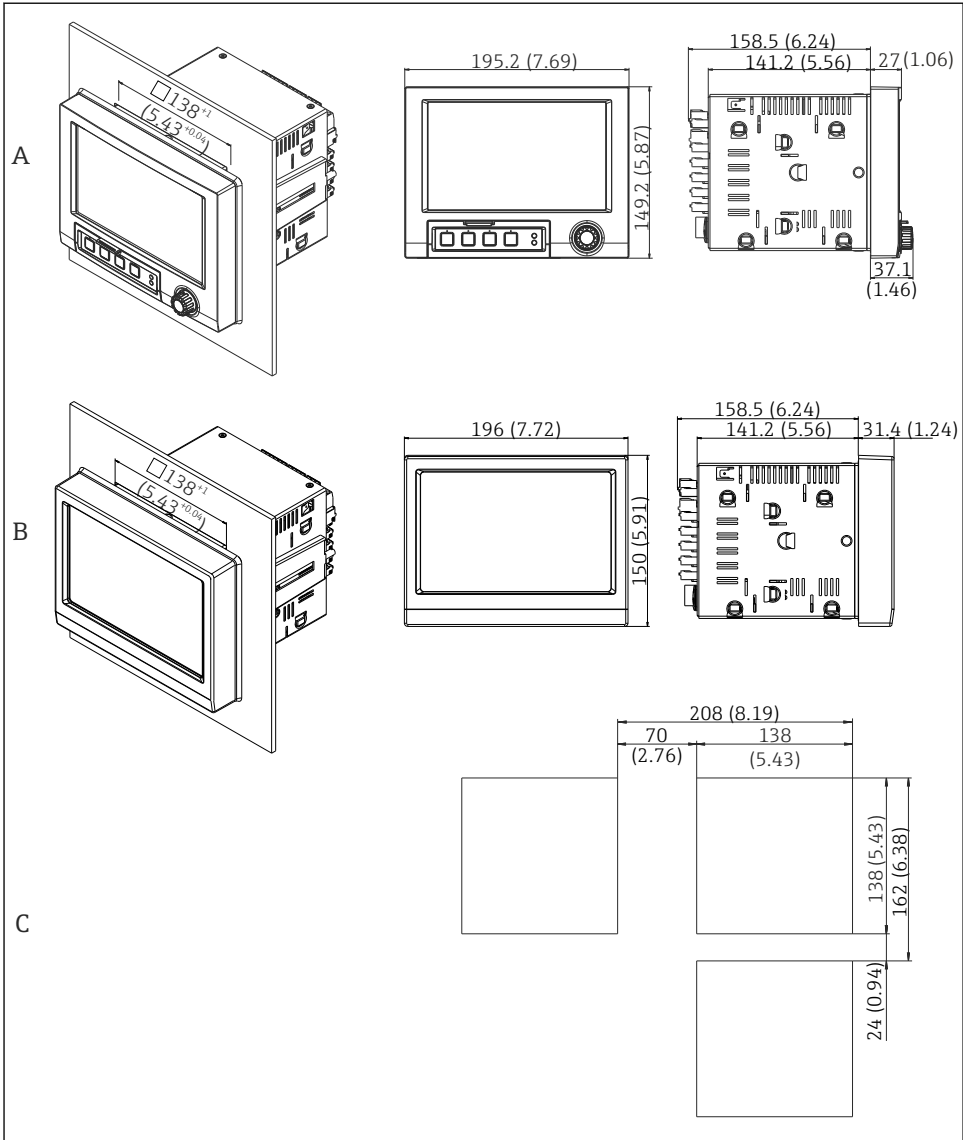
- Installation depth: approx. 90 mm (3.54 in) for device incl. terminals.
- Secured on DIN rail as per IEC 60715
- The devices can be arranged horizontally beside one another without clearance between the devices.

5.2 Mounting the measuring device

5.2.1 Mounting the panel-mounted device



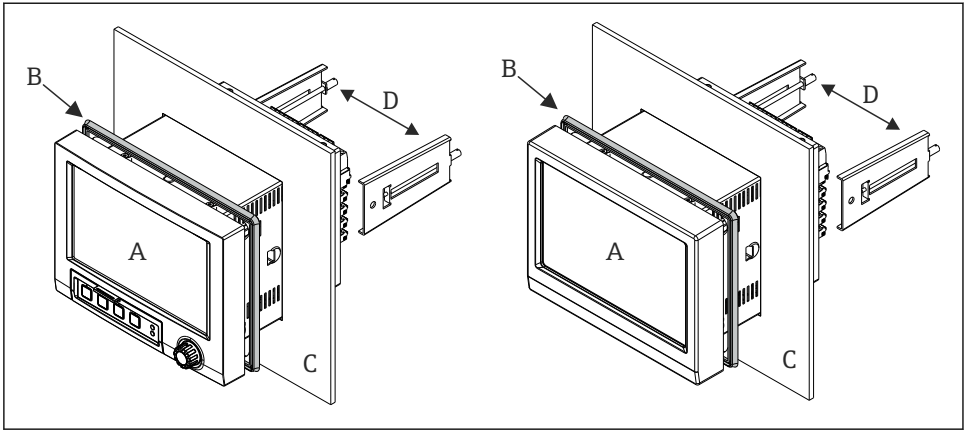
Mounting tool: For installation in the panel, all you need is a screwdriver.



A0024610

3 Panel cutout and dimensions in mm (in).

- A Version with navigator and front interfaces
- B Version with stainless steel front and touchscreen
- C Grid dimensions of panel cutouts for multiple devices

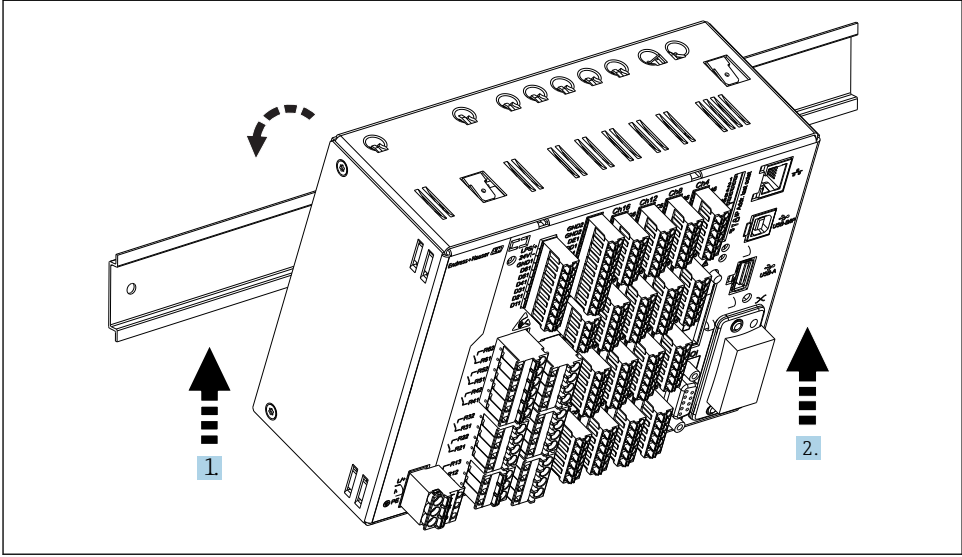


A0026672

4 Panel mounting

1. From the rear of the device, push the sealing rubber (B) (supplied) as far as the front frame of the device (A).
2. Slide the device (A) through the panel cutout from the front (C). To avoid the buildup of heat, maintain a distance of >12 mm (>0.47 in) from walls and other devices.
3. Hold the device (A) level and hook the fastening clips (D) into the openings (1 x left, 1 x right).
4. Evenly tighten the screws on the fastening clips (D) using a screwdriver to guarantee a secure seal to the panel (torque: 100 Ncm).

5.2.2 Mounting and disassembling the DIN rail version



A0036761

5 DIN rail version

1. Set the device on the top-hat rail from below.
2. Swivel the device into the end position by pushing the device gently upwards and turning it towards the carrier rail
3. Lower the device gently to release it. The device is now engaged on the DIN rail.

Disassembly is the reverse of the assembly sequence.

5.3 Post-installation check

Panel-mounted device:

- Is the sealing ring undamaged?
- Does the seal run all around the housing collar?
- Are the fastening clips tightened?
- Is the device fixed firmly in the center of the panel cutout?

DIN rail version:

Check that the device is firmly seated on the DIN rail

6 Electrical connection

6.1 Connection conditions

WARNING

Danger! Electric voltage!

- ▶ The entire connection of the device must take place while the device is de-energized.
- ▶ The mixed connection of safety extra-low voltage and dangerous contact voltage to the relay is **not** permitted.
- ▶ Apart from the relays and the supply voltage, only energy-limited circuits according to IEC/EN 61010-1 may be connected.

Danger if protective ground is disconnected

- ▶ The ground connection must be made before all other connections.

NOTICE

Cable heat load

- ▶ Use suitable cables for temperatures of 5 °C (9 °F) above ambient temperature.

Incorrect supply voltage can damage the device or cause malfunctions

- ▶ Before commissioning the device, make sure that the supply voltage matches the voltage specifications on the nameplate.

Check emergency shutdown for device

- ▶ Provide suitable switch or circuit breaker in building installation. This switch must be provided close to the device (within easy reach) and marked as a circuit breaker.

Protect the device from overload

- ▶ Provide overload protection (nominal current = 10 A) for power cable.

Incorrect wiring may result in the device being destroyed

- ▶ Note terminal designation on the rear of the device.

Energy-rich transients in the case of long signal lines

- ▶ Install suitable overvoltage protection (e.g. E+H HAW562) upstream.



Special requirements according to FDA 21 CFR Part 11:

- The user must have the appropriate skills and qualifications to connect the device. Connection errors can only be prevented in this way.
- The user is responsible for selecting the right input ranges and for connecting suitable sensors.
- Users must ensure that the connected sensors cannot be tampered with by making sure they are suitably mounted and wired.
- An optional terminal cover is available to prevent tampering at the device terminals and terminal temperature measurement. It is the responsibility of the user to verify that the device is correctly installed and sealed following validation.
- The user is responsible for compliance with the EMC limit values at the installation location (see technical data).

6.2 Connection instructions


6.2.1 Cable specification

Cable specification, spring terminals

All connections on the rear of the device are designed as pluggable screw or spring terminal blocks with reverse polarity protection. This makes the connection very quick and easy. The spring terminals are unlocked with a slotted screwdriver (size 0).

Please note the following when connecting:

- Wire cross-section, auxiliary voltage output, digital I/O and analog I/O: max. 1.5 mm² (14 AWG) (spring terminals)
- Wire cross-section, mains: max. 2.5 mm² (13 AWG) (screw terminals)
- Wire cross-section, relays: max. 2.5 mm² (13 AWG) (spring terminals)
- Stripping length: 10 mm (0.39 in)

 No ferrules must be used when connecting flexible wires to spring terminals.

Shielding and grounding


Optimum electromagnetic compatibility (EMC) can only be guaranteed if the system components and, in particular, the lines - both sensor lines and communication lines - are shielded and the shield forms as complete a cover as possible. A shielded line must be used for sensor lines that are longer than 30 m. A shield coverage of 90% is ideal. In addition, make sure not to cross sensor lines and communication lines when routing them. Connect the shield as often as possible to the reference ground to ensure optimum EMC protection for the different communication protocols and the connected sensors.

To comply with requirements, three different types of shielding are possible:

- Shielding at both ends
- Shielding at one end on the supply side with capacitance termination at the device
- Shielding at one end on the supply side

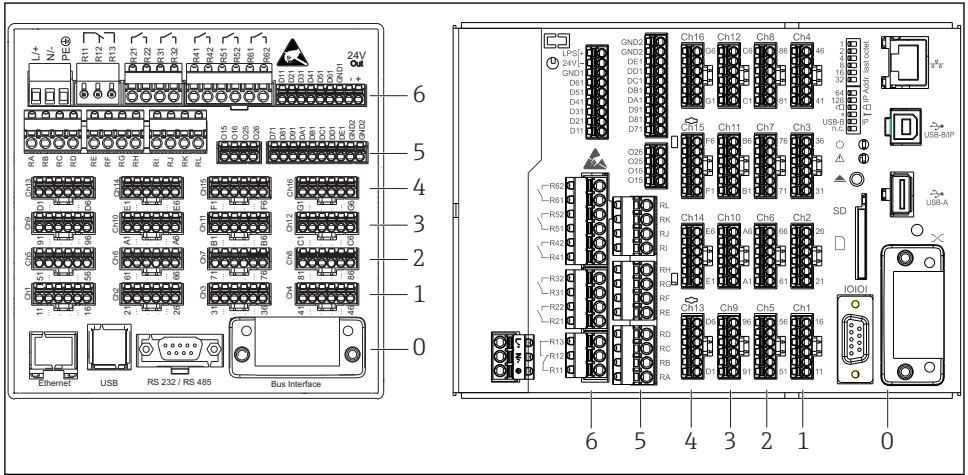
Experience shows that the best results with regard to EMC are achieved in most cases in installations with one-sided shielding on the supply side (without capacitance termination at the device). Appropriate internal device wiring measures must be taken to allow unrestricted operation when EMC interference is present. These measures have been taken into account for this device. Operation in the event of disturbance variables as per NAMUR NE21 is thus guaranteed.

Where applicable, national installation regulations and guidelines must be observed during the installation! Where there are large differences in potential between the individual grounding points, only one point of the shielding is connected directly with the reference ground.

 If the shielding of the cable is grounded at more than one point in systems without potential matching, mains frequency equalizing currents can occur. These can damage the signal cable or significantly impact signal transmission. In such cases the shielding of the signal cable is to be grounded on one side only, i.e. it may not be connected to the ground terminal of the housing. The shield that is not connected should be insulated!

6.3 Connecting the measuring device

6.3.1 Connections



A0024605

6 Connections: back of device, panel version (left), DIN rail version (right)

- 6 Slot 6: Power supply with relays
- 5 Slot 5: Multifunction card or HART® card (channels 17-20) or digital card
- 4 Slot 4: Multifunction card or HART® card (channels 13-16)
- 3 Slot 3: Multifunction card or HART® card (channels 9-12)
- 2 Slot 2: Multifunction card or HART® card (channels 5-8)
- 1 Slot 1: Multifunction card or HART® card (channels 1-4)
- 0 Slot 0: CPU card with interfaces

6.3.2 Electrical connection, terminal assignment

i All connection examples are illustrated using the panel version. The connections on the DIN rail version are identical.

Supply voltage (power unit, slot 6)

Power unit type	Terminal		
	A0019103		
100-230 VAC	L+	N-	PE
	Phase L	Zero conductor N	Ground
24 V AC/DC	L+	N-	PE
	Phase L or +	Zero conductor N or -	Ground

Relay (power unit, slot 6)

Type	Terminal (max. 250 V, 3 A)				
	A0019103				
Alarm relay 1	R11	R12	R13		
	Changeover contact	Normally closed contact (NC) ¹⁾	Normally open contact (NO) ²⁾		
Relay 2 to 6				Rx1	Rx2
				Switching contact	Normally open contact (NO ²⁾)

- 1) NC = normally closed (breaker)
- 2) NO = normally open (maker)

i The open or close function (= activation or deactivation of the relay coil) in a limit event can be configured in the setup: "Setup -> Advanced setup -> Outputs -> Relay -> Relay x". However, in the event of a power failure, the relay adopts its quiescent switch state regardless of the setting programmed.

Digital inputs; auxiliary voltage output (power unit, slot 6)

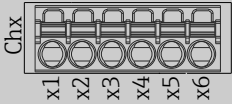
Type	Terminal			
Digital input 1 to 6	D11 to D61	GND1		
	Digital input 1 to 6 (+)	Ground (-) for digital inputs 1 to 6		
Auxiliary voltage output, not stabilized, max. 250 mA			24V Out -	24V Out +
			- Ground	+ 24V ($\pm 15\%$)

i If the auxiliary voltage is to be used for the digital inputs, the **24 V out -** terminal of the auxiliary voltage output must be connected with the **GND1** terminal.

Analog inputs (slot 1-5)

The first digit (x) of the two-digit terminal number corresponds to the associated channel:

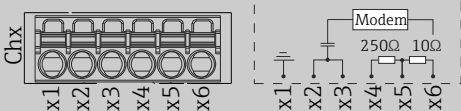
Type	Terminal					
	x1	x2	x3	x4	x5	x6
Current/pulse/frequency input ¹⁾					(+)	(-)
Voltage > 1V		(+)				(-)
Voltage ≤ 1V				(+)		(-)
Resistance thermometer RTD (2-wire)	(A)					(B)
Resistance thermometer RTD (3-wire)	(A)			b (sense)		(B)


Type	Terminal					
						
	A0019303					
Resistance thermometer RTD (4-wire)	(A)		a (sense)	b (sense)		(B)
Thermocouples TC				(+)		(-)

1) If a universal input is used as a frequency or pulse input, a series resistor must be used in series connection with the voltage source. Example: 1.2 kΩ series resistor at 24 V

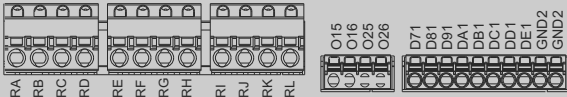
HART® inputs (slot 1-5)

The first digit (x) of the two-digit terminal number corresponds to the associated channel:

Type	Terminal					
						
	A0024862					
	x1	x2	x3	x4	x5	x6
HART® (4 to 20 mA)	SHD	H_1	H_2	R _{com}	I+	I-

-  A 250 Ω communication resistor (load) is installed on the device side between terminals x4 and x5.
- A 10 Ω resistor (shunt) is installed on the device side at the current input between terminals x5 and x6.
- Terminals x2 and x3 (H_1 and H_2) are jumpered internally.
- The internal HART® modem is located between terminals x2/x3 and x6.

Relay extension (digital card, slot 5)

Type	Terminal (max. 250 V, 3 A)				
					
	A0024736				
Relay 7, 8	RA	RB	RC	RD	
Relay 9, 10	RE	RF	RG	RH	

Type	Terminal (max. 250 V, 3 A)			
Relay 11, 12	RI	RJ	RK	RL
	Switching contact	Normally open contact ⁽¹⁾	Switching contact	Normally open contact ⁽²⁾

- 1) NO)
- 2) NO)

i The open or close function (= activation or deactivation of the relay coil) in a limit event can be configured in the setup: "Setup -> Advanced setup -> Outputs -> Relay -> Relay x". However, in the event of a power failure, the relay adopts its quiescent switch state regardless of the setting programmed.

Analog outputs (digital card, slot 5)

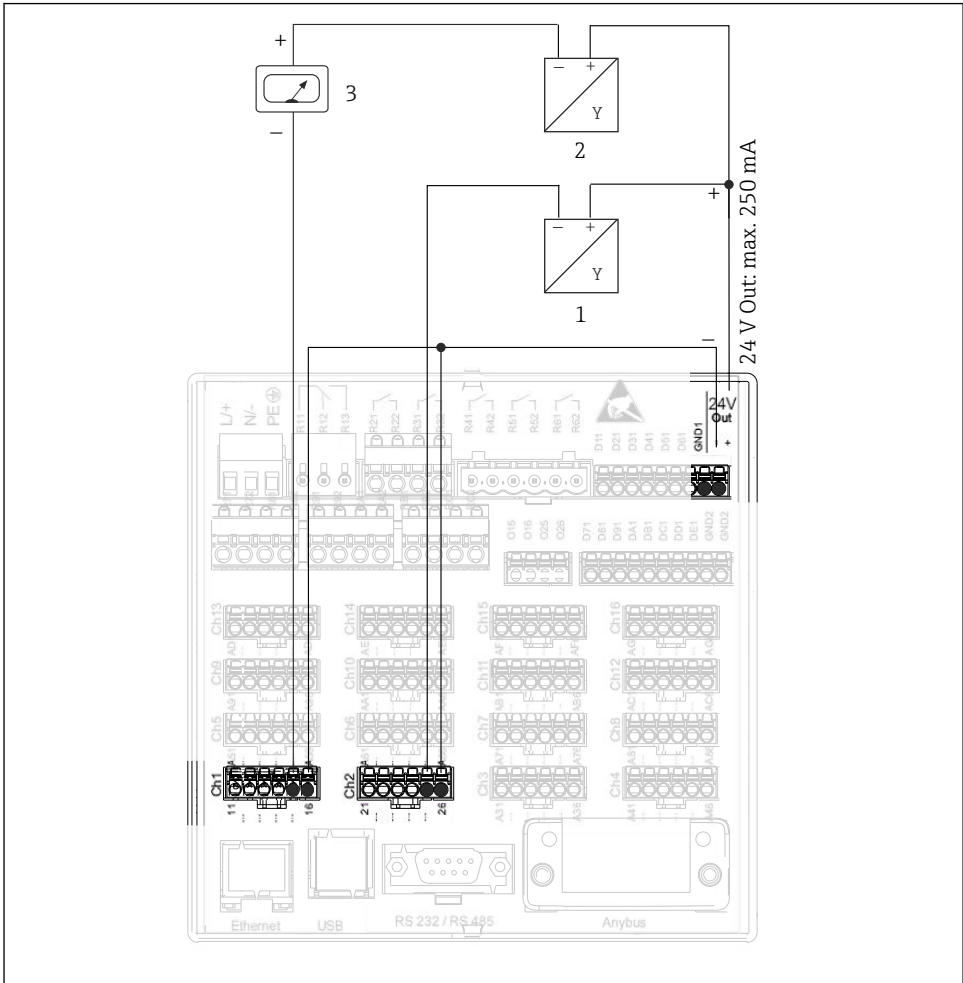
Type	Terminal			
Analog output 1-2	O15	O16	O25	O26
	Analog output 1 (+)	Ground, analog output 1 (-)	Analog output 2 (+)	Ground, analog output 2 (-)

Extension of digital inputs (digital card, slot 5)

Type	Terminal		
Digital input 7 to 14	D71 to DE1	GND2	GND2
	Digital input 7 to 14 (+)	Ground (-) for digital inputs 7 to 14	Ground (-) for digital inputs 7 to 14

i If the auxiliary voltage is to be used for the digital inputs, the **24 V out** - terminal of the auxiliary voltage output (power unit, slot 6) must be connected with the **GND2** terminal.

6.3.3 Connection example: Auxiliary voltage output as transmitter power supply for 2-wire sensors

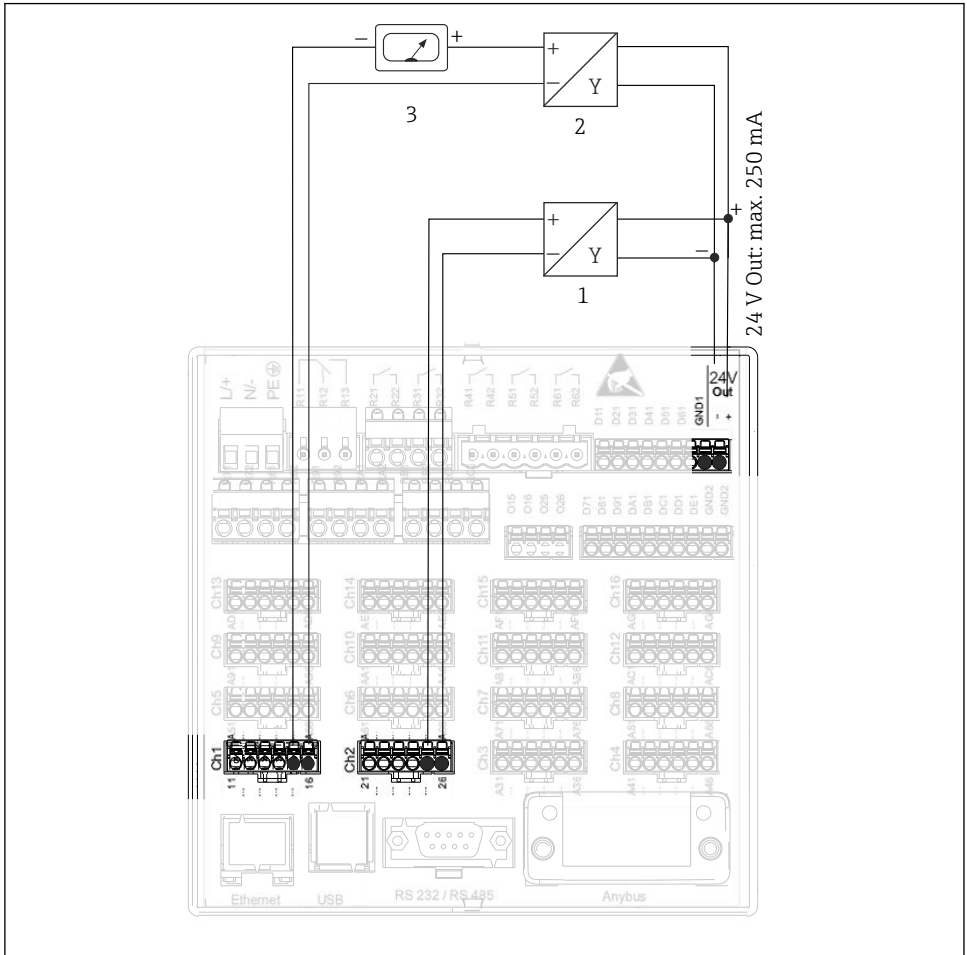


A0024729

7 Connecting the auxiliary voltage output when using as a transmitter power supply for 2-wire sensors in the current measuring range

- 1 Sensor 1 (e.g. Cerabar from Endress+Hauser)
- 2 Sensor 2
- 3 External indicator (optional) (e.g. RIA16 from Endress+Hauser)

6.3.4 Connection example: Auxiliary voltage output as transmitter power supply for 4-wire sensors

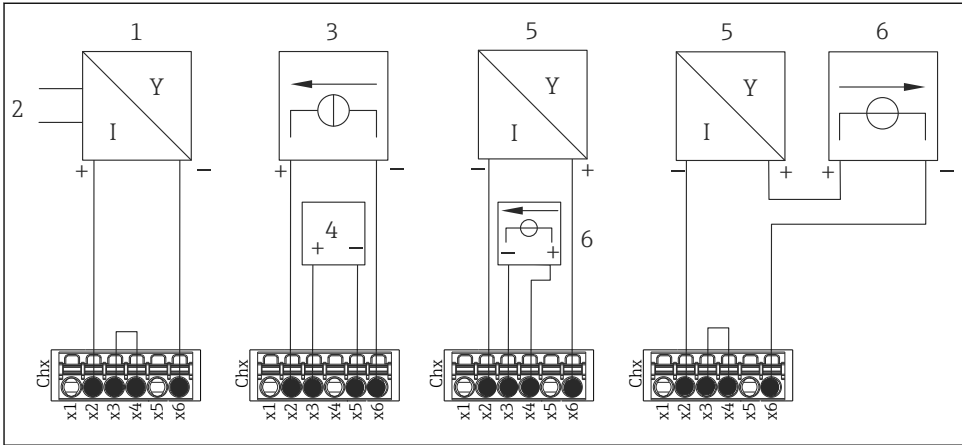


A0024730

8 Connecting the auxiliary voltage output when using as a transmitter power supply for 4-wire sensors in the current measuring range

- 1 Sensor 1 (e.g. temperature switch TTR31 from Endress+Hauser)
- 2 Sensor 2
- 3 External indicator (optional) (e.g. RIA16 from Endress+Hauser)

6.3.5 Connection example: HART® input in a point-to-point connection



A0024864

9 Connection example: HART® inputs in a point-to-point connection

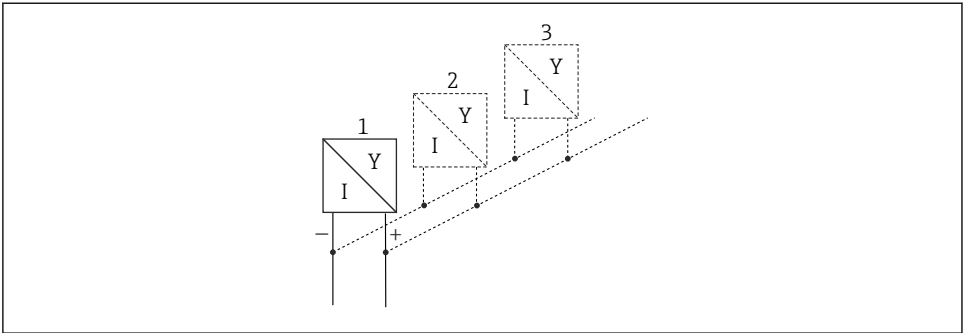
- 1 Active 4-wire sensor (slave)
- 2 Power supply for 4-wire sensor
- 3 Power supply (electricity source) for actuator
- 4 Actuator (e.g. adjuster or valve)
- 5 Passive 2-wire sensor (slave)
- 6 Power supply (voltage source) for sensor.

i The internal auxiliary voltage (24 V OUT) can also be used as the transmitter power supply.

6.3.6 Connection example: HART® input in a Multidrop connection

i Information on HART® Multidrop topology:

- The analog signal is not available for the process variable. Only the digital signal is used.
- Multidrop topology is **not** recommended for time-critical applications due to the slower update rate.
- The device supports a maximum of 5 sensors per current loop. The address should be in the 1 to 15 range (compatibility with HART®5).



A0024860

 10 Connection example: HART® input in a Multidrop connection

- 1 Sensor (slave 1)
- 2 Sensor (slave 2)
- 3 Sensor (slave 3-5)



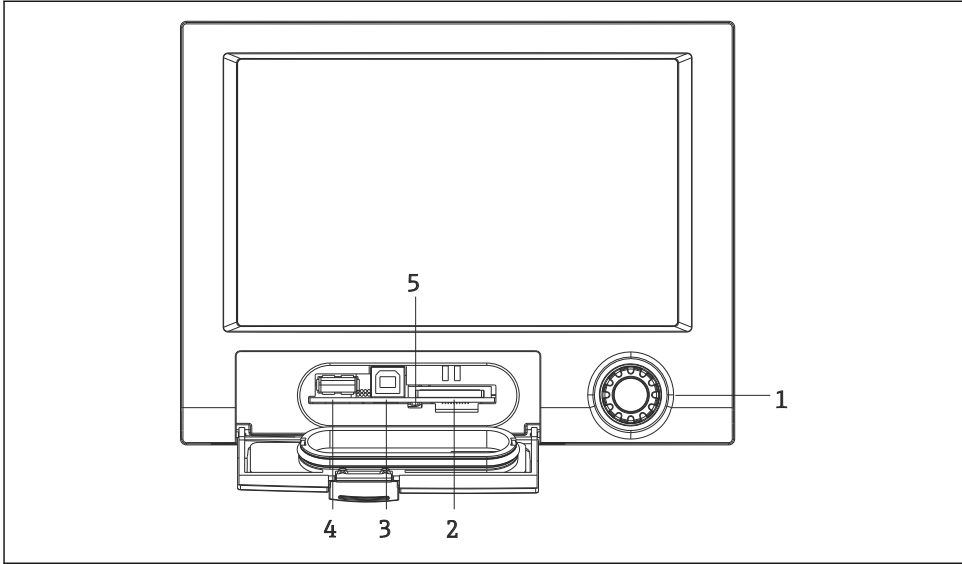
The internal auxiliary voltage (24 V OUT) can also be used as the transmitter power supply.

6.3.7 Connecting the interfaces (CPU card, slot 0)

Ethernet, RS232/RS485 and USB port

For details on connecting the interfaces, see the Operating Instructions.

6.3.8 Front of device (version with navigator and front interfaces)



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11 Version with navigator and front interfaces with open flap

- 1 Navigator
- 2 Slot for SD card
- 3 USB B socket "Function" e.g. to connect to PC or laptop
- 4 USB A socket "Host" e.g. for USB memory stick, external keyboard/mouse, USB hub, barcode reader or printer
- 5 LED at SD slot. Yellow LED lit or flashing when the device writes to the SD card or reads it.

 For details on connecting the USB interfaces at the front of the device, see the Operating Instructions.

Requirements with regard to the SD card

Industrial grade SD-HC cards with max. 32 GB are supported.

 Use only the industrial grade SD cards described in the "Accessories" section of the Operating Instructions. These have been tested by the manufacturer and guaranteed to function faultlessly in the device.

 The SD card must be formatted to FAT or FAT32. NTFS format is not readable.

6.4 Post-connection check

Device condition and specifications	Notes
Are cables or the device damaged?	Visual inspection

Electrical connection	Notes
Does the supply voltage match the specifications on the nameplate?	-
Are all terminals firmly engaged in their correct slot?	-
Are the mounted cables strain-relieved?	-
Are the power supply and signal cables correctly connected?	See connection diagram and device.

7 Operation options

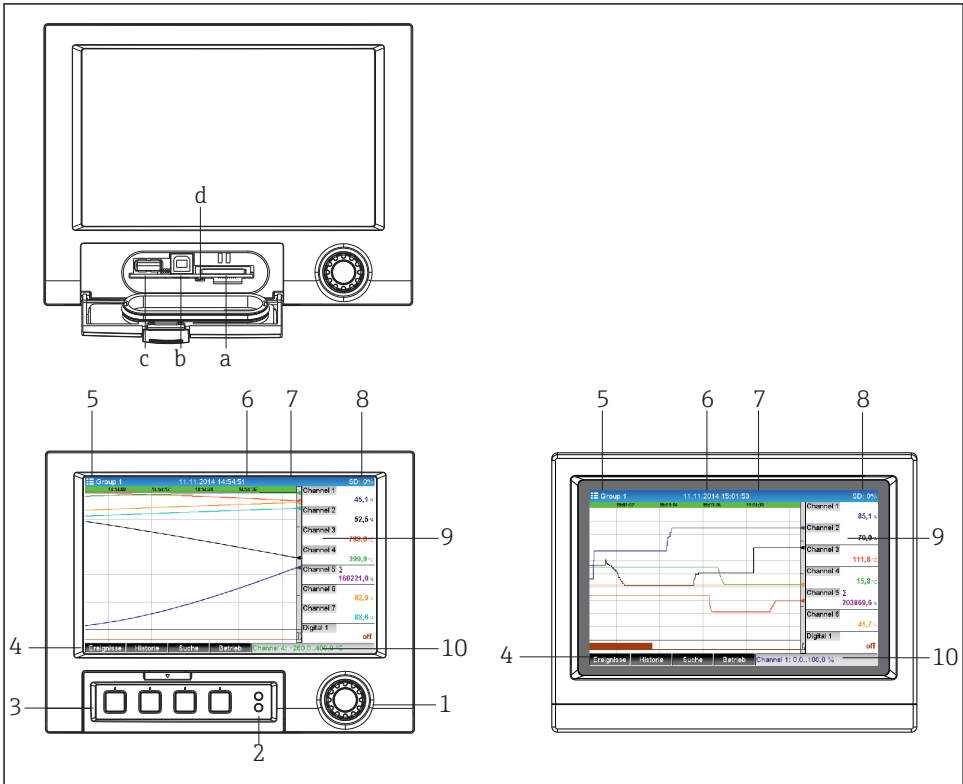
7.1 Overview of operation options

The device can be operated directly onsite with the navigator and USB keyboard/mouse (only panel-mounted device) or via interfaces (serial, USB, Ethernet) and operating tools (Web server); FieldCare/DeviceCare configuration software).

The DIN rail device is operated exclusively via the operating tools.


7.2 Measured value display and operating elements


7.2.1 Measured value display and operating elements on panel-mounted device



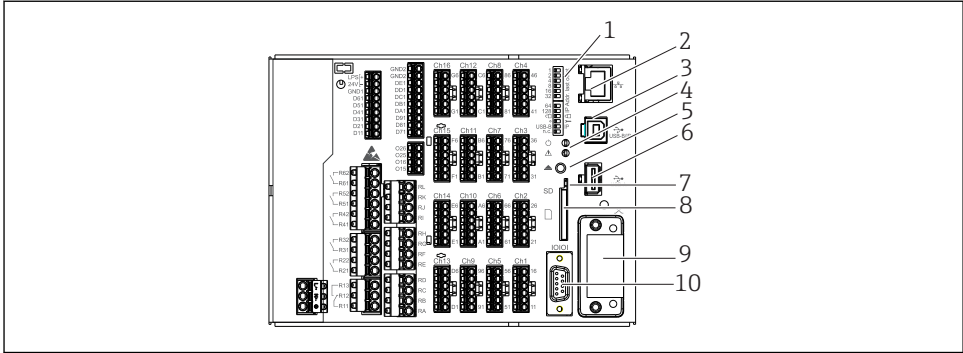
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12 Device front (left: version with navigator and front interfaces; right: version with stainless steel front and touchscreen)

Item No.	Operating function (display mode = display of measured values) (Setup mode = operation in the Setup menu)
a	Slot for SD card
b	USB B socket "Function" e.g. to connect to PC or laptop
c	USB A socket "Host" e.g. for USB memory stick, external keyboard, barcode reader or printer
d	LED at SD slot. Yellow LED lit or flashing when the device writes to the SD card or reads it.  Do not remove the SD card if the LED is lit or flashing! Risk of data loss!



Item No.	Operating function (display mode = display of measured values) (Setup mode = operation in the Setup menu)
1	<p>"Navigator": jog/shuttle dial for operating with additional press/hold function.</p> <p>In display mode: turn the dial to switch between the various signal groups. Press the dial to display the main menu.</p> <p>In setup mode or in a selection menu: turn the dial anticlockwise to move the bar or the cursor upwards or to the left, changes the parameter. Turning clockwise moves the bar or cursor down or to the right, changes the parameter. Press = select highlighted function, start parameter change (ENTER key).</p>
2	<p>Functions of LED indicators (according to NAMUR NE44:)</p> <ul style="list-style-type: none"> ▪ Green LED (top) lit: power supply OK ▪ Red LED (bottom) flashing: maintenance required, caused by external factor (e.g. cable open circuit etc.) or a message/notification requiring acknowledgment is pending, calibration is running.
3	Variable "soft keys" 1-4 (from left to right)
4	Function indicator of "soft keys"
5	<p>In display mode: current group name, type of analysis;</p> <p>In setup mode: name of the current operating item (dialog title)</p>
6	<p>In display mode: displays current date/time</p> <p>In setup mode: --</p>
7	<p>In display mode: user ID (if function is active)</p> <p>In setup mode: --</p>
8	<p>In display mode: alternating display indicating the percentage space on the SD card or USB stick that has already been used.</p> <p>Status symbols are also displayed in alternation with the memory information (e.g. simulation mode, data storage active, operation lock, batch active)</p> <p>In setup mode: the current "direct access" operating code is displayed</p>
9	<p>In display mode: window for measured value display (e.g. curve display).</p> <p>Display of current measured values and the status in the event of an error/alarm condition. In the case of counters, the type of counter is displayed as a symbol.</p> <p> If a measuring point has limit value status, the corresponding channel identifier is highlighted in red (quick detection of limit value violations). During a limit value violation and device operation, the acquisition of measured values continues uninterrupted.</p>
9	In setup mode: display of operating menu
10	<p>In display mode: alternating status display (e.g. set zoom range) of the analog or digital inputs in the appropriate color of the channel.</p> <p>In setup mode: different information is displayed here depending on the display type.</p>

7.2.2 Operating elements of the DIN rail version





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13 Device front of the DIN rail version

Item No.	Operating function																																																						
1	<p>DIP switches</p> <p>The behavior of the Ethernet interface is configured via DIP switches (left = OFF, right = ON).</p> <p>Function of the DIP switches (1 = top, 12 = bottom):</p> <ul style="list-style-type: none"> ▪ DIP switches 1-8: configuration of IP address in last octet (e.g. 192.168.1.212) ▪ DIP switch 9: <ul style="list-style-type: none"> OFF = setup change not locked ON = setup locked ▪ DIP switch 10: <ul style="list-style-type: none"> OFF = default / OFF ON = service addressing ▪ DIP switch 11 for the configuration of the USB-B interface: <ul style="list-style-type: none"> OFF = USB standard ON = Ethernet via USB (Web server) ▪ DIP switch 12: not assigned <p> The DIN rail version is supplied with the following Ethernet settings: IP address: 192.168.1.212; subnet mask: 255.255.255.0; gateway: 0.0.0.0</p> <div style="float: right; text-align: center;"> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th></th> <th>OFF</th> <th>ON</th> <th></th> </tr> </thead> <tbody> <tr> <td rowspan="6">IP Addr. last octet</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>1</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>2</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>4</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>8</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>16</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>32</td> </tr> <tr> <td rowspan="2">USB-B n.c.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>64</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>128</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>7</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>8</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>9</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>10</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>11</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>12</td> </tr> </tbody> </table> </div>		OFF	ON		IP Addr. last octet	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	2	<input type="checkbox"/>	<input type="checkbox"/>	4	<input type="checkbox"/>	<input type="checkbox"/>	8	<input type="checkbox"/>	<input type="checkbox"/>	16	<input type="checkbox"/>	<input type="checkbox"/>	32	USB-B n.c.	<input type="checkbox"/>	<input type="checkbox"/>	64	<input type="checkbox"/>	<input type="checkbox"/>	128		<input type="checkbox"/>	<input type="checkbox"/>	7		<input type="checkbox"/>	<input type="checkbox"/>	8		<input type="checkbox"/>	<input type="checkbox"/>	9		<input type="checkbox"/>	<input type="checkbox"/>	10		<input type="checkbox"/>	<input type="checkbox"/>	11		<input type="checkbox"/>	<input type="checkbox"/>	12
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5	<p>Cyclic storage is completed via the "Remove SD card safely" button, the LED (d) goes out. The SD card can now be removed.</p> <p> If the SD card is not removed within 5 minutes, the write cycles start again.</p>																																																						

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Item No.	Operating function
6	<p>USB A socket "Host" e.g. for USB memory stick or printer</p> <p>If a USB stick is inserted, data that have not yet been saved are copied to the stick automatically. The red LED on the USB socket flashes while the data are being copied to the stick.</p> <p> Do not remove the USB stick when the red LED is flashing! Risk of data loss!</p> <p>If an error occurs (e.g. USB stick full or defective), the red LED is lit constantly. Remove the USB stick and replace it.</p>
7	<p>LED at SD slot. Yellow LED lit or flashing when the device writes to the SD card or reads it.</p> <p> Do not remove the SD card if the LED is lit or flashing! Risk of data loss!</p>
8	Slot for SD card
9	Anybus® interface (option)
10	Serial RS232/RS485 interface

7.3 Access to the operating menu via the local display

Using the "navigator" (jog/shuttle dial with additional press function), the soft keys or the touchscreen (option), all settings can be made directly onsite at the device.

7.4 Device access via operating tools

It is possible to configure the device and obtain measured values via interfaces. The following tools are available for this purpose:

Operating tool	Functions	Access via
Field Data Manager (FDM) analysis software, SQL database support (included in the delivery)	<ul style="list-style-type: none"> ▪ Export of saved data (measured values, analyses, event log) ▪ Visualization and processing of saved data (measured values, analyses, event log) ▪ Safe archiving of exported data in a SQL database 	RS232/RS485, USB, Ethernet
Web server (integrated into the device; access via browser)	<ul style="list-style-type: none"> ▪ Display of current and historical data and measured value curves via the Web browser ▪ Easy configuration without additional installed software ▪ Remote access to device and diagnostic information 	Ethernet, or Ethernet via USB


OPC server (optional)	The following momentary values can be provided: <ul style="list-style-type: none"> ▪ Analog channels ▪ Digital channels ▪ Mathematics ▪ Totalizer 	RS232/RS485, USB, Ethernet
FieldCare/DeviceCare configuration software	<ul style="list-style-type: none"> ▪ Device configuration ▪ Loading and saving of device configurations (upload/download) ▪ Documentation of the measuring point 	USB, Ethernet

 The configuration of device-specific parameters is described in detail in the Operating Instructions.

Download the necessary driver at: www.endress.com/download

8 System integration

8.1 Integrating the measuring device in the system

 For detailed information on fieldbus system integration, see the Operating Instructions.

8.1.1 General notes

The device has (optional) fieldbus interfaces for exporting process values. Measured values and statuses can also be transmitted to the device via fieldbus.

Note: Counters cannot be transferred.



Alarms or errors in the context of data transmission are displayed depending on the bus system (e.g. status byte).

The process values are transferred in the same units that are used for display at the device.

9 Commissioning

9.1 Function check

Perform the following checks prior to commissioning:

- "Post-installation check" checklist →  14.
- "Post-connection check" checklist →  26.

9.2 Switching on the measuring device

After the operating voltage is applied, the green LED lights up and the device is ready for operation.

If you are commissioning the device for the first time, program the setup as described in the following sections of the Operating Instructions.

If you are commissioning a device that is already configured or preset, the device starts measuring immediately as defined in the settings. The values of the channels currently activated are shown on the display.



Remove the protective film from the display as this would otherwise affect the readability of the display.

9.3 Setting the operating language

Factory setting: English or ordered local language

Version with stainless steel front and touchscreen, or when operating with the external USB mouse:

Calling the main menu, configuring the operating language:

1. Press or click the "Menu" soft key at the bottom edge of the screen
2. The main menu appears on the display with the "Sprache/Language" option
3. To change the default language setting: press or click "Sprache/Language" and select the desired language from the drop-down menu
4. Use "Back" or "ESC" to quit the main menu

The operating language has been changed.


Version with navigator and front interfaces:

Calling the main menu, configuring the operating language:

1. Press the navigator
2. The main menu appears on the display with the "Sprache/Language" option
3. Change the default language setting: press the navigator, turn it to select the preferred language and press the navigator again to accept the setting.
4. Use "Back" or "ESC" to quit the main menu

The operating language has been changed.



The function  "Back" appears at the end of each menu/submenu.

Press "Back" briefly to go up one level in the menu structure.

To quit the menu immediately and return to the measured value display, press and hold "Back" (>3 sec.). The changes made are accepted and saved.

DIN rail version:

The operating language can only be changed via the Web server or the configuration software (DTM):

1. Establish a connection to the device.
2. Change the operating language using the descriptions provided in the following chapter.

The operating language has been changed.

9.4 Configuring the measuring device (Setup menu)

Access to the setup is enabled when the device leaves the factory and can be locked in various ways e.g. by entering a 4-digit access code or by user administration.

When locked, basic settings can be checked but not changed. The device can also be put into operation and configured via the PC.

Device configuration options:

- Setup directly at the device (panel-mounted device only)
- Setup via SD card or USB stick by transferring the parameters stored on it
- Setup via Web server using Ethernet or Ethernet via USB
- Setup via FieldCare/DeviceCare configuration software



Information on configuration using FieldCare/DeviceCare configuration software

- Offline configuration: Most of the parameters are available (depending on the device configuration).
- Online configuration: Only parameters marked "Online configuration" are available.

9.4.1 Step-by-step: to the first measured value

Procedure and necessary settings:

1. Check the date/time in the main menu under **"Setup"** and set it if necessary
2. Make settings for the interfaces and communication in the main menu under **"Setup -> Advanced setup -> Communication"**
3. Create universal or digital inputs in the main menu under **"Setup -> Advanced setup -> Inputs -> Universal inputs/Digital inputs"**: **Add input: select "Universal input x" or "Digital input x"** with which the input signal should be detected. Then select the newly created input and configure it.
4. Activate relays or analog outputs (optional) in the main menu under **"Setup -> Advanced setup -> Outputs"**
5. Assign activated inputs to a group in the main menu under **"Setup -> Advanced setup -> Application -> Signal groups -> Group x"**
6. Use "Back" or "ESC" to quit the main menu. The changes made are accepted and saved.

The device is in the measured value display mode and displays the measured values.

9.4.2 Step-by-step: set or delete the limit values

Procedure for setting limit values:

1. Open the limit values in the main menu under **"Setup -> Advanced setup -> Application -> Limits"**
2. Add a limit value: select **"Yes"**
3. Select and configure **"Limit value x"**
4. Use "Back" or "ESC" to quit the main menu. The changes made are accepted and saved.

The device is in the measured value display mode and displays the measured values.

Procedure for deleting limit values:

1. Open the limit values in the main menu under **"Setup -> Advanced setup -> Application -> Limits"**
2. Delete a limit value: select **"Yes"**
3. Select the limit value to be deleted from the list
4. Use "Back" or "ESC" to quit the main menu. The changes made are accepted and saved.

The device is in the measured value display mode and displays the measured values.

9.4.3 Step-by-step: read HART® values (option)

Procedure for reading measured values from a HART® device/sensor:


1. Make settings for HART® communication (HART® master, connection attempts) under **"Setup -> Advanced setup -> Communication -> HART"**
2. Add new value to be read by selecting **"Add value -> Yes"**
3. Open the configuration for **"Value x"**
4. Select the physical interface to which the HART® device is connected **"Connection -> Channel x"**
5. Set the address of the connected device, the HART® value to be read and the channel identifier
6. Activate the universal input in the main menu under **"Setup -> Advanced setup -> Inputs -> Universal inputs"**
7. Select the **"HART"** signal type and assign the previously defined HART® values. Make the selection using the channel identifier of the HART® value.
8. Other settings of the universal input are the same as for standard analog inputs .
9. Assign activated inputs to a group in the main menu under **"Setup -> Advanced setup -> Application -> Signal groups -> Group x"**
10. Use "Back" or "ESC" to quit the main menu. The changes made are accepted and saved.


The device is in the measured value display mode and displays the measured values.

9.4.4 Device setup

In the **"Setup"** menu and in the **"Advanced setup"** submenu, you will find the **most important** settings for the device:

Parameter	Possible settings	Description
Change date/time	UTC time zone dd.mm.yyyy hh:mm:ss	Change the date and time.
Advanced setup		Advanced settings for the device e.g. system settings, inputs, outputs, communication, application etc.

Parameter		Possible settings	Description
	System		Basic settings that are needed to operate the device, (e.g. date/ time, security, memory management, messages, etc.)
	Inputs		Settings for analog and digital inputs.
	Outputs		Settings only required if outputs (e.g. relays or analog outputs) are to be used.
	Communication		Settings required if the USB, RS232/RS485 or Ethernet interface of the device is to be used (PC operation, serial data export, modem operation, etc.).  The different interfaces (USB, RS232/RS485, Ethernet) can be operated in parallel. However, simultaneous use of the RS232 and RS485 interface is not possible.
	Application		Various application-specific settings (e.g. group settings, limit values, etc.).

 For a detailed overview of all operating parameters, see the Appendix to the Operating Instructions.

9.4.5 Setup via SD card or USB stick

An existing device configuration ("Setup data" *.DEH) from another Memograph M RSG45 or from FieldCare/DeviceCare can be uploaded directly to the device.


Import new setup directly at the device: The function used to load the setup data can be found in the main menu under "**Operation -> SD card (or USB stick) -> Load setup -> Select directory -> Next**".

 In the case of the DIN rail version, the setup can only be uploaded to the device using an SD card.

9.4.6 Setup via Web server

To configure the device via the Web server, connect the device to a PC via Ethernet (or Ethernet via USB).

Please observe the information and communication settings for Ethernet and the Web server in the Operating Instructions.

 To configure the device via a Web server, you must have Administrator or Service access. ID and password administration is performed in the main menu under "**Setup -> Advanced setup -> Communication -> Ethernet -> Configuration Web server -> Authentication**".

Default value for ID: admin; Password: admin

Note: The password should be changed during commissioning!

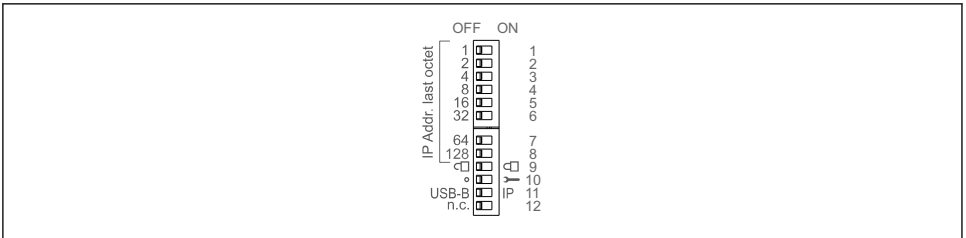
If security settings are according to "FDA 21 CFR Part 11", you must have Administrator rights to configure the device via a Web server.

Establishing a connection and setup

Procedure for setting up a connection:

1. Connect the device to the PC via Ethernet (or Ethernet via USB).
2. Start the browser at the PC; open the Web server for the device by entering the IP address: `http://<ip-address>` Note: Leading zeros in IP addresses must not be entered (e.g. enter 192.168.1.11 instead of 192.168.001.011).
3. Enter ID and password, and confirm each by clicking "OK" (see also the "Web server" section of the Operating Instructions)
4. The Web server shows the instantaneous value display of the device. Click "**Menu -> Setup -> Advanced setup**" in the Web server function bar.
5. Starting configuration

Procedure for establishing a connection with the DIN rail version:



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Version 1: via Web server/USB (requires a USB driver)

1. Set DIP switch 11 (USB-B/IP) to IP (ON)
2. Connect the USB and open the Web server using the Web browser (IP 192.186.1.212)
3. Configure the device under "**Expert -> Communication -> Ethernet**" (fixed IP address or DHCP)



DIP switches 10 and 11 should not be set to ON simultaneously. In this case, only Ethernet or USB may be connected.

DHCP: The IP address assigned by DHCP is determined under "**Network**" (the device must be connected by Ethernet).

If DIP switches 1 to 8 are all set to ON or OFF, software addressing is active. In all other cases hardware addressing is active. The first 3 octets are therefore used by the software IP address (DHCP = off). The last octet must be configured via the DIP switches.


The USB driver must be installed.

If the position of DIP switch 11 (USB-B/IP) is changed, the USB cable must be disconnected from the device for at least 10 seconds.

Procedure for establishing a connection with the DIN rail version:

Version 2: via DTM/USB

1. Set DIP switch 11 (USB-B/IP) to USB-B (OFF)
2. Connect the USB
3. Open the DTM (offline parameterization) and configure the device under **"Expert -> Communication -> Ethernet"** (fixed IP address or DHCP)

 DIP switches 10 and 11 should not be set to ON simultaneously. In this case, only Ethernet or USB may be connected.

DHCP: The IP address assigned by DHCP can be viewed in the online configuration under **"Diagnostics -> Device information -> Ethernet"** (the device must be connected by Ethernet).

If DIP switches 1 to 8 are all set to ON or OFF, software addressing is active. In all other cases hardware addressing is active. The first 3 octets are therefore used by the software IP address (DHCP = off). The last octet must be configured via the DIP switches.

The PC must be configured correctly (see also the procedure for "Point-to-point connection")


The USB driver must be installed.

If the position of DIP switch 11 (USB-B/IP) is changed, the USB cable must be disconnected from the device for at least 10 seconds.

Procedure for establishing a connection with the DIN rail version:

Version 3: via Ethernet

1. Set DIP switch 10 (Service) to ON
2. Connect the Ethernet cable (point-to-point connection; a crossover cable is not required)
3. Now configure the device via the IP address 192.168.1.212 by Web server or DTM (see version 1 and 2)
4. Following configuration, set DIP switch 10 back to OFF. It is now possible to communicate with the device via the configured IP address.

 DIP switches 10 and 11 should not be set to ON simultaneously. In this case, only Ethernet or USB may be connected.

With this method it is not possible to determine which DHCP address the device has received. DHCP should be disabled for this reason. Alternatively, a network administrator must determine the IP address via the MAC address.

The PC must be configured correctly (see also the procedure for "Point-to-point connection")

The USB driver must be installed.

If DIP switches 1 to 8 are all set to ON or OFF, software addressing is active. In all other cases hardware addressing is active. The first 3 octets are therefore used by the software IP address (DHCP = off). The last octet must be configured via the DIP switches.

Procedure to establish a direct connection via Ethernet (point-to-point connection):

1. Configure the PC (depends on operating system): e.g. IP address: 192.168.1.1; subnet mask: 255.255.255.0; gateway: 192.168.1.1
2. Disable DHCP on the device
3. Make communication settings on the device: e.g. IP address: 192.168.1.2; subnet mask: 255.255.255.0; gateway: 192.168.1.1
4. Start the browser at the PC; open the Web server for the device by entering the IP address: `http://<ip-address>` Note: Leading zeros in IP addresses must not be entered (e.g. enter 192.168.1.11 instead of 192.168.001.011).
5. Enter ID and password, and confirm each by clicking "OK"
6. The Web server shows the instantaneous value display of the device. Click **"Menu -> Setup -> Advanced setup"** in the Web server function bar.
7. Starting configuration



A crossover cable is not required.

Continue with device configuration in accordance with the Operating Instructions for the device. The complete Setup menu i.e. all of the parameters listed in the Operating Instructions, can also be found on the Web server. After configuration, accept the setup with **"Save settings"**.

NOTICE

Undefined switching of outputs and relays

- ▶ During configuration using a Web server, the device may assume undefined statuses! This may result in the undefined switching of outputs and relays.

9.4.7 Setup via FieldCare/DeviceCare configuration software

To configure the device using the configuration software, connect the device to your PC via USB or Ethernet.



Download at: www.endress.com/download

Establishing a connection and setup

Continue with device configuration in accordance with the Operating Instructions for the device.



Information on configuration using FieldCare/DeviceCare configuration software

- Offline configuration: Most of the parameters are available (depending on the device configuration).
- Online configuration: Only parameters marked "Online configuration" are available.


NOTICE

Undefined switching of outputs and relays

- ▶ During configuration using the configuration software, the device may assume undefined statuses! This may result in the undefined switching of outputs and relays.

9.5 Access protection and security concept

To protect the setup from unauthorized access following commissioning, there are many options to ensure access protection to the setup settings and the user entries. Access and authorizations can be configured and assigned passwords.


 The user of the device is responsible for access protection and the security concept. In addition to the device functions listed, user policies and procedures, in particular, must also be applied (e.g. password allocation, password sharing, physical access barriers, etc.).

The following protection options and functionalities are available:


- Protection per control input
- Protection via access code
- Protection via user roles
- Protection via user administration according to "FDA 21 CFR Part 11"
- Protection via DIP switches (DIN rail version)

In order to change any parameter, the correct code must first be entered or the device must be unlocked using the control input.


Setup lock via control input: The settings for the control input can be found in the main menu under "**Setup -> Advanced setup -> Inputs -> Digital inputs -> Digital input X -> Function: Control input; Action: Lock setup**".

 It is preferable to lock the setup using a control input.

Setting up an access code: The settings for the access code can be found in the main menu under "**Setup -> Advanced setup -> System -> Security -> Protected by -> Access code**". Factory setting: "open access", i.e. modifications can always be made.

 Make a note of the code and store in a safe place.


Setting up user roles: The settings for the user roles (operator, admin and service) are provided in the main menu under "**Setup -> Advanced setup -> System -> Security -> Protected by -> User roles**". Factory setting: "open access", i.e. modifications can always be made.

 The passwords should be changed during commissioning.
Make a note of the code and store in a safe place.

Setting up user administration according to "FDA 21 CFR Part 11": The settings for user administration can be found in the main menu under "**Setup -> Advanced setup -> System -> Security -> Protected by -> FDA 21 CFR Part 11**". Factory setting: "open access", i.e. modifications can always be made.

 Please refer to the Operating Instructions for details on security settings and user administration.

9.6 TrustSens Calibration Monitoring

 Available in conjunction with iTHERM TrustSens TM371 / TM372.

Application package :

- Up to 20 iTHERM TrustSens TM371 / TM372 can be evaluated via the HART interface
- Self-calibration data displayed on screen or via the Web server
- Generation of a calibration history
- Creation of a calibration protocol as an RTF file directly at the RSG45
- Evaluation, analysis and further processing of the calibration data using "Field Data Manager" (FDM) analysis software

Function activation: Self-calibration monitoring is switched on via the menu **Expert** → **Application** → **Monitor self-calibration**.



For more information, see additional Operating Instructions →  BA01887R



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