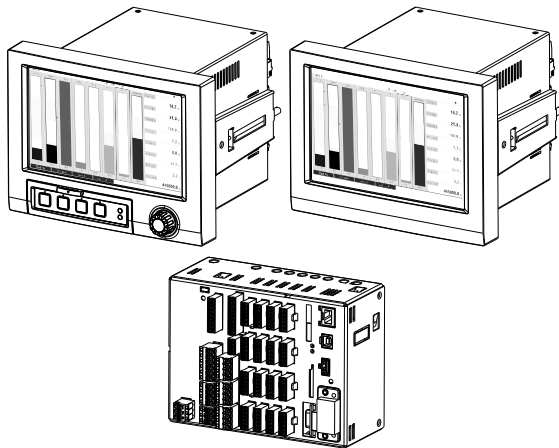


Brief Operating Instructions

Data manager

ORSG45



These are Brief Operating Instructions; they do not replace the Operating Instructions included in the scope of supply.

Detailed information can be found in the Operating Instructions and the additional documentation.

The complete device documentation consists of:

- These Brief Operating Instructions
- The Operating Instructions
- Approvals and security certificates
- Other device-specific information.

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1 About this document

1.1 Document function

The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

1.2 Symbols

1.2.1 Safety symbols

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 potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION

This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE

This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

1.2.2 Electrical symbols

Symbol	Meaning
	Direct current
	Alternating current
	Direct current and alternating current
	Ground connection A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	Protective earth (PE) Ground terminals that must be connected to ground prior to establishing any other connections. The ground terminals are located on the interior and exterior of the device: ▪ Interior ground terminal: protective earth is connected to the mains supply. ▪ Exterior ground terminal: device is connected to the plant grounding system.

1.2.3 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

1.2.4 Symbols in graphics

Symbol	Meaning	Symbol	Meaning
1, 2, 3,...	Item numbers		Series of steps
A, B, C, ...	Views	A-A, B-B, C-C, ...	Sections
	Hazardous area		Safe area (non-hazardous area)

2 Basic safety instructions

The reliable and safe operation of the device is only ensured 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 for the personnel

The personnel must fulfill the following requirements for its tasks:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).

- ▶ Follow instructions and comply with basic conditions.

2.2 Intended use



The device is designed for installation in a panel or a control cabinet and must only be operated in an installed state. Operation in a desktop or field housing is possible as an option.

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

2.2.1 Product liability

The manufacturer does not accept any responsibility for damage that results from non-designated use and from failure to comply with the instructions in this manual.

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

Damage to the device!

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

2.5 Product safety

This state-of-the-art device is designed and tested in accordance with good engineering practice to meet operational safety standards. It 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 EU directives listed in the device-specific EU declaration of conformity. The manufacturer confirms this by affixing the CE mark.

2.6 Safety information for desktop 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: $U(\max) = 30 V_{\text{eff}}(\text{AC})/60 V(\text{DC})$

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 delivery:

1. Check the packaging for damage.
 - ↳ Report all damage immediately to the manufacturer.
Do not install damaged components.
2. Check the scope of delivery using the delivery note.
3. Compare the data on the nameplate with the order specifications on the delivery note.
4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.



If one of the conditions is not satisfied, contact the manufacturer.

4.2 Product identification

The device can be identified in the following ways:

- Nameplate specifications
- Extended order code with breakdown of the device features on the delivery note

4.2.1 Nameplate

Do you have the correct device?

The nameplate provides you with the following information on the device:

- Manufacturer identification, device designation
- Order code
- Extended order code
- Serial number
- Tag name (TAG) (optional)
- Technical values such as supply voltage, current consumption, ambient temperature, communication-specific data (optional)
- Degree of protection
- Approvals with symbols
- Reference to Safety Instructions (XA) (optional)

► Compare the information on the nameplate with the order.

4.2.2 Name and address of manufacturer

Name of manufacturer:	Endress+Hauser Wetzer GmbH + Co. KG
Address of manufacturer:	Obere Wank 1, D-87484 Nesselwang or www.endress.com

4.3 Storage and transport

Note the following points:

The permitted storage temperature is -20 to $+60$ °C (-4 to $+140$ °F)



Pack the device for storage and transportation in such a way that it is reliably protected against impact and external influences. The original packaging offers the best protection.

Avoid the following environmental influences during storage:

- Direct sunlight
- Proximity to hot objects
- Mechanical vibration
- Aggressive media

5 Installation

5.1 Mounting conditions

NOTICE

Overheating due to buildup of heat in the device

► Always ensure adequate cooling of the device to prevent heat accumulation.

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:

- Panel-mounted device:
Front: IP65, NEMA Type 4 encl. / Rear: IP20
- Version with stainless steel front and touchscreen:
Front: IP65, NEMA Type 4X encl. (approved by UL)/Rear: IP20
- DIN rail Version: NEMA Type 1, IP20

5.1.1 Installation dimensions for the panel-mounted device

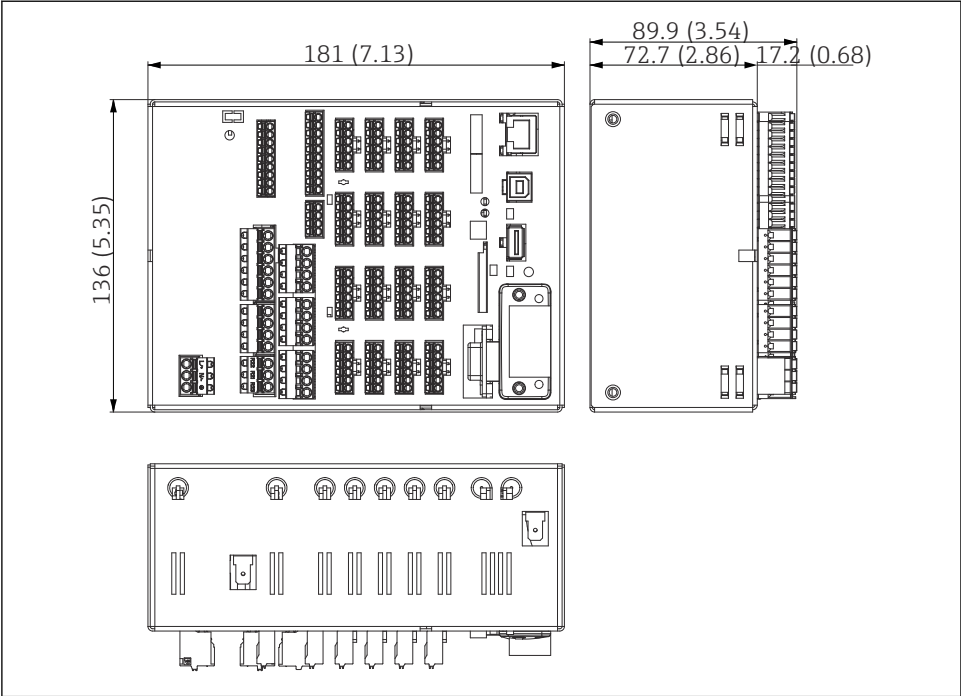
- Installation depth (excluding terminal cover): approx. 159 mm (6.26 in) for device incl. terminals and fastening clips.
- Installation depth including terminal cover (option): approx. 198 mm (7.8 in)
- Panel cutout: 138 to 139 mm (5.43 to 5.47 in) x 138 to 139 mm (5.43 to 5.47 in)
- Panel thickness: 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.

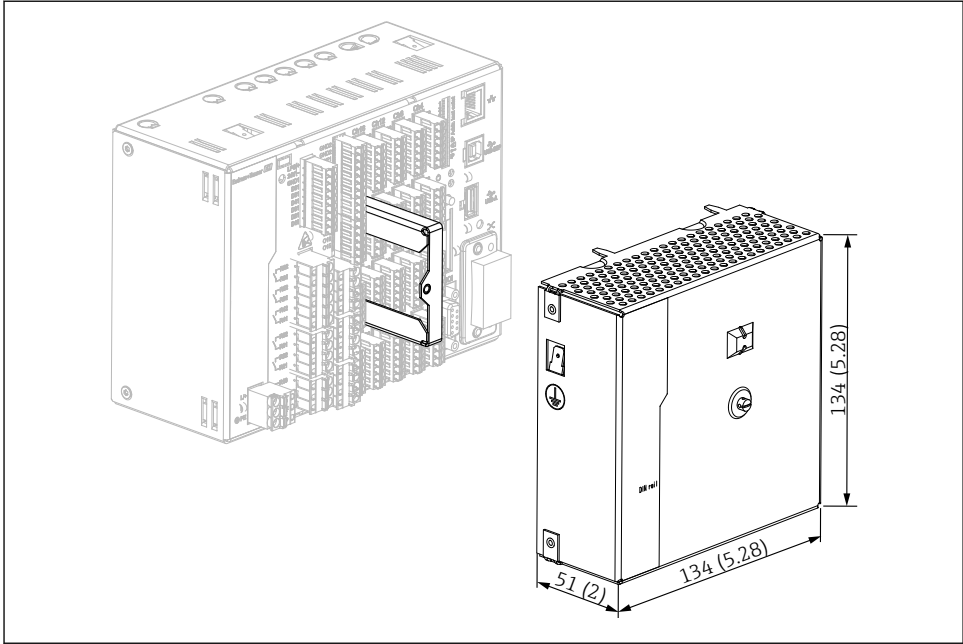


The DIN rail device is **not** approved for operation in the hazardous area.



A0036528

1 DIN rail version, dimensions in mm (in)



A0046633

2 Terminal cover, DIN rail version, dimensions in mm (in)

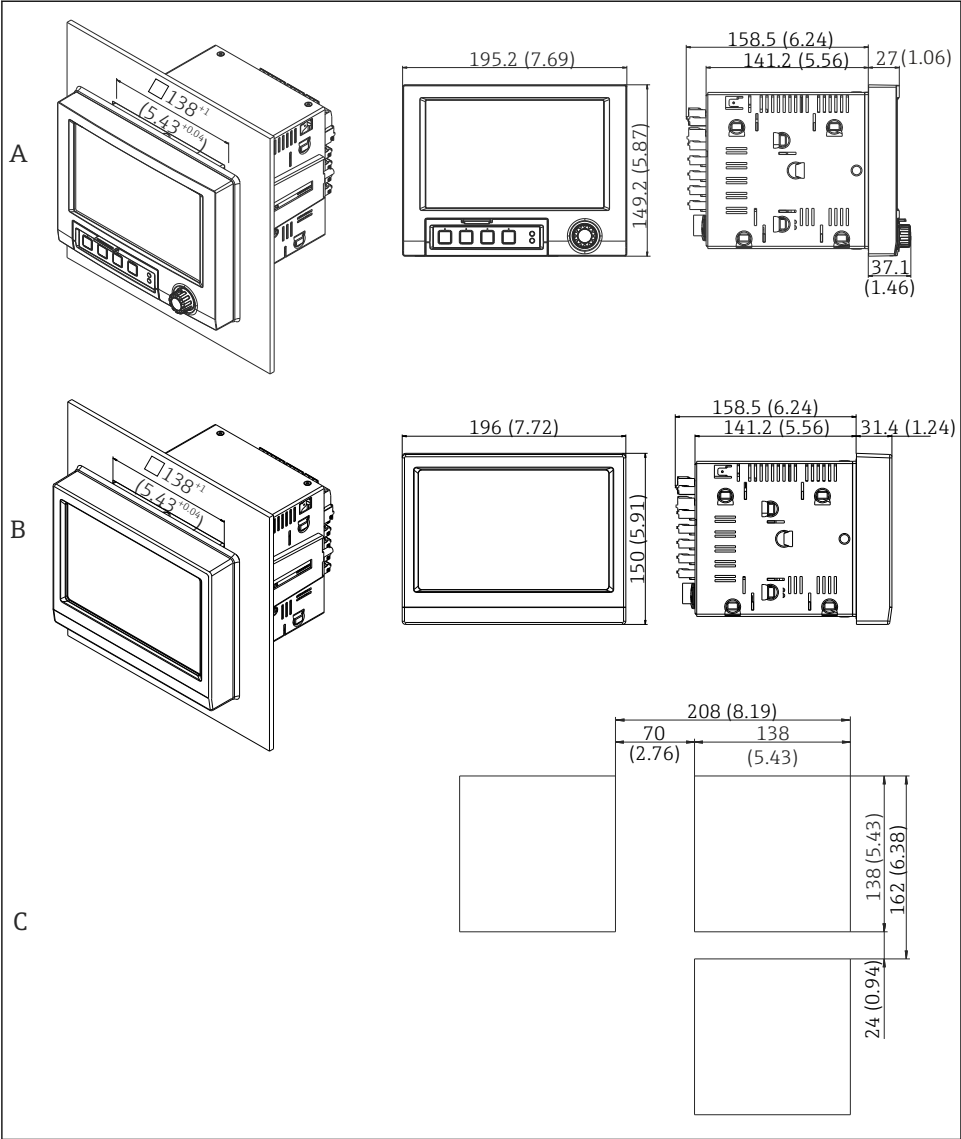
Installation dimensions

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

5.2 Installing the measuring instrument

5.2.1 Mounting the panel-mounted device

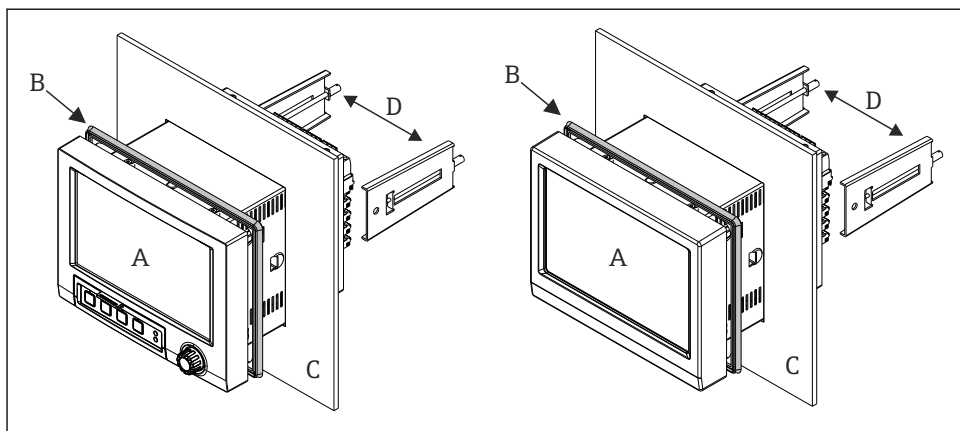
 Mounting tool: A screwdriver is required for installation in the panel.



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

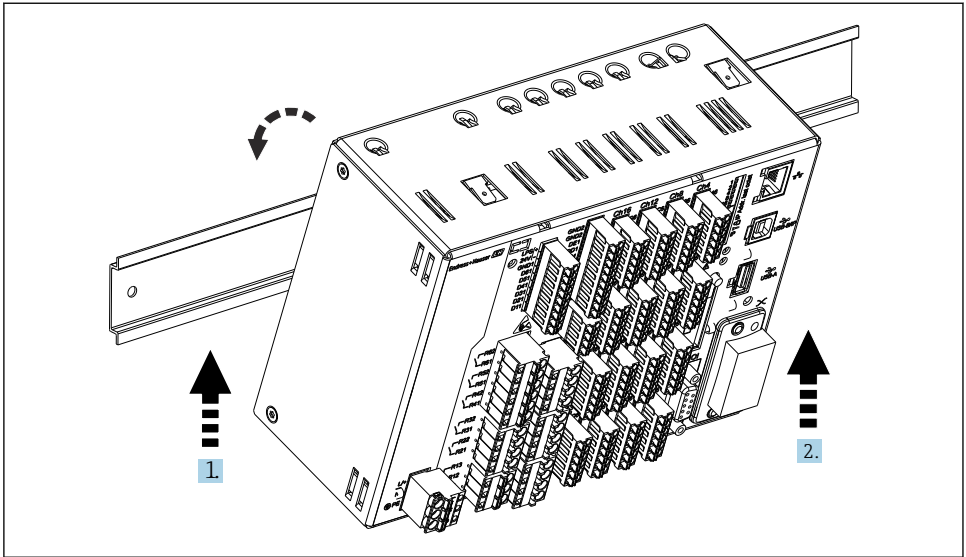


A0026672

 4 Panel mounting

1. Push the supplied sealing rubber (B) from the rear of the device onto 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 DIN rail from below.
2. Swivel the device into the end position by pushing it 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 Connecting requirements

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 protective ground connection must be established 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 cables

- ▶ Connect a suitable overvoltage protection in series 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 Connecting instructions

6.2.1 Cable specifications

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. The spring terminals are unlocked with a slotted screwdriver (size 0).

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 the cables - both sensor and communication cables - are shielded and the shielding forms as complete a cover as possible. A shielded cable must be used for sensor cables that are longer than 30 m (100 ft). A shield coverage of 90% is ideal. Make sure that the communication cables and sensor cables do not cross when routing them. Connect the shielding 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 feed side

The best results are achieved in installations with shielding at one end 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.

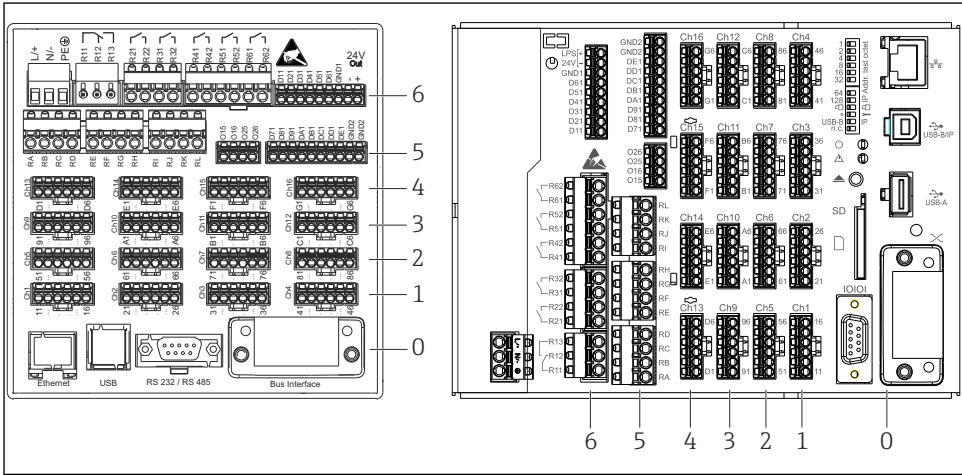
Observe national installation requirements and guidelines during installation. Where there are large differences in potential between the individual grounding points, only one point of the shielding is connected directly with the reference ground.



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 and significantly impact signal transmission. In such cases, the shield of the signal cable should be grounded on one side only and must not be connected to the ground terminal of the housing. The unconnected shield must be insulated.

6.3 Connecting the measuring instrument

6.3.1 Terminal assignment



A0024605

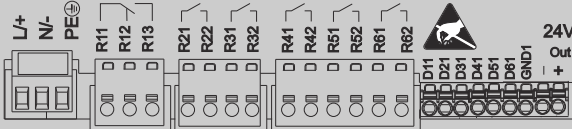
 6 Connections: back of device, panel version (left), DIN rail version (right)

- 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

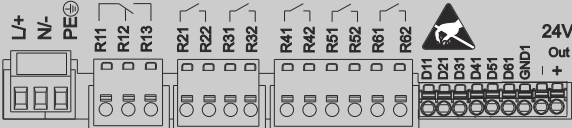
6.3.2 Electrical connection, terminal assignment

 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		
			
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)

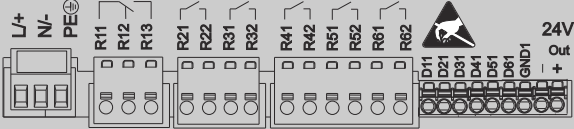
Type	Terminal (max. 250 V, 3 A)				
					
Alarm relay 1	R11	R12	R13		
	Changeover contact	Normally closed contact (NC) ¹⁾	Normally open contact (NO) ²⁾		
Relay 2 to 6				Rx1	Rx2
				Switching contact	Normally open contact (NO ²⁾)

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



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.

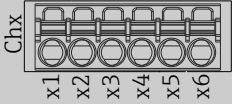
Digital inputs; auxiliary voltage output (power unit, slot 6)

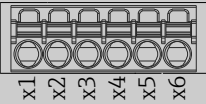
Type	Terminal			
				
Digital input 1 to 6	D11 to D61	GND1		
	Digital input 1 to 6 (+)	Ground (-) for digital inputs 1 to 6		
Auxiliary voltage output, not stabilized, max. 250 mA			24V Out -	24V Out +
			- Ground	+ 24V (±15%)

 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.

Analogue inputs (slot 1-5)

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

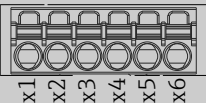
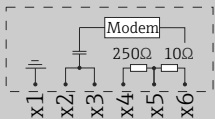
Type	Terminal					
						
	x1	x2	x3	x4	x5	x6
Current/pulse/frequency input ¹⁾					(+)	(-)
Voltage > 1V		(+)				(-)
Voltage ≤ 1V				(+)		(-)
Resistance thermometer RTD (2-wire)	(A)					(B)
Resistance thermometer RTD (3-wire)	(A)			b (sense)		(B)

Type	Terminal					
	Chx  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

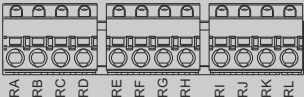
HART® inputs (slot 1-5)

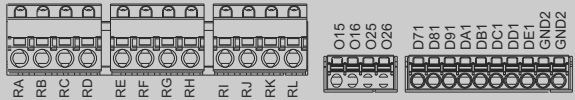
The first digit (x) of the two-digit terminal number corresponds to the associated channel:

Type	Terminal					
	Chx   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

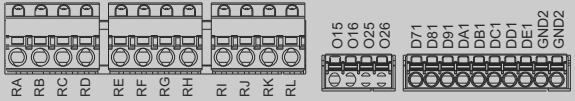
Type	Terminal (max. 250 V, 3 A)			
	 A0024736			
Relay 11, 12	RI	RJ	RK	RL
	Switching contact	Normally open contact ⁽¹⁾	Switching contact	Normally open contact ⁽²⁾

- 1) NO)
- 2) NO)

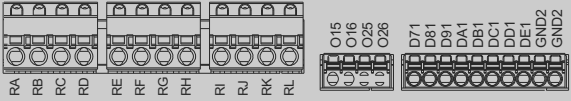


The open or close function (= activation or deactivation of the relay coil) in a limit event can be configured in the setup: "Setup -> Advanced setup -> Outputs -> Relay -> Relay x". However, in the event of a power failure, the relay adopts its quiescent switch state regardless of the setting programmed.

Analog outputs (digital card, slot 5)

Type	Terminal			
	 A0024736			
Analog output 1-2	O15	O16	O25	O26
	Analog output 1 (+)	Ground, analog output 1 (-)	Analog output 2 (+)	Ground, analog output 2 (-)

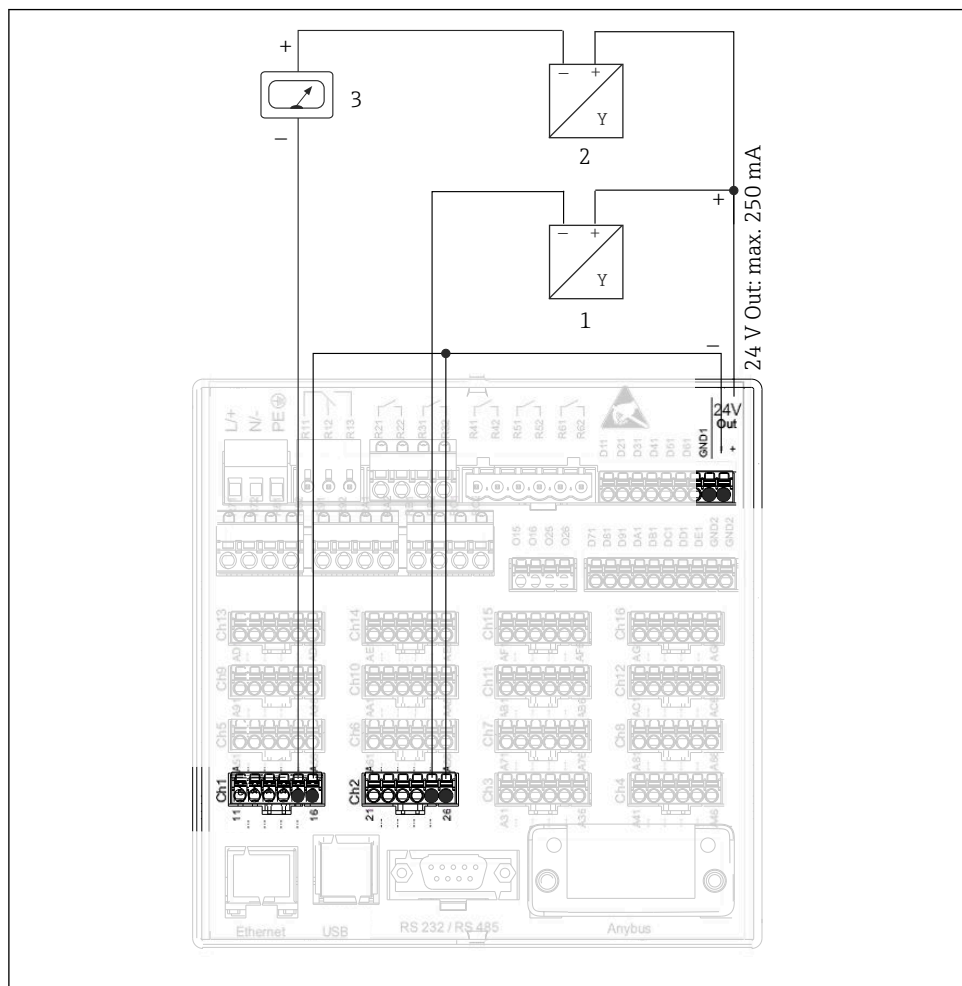
Extension of digital inputs (digital card, slot 5)

Type	Terminal		
	 A0024736		
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



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

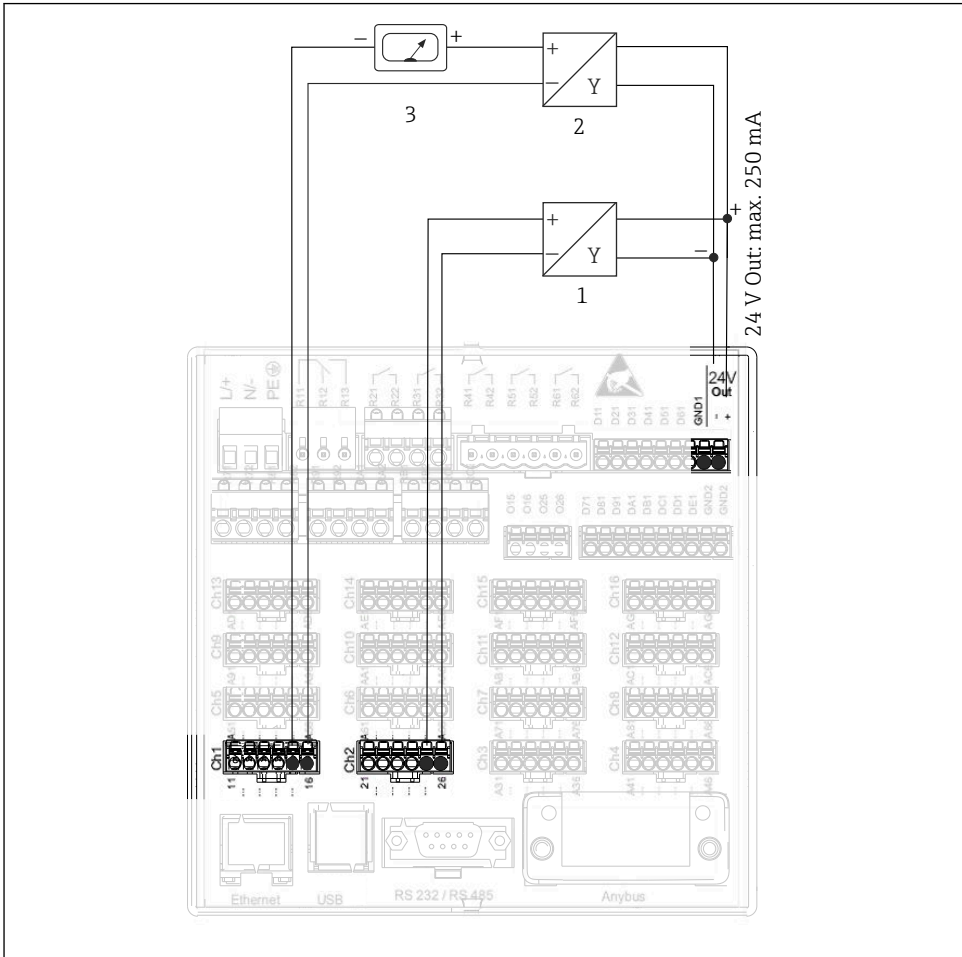


A0024729

- 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
- 2 Sensor 2
- 3 External indicator (optional)

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

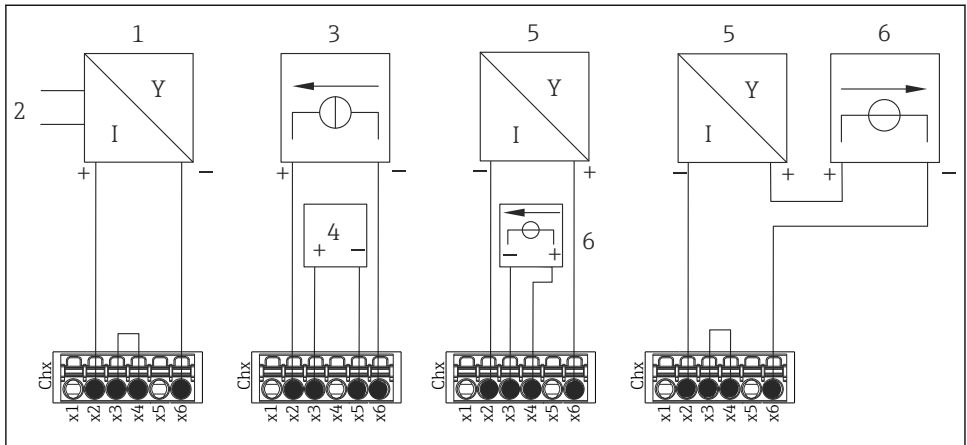


A0024730

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
- 2 Sensor 2
- 3 External indicator (optional)

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

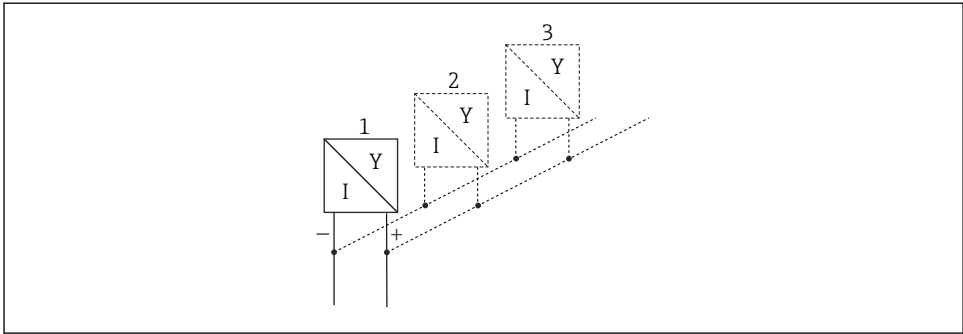
- 1 Active 4-wire sensor (slave)
- 2 Power supply for 4-wire sensor
- 3 Power supply (electricity source) for actuator
- 4 Actuator (e.g., final control element or valve)
- 5 Passive 2-wire sensor (slave)
- 6 Power supply (voltage source) for sensor.

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).



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 10 Connection example: HART® inputs in a Multidrop connection

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

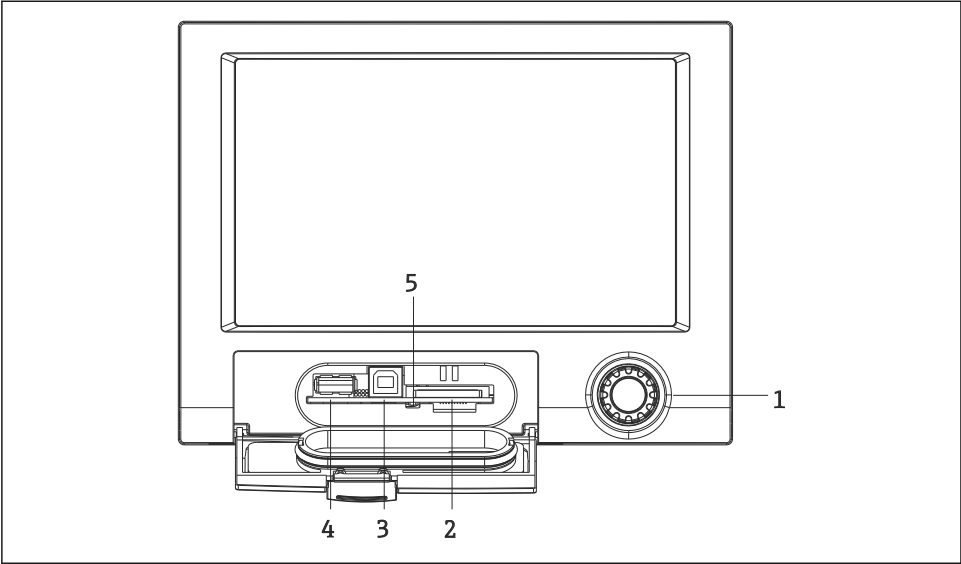
 The internal auxiliary voltage (24 V OUT) can also be used as the transmitter power supply.

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)



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 a PC or laptop
- 4 USB-A socket "Host", e.g., for a USB memory stick, external keyboard or 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.

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

Requirements for the SD card

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

- i** Use only the industrial grade SD cards described in the "Accessories" section of the Operating Instructions. These have been tested by the manufacturer and are guaranteed to function correctly in the device.
- i** 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 information 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 Operating options

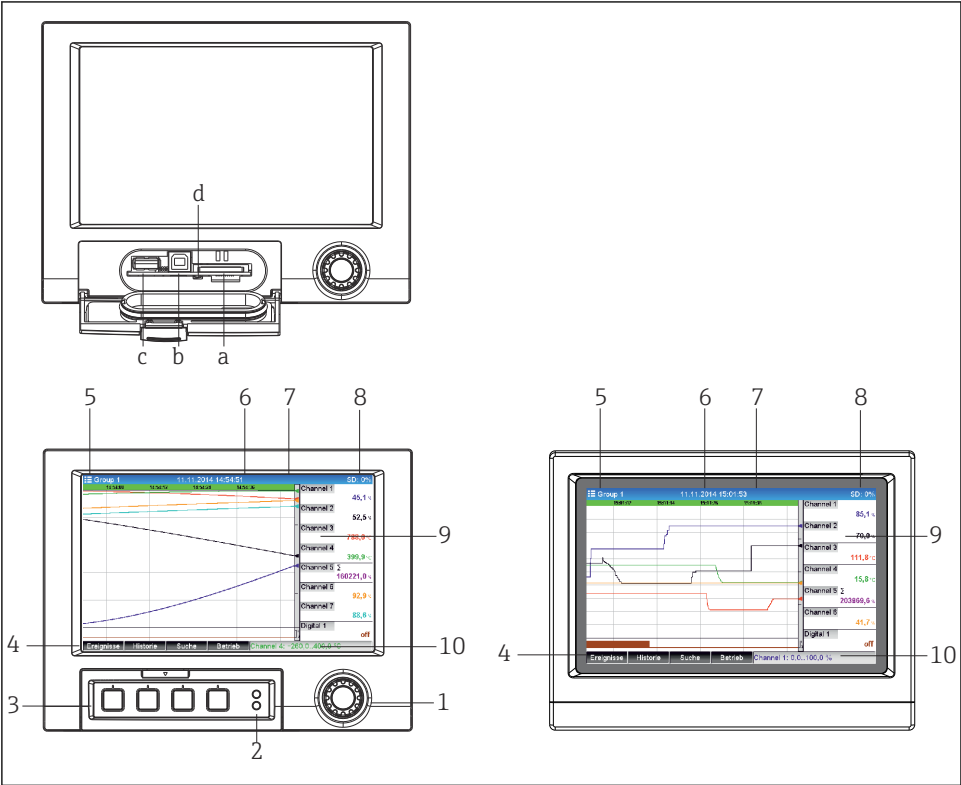
7.1 Overview of operating options

The device can be operated directly on site with the navigator and USB keyboard/mouse (only panel-mounted device) or via interfaces (serial, USB, Ethernet) and operating tools (web server).

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



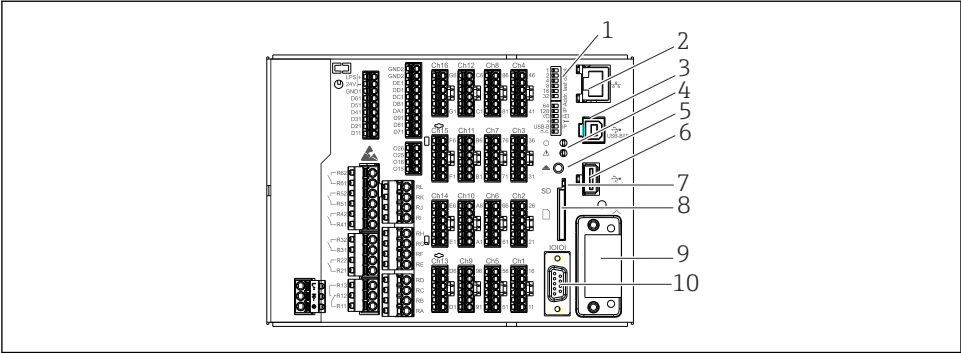
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12 Device front (left: version with navigator and front interfaces; right: version with stainless steel front and touchscreen)

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 a 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 is accessing the SD card.  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	"Navigator": Jog/shuttle dial for operating with additional press/hold function. In display mode: Turn the dial to switch between the various signal groups. Press the dial to display the main menu. In setup mode and in a selection menu: Turn the dial anticlockwise to move the bar or the cursor up or to the left, changes the parameter. Turning clockwise moves the bar or cursor down or clockwise, changes parameter. Press = select highlighted function, start parameter change (ENTER key).
2	Functions of LED indicators (according to NAMUR NE44:) ■ 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	In display mode: current group name, type of analysis; In setup mode: name of the current operating item (dialog title)
6	In display mode: displays current date/time In setup mode: --
7	In display mode: user ID (if function is active) In setup mode: --
8	In display mode: alternating display indicating the percentage space on the SD card or USB stick that has already been used. Status symbols are also displayed in alternation with the memory information (e.g., simulation mode, data storage active, operation locked, batch active) In setup mode: the current "direct access" operating code is displayed
9	In display mode: window for measured value display (e.g., curve display). Displays the 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.  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.
9	In setup mode: displays the operating menu
10	In display mode: alternating status display (e.g., set zoom range) of the analog or digital inputs in the appropriate color of the channel. In setup mode: different information is displayed here depending on the display type.

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	DIP switches The behavior of the Ethernet interface is configured via DIP switches (left = OFF, right = ON). Function of the DIP switches (1 = top, 12 = bottom): - DIP switches 1-8: configuration of IP address in last octet (e.g., 192.168.1.212) - DIP switch 9: - OFF = setup change not locked - ON = setup locked - DIP switch 10: - OFF = default/OFF - ON = service addressing - DIP switch 11 for the configuration of the USB-B interface: - OFF = USB standard - ON = Ethernet over USB (web server) - DIP switch 12: not assigned OFF ON 1 2 3 4 5 6 7 8 9 10 11 12 IP Addr. last octet USB-B n.c. IP 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
2	Ethernet interface
3	USB-B socket "Function", e.g., to connect to a PC or laptop
4	Functions of LED indicators (according to NAMUR NE44:) - 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.
5	Cyclic storage is completed via the "Safe SD card removal" button, the LED (d) goes out. The SD card can now be removed. If the SD card is not removed within 5 minutes, the write cycles start again.

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Item no.	Operating function
6	USB-A socket "Host", e.g., for USB memory stick or printer 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.  Do not remove the USB stick when the red LED is flashing! Risk of data loss! If an error occurs (e.g., USB stick full or defective), the red LED is lit constantly. Remove the USB stick and replace it.
7	LED at SD slot. Yellow LED lit or flashing when the device is accessing the SD card.  Do not remove the SD card if the LED is lit or flashing! Risk of data loss!
8	Slot for SD card
9	Anybus interface (option)
10	Serial RS232/RS485 interface

7.3 Access to operating menu via local display

Using the "Navigator" (jog/shuttle dial with additional press/hold function), the "soft keys" or touch control (optional), all settings can be made directly on site at the device.

7.4 Device access via operating tools

Device configuration and measured value retrieval can also be done via interfaces. The following tools are available for this purpose:

Operating tool	Functions	Access via
Analysis software, SQL database support (included in scope of delivery)	▪ Export of saved data (measured values, analyses, event logbook) ▪ Visualization and processing of saved data (measured values, analyses, event logbook) ▪ Safe archiving of exported data in an SQL database	RS232/RS485, USB, Ethernet
Web server (integrated into the device; access via browser)	▪ Displays the 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 over USB
OPC server (optional)	The following instantaneous values can be provided: ▪ Analog channels ▪ Digital channels ▪ Mathematics ▪ Totalizer	RS232/RS485, USB, Ethernet

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

8 System integration

8.1 Integrating the measuring instrument into the system



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

8.1.1 General information

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.

Depending on the bus system, alarms and faults occurring during data transmission are displayed (e.g., status byte).

The process values are transmitted in the same units that are used to display the values on the device.

9 Commissioning

9.1 Function check

Perform the following checks prior to commissioning:

- "Post-installation check" checklist →  13.
- "Post-connection check" checklist →  25.

9.2 Switching on the measuring instrument

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 Configuring 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 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 "Sprache/Language" and select the desired language from the dropdown 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. To change the set language: Press the navigator, turn the navigator to select the desired language and press the navigator to apply the change.
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 (Setup) or configuration software (DTM).

9.4 Configuring the measuring instrument (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 over USB

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. Configure 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 and configure the new input that has been created.
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 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: setting or deleting 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 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 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: reading HART values (optional)

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 name.
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 name 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 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, such as system settings, inputs, outputs, communication, application etc.
	System		Basic settings that are needed to operate the device (e.g., date/time, security, memory management, messages, etc.)
	Inputs		Settings for the 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 the operating parameters, please refer to the Appendix of the Operating Instructions.

9.4.5 Setup via SD card or USB stick

An existing device configuration ("Setup data" *.DEH) from another data manager 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 over 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"**.

ID default value: admin; Password: admin

Note: Change the password during commissioning.

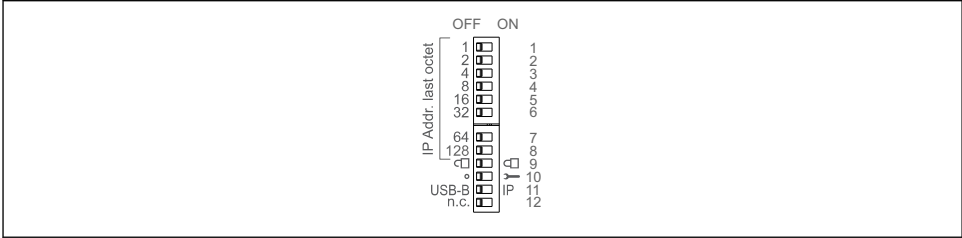
If security settings are according to "FDA 21 CFR Part 11", you must have Administrator rights to configure the device via a web server.

Establishing a connection and setup

Procedure for setting up a connection:

1. Connect the PC to the device via Ethernet (or Ethernet over USB).
2. Start the browser on the PC; enter the IP address: `http://<IP address>` to open the web server for the device. 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. In the web server taskbar, click **"Menu -> Setup -> Advanced setup"**.
5. Start parameter 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 192.168.1.212).
3. Configure the device under **"Expert -> Communication -> Ethernet"** (fixed IP address or DHCP).

 DIP switches 10 and 11 must 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 via 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 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 parameter configuration) and configure the device under **"Expert -> Communication -> Ethernet"** (fixed IP address or DHCP).



DIP switches 10 and 11 must 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 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 versions 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 must 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 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. Define the 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 on the PC; enter the IP address: http://<IP address> to open the web server for the device. 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. In the web server taskbar, click **"Menu -> Setup -> Advanced setup"**.
7. Start parameter 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

- When configuring using a web server, the device may adopt undefined states. 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. can be changed at any time.



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. can be changed at any time.



Change the passwords 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. can be changed at any time.



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

9.6 HTTPS web server setup

To operate the HTTPS web server, an X.509 certificate and a suitable private key must be installed on the device. For security reasons, installation is via a USB stick only.



The certificate that is preinstalled on the device when delivered from the factory should not be used.



Server certificates cannot be installed via the "USB stick/import SSL certificates" function!

Requirements

Private key:

- X.509 PEM file (Base64 encoded)
- RSA key with max. 2048 bit
- May not be password-protected

Certificate:

- X.509 file (Base64 encoded PEM or binary DER format)
- V3 incl. extension required
- Signed by a certification authority (CA) or sub-certification authorities (recommended), or self-signed

Certificate and private key can be created or converted using openssl (<https://www.openssl.org>) for example. Contact the IT administrator to create the corresponding data.

Installation:

1. Copy the private key onto a USB stick into the root directory. File name: **key.pem**.
2. Copy the certificate onto a USB stick into the root directory. File name: **cert.pem** or **cert.der**.
3. Connect the USB stick to the device. The private key and the certificate are installed automatically. The installation is logged in the event logbook.
4. Remove the USB stick using the **"Safe removal"** function.



Notes:

- In the DIN rail version, the device will automatically copy any data not yet saved to the USB stick.
- Restart the device so the browser uses the new certificate.
- Delete the private key from the USB stick following installation.
- Keep the private key in a safe place.
- Use the private key and the certificate for one device only.
- To prevent unauthorized use, it is possible to disable the USB A port on the device. In this way, an attacker cannot replace the certificate or the private key ("Denial of Service"). Install a perimeter guard to prevent access to the device.

Checking certificates

Check the certificate via **"Main menu -> Diagnostics -> Device information -> SSL certificates"**. Select the **"Server certificate"** point under the certificate.



Replace the certificate in good time before it expires. The device will display a diagnostic message 14 days before the certificate expires.

Uninstalling certificates and the private key

Check the certificate via **"Main menu -> Diagnostics -> Device information -> SSL certificates"**. Select the **"Server certificate"** point under the certificate. Delete the certificate.



In this case, the preinstalled certificate is reused.

Using self-signed certificates



Self-signed certificates must be stored in the PC's certificate memory under "Trusted Root Certification Authorities" so that the browser does not display a warning.

Alternatively, an exception can be saved in the browser.

10 Maintenance

No special maintenance work is required for the device.

10.1 Cleaning

10.1.1 Cleaning of surfaces not in contact with the medium

- Recommendation: Use a lint-free cloth that is either dry or slightly dampened using water.
- Do not use any sharp objects or aggressive cleaning agents that corrode the surfaces (e.g. displays, housing) and seals.
- Do not use high-pressure steam.
- Observe the degree of protection of the device.



The cleaning agent used must be compatible with the materials of the device configuration. Do not use cleaning agents with concentrated mineral acids, bases or organic solvents.



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