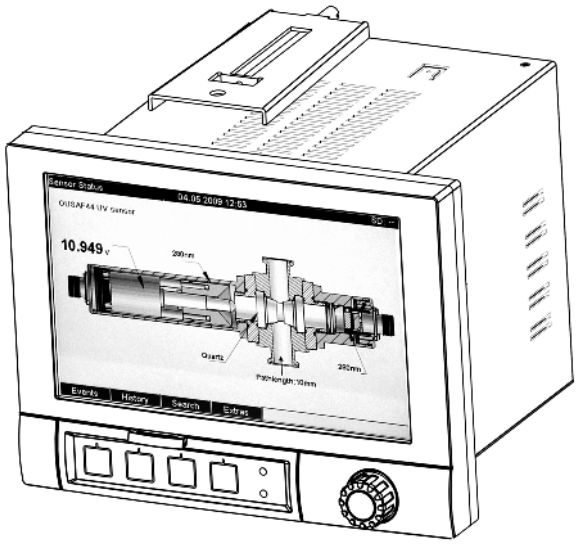
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Operating Instructions

Memograph CVM40

Graphic transmitter for inline photometers and data manager



BA457C/07/EN/13.10
71124499

Endress+Hauser

People for Process Automation

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1 Safety instructions

1.1 Designated use

This unit is designed for operating inline photometers for UV, color, NIR, turbidity and cell growth. Furthermore it can be used for the electronic acquisition, display, recording, analysis, remote transmission and archiving of analog and digital input signals in non-hazardous areas.
The unit is suitable for installation in a panel or a cabinet and may only be operated in an installed state.

Any other use than the one described here compromises the safety of persons and the entire measuring system and is not permitted.
The manufacturer is not liable for damage caused by improper or non-designated use.

1.2 Installation, commissioning and operation

Please note the following items:
- Installation, commissioning, operation and maintenance of the measuring system must only be carried out by trained technical personnel.
  Trained personnel must be authorized for the specified activities by the system operator.
- Electrical connection must only be carried out by a certified electrician.
- Technical personnel must have read and understood these Operating Instructions and must adhere to them.
- Before commissioning the entire measuring point, check all the connections. Ensure that electrical cables and hose connections are not damaged.
- Do not operate damaged products and secure them against unintentional commissioning. Mark the damaged product as being defective.
- Measuring point faults may only be rectified by authorized and specially trained personnel.
- If faults can not be rectified, the products must be taken out of service and secured against unintentional commissioning.
- Repairs not described in these Operating Instructions may only be carried out at the manufacturer's or by the service organization.

1.3 Operational safety

The measuring system has been designed and tested to the highest standards and left the factory in perfect functioning order.
Relevant regulations and European standards have been met.

As the user, you are responsible for complying with the following safety conditions:
- Installation instructions
- Local prevailing standards and regulations.

Immunity to interference
This instrument has been tested for electromagnetic compatibility in industrial use according to applicable European standards.
Protection against interference as specified above is valid only for an instrument connected according to the instructions in these Operating Instructions.

1.4 Return

If the device has to be repaired, please return it *cleaned* to the sales center responsible.
Please use the original packaging, if possible.

1.5 Notes on safety icons and symbols

Safety icons



Warning!
This symbol alerts you to hazards that can cause serious damage to the instrument or to persons if ignored.



Caution!
This symbol alerts you to possible faults which could arise from incorrect operation. They could cause damage to the instrument if ignored.



Note!
This symbol indicates important items of information.

Electrical symbols



Direct Current (DC)
A terminal at which DC is applied or through which DC flows.



Alternating Current (AC)
A terminal at which (sine-form) AC is applied or through which AC flows.



Ground connecting
A terminal which, from the user's point of view, is already grounded using a grounding system.



Protective ground terminal
A terminal which must be grounded before other connections may be set up.



Alarm relay



Input



Output

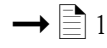


DC voltage source



Temperature sensor

1.6 Document symbols



This symbol indicates a cross reference to a defined page (e.g. p. 1).



This symbol indicates a cross reference to a defined figure (e.g. fig. 2).

2 Identification

2.1 Device designation

2.1.1 Nameplate

Compare the order code on the nameplate (on the device) with the product structure (see below) and your order.
You can identify the device version by the order code on the nameplate.

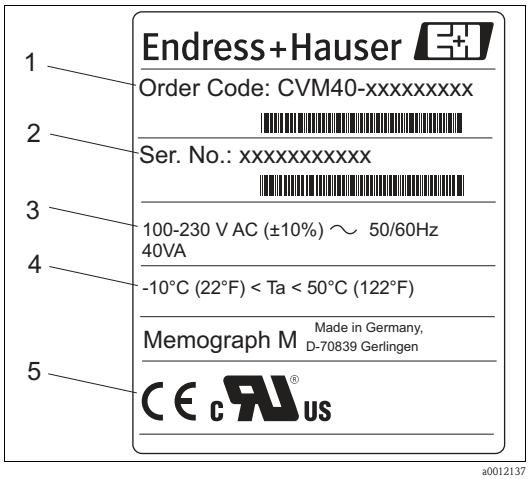


Fig. 1: Example of a nameplate

1 Order code
2 Serial number
3 Supply voltage, power frequency, power consumption
4 Ambient temperature range
5 Approvals

2.1.2 Ordering information

	Approval							
	AA	Non-hazardous area						
		Input signal						
		1	1 x optical channel					
		2	2 x optical channel					
		4	4 x optical channel					
			Power supply					
			A	100 to 230 VAC (± 10 %)				
			B	24 VAC/DC				
				Housing				
				1	Panel 144 x 190, IP 65, NEMA 4			
				2	Field housing, IP 65, NEMA 4			
					Operation language			
					A	America (de, en, fr, es, pt)		
						Software		
						1	Mathematics package	
							Calibration	
							A	Single order/spare part (stand alone)
							B	Calibration with sensor/cable position (complete measuring system)
CVM40-								complete order code

	Accessory enclosed (optional, multiple selection possible)
M1	SD card, 256 MB
M2	SD card, 512 MB

	Communication (optional, select one option only)
N1	PROFIBUS DP Slave, max. 40x, analog
N2	Modbus RTU, max. 40x analog, 14x digital
N3	Modbus TCP, max. 40x analog, 14x digital



Note!
To complete your order code, simply add the optional features to the end of the order code. If you have any questions, please contact your local sales office.

2.2 Scope of delivery

The scope of delivery comprises:
- Device (with terminals, as per your order)
- 2 fastening clips
- USB interface cable, length 1.5 m (4.9 ft)
- Optional secure digital (SD) card (card not in device but is supplied)
- PC operating and configuration software on CD-ROM
- Lamp voltage sense tool
- Brief Operating Instructions as hard copy
- Operating Instructions on CD-ROM

If you have any questions, please contact your supplier or your local sales center.

2.3 Certificates and approvals

Declaration of conformity
The product meets the requirements of the harmonized European standards. It thus complies with the legal requirements of the EC directives.
The manufacturer confirms successful testing of the product by affixing the CE symbol.

UL-listed for Canada and USA
The device has been examined by Underwriters Laboratories Inc. (UL) in compliance with the UL 601010-1 and CSA C22.2 No. 61010-1 standards and has been UL-listed under the number E225237.

FDA
FDA 21 CFR
The device meets the requirements of the "Food and Drug Administration" for electronic recording/electronic signature.

3 Installation

3.1 Incoming acceptance, transport, storage

- Make sure the packaging is undamaged!
  Inform the supplier about any damage to the packaging.
  Keep the damaged packaging until the matter has been settled.
- Make sure the contents are undamaged!
  Inform the supplier about damage to the contents. Keep the damaged products until the matter has been settled.
- Check that the order is complete and agrees with your shipping documents.
- The packaging material used to store or to transport the product must provide shock protection and humidity protection. The original packaging offers the best protection. Also, keep to the approved ambient conditions (see "Technical data").
- If you have any questions, please contact your supplier or your local sales center.

3.2 Measuring system

A complete measuring system comprises:
- Memograph M CVM40
- An optical sensor, e.g. OUSAF44
- Flow assembly, e.g. OUA260
- Cable set, e.g. OUK40

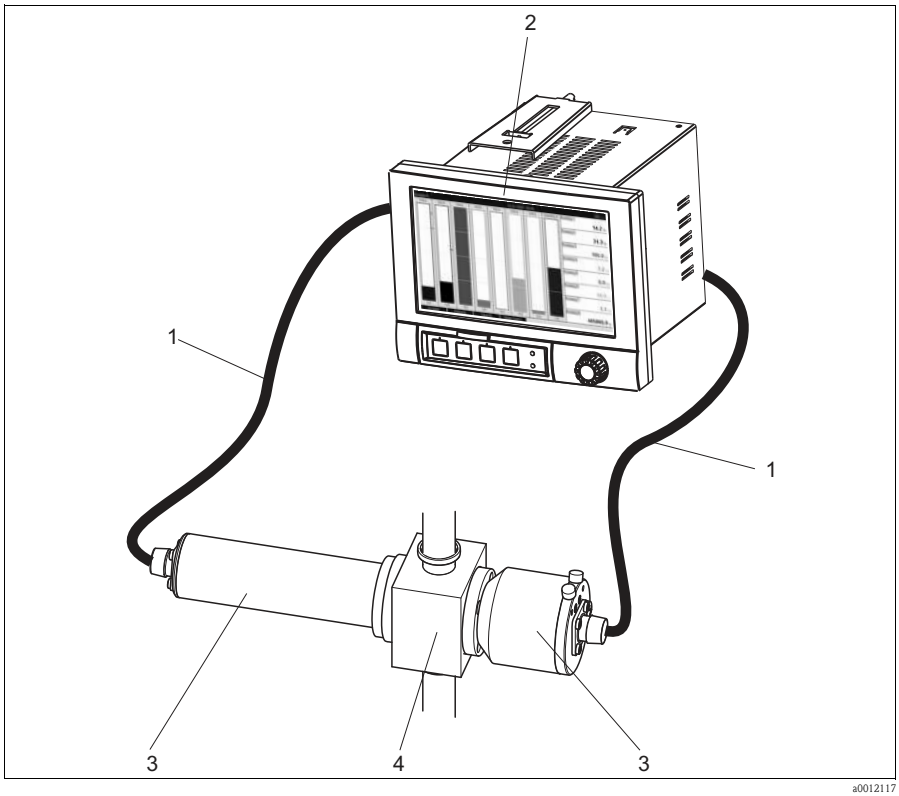


Fig. 2: Example of a measuring system

1 Cable set OUK40
2 Memograph M CVM40 photometer
3 OUSAF44 sensor
4 OUA260 flow assembly

3.3 Installation conditions

Working temperature range:
–10 to 50 °C (14 to 122 °F), max. 75% rel. humidity without condensation.

Caution!
- To avoid heat accumulation, please always ensure that the unit is sufficiently cooled.
- Maintain distance from strong magnetic fields (see Section 10 "Technical data", interference immunity)
- Permitted ambient conditions at front: in accordance with unit ingress protection of max. IP65 (with front flap closed)

3.4 Installation instructions

3.4.1 Mounting the device

Panel cutout and installation / design, dimensions

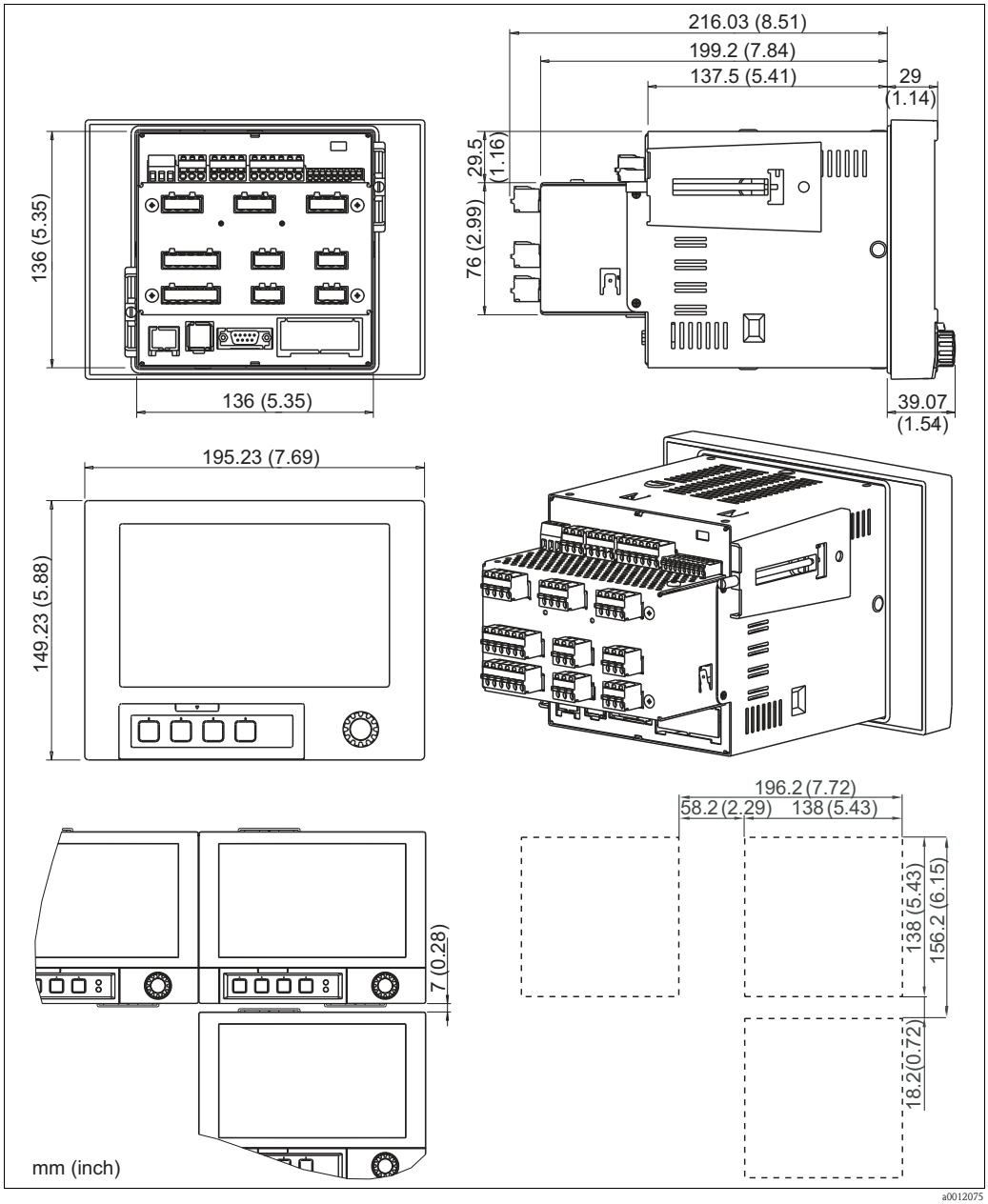


Fig. 3: Dimensions / panel cutout

Mounting dimensions:
- Installation depth: approx. 216 mm (8.51") (incl. terminals)
- Panel cutout: 138^{+1} x 138^{+1} mm ($5.43^{+0.04}$ x $5.43^{+0.04}$")
- Panel thickness: 2 to 40 mm (0.08 to 1.58")
- Max. viewing angle range: from the central display axis 50° in all directions
- Securing according to DIN 43 834

Note!
Make sure to leave an additional clearance of min. 35 mm (1.4") for cable connection.

1. Push the unit through the panel cutout from the front. To avoid heat accumulation, we recommend keeping a distance of > 15 mm (>0.59 inch) from the walls and other units.
2. Hold the unit horizontally and then hang the two jack screws in the openings opposite (either on left or right housing side, or at top or bottom).
3. Tighten the screws on the jack screws equally with a screwdriver such that a secure seal to the control panel is guaranteed.

Note the following points for installation:
- A distance of min. 7 mm (0.28") has to be observed if aligning the devices in the Y direction (vertically above on another).
- The devices can be arranged horizontally beside on another in the X direction without any spacing between the devices.
- The grid dimension of the panel cutouts for multiple devices must be min. 196.2 mm (7.72") horizontally and min. 156.2 mm (6.15") vertically (tolerance not considered).

3.5 Post-installation check

- After installation, check the device for damage.
- Check whether the device is fixed firmly in the center of the control panel cutout.

4 Wiring

4.1 Electrical connection

Warning!
- The electrical connection must only be carried out by a certified electrician.
- Technical personnel must have read and understood the instructions in this manual and must adhere to them.
- Ensure that there is no voltage at the power cable before beginning the connection work.

Caution!
- The ground connection must be made before all other connections. Any interruption in the ground can cause danger.
- Before commissioning, compare the supply voltage with the information specified on the nameplate (left-hand side of the housing).
- The mixed connection of safe extra-low voltage and dangerous contact voltage to the relay is not permitted.
- Provide a suitable switch or circuit breaker when installing in a building. This switch must be installed near the unit (easily accessible) and must be properly labeled.
- An overcurrent protective unit (nominal current ≤ 10 A) is required for the power cable.

4.2 Wiring diagram

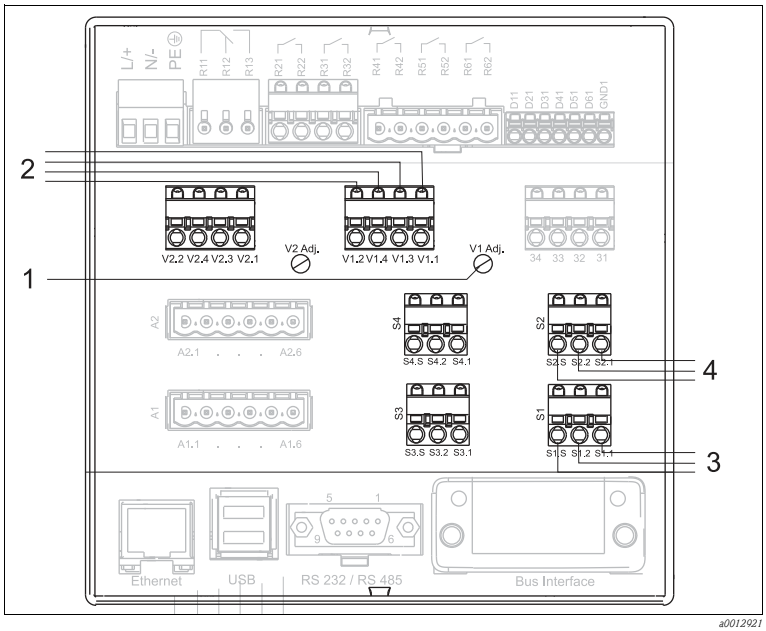


Fig. 4: Wiring diagram with terminals for lamps and sensors

1 Lamp voltage adjustment
Turn clockwise: voltage decrease
Turn counter-clockwise: voltage increase

2 V1.1: Lamp voltage + (Yellow bold)
V1.3: Lamp sense + (Yellow thin)
V1.4: Lamp sense - (Black thin)
V1.2: Lamp voltage - (Black bold)

3 S1.1: Photo diode anode (Red for measurement detector)
S1.2: Photo diode cathode (Black for measurement detector)
S1.S: Shield (Grey)

4 S2.1: Photo diode anode (White for reference detector)
S2.2: Photo diode cathode (Green for reference detector)
S2.S: Shield (Grey)

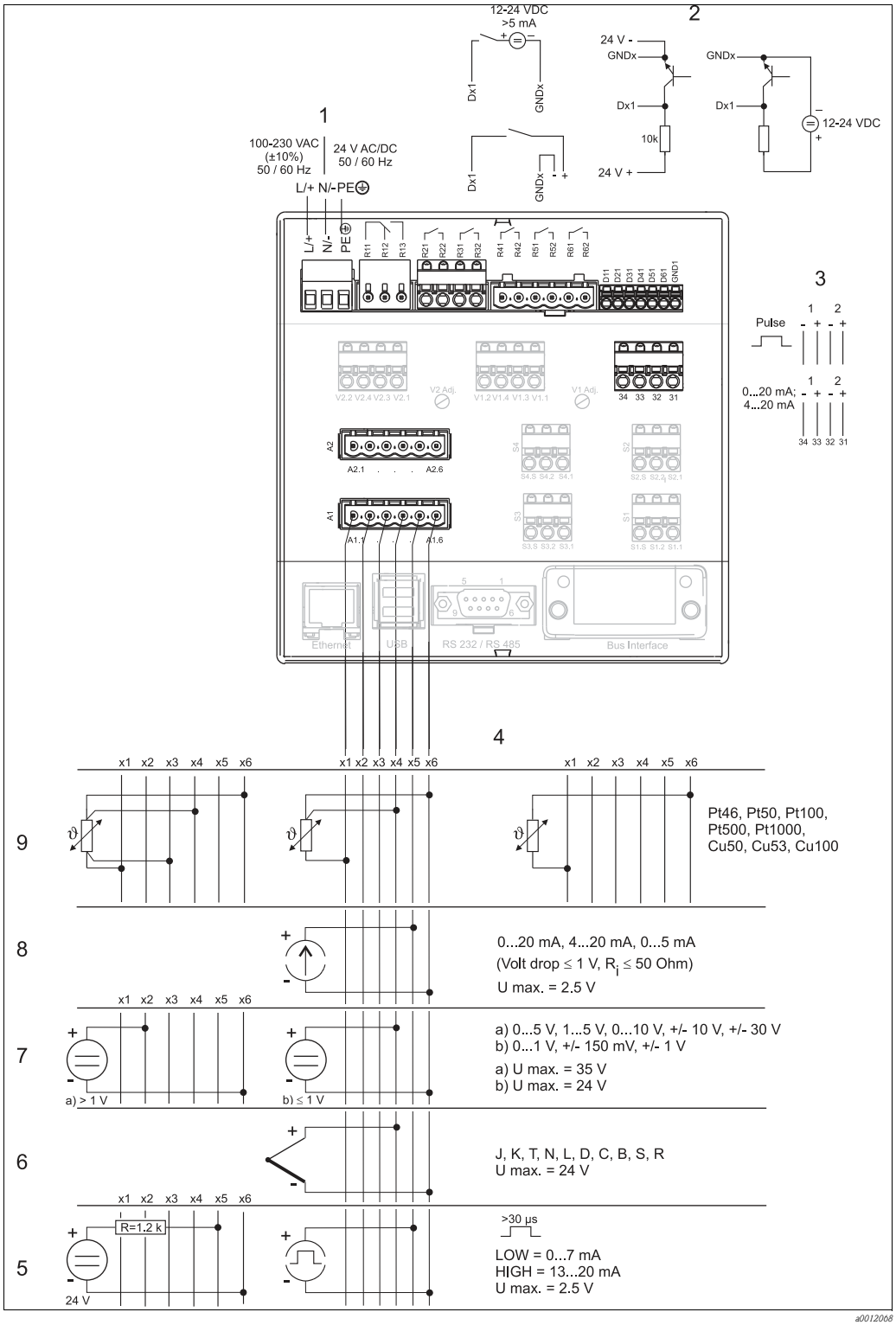


Fig. 5: Wiring diagram

1 Power supply
2 Binary inputs (D)
3 Analog outputs (O)
4 Analog inputs
5 Pulse / frequency
6 Thermocouples (TC)
7 Voltage (U)
8 Current (I)
9 Resistance thermometer (RTD)

4.3 Terminal assignment

Caution!
If high-energy transients occur when using long signal cables, we recommend connecting a suitable overvoltage protection (e.g. E+H HAW560/562).
Use shielded signal lines for serial interfaces!

4.3.1 Cable specification, spring terminals

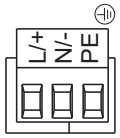
All connections on the rear of the unit are designed as screw or spring terminal blocks with reverse polarity protection. This makes the connection very quick and easy. The spring terminals are actuated with a slotted screwdriver (size 0).

Wire cross-sections:

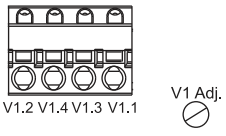
Digital I/O and analog inputs:	max. 1.5 mm^2 (14 AWG) (spring terminals)
Power supply:	max. 2.5 mm^2 (13 AWG) (screw terminals)
Relays:	max. 2.5 mm^2 (13 AWG) (spring terminals)
Stripped length:	10 mm (0.39 inch), 6 mm (0.24 inch) for power terminal

Note!
No ferrules need to be used when connecting flexible wires to spring terminals.

4.3.2 Power supply

Power unit type	**Terminal** 		
100-230 V AC	**L/+**	**N/-**	**PE**
	Phase L	Zero conductor N	Protective ground
24 V AC/DC	**L/+**	**N/-**	**PE**
	Phase L or +	Zero conductor N or –	Protective ground

4.3.3 Lamp terminals

Type	**Terminal** 			
	Vx.2	**Vx.4**	**Vx.3**	**Vx.1**
Lamp 1-2	Lamp voltage - (Black bold)	Lamp sense – (Black thin)	Lamp sense + (Yellow thin)	Lamp voltage + (Yellow bold)

Lamp voltage adjustment (Vx Adj.):

- Turn clockwise to decrease voltage.
- Turn counter-clockwise to increase voltage.

Lamp voltage sense tool:
The lamp voltage sense tool allows to read the lamp voltage on the display of CVM40 without the cable and sensor connected.
This procedure is only necessary when changing the sensor type. E.g. when changing from an OUSAF44 sensor to an OUSTF10 sensor, the lamp voltage needs to be reduced from 12V to 5V. User has to do this change prior to connecting the sensor.

Caution!
Use this tool before connecting any new sensor type to the transmitter.
Failure in doing so can damage the lamp.

By using the lamp voltage sense tool the lamp voltage can be adjusted approximately to the rated value before connecting the sensor. Connect the power supply pin V1.1 and V1.2 to voltage sense pin V1.3 and V1.4.

The following steps are required for changing the sensor type:

1. Disconnect the cable set of the old sensor.
2. Connect the lamp voltage sense tool to the lamp power supply.
3. Adjust the voltage trimmer to the rated lamp voltage.
4. Take off the voltage sense tool.
5. Connect the cable set of the new sensor to the lamp power supply.
6. Observe the lamp voltage on the display and fine tune the lamp voltage to compensate the voltage drop on the cable.

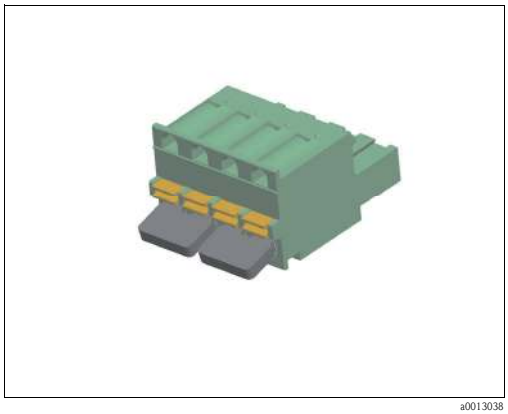
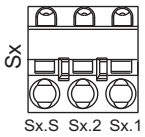


Fig. 6: Lamp voltage sense tool

4.3.4 Sensor terminals

Type	Terminal		
			
	Sx.S	**Sx.2**	**Sx.1**
Sensor (e.g. OUSAF44)	Shield (Grey)	Photo diode cathode (Black for measurement detector, green for reference detector)	Photo diode anode (Red for measurement detector, white for reference detector)

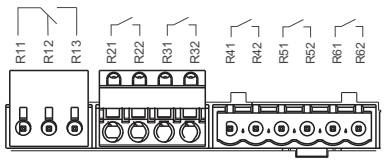
Single channel sensors:
Use S1 for sensor 1 and S2 for sensor 2.

Dual channel sensors:
Use S1 for measurement detector (scattered light) and S2 for reference detector (direct light).

Four channel sensor OUSAF46:

- Use S1 for measurement at wavelength 1.
- Use S2 for reference at wavelength 1.
- Use S3 for measurement at wavelength 2.
- Use S4 for reference at wavelength 2.

4.3.5 Relays

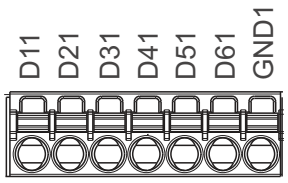
Type	Terminal				
					
	R11	**R12**	**R13**	**Rx1**	**Rx2**
Alarm relay 1	Changeover contact	Normally closed contact (NC)	Normally open contact (NO)		
Relay 2 - 6				Switching contact	Normally open contact (NO)

Note!

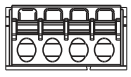
- The opening and closing function (= activation or deactivation of the relay coil) in the event of a limit value can be defined in the setup "Setup -> Outputs -> Relay -> Relay x".
  If the power fails, the relay assumes its quiescent switching position regardless of the programming.
- If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".

4.3.6 Binary inputs

Note!
If the auxiliary voltage is to be used for the binary inputs, the "–" terminal of the 24 V auxiliary voltage has to be connected to the "GND1" terminal.

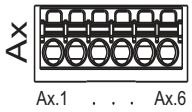
Type	Terminal 								
	D11	**D21**	**D31**	**D41**	**D51**	**D61**	**GND1**	**(–)**	**(+)**
Binary input 1 - 6	Binary input 1 (+)	Binary input 2 (+)	Binary input 3 (+)	Binary input 4 (+)	Binary input 5 (+)	Binary input 6 (+)	Ground (-) for binary inputs 1-6		
Auxiliary voltage output, not stabilized, max. 200 mA								Ground	Approx. + 24 V

4.3.7 Analog outputs

Type	Terminal 			
	34	**33**	**32**	**31**
Analog output 1-2	Ground analog output 2 (–)	Analog output 2 (+)	Ground analog output 1 (–)	Analog output 1 (+)

4.3.8 Analog inputs

The first digit (x) of the two-digit terminal number corresponds to the related channel (e.g. Ch1: 11, 12, 13, 14, 15, 16):

Type	Terminal  					
	x1	**x2**	**x3**	**x4**	**x5**	**x6**
Current/pulse/frequency input					(+)	(–)
Voltage > 1 V		(+)				(–)
Voltage ≤ 1 V				(+)		(–)
Resistance thermometer RTD (2-wire)	(A)					(B)
Resistance thermometer RTD (3-wire)	(A)			b (sense)		(B)
Resistance thermometer RTD (4-wire)	(A)		a (sense)	b (sense)		(B)
Thermocouples TC				(+)		(–)

4.4 Interface connection

4.4.1 USB socket/SD slot at the front of the device

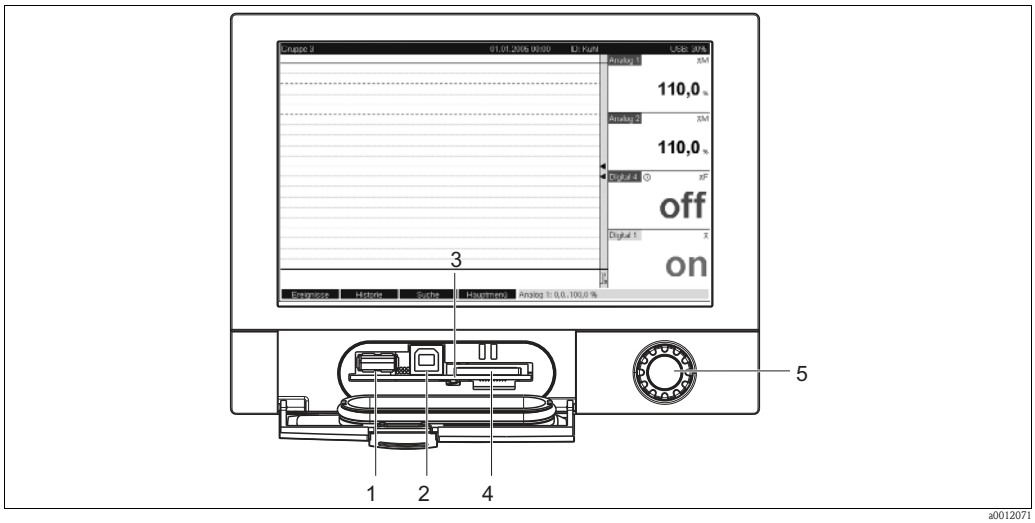


Fig. 7: Front unit with open flap/keyboard

1 USB A socket "Host", e.g. for USB memory stick, external keyboard, bar code reader or printer
2 USB B socket "Function", e.g. to connect PC or laptop
3 LED at SD slot, yellow LED lit when the unit writes to the SD card or reads it
4 Slot for SD card
5 Navigator

1 x USB connection, type A (host)
A USB 2.0 connection is available on a shielded USB A socket at the front of the unit. A USB stick as a memory medium, a keyboard, a USB hub, a bar code reader or a printer (PCL5c or higher) can be connected to this interface.

1 x USB connection, type B (function)
A USB 2.0 connection is available on a shielded USB B socket at the front of the unit. This can be used to connect the unit for communication with a laptop for example.

1 x SD slot
A SD slot is available at the front of the unit. A SD card can be used as a memory medium.

4.4.2 USB at the rear of the device

2 x USB connection, type A (host) (interface slot)
Two USB 2.0 connections are available on shielded USB A sockets at the rear of the unit. A USB stick as a memory medium, a keyboard, a USB hub, a bar code reader or a printer (PCL5c or higher) can be connected to these interfaces.

Note!
- The USB 2.0 connections are compatible with USB 1.1, i.e. communication is possible.
- The assignment of the USB ports corresponds to the standard such that shielded standard cables with a maximum length of 3 meters (9.8 ft) can be used here.
- Multiple USB sticks cannot be operated simultaneously. The USB stick that was first connected has priority.

4.4.3 Points to note concerning USB devices



Note!
The USB devices are detected by the "plug-and-play" function. If several devices of the same type (e.g. printer) are connected, only the first USB device connected is available.
Settings for the USB devices are made in the setup.
A maximum of 8 external USB devices (incl. USB hub) can be connected if they do not exceed the maximum load of 500 mA. If overloaded, the corresponding USB devices are automatically disabled.

Requirements for use of an external USB hub

If USB devices are deactivated due to the 500 mA device limit, such devices can be connected by means of a USB hub. Only active USB hubs (i.e. hubs with their own power supply) can be connected to the device. Hubs with an "overcurrent protection" are recommended. A maximum of 1 hub can be connected to the device.

Requirements for use of a USB stick/SD card

USB sticks/SD cards supported: 256 MB, 512 MB, 1 GB and 2 GB. It cannot be ensured that USB sticks from all manufacturers will work perfectly. For this reason, an "Industrial Grade" SD card is recommended for safe data recording (see Accessories).

Requirements for use of an external USB keyboard

The system only supports keyboards which can be addressed using generic drivers (HID keyboard (human interface unit)). Special keys are not supported (e.g. Windows keys). Users can only enter characters that are available in the entry character set of the unit. All unsupported characters are rejected. It is not possible to connect a wireless keyboard.
The following keyboard assignments are supported: DE, CH, FR, USA, UK, IT.
See setting under "Setup -> System -> Keyboard".

Requirements for use of an external USB bar code reader

The connected bar code reader has to act like a HID keyboard (human interface unit) (universal keyboard driver). The bar code reader must complete every bar code with a carriage return (0x0D) + line feed (0x0A).

Before connecting the bar code reader to the unit, it should be checked at a PC:

1. Connect the bar code reader and wait until Microsoft Windows® recognizes the unit as a HID keyboard and installs it (check with the Windows unit manager).
2. Configure the bar code reader as specified in the Operating Instructions of the bar code reader.
3. Start the Notepad (editor).
4. Using the bar code reader, read in a bar code (as it is used later) and check it.
5. Only connect the bar code reader to the unit once the bar code reader has been correctly configured and tested on the PC.
6. Select the character set at the unit under "Setup -> System -> Bar code reader -> Character set". The following character sets are supported: DE, CH, FR, USA, UK, IT.
   Note: This setting has to be identical to the configuration of the bar code reader!
   The system only reads characters that are available in the entry character set of the unit. All other characters are rejected.
7. The bar code reader should also be tested at the unit via "Main menu -> Diagnosis/simulation -> Simulation -> Test bar code reader".

If problems arise, please contact the manufacturer of the bar code reader.

Reference list: Datalogic Gryphon D230, Metrologic MS5100 Eclipse Series, Symbol LS2208

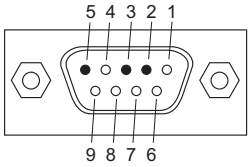
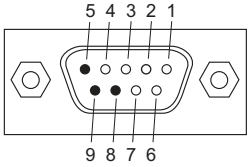
Requirements for use of an external USB printer

The printer must support PCL5c (or higher). Laser jet and ink jet printers are supported. The printouts are always color printouts (if supported by the printer). The printout has different shades of gray if you use a black/white printer.
Reference list: HP Color LaserJet CP1515n, Kyocera FS-C5015N

Note!
GDI printers are not supported!

4.4.4 RS232/RS485 interface

RS232/RS485 connection
A combined RS232/RS485 connection is available on a shielded SUB D9 socket at the rear of the unit. This can be used for data or program transfer and to connect a modem. For communication via modem, we recommend an industrial modem with a watchdog function.

	Pin of the SUB-D9 socket								
	1	**2**	**3**	**4**	**5**	**6**	7	8	**9**
RS232 assignment		TxD (data output)	RxD (data input)		GND				
	Fig. 8: RS232 assignment 				Caution! Unoccupied connections should be left empty. The maximum cable length is 2 m (6.6 ft).				
RS485 assignment					GND			RxD/TxD –	RxD/TxD –
	Fig. 9: RS485 assignment 				Caution! Unoccupied connections should be left empty. The maximum cable length is 1000 m (3280 ft).				

Caution!
Only one interface can be used at a time (RS232 **or** RS485). Select the interface to be used under "Extras > Serial Interface".

4.4.5 Ethernet

In principle, a unit equipped with an internal Ethernet interface can be integrated into a PC network (TCP/IP Ethernet). The unit(s) can be accessed by any of the PCs in the network using the PC operating and configuration software supplied.
Using DHCP,[1)] the fully automated integration of a new unit into an existing network is possible without any additional configuration. Normally, only automatic IP address acquisition has to be configured at the client. When the unit is started in the network, it can automatically get the IP address, subnetmask or gateway from a DHCP server. Without DHCP, these settings have to be made directly in the unit (depending on the network to which the unit should be connected).

Note!
- The IP address assigned by DHCP is required in the PC software supplied to be able to communicate with the unit. It can be viewed under "Setup > System > Communication > Ethernet" or under "Diagnosis / Simulation > Device information / ENP".
- If the unit has been switched off for an extended period, it is given a new "leasing time" IP address. Alternatively, the network administrator can also set up the system such that the unit is always given the same IP address.
- A maximum of 5 Ethernet connections can be established to the unit at the same time (e.g. 2 x PC software and 3x per Web server).
- If multiple PCs are to read out stored measured values (via different Ethernet connections or other communication interfaces such as a USB, for example), these PCs must receive different read-out IDs (configure in the PC software supplied under "Unit > Display/change unit setup/add new unit > Select unit > Extras > Unit readout").

Ethernet connection

An IEEE 802.3-compatible connection is available on a shielded RJ45 plug connector on the rear of the unit as the network connection. This can be used to connect the unit with a hub or switch to units in an office environment. For safe spacing distances, the office equipment standard EN 60950 must be observed. The assignment corresponds to a standards-compliant MDI port (AT&T258) such that a shielded 1:1 cable with a maximum length of 100 meters (328 ft) can be used here. The Ethernet port is designed as 10/100–BASE–T. Direct connection to a PC is possible with a crossover cable. Half-duplex and full-duplex data transfer is supported. Alternatively, a GPRS modem can also be connected to the Ethernet interface.

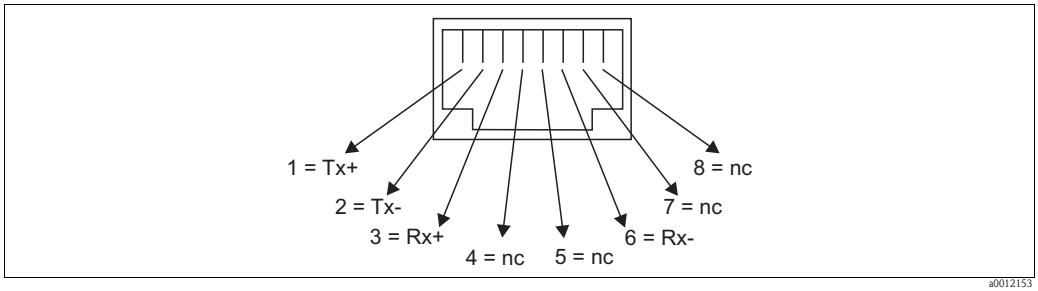


Fig. 10: Rj45 assignment

Meaning of the LEDs

Beneath the Ethernet connection (see rear of unit) there are two light emitting diodes which indicate the status of the Ethernet interface.

- Yellow LED: link signal; is on when the unit is connected to a network. If this LED is not illuminated then communication is impossible.
- Green LED: Tx/Rx; when the unit is receiving or sending data it flashes irregularly, otherwise is continuously on.

1) DHCP: In conjunction with an appropriate server, the Dynamic Host Configuration Protocol (DHCP) makes it possible to dynamically assign an IP address and additional configuration parameters of a unit in a network (e.g. Internet or LAN).

4.4.6 PROFIBUS or Modbus option

- PROFIBUS–DP slave:
  The unit can be integrated into a fieldbus system as per the PROFIBUS–DP standard by means of the PROFIBUS-DP interface. Up to 40 analog inputs and 14 digital inputs can be transmitted via PROFIBUS–DP and stored in the unit. For bidirectional communication in cyclic data transfer.
  Baudrate: maximum 12 Mbit/s
- Modbus RTU slave:
  Up to 40 analog inputs and 14 digital inputs can be transmitted via Modbus and stored in the unit.
- Ethernet Modbus TCP slave:
  Connection to SCADA systems (Modbus master). Up to 40 analog inputs and 14 digital inputs can be transmitted via Modbus and stored in the unit.

4.5 Post-connection check

After the electrical connection, carry out the following checks:

Device condition and specifications	Notes
Are the unit and cables damaged on the outside?	Visual inspection

Electrical connection	Notes
Does the supply voltage match the information on the nameplate?	Compare nameplate on the unit.
Are the mounted cables strain relieved?	
Does the cable run without loops and cross-overs?	
Are all terminals fimly seated at the contacts?	

5 Operation

5.1 Display and operating elements

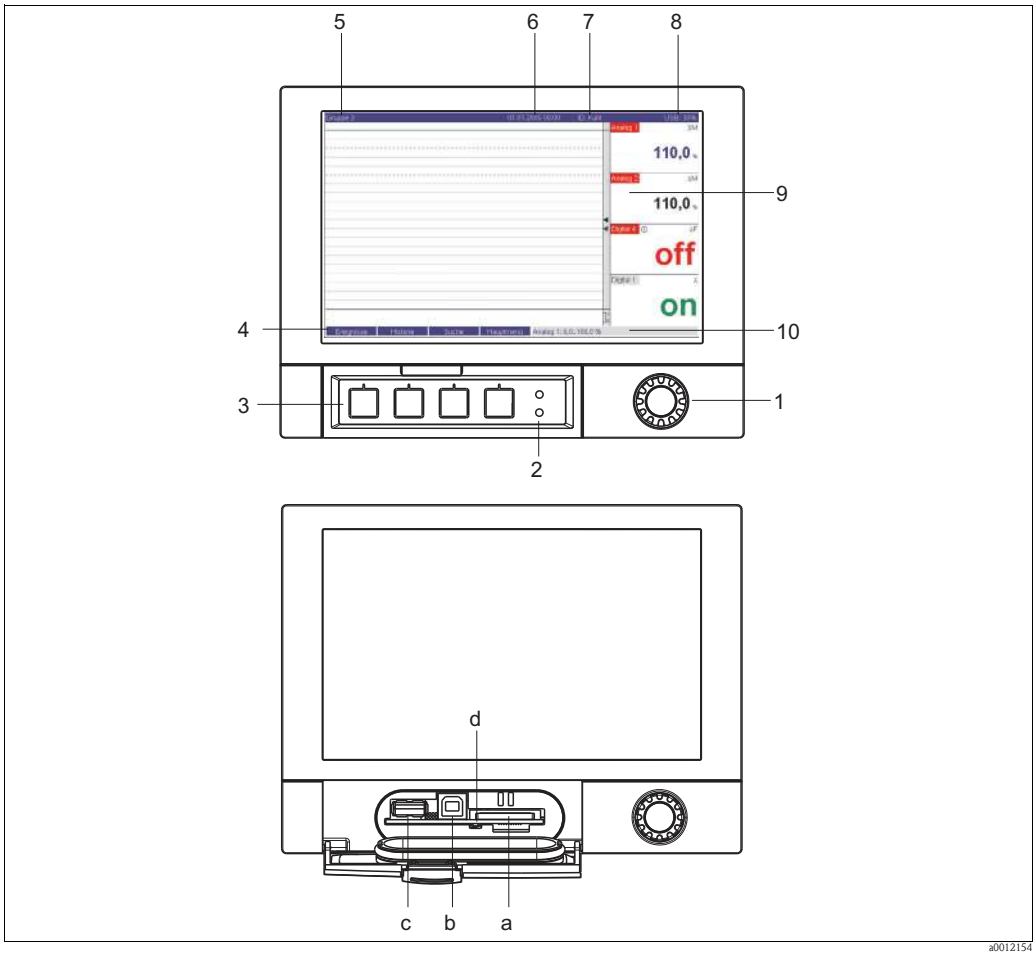


Fig. 11: Device display/operating units

Operating element (Item No.)	Operating function (Display mode = measured value display) (Setup mode = operating in the Setup menu)
1	"Navigator" jog/shuttle dial for operating with additional press function. In the Display mode: turn the dial to switch between the various signal groups. Press the dial to display the main menu. In the Setup mode or in a selection menu: turn the dial counter-clockwise to move the bar or the cursor upwards or left, changes the parameter. Turning clockwise moves the bar or cursor down or right, changes parameter. Press = selects the highlighted function, starts parameter change (ENTER).
2	Functions of the LED display (as per NAMUR NE44:) ■ Green LED (top) lights up: power supply OK, unit working without faults ■ Red LED (bottom) flashes: need for maintenance if unit-external problem occurs (e.g. cable open circuit etc.) or a message / note to be acknowledged is pending, calibration in progress.
3	Variable softkeys 1 to 4 (from left to right)
4	Softkey function indicator
5	In the Display mode: current group name, type of evaluation In the Setup mode: name of the current operating item (dialog title)

Operating element (Item No.)	Operating function (Display mode = measured value display) (Setup mode = operating in the Setup menu)
6	In the Display mode: displays current date/time In the Setup mode: —
7	In the Display mode: user ID (if the function is enabled) In the Setup mode: —
8	In the Display mode: alternating display indicating what percentage of the SD card or USB stick has already been written to. Status symbols are displayed for the following functions (alternate with the memory information): simulation mode, data storage active, operating lock, batch active [1)] In the Setup mode: the current "direct access" operating code is displayed
9	In the Display mode: screen for measured value display Displays the current measured values, and the status in a fault/alarm condition, depending on the signal display selected. In the case of counters, the type of counter is displayed as a symbol [1)]. Note! If a measuring point has limit value status, the corresponding channel identifier is highlighted in red (quick detection of limit values). When you are operating the unit, measured value acquisition continues to run without interruption.
10	In the Display mode: alternating status display (e.g. set zoom range) of the photometric measurement, the analog or digital inputs in the appropriate color of the channel. In the Setup mode: different information can be displayed here depending on the display type.
a	Slot for SD card Caution! Do not remove the SD card if the yellow LED (d) is lit! Risk of data loss!
b	USB B socket type "function" e.g. for laptop
c	USB A socket type "host" e.g. for USB stick
d	LED at SD slot Yellow LED lit when the unit writes to the SD card or reads it. Caution! Do not remove the SD card if the yellow LED is lit! Risk of data loss!

1) Overview of symbols, Chapter "Overview of the symbols used".

5.2 Entering texts and numbers

5.2.1 Virtual keyboard

A virtual keyboard is available for entering text and numbers. This is opened automatically if needed. Here, turn the navigator to select the corresponding character and press the navigator to accept it.

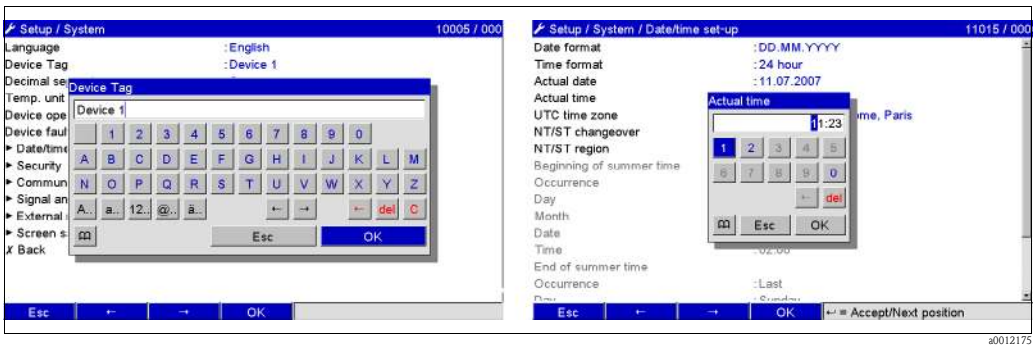


Fig. 12: Virtual keyboard

5.2.2 External USB keyboard

Keys F1 to F4 correspond to softkeys 1 to 4 of the unit. Keys F5 to F12 are assigned as follows (only if the unit is in the measured value display mode. Otherwise no function is assigned to the keys):

- F5: Event log/audit trail
- F6: Safe SD card removal
- F7: Safe USB stick removal
- F8: Screenshot (only if an SD card or USB stick is connected)
- F9: Not assigned
- F10: Not assigned
- F11: Login (only if user administration is activated)
- F12: Logout (only if user administration is activated)

The context menu can be launched with the "Shift+Enter" key combination.

5.3 Overview of the display symbols

Symbol	Explanation	Symbol	Explanation
	Comment/subsequent reporting		Analysis 1
	Help		Analysis 2
	Telealarm (option): alarm active!		Analysis 3
	Warning		Analysis 4
	Information		Intermediate statistics
	Confirmation		Daily analysis
	Unit locked/operating lock		Weekly analysis
	External communication		Monthly analysis
	Sequence active (bar code reader waiting for input)		Annual analysis

Symbol	Explanation	Symbol	Explanation
	Lower limit value		Total analysis
	Upper limit value		Save to SD card/USB stick
	Limit value gradient increasing		Measured value simulation
	Limit value gradient decreasing		Power off

5.4 Confirming error messages

The process for confirming error messages depends on whether user administration as per FDA 21 CFR Part 11 is enabled or not.

1. User administration not enabled:
   Error messages on the display are acknowledged by pressing the navigator.
2. User administration enabled:
   The confirmation of messages can be configured in different ways. See "Main menu > User administration > General > Acknowledging messages"
   – Messages do not have to be confirmed with a password. Select "No".
   – Messages have to be confirmed with an ID and password. The user logged onto the unit beforehand remains logged on. Select "Yes, same user".
   – Messages have to be confirmed with an ID and password. This user is logged onto the unit from this point onwards.

5.5 Communication

Note!
Version V1.22.0.0 (or higher) of the supplied PC software must be installed to be able to establish communication between the unit and the PC. To be on the safe side, you should install the current PC software package (CD–ROM supplied).

5.5.1 Installing the supplied PC software

Note!
The "Arial Unicode MS™" font must be installed on your PC to operate the supplied PC software. Otherwise certain characters might be displayed incorrectly or not at all. Check this on your PC under "Control Panel > Fonts". If this font is not installed, please refer to your Microsoft Office® or Microsoft Windows® manual.

Note!
Administrator authorization is needed to install the software.

1. Install the supplied PC software on your computer. The program's Operating Instructions can be printed out after installation, if required.
2. Once the PC software has been installed successfully, you can launch the software under "Start > All programs".

5.5.2 Communication via USB/USB driver installation

Once the PC software supplied has been installed successfully, the unit can be connected to the PC with a USB cable. The operating system automatically recognizes the new USB unit.

Note!
Proceed as follows to then install the USB driver (depends on operating system):

1. The Windows prompt "Should a connection be established with Windows Update to look for software?" appears. Click "No, not this time" and then "Next".
2. The "What do you want the wizard to do?" window appears. Select "Install the software automatically (Recommended)" and then click "Next".

You can now start the supplied PC software to establish communication with the unit.

Caution!
Wait at least 15 seconds before plugging in and out the USB connection from the PC to the unit once more!

5.5.3 Communication via serial interfaces RS232/RS485

The RS232/RS485 serial interface can be accessed from the rear (9-pin Sub-D socket).

Note!
It is not possible to use the RS232 and RS485 interface simultaneously. The desired interface type must be selected in the setup under "System – Communication - Serial Interface".

Caution!
When using an RS232/RS485 converter, ensure that it supports automatic changeover between "sending" and "receiving" (e.g. W+T type 86000).

5.5.4 Communication via modem

In principle, any modem with a complete AT command set can be used for data transfer between your unit with RS232 interface and the supplied PC software.

Note!
An industrial modem with a watchdog function is recommended (e.g. WESTERMO or Devolo).

Connecting the modem to the unit:
The modem's original cable cannot be used for this because the unit and the modem have the same pin assignments at the interface plug. For this reason, if possible use the modem cable "RXU10-A1" which is available as an accessory. Alternatively, an appropriate modem cable can be made following the drawing below. Only three cables are required (TxD, RxD, GND) and 2 bridges are required on the modem side:

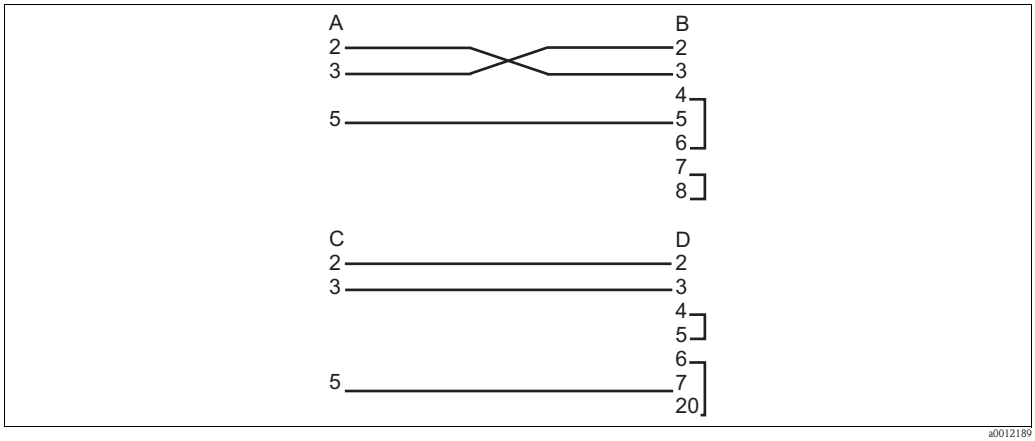


Fig. 13: Modem cable assignment at the unit via RS232

A Unit SUB-D 9-pin
B Modem SUB-D 9-pin
C Unit SUB-D 9- pin
D Modem SUB-D 25-pin

Initializing the modem at the unit:
The modem connected to the unit first has to be initialized:
1. Under "Setup > System > Communication > Serial interface", set the baud rate the modem supports.
2. In the main menu, select "Diagnosis/Simulation > Initialize modem".
3. A message appears on the display stating that the modem has been initialized.

Connecting the modem with the PC:
The modem, which works from the PC, does not have to be initialized. Connection to the PC is made with the original modem cable (normally included with the modem).
The first connection to the receiver is made as follows:

- In the PC software supplied, select "Display/change unit setup - Add new unit".
- Select unit, set interface parameters manually (COM, baudrate, number of data bits, parity)
- Activate modem operation - set up modem
- Enter receiver's telephone number.
- Now enter the telephone number under which the unit connected by modem can be reached and start the connection with "OK".

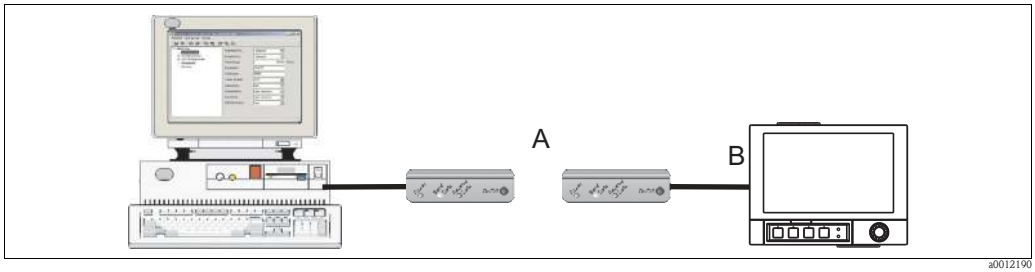


Fig. 14: Modem connection at unit and PC

5.5.5 Communication via Ethernet (TCP/IP)

In principle, all units equipped with an internal Ethernet interface can be integrated into a PC network (TCP/IP Ethernet).
The unit(s) can be accessed by any of the PCs in the network using PC software supplied. There is no need to install driver software ("COM redirection") on the PC because the supplied PC software has direct access to the Ethernet.
The system parameters "IP address", "Subnetmask" and "Gateway" are input directly at the unit. Changes to the system parameters are not activated until the SETUP menu is closed and the settings accepted. Only then will the unit work with the new settings.

Ethernet commissioning
Before a connection can be established via the PC network, the system parameters in the unit must be set via "Setup > System > Communication > Ethernet". Alternatively, DHCP can be used to allow the fully automated integration of a new unit into an existing network without the need for additional configuration settings (see Section 4.4.5 "Ethernet").

Note!
You can obtain the system parameters from your relevant network administrator.

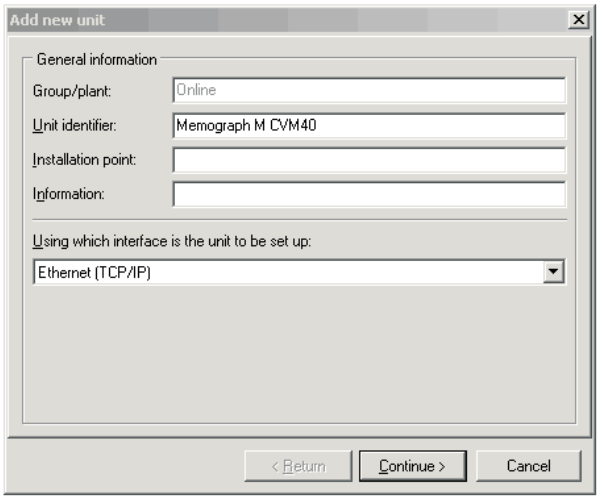
The following system parameters must be set:

1. IP address
2. Subnetmask
3. Gateway

5.5.6 Communication in the network using the supplied PC software

After the unit has been configured and connected to the PC network, a connection to one of the PCs in the network can be established.
The following steps are required for this:

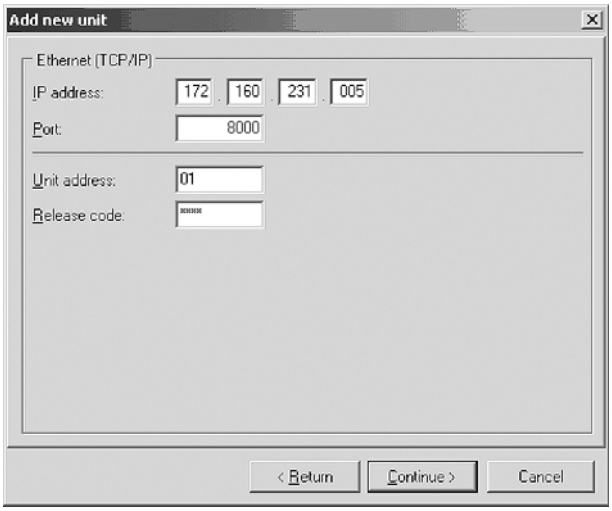
1. Install the supplied PC software on the PC via which communication is to take place (see Section 5.5.1 "Installing the supplied PC software").
2. A new unit now has to be created in the database. After the unit identifier has been entered, select how the unit settings are to be transferred. In this case, select Ethernet (TCP/IP).



a0013037

Fig. 15: Creating a new unit in the PC database

Now enter the IP address. The port address is 8000.
The unit address set at the unit and the release code must also be set correctly here.



a0012192

Fig. 16: Entering the IP address of the new unit (example)

Confirm the entry with "Continue" and start the transfer with OK.
The connection is now established and the unit is saved in the unit database.

6 Commissioning

6.1 Function check

Warning!
- Check all connections for correctness.
- Make sure that the supply voltage is identical to the voltage indicated on the nameplate!

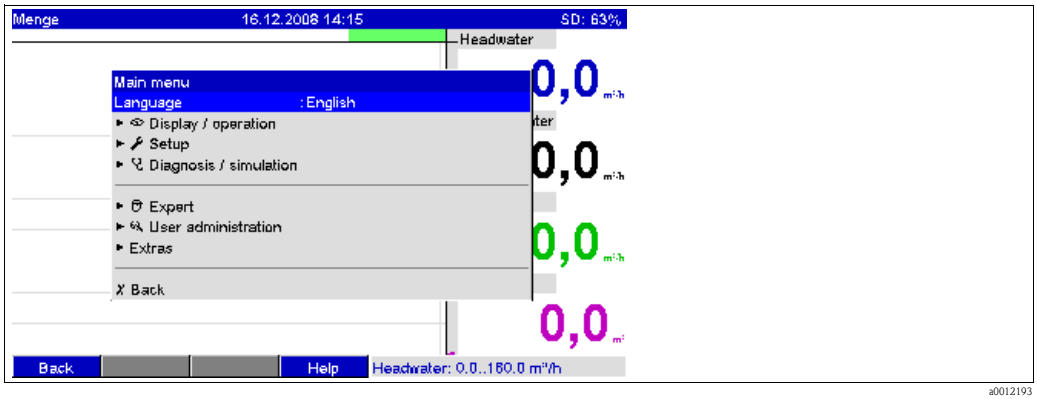
6.2 Switching on

Once the operating voltage is applied, the display lights up and the unit is ready for operation.

- When you first commission the unit, program the setup in accordance with the description in the Operating Instructions.
- If you are commissioning a unit that is already configured, measuring is immediately started in accordance with the settings. The values of the display group currently configured appear on the display.

6.2.1 Configuring the operating language

The default setting for the operating language is English. A different operating language can be configured in the main menu.
Press the Navigator, select Language.



6.3 Setup

6.3.1 General information

Note!
When ordered as a complete measuring system the unit is factory-calibrated and preset with the related sensor and armature. Operation of measuring loop based on basic settings is guaranteed when switching on the device.

You can also start up or configure your unit via PC and the supplied PC software. The following are available for this:

1. Front USB B system interface (see Section 6.3.3)
2. SD card slot for reading in the parameters stored on the SD card (see Section 6.3.4)
3. USB A socket on the front or rear of the device to read in parameters stored on a USB stick (see Section 6.3.5)
4. Rear system interfaces RS232/RS485/Ethernet (see Section 6.3.3)

Advantages of configuring by PC

- The unit's configuration is saved in a database and can be accessed again at any time.
- Text entries can be carried out more quickly and efficiently by keyboard.
- Measured values can also be read out, archived and displayed on the PC with the same program.

Note!
- The interfaces **cannot** be used simultaneously for configuration. Select the interface used under "Main menu > Setup > System > Communication".
- After commissioning (unit setup), the SD card and the internal memory should be cleared to delete the temporary setup data!
  Deleting the SD card: Extras > SD card > Delete
  Deleting the internal memory: Main menu > Diagnosis/Simulation > Delete internal memory

6.3.2 Notes on the setup access protection

Access to the setup is unlocked when the unit leaves the factory and can be locked in various ways:
- By entering a 4-digit release code (factory setting: "0000", see Section 6.4.3)
- Via user administration with a unique password/ID combination for the administrator and users (see Section 6.6.6)
- By activating a digital input as a control input with a setup block

Access protection via user administration: If user administration is enabled, unit settings can only be checked. Depending on the configuration, users cannot make any changes in the setup. On the other hand, an administrator can make the following changes:
- Add new users or delete users already created (e.g. new employees or employees that have left the company)
- Add, change or delete texts/comments. Comments already saved are not affected by this.

Note!
If operating parameters that affect measured value storage are changed (e.g. channel identifier, switching channels on/off), users cannot access the data prior to the setup changes at the device (i.e. measured value curves start again and it is no longer possible to search for data before this time). The data are NOT deleted however, i.e. they can still be read out/displayed using the PC software supplied or saved to the external SD card or a USB stick.

6.3.3 Setup via interface and supplied PC software

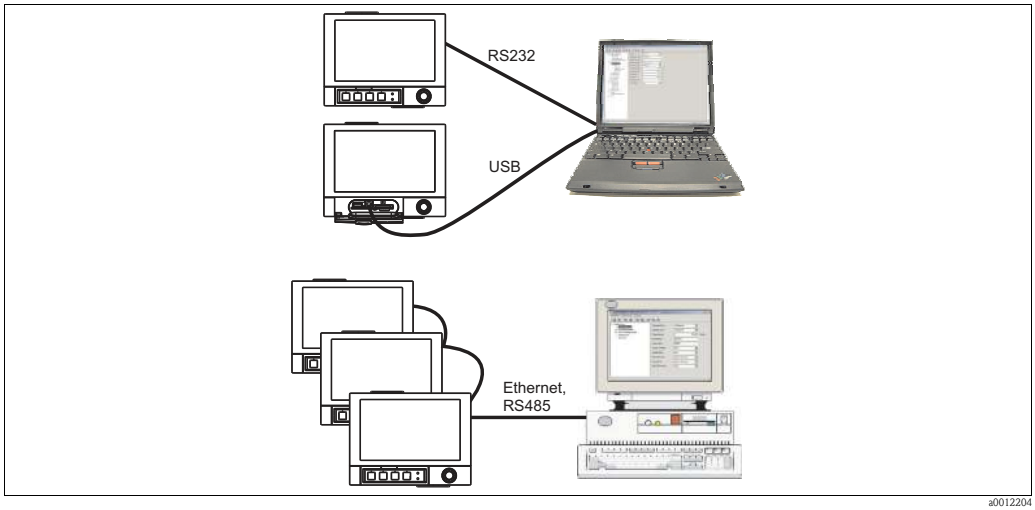
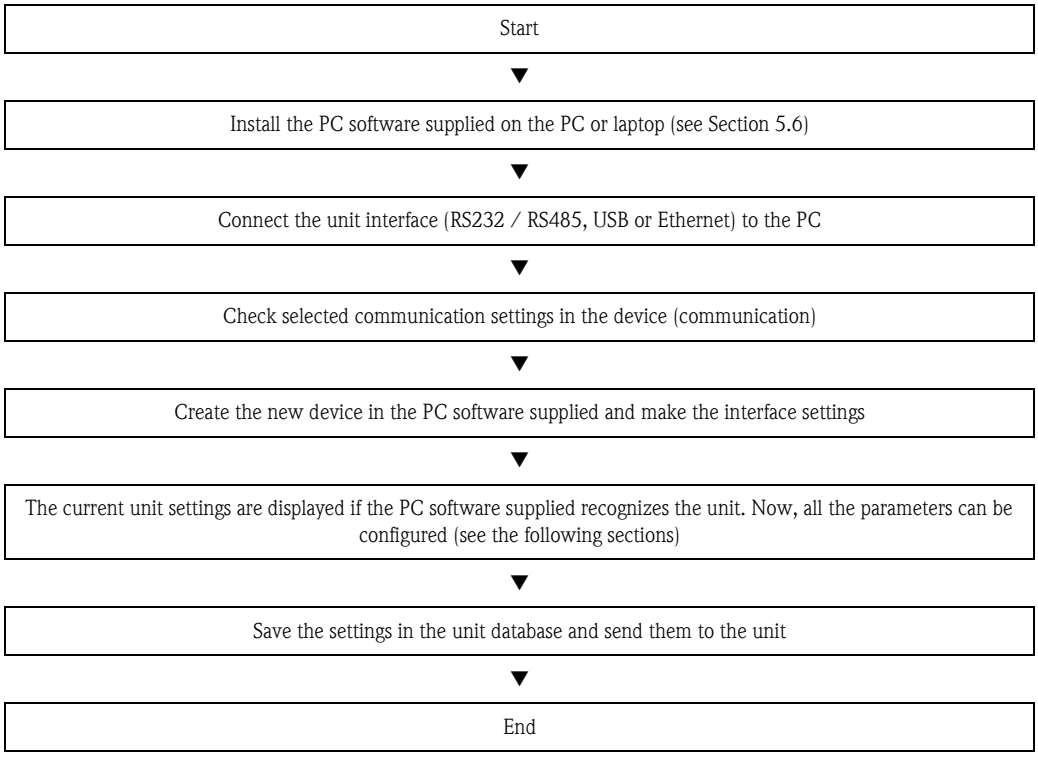


Fig. 17: Example: Setup via supplied PC software

Procedure for setup via interface and supplied PC software



In order to be able to use this function, the unit must already be created in the PC database or has to be created beforehand.

1. Connect the unit interface (RS232 / RS485, USB or Ethernet) to the PC.
2. Start the PC software and create a new unit in the PC database:
   – Select "Unit –> Display/change unit setup/Add new unit"
   – Select "Unit –> Add new unit"
   – Enter unit identifier. To transmit the unit setup select the corresponding unit interface. Confirm with "Next". Select the corresponding interface parameters (must match the settings for communicating at the device). Confirm with "Next". A summary of the information on the new unit is displayed. When you click "OK", a connection is established to the unit and the new unit is created in the PC database.
3. Adjust the unit settings and select "Finished –> Send setup to unit". The new setup parameters are automatically transferred to the unit.
4. Finally, the unit settings should be saved in the unit database. Select "Finished –> Save setup in unit database".

6.3.4 Setup via SD card

Save the unit settings on the PC onto the SD card using the supplied PC software. This setup file can then be imported into the unit.

Note!
In order to be able to use this function, the unit must already be created in the PC database or has to be created beforehand. In addition, there has to be an SD card slot on the PC.

Caution!
Never remove the SD card from the unit without previously launching the function "Extras –> SD card –> Remove safely" as data could be lost otherwise.

Procedure for setup using an SD card

1. Copy setup to SD card:
   - Insert a formatted SD card into the unit.
   - In the Extras menu, select "SD card > Save setup".
   – In the Extras menu, select "SD card > Remove safely".
   – Remove the SD card from the unit and insert it into the SD card slot at the PC.
2. Start the PC software and create a new unit in the PC database:
   – Select "Unit > Display/change unit setup/Add new unit"
   – Select "Unit > Add new unit"
   – Enter unit identifier. Select "Parameter file from a data source (e.g. diskette, ATA Flash, CF, SD)" to transmit the unit setup. Confirm with "Next". Select the corresponding unit parameter file (*.rpd) from the SD card. Confirm with "Next". A summary of the information on the new unit is displayed. When you click "OK", the new unit is created in the PC database.
3. Adjust setup in the PC program and save in the associated database:
   - Adjust the unit settings.
   – Select "Finished > Save setup in unit database". The new setup parameters are saved in the PC database. Transfer the new SETUP file to the SD card in your PC: select "Finished > Create setup data carrier (diskette/ATA flash/CF/SD)" and select the suitable drive.
   – Remove the SD card from the slot in the PC and insert it into the unit.
4. Read in new setup directly at the unit:
   – In the Extras menu, select "SD card > Load setup". To remove the SD card, select "SD card > Safe removal" in the Extras menu. Repeat these steps to configure additional units with this setup.



Caution!
If the setup SD card is not removed, the measurement data will begin to be saved after approx. 5 minutes. The setup data are still kept. Please change the SD card if the measurement data are not meant to be saved onto this card.



Caution!
Correct and safe functioning is only guaranteed with genuine SD cards of the manufacturer (see "Accessories", Section 8).

6.3.5 Setup via USB stick

Save the unit settings on the PC onto a USB stick using the PC software supplied. This setup file can then be imported into the unit.



Note!
In order to be able to use this function, the unit must already be created in the PC database or has to be created beforehand. In addition, there has to be a free USB socket on the PC.



Caution!
Never remove the USB stick from the unit without previously launching the function "Extras > USB stick > Remove safely" as data could be lost otherwise.

Procedure for setup using a USB stick

1. Copy the setup to the USB stick:
   – Insert the USB stick into the USB A socket on the unit front or rear.
   – In the Extras menu, select "USB stick –> Save setup".
   – In the Extras menu, select "USB stick –> Remove safely".
   – Remove the USB stick from the unit and insert it into the USB socket on the PC.
2. Start the PC software and create a new unit in the PC database:
   – Select "Unit –> Display/change unit setup/Add new unit"
   – Select "Unit –> Add new unit"
   – Enter unit identifier. Select "Parameter file from a data source (e.g. diskette, ATA Flash, CF, SD)" to transmit the unit setup. Confirm with "Next". Select the corresponding unit parameter file (*.rpd) from the USB stick. Confirm with "Next". A summary of the information on the new unit is displayed. When you click "OK", the new unit is created in the PC database.

3. Adjust setup in the PC program and save in the associated database:
   - Adjust the unit settings.
   – Select "Finished –> Save setup in unit database". The new setup parameters are saved in the PC database. Transfer the new SETUP file to the USB stick in your PC: select "Finished –> Create setup data carrier (diskette/ATA flash/CF/SD)" and select the suitable drive.
   – Remove the USB stick from the PC and insert it into the USB A socket on the unit.
4. Read in new setup directly at the unit:
   – In the Extras menu, select "USB stick –> Load setup". To remove the USB stick, select "USB stick –> Safe removal" in the Extras menu. Repeat these steps to configure additional units with this setup.

6.3.6 Setup directly at the unit (using keys/navigator)

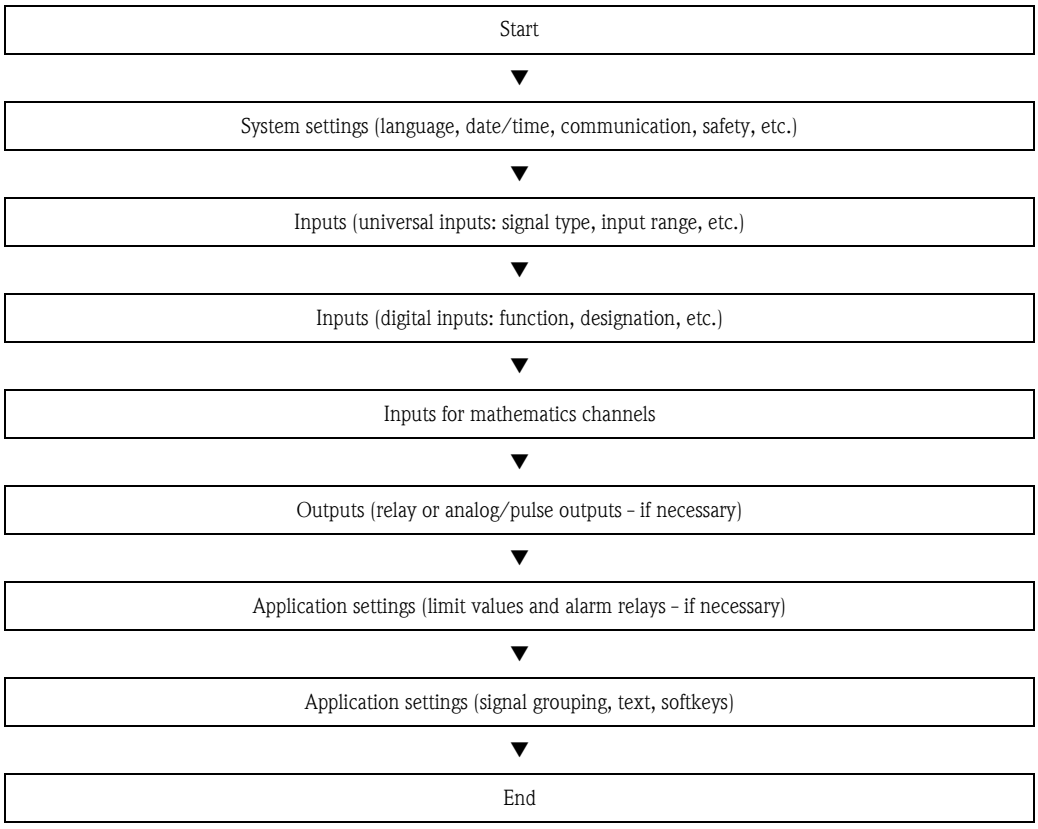
Key functions in the setup
The function of the operating keys is described in the fields directly above the corresponding keys on the screen. Free fields mean that no function is currently assigned to the keys in question.

- Press the navigator; the main menu is displayed
- Using the navigator, select the "Setup" menu
- Press the navigator again to confirm your entry
- To call up the Help on the entry selected use the softkey "Help".
- The "Cancel" or "Back" softkey cancels entries or returns to the previous screen.



Note!
- Every parameter is modified via a dialog box.
- The modified settings do not take effect until you return to the normal operating mode by pressing "Back" repeatedly (confirm setup is accepted with "Yes"). Until this time, the unit still works with the previous data.

Procedure for unit configuration/setup



6.4 Setup screen (main menu)

Two Setup modes are available: the Standard setup and the Expert setup. All the settings that are needed to operate the unit can be made in the Standard setup. Additional settings are made in the Expert setup (e.g. Direct Access, Service).

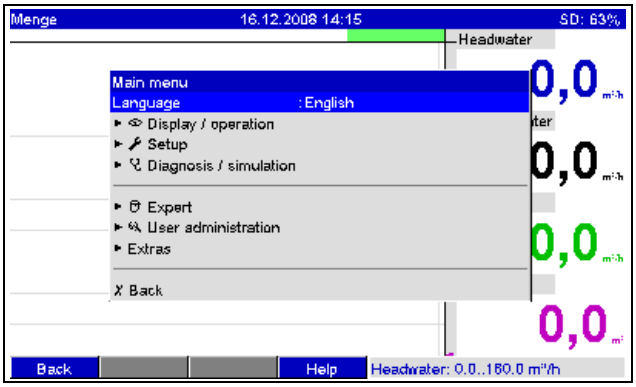


Fig. 18: Standard setup in the main menu



Fig. 19: The Setup screen (standard)

6.4.1 Launching the expert setup

The Expert setup is reserved for experienced users or service technicians. A 4-digit release code always has to be entered after calling up the Expert setup.

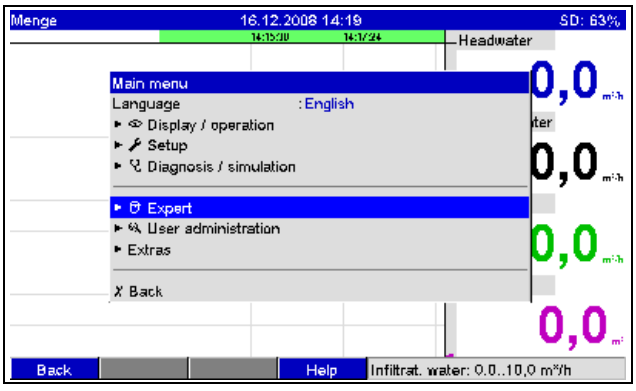


Fig. 20: Expert setup in the main menu

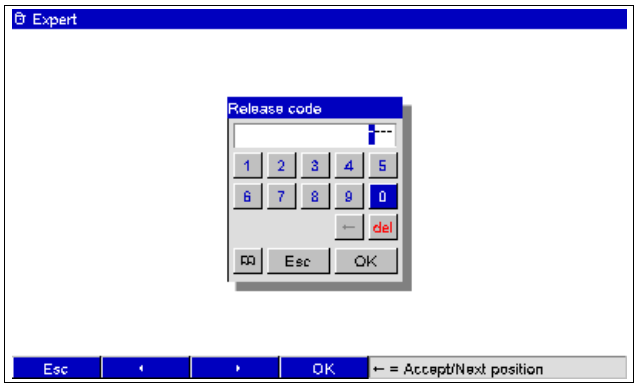


Fig. 21: Release code for Expert setup (factory setting: 0000)

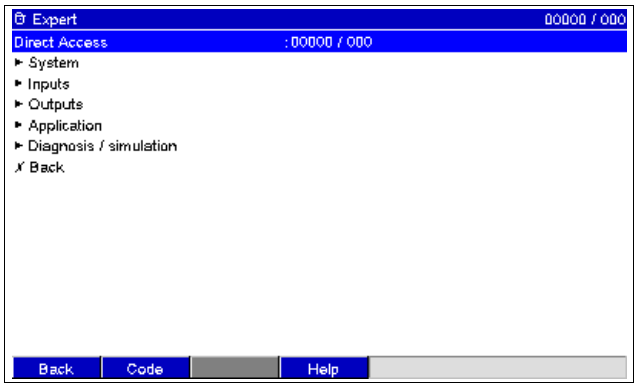


Fig. 22: The expert setup

The individual parameters are summarized in the Setup menu in the following sections:

Direct access	Expert setup	Direct access to active operating items (rapid access). Entering the direct access code takes you directly to the desired operating parameter. The direct access code is displayed in the Setup menu on the top right of the display (e.g. 00000/000).
System	Standard setup / Expert setup	Basic settings that are needed to operate the unit, (e.g. date, time, communication settings, etc.)
Inputs	Standard setup / Expert setup	Settings for the analog and digital inputs, mathematics channels and linearization.
Outputs	Standard setup / Expert setup	Settings only required if outputs (e.g. relays or analog outputs) are to be used.
Application	Standard setup / Expert setup	Specify the various application-specific settings (e.g. limit values, signal grouping, text, softkeys, Web server.
Diagnosis/Simulation	Expert setup	Unit information and service information for a swift unit check.

6.4.2 Entry principle

1. Begin changing parameters each time by pressing the navigator.
2. Turn the navigator to scroll through the values, characters and picklists.
3. If the parameter is set correctly, press the navigator again to confirm.

Note!
- Any settings that are displayed in gray cannot be selected/cannot be changed (only notes, or option not available/not activated).
- With the factory setting "0000" for the release code (delivery status), configuration is possible at any time. It can be protected against unauthorized manipulation by entering a 4-digit release code (see: Main menu –> Setup –> System –> Security –> Protected by: Release code). This has to be entered when the settings are later changed, if the unit settings are to be changed by keyboard. **Tip:** Make a note of your release code. Store it somewhere where unauthorized persons do not have access to it.
- The modified settings do not take effect until you return to the normal operating mode by pressing "Back" repeatedly and confirming the "Accept setup" prompt with "Yes". Until this time, the unit still works with the previous data.

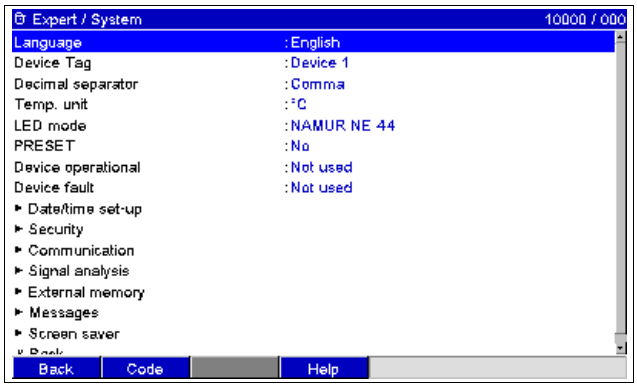
6.4.3 Setup - System

Settings that are not channel specific, this means date, time, communication etc.

Procedure for basic settings in the "System" menu:

Start
▼
Select an operating language from the list
▼
Assign a device designation
▼
Select a decimal separator (comma or point)
▼
Select the temperature unit (°C, °F, K)
▼
Make date/time settings (e.g. select region for summertime changeover)
▼
Security: choose whether the setup should be protected and how
▼
Select communication
▼
Signal analysis: activate the desired signal analysis here (e.g. daily, weekly or annual analysis)
▼
External memory: make settings for the external memory (SD card)
▼
Screen saver: activating the screen saver increases the operating life of the rear illumination
▼
Keyboard (only relevant if an external USB keyboard is connected)
▼
Bar code reader (only relevant if a USB bar code reader is connected)
▼
End

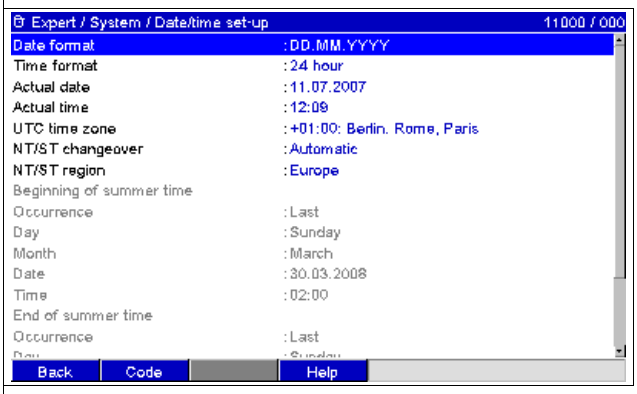
Note!
Depending on the selected function, the unit's user interface adapts itself, so that each time only parameters that are required for safe unit functioning have to be checked/set.

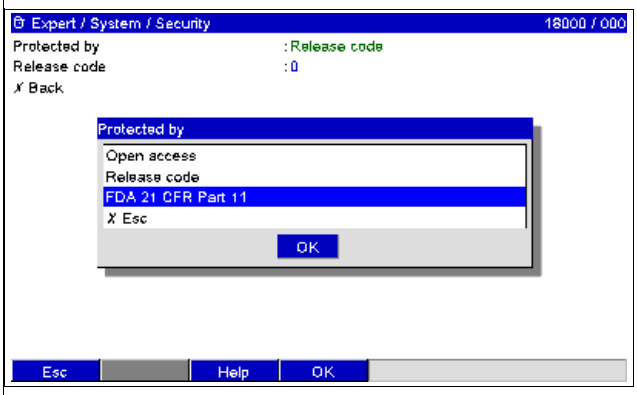


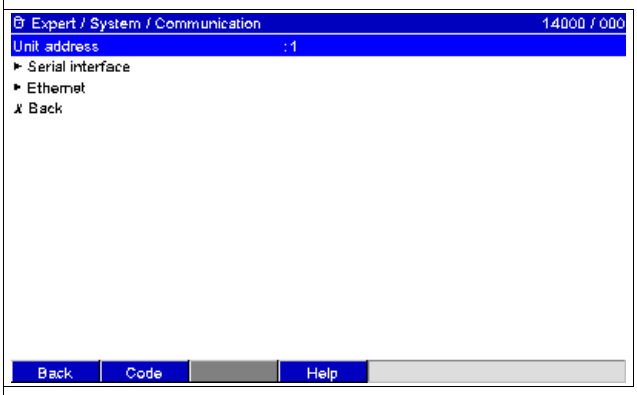
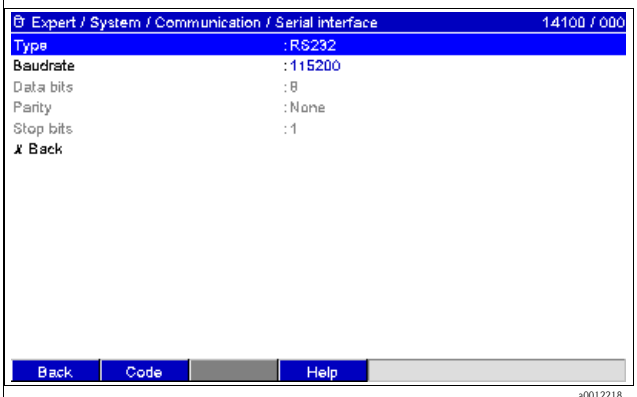
a0012210

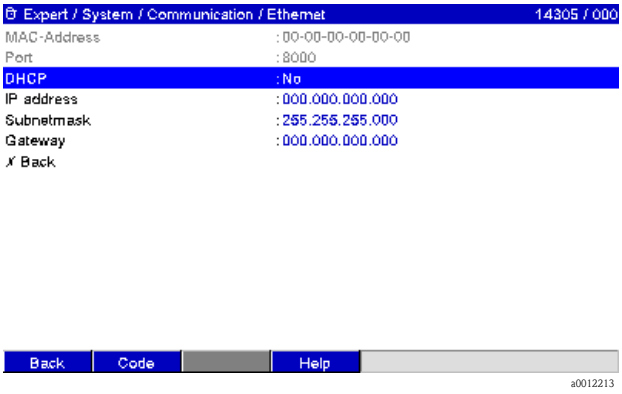
Fig. 23: Setup - System

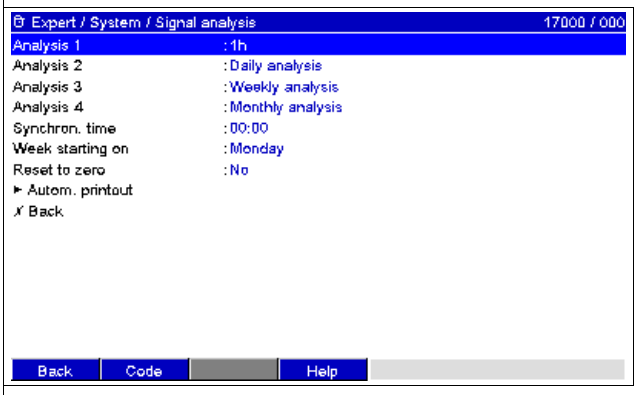
"System" menu items	Configurable parameters (factory settings are highlighted in bold)	Direct access code
Language	Select unit operating language. Factory setting: **English**	10000/000
Device tag	Individual unit identifier (max. 22 characters). Factory setting: **Device 1** Note! Is also saved on the SD card.	10005/000
Decimal separator	Select in which form the decimal separator character is to be displayed. Picklist: **comma**, point	10010/000
Temp. unit	Selection of temperature units. All directly connected thermocouples or resistance thermometers (RTD) are displayed in the preset engineering units. Picklist: **°C**, °F, K	10015/000
LED mode (only in the Expert mode)	**"Namur NE44"**: Green LED –> power supply OK. Red LED –> Measuring signal failure. Red LED flashing –> Maintenance required. "Namur NE44+": see above, + red LED in event of limit violation	10020/000
PRESET (only in the Expert mode)	Caution! Returns all parameters to the factory default setup! Note! Only appears once the service code has been entered!	10025/000
Device operational	This relay is switched as soon as the device is fully operational. Picklist: **not used**, relay x (xx-xx) Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	10030/000
Device fault	The relay switches if the unit detects a system error (e.g. hardware defect). Picklist: **not used**, relay x (xx-xx) Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	10035/000

"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu "Date/time setup"	Here you can find various date and time settings.  a0012212 *Fig. 24: Setup - System, submenu "Date/time setup"*		
	Date format	Select in which format the date is to be set and displayed. **(DD.MM.YYYY)**	11000/000
	Time format	Select in which format the time is to be set and displayed. Picklist: 12 hours AM/PM or **24 hours**	11005/000
	Actual date	Set up the actual date for the unit.	11010/000
	Actual time	Set up the actual time for the unit.	11015/000
	UTC time zone	Set your UTC time zone (UTC = Coordinated Universal Time). This setting is only needed for the Web server.	11020/000
	NT/ST changeover	Function for summer time/normal time changeover. **"Automatic":** changes as per local regional regulations; "Manual": changeover times can be set in the subsequent line items; "Off": no changeover times required	11025/000
	NT/ST region Only for "Automatic summer time changeover"	Selects the regional settings for summer/normal time changeover. Picklist: **Europe**, USA	11030/000
	Beginning of summer time: Occurrence Only for "Manual summer time changeover"	Day, when in the spring a change from normal to summer time occurs. Picklist: 1., 2., 3., 4., **last**	11035/000
	Day Only for "Manual summer time changeover"	Day, when in the spring a change from normal to summer time occurs. Picklist: **Sunday**, Monday to Saturday	11040/000
	Month Only for "Manual summer time changeover"	Month, when in the spring a change from normal to summer time occurs. Picklist: January, February, **March** to December	11045/000
	Date Only for "Manual summer time changeover"	Displays the calculated changeover date.	
	Time Only for "Manual summer time changeover"	Time when the time is moved forward by 1 hour on the day of the changeover from normal time to summer time. (Format: hh:mm) Time when the time is moved back by -1 hour on the day of the changeover from summer time to normal time. (Format: hh:mm)	11055/000

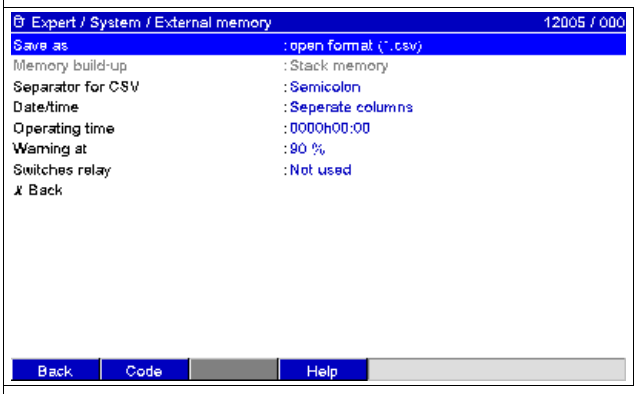
"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	End of summer time: Occurrence Only for "Manual summer time changeover"	Day, when in the autumn a change from summer to normal time occurs. Picklist: 1., 2., 3., 4., **last**	11060/000
	Day Only for "Manual summer time changeover"	Day, when in the autumn a change from summer to normal time occurs. Picklist: **Sunday**, Monday to Saturday	11065/000
	Month Only for "Manual summer time changeover"	Month, when in the autumn a change from summer to normal time occurs. Picklist: January to **October**, November, December	11070/000
	Date Only for "Manual summer time changeover"	Displays the calculated changeover date.	
	Time Only for "Manual summer time changeover"	Time when the time is moved back by 1 hour on the day of the changeover from summer time to normal time. (Format: hh:mm)	11080/000
Submenu "Security"	Settings that protect the unit against unauthorized operation and configuration.  *Fig. 25: Setup - System, submenu "Security"*		
	Protected by	Specify how the unit should be protected: **"Open access"**: the unit can be operated and configured without any restrictions. "Release code": the unit configuration is protected by a code. There is free access to all the other functions. "FDA 21 CFR Part 11": The unit is protected by a user administration system. Actions have to be authenticated using an ID and password. Note: user administration is managed outside the setup.	18000/000
	Release code	Using this code setup access can be protected from unauthorized persons. In order to change any parameter the correct code must be entered. Factory setting: **"0000"**, i.e. changes are possible any time. **Tip:** make a note of the code and store in a safe place out of the reach of unauthorized persons. ✎ Note! This release code also has to be entered in the supplied PC software.	18005/000

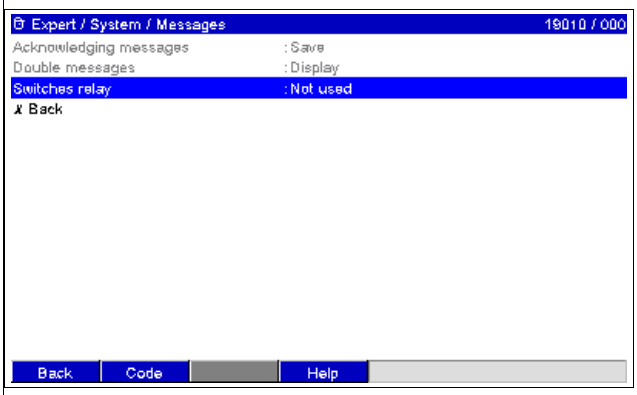
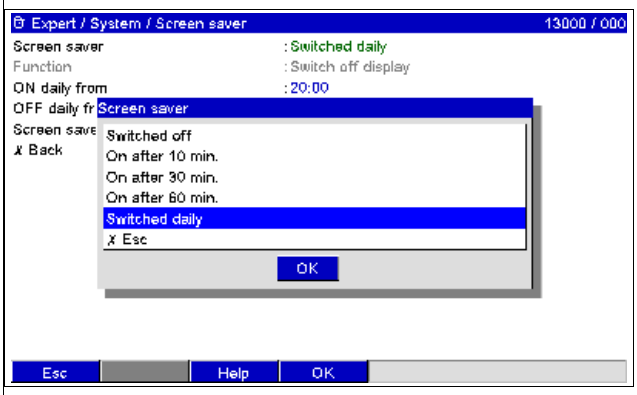
"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Set point code Only if the release code is enabled	The unit is protected by a release code. If a set point code has been set up then the user can change the alarm set points after entering this code or the unit release code (all other operating positions cannot be changed). Factory setting: **"0000"**, i.e. the alarm set points can only be changed by entering the release code. Note: the set point code and release code should not be identical!	18010/000
Submenu "Communication"	Setup required if you are using the USB, RS232/RS485 or Ethernet interface of the unit (PC operation, serial data read-out, modem operation, etc.). Note: the various interfaces can be operated in parallel.  *Fig. 26: Setup - System, submenu "Communication"*		
	Unit address	Each unit used by the USB, RS232, RS485 or Ethernet interfaces must have its own individual address (0-99). This is needed for PC software identification. Factory setting: **1**.	14000/000
	Submenu "Communication - Serial interface"	Setup required if you are using the RS232 or RS485 unit interface.  *Fig. 27: Setup - System - Communication, submenu "Serial interface"*	
		"Type": specify how the serial interface is used. Pay attention to the terminal assignment. Picklist: **RS232**, RS485	14100/000
		"Baudrate": transmission rate ("baudrate") - must match the settings of the supplied PC software.	14105/000
		"Data bits": make sure the setting matches that of the supplied PC software! Fixed settings - cannot be changed. Default value **"8"**.	14110/000

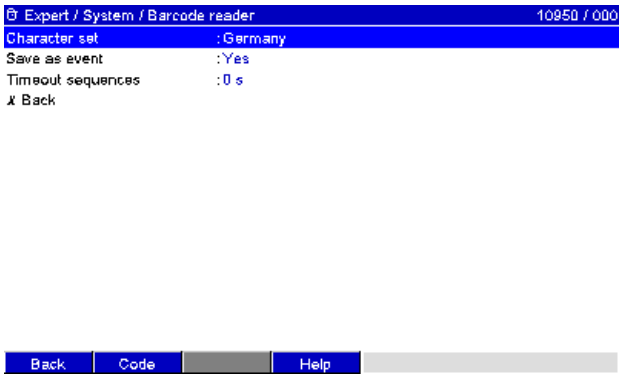
"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
		"Parity": make sure the setting matches that of the supplied PC software! Fixed settings – cannot be changed. Default value **"none"**.	14115/000
		"Stop bits": make sure the setting matches that of the supplied PC software! Fixed settings – cannot be changed. Default value **"1"**.	14120/000
	Submenu "Communication – Ethernet"	Setup required if you are using the Ethernet interface of the unit. Note! A maximum of 5 connections can be established to the unit at the same time (e.g. via Web server or the supplied PC software).  *Fig. 28: Setup – System – Communication – Ethernet*	
		MAC address MAC address (preset at the factory – cannot be modified). The MAC (media access control) address is the hardware address that is used to uniquely identify the unit in the network.	14300/000
		Port Please check that settings are compatible with the settings of the supplied PC software! Fixed settings – cannot be changed. Port preset at the factory to **"8000"**. Note! The port "8000" must be released at the firewall of the accessing PC. The port "80" has to be released with the Web server function. Please contact your system administrator!	14325/000
		DHCP The unit can use the DHCP to get its Ethernet settings. Caution: the settings determined are not displayed until the setup has been accepted! Picklist: **no**, yes Note! The unit always gets the same IP address if the leasing time is set long enough on the DHCP server. The PC software needs the IP address to establish a connection!	14305/000

"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
		IP address Enter the IP address for the unit here. This IP address is assigned by your network administrator. Please talk to your network administrator about this. The unit is delivered with a preset IP address which must, however, be changed in the setup procedure. Before you can make the input in the unit, an IP address valid for your network must be defined. ✎ Note! Entry only needed if the IP address is not acquired automatically via DHCP. The IP address must be unique within the network! Please be aware that this number is not arbitrary, rather it must be defined dependent on the network address of the TCP/IP network. The input form corresponds to syntax (e.g. 192.168.100.002).	14310/000
		Subnetmask Please input the subnetmask (given by your network administrator). The subnetmask must be input if the unit is to establish connections in another sub-network. Specify the subnetmask of the sub-network in which the unit is located (e.g. 255.255.255.000). Please note: the IP address determines the network class. The result of this is a default subnetmask (e.g. 255.255.000.000 for a Class B network).	14315/000
		Gateway Please input the Gateway (given by your network administrator). Enter the IP address of the gateway here if connections are to be established in other networks. Factory setting: **000.000.000.000** ✎ Note! Changes to the system parameters are not activated until the System menu is closed and the settings accepted. Only then will the unit work with the new settings.	14320/000
Submenu "Signal analysis"	Setup in order to get signal analysis for a preset time range/cycle as well as the function to manually reset the signal analysis. Up to 4 analyses can be performed in parallel. The analyses can be displayed in the Extras menu.  *Fig. 29: Setup - System, submenu "Signal analysis"*		
	Analysis 1	Determines the minimum, maximum and average values, as well as the volumes and operating times, for the set time range. "Externally controlled": the analysis is started or stopped by means of a digital input (set the digital input to "Control input" and the action to "Analysis x"). Picklist: **no**, externally controlled, 1 min to 12 h	17000/000

"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Analysis 2 **Analysis 3** **Analysis 4**	Here, choose whether a daily, weekly, monthly or annual analysis should be performed. "No": no analysis "Externally controlled": the analysis is started or stopped by means of a digital input (set the digital input to "Control input" and the action to "Analysis x"). "Daily analysis": determines the daily minimum, maximum and average values, and the volumes for the day, when the day changes. "Weekly analysis": determines the weekly minimum, maximum and average values, and the volumes for the week, when the week changes. "Monthly analysis": determines the monthly minimum, maximum and average values, and the volumes for the month, when the month changes. "Annual analysis": determines the annual minimum, maximum and average values, and the volumes for the year, when the year changes.	17005/000 17010/000 17015/000
	Synchron. time	Time for ending the signal analysis. Example for daily analysis: starting at the set time, e.g. 7 a.m., the daily analysis continues until 7 a.m. the following day. It contains the analysis for the measured values over the last 24 hours. Factory setting: **"00:00"**	17020/000
	Week starting on Only if "Weekly analysis" is activated	Specify what day the weekly analysis should start. Factory setting: **"Monday"**	17025/000
	Reset to zero	The analyzed values can be reset to zero. Example: reset after commissioning a plant. All commissioning signals are discarded. The graphics or memory storage are not influenced (traceability)! Picklist: **no**, analysis 1-4, totalizer, all counters. ✎ Note! All previous (commissioning) signals are discarded. The graphics/storage are, however, not affected if you leave the setup and answer the "Accept setup?" question with "No" (traceability). If you answer the question with "Yes", the contents of the memory and thereby the graphic display is also deleted/reset. If the previous signals are still required, save them onto an external storage medium (USB stick or SD card) before resetting. The reset takes effect immediately if you confirm acceptance here.	17035/000
	Submenu "Autom. printout"	Specify whether the analysis should be printed out automatically at the end of an analysis. ✎ Note! The information is only printed out if a USB printer is connected to the device! With the Batch option, the printout process is configured in the Batch mode/printout menu.	
		Analysis 1: picklist: **no**, yes **Analysis 2**: picklist: **no**, yes **Analysis 3**: picklist: **no**, yes **Analysis 4**: picklist: **no**, yes	17100/000 17105/000 17110/000 17115/000

"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu "External memory"	Settings for the external data carrier, amongst other things which data are to be stored in which format on the external data carrier.  *Fig. 30: Setup - System, submenu "External memory"*		
	Save as	**"Protected format"**: all the data are stored in a way that protects them from data manipulation. They can only be interpreted using the supplied PC software. "Open format": the data are stored in CSV format. This can be opened by a number of different programs (caution: no manipulation protection). MS Excel restricts the open format to a maximum of 65535 rows.	12005/000
	Memory buildup	**"Stack memory"**: no more data can be stored once the data carrier is full. "Ring memory (FIFO)": once the data carrier is full the oldest data are deleted so that new data can be stored (first in first out (FIFO)). Option only possible for "Protected format".	12000/000
	Separator for CSV Can only be configured for "Open format (*.csv)"	Specify which separator is used by your application (e.g. in Excel = semicolon). Picklist: comma, **semicolon**	12010/000
	Date/time Can only be configured for "Open format (*.csv)"	Specify whether the date and the time should be saved in a joint column or in two separate columns when saving the data in CSV format.	12011/000
	Operating time Can only be configured for "Open format (*.csv)"	Specify the format for which operating times should be saved/displayed. Factory setting: **0000h00:00**	12015/000
	Warning at Can only be configured for "Stack memory"	Gives a warning before the data carrier is x% full. A warning is indicated on the unit and this is also stored in the event list. A relay can also be switched. Note: only with the external SD card (does not apply for USB stick)! Factory setting: **90 %**	12020/000
	Switches relay Can only be configured for "Stack memory"	When the warning "Data carrier full" is displayed a relay can also be switched. Picklist: **not used**, relay x (xx-xx) ✎ Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	12025/000

"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu "Messages" (only available in the Expert setup)	Settings for displaying/confirming messages. For example, messages can be: ■ Messages triggered by set points ■ Messages triggered by a digital input ■ Error messages, etc.  *Fig. 31: Setup - System, submenu "Messages"*		
	Acknowledging messages	The time the message is acknowledged can be saved in the events list. Note: this setting cannot be changed if the user administration function is activated (FDA 21 CFR Part 11). Picklist: do not save, **save**	19005/000
	Double messages Can only be configured if "Do not save" is selected for "Acknowledging messages"	The unit can merge the same messages into one single message (with the time stamp of the last message). Note: this setting cannot be changed if the user administration function is activated (FDA 21 CFR Part 11). Picklist: combine, **display**	19000/000
	Switches relay	A relay can be switched as soon as a message that has to be acknowledged (e.g. on/off messages, device errors, etc.) is displayed. Picklist: **not used**, relay x (xx-xx) Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	19010/000
Submenu "Screensaver"	Note! To increase the life span of the LCD the rear illumination can be switched off (= screen saver). If the unit is in an alarm condition (e.g. open circuit or alarm point violation), the screen saver is not switched on or is automatically switched off. In this way, alarms can be read even if the screen saver is activated.  *Fig. 32: Setup - System, submenu "Screensaver"*		

"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Screensaver	**"Switched off":** LCD is always switched on "On after x min": display turns dark after 10, 30 or 60 minutes. All other functions remain in operation. Press an operating key: illumination is switched back on. "Switched daily": specify time. With this setting, the display turns dark 1 minute after the last key was pressed.	13000/000
	Function	**"Switch off display"**: the unit switches off the display when the screensaver is activated.	13005/000
	ON daily from Only for "Switched daily"	Set time (hh:mm) from which the rear illumination is to be switched off (e.g. shift end time). **Factory setting: 20:00**	13010/000
	OFF daily from Only for "Switched daily"	Set time (hh:mm) from which the rear illumination is to be switched on (e.g. shift start time). **Factory setting: 07:00**	13020/000
	Screensaver	**"Off on alarm"**: the screensaver is automatically deactivated in an alarm condition (e.g. limit value, cable open circuit, etc.). "Always on": the screensaver remains switched on even in the event of an alarm. Note: active messages that have to be acknowledged always deactivate the screensaver.	13025/000
Submenu "Keyboard"	Keyboard settings (only relevant if a USB keyboard is connected to the unit)		
	Keyboard layout	Please select the keyboard layout. Picklist: **Germany**, Switzerland, France, USA, USA International, UK, Italy	10900/000
Submenu "Bar code reader"	Instructions for operating a bar code reader: ■ It has to act like a HID keyboard ■ Texts must be terminated with a carriage return.  *Fig. 33: Setup - System, submenu "Bar code reader"*		
	Character set	Please select the character set. Picklist: **Germany**, Switzerland, France, USA, USA International, UK, Italy	10950/000
	Save as event	The unit can save texts read in using the bar code reader in the event log. Picklist: **yes**, no Note! Texts are NOT saved in the following situations: ■ An order sequence was read in ("Batch" option) ■ The dialog for entering batch information is active ("Batch" option) ■ The dialog for testing the bar code reader is active ■ The "Save text" function is already being executed	10955/000

"System" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Timeout sequences	Specify after how many seconds an order sequence is aborted if the necessary data are not read in. User input: 10 to 180 seconds; factory setting: **30 s**	10960/000

6.4.4 Setup - Inputs

Settings for the optical sensors, universal analog and digital inputs, mathematics channels and linearization.

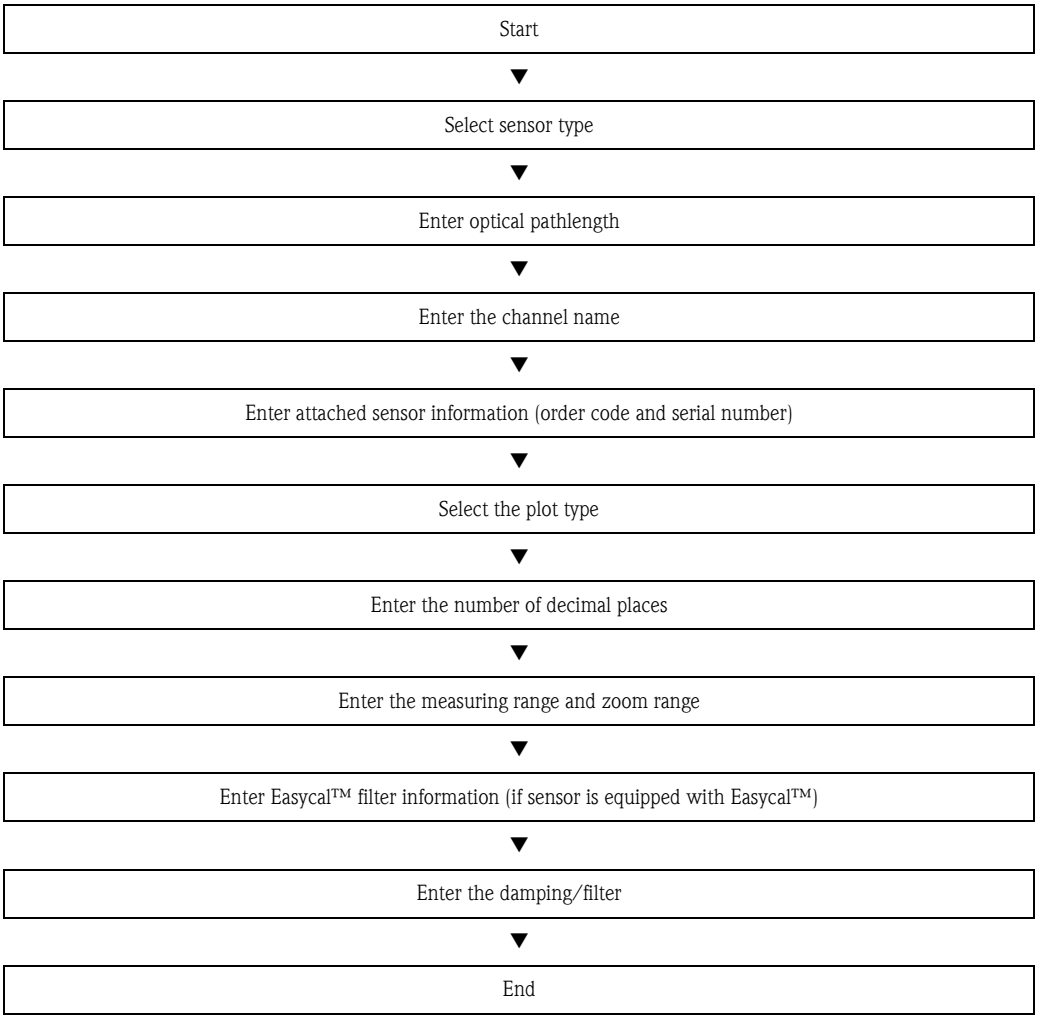
Note!
Depending on the selected function, the unit's user interface adapts itself, so that each time only parameters that are required for safe unit functioning have to be checked/set.

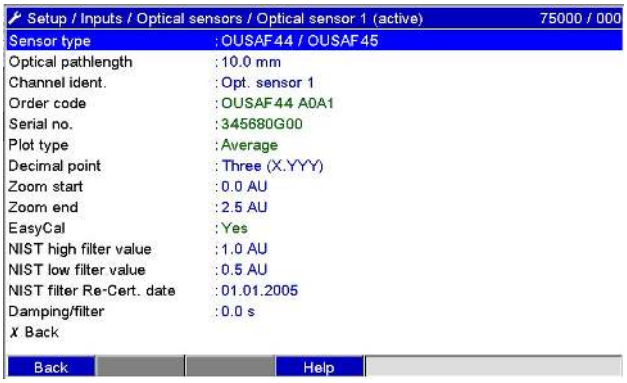


Fig. 34: Setup - Inputs

Setup - Inputs submenu: Optical sensors

Procedure for the signal settings of the optical sensors:

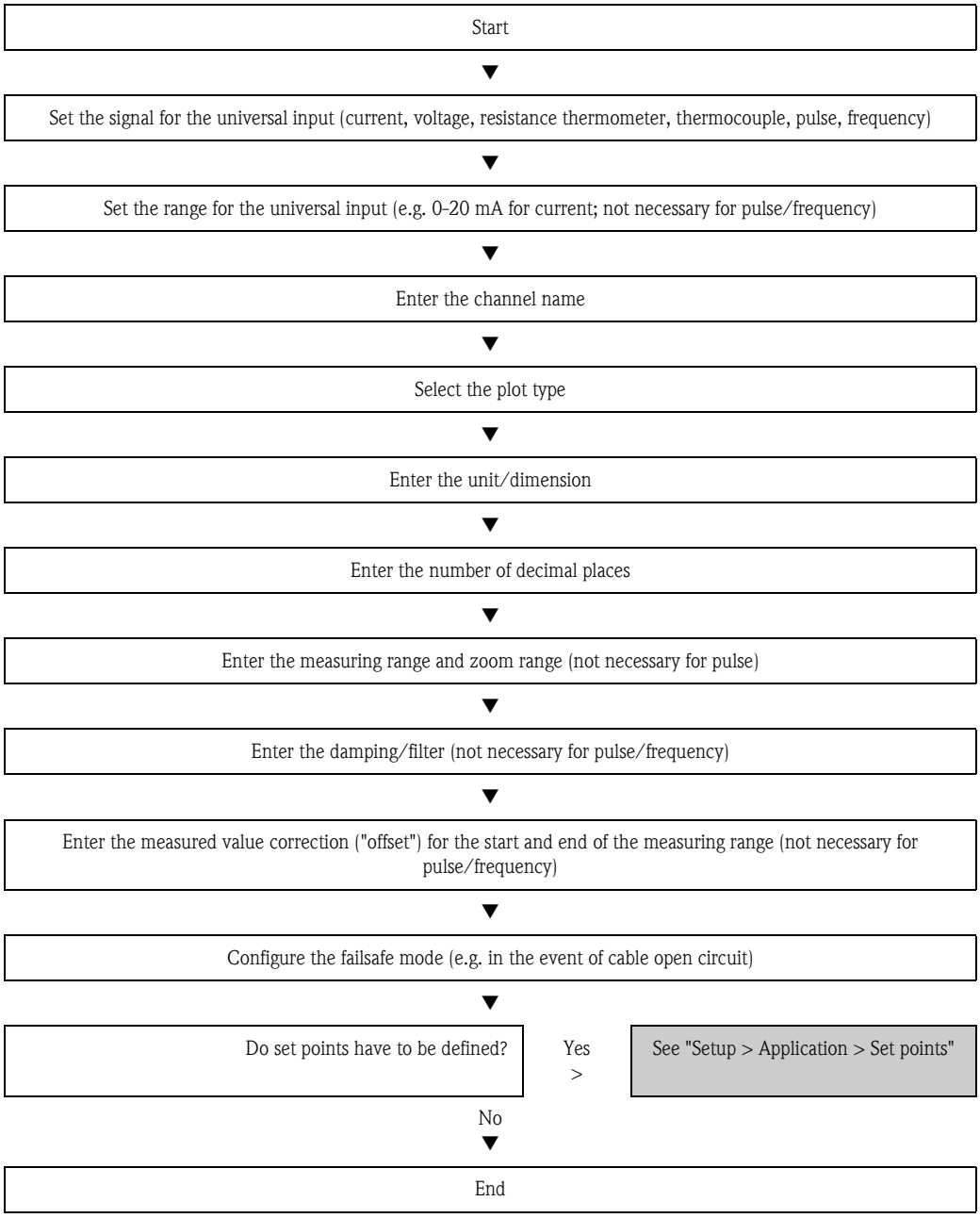


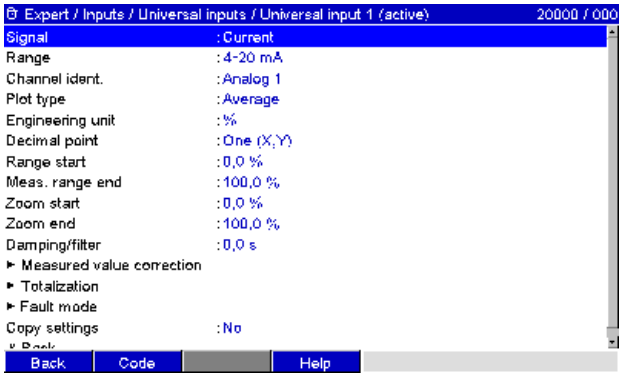
"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Optical sensors, optical sensor x	View or change settings of the connected optical sensor for the selected channel. The unit can be equipped with a maximum of 2 optical sensors.  *Fig. 35: Setup - Inputs, submenu: Optical sensors, Optical sensor*		
	Sensor type	Select the connected optical sensor type (OUSAF44, OUSAF45, etc.). The channel is switched off if no sensor is selected (factory default). Picklist: **switched off**, OUSAF11/AF12/AF13/DP11, OUSAF21/OUSAF22/OUSAF23, OUSAF44/OUSAF45, OUSAF46, OUSTF10/OUSAF30, OUSBT65/OUSBT66	75000/000 to 75000/039
	Optical pathlength	Enter the distance between both side glasses in the flowcell. The distance depends on the line size and the process connection.	75005/000 to 75005/039
	Channel ident.	Identifier for the optical sensor connected to this input. 16-character entry. **Factory setting: Optical sensor x**	75010/000 to 75010/039
	Order code	Displays the order code of the connected optical sensor.	75185/000 to 75185/039
	Serial number	Displays the serial number of the connected optical sensor.	75190/000 to 75190/039
	Plot type	The optical sensors are scanned at 100ms cycles. Depending on the save cycle, the selected data are determined from the scanned values and saved (e.g. with a save cycle of 1 min., the average of 600 values (10x60) is calculated and saved). "Instantaneous value": the value pending for the save cycle is saved. **"Average":** the average value during the save cycle is calculated and saved. "Minimum value": the minimum value is calculated and saved. "Maximum value": the maximum value is calculated and saved. "Minimum + Maximum": both minimum and maximum values are saved (requires higher memory capacity)	75015/000 to 75015/039
	Decimal point	Number of places after decimal point for the display. Picklist is 0 to 5 places after the decimal point. This information is only used to better display the measured value. Factory setting: **one (X,Y)**	75025/000 to 75025/039
	Zoom start	If the total transmitter range is not being used then the lower value of the required range can be entered here (higher resolution). Example: transmitter 0 to 2.5 AU, required range: 0.75 to 2 AU. Set up "0.75" here. The zoom has no influence on the storage.	75030/000 to 75030/039

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Zoom end	As in "Zoom start". Enter the upper value of the required range here. Example: transmitter 0 to 2.5 AU, required range: 0.75 to 2 AU. Enter "2" here.	75035/000 to 75035/039
	Easycal™ (not available for OUSTF10, OUSAF30, OUSBT65/66,	Patented calibration method using NIST traceable filters.	75040/000 to 75040/39
	NIST high filter value (with Easycal™ only)	Enter the high neutral density filter value. Refer to the Easycal™ calibration certificate for the correct value.	75045/000 to 75045/039
	NIST low filter value (with Easycal™ only)	Enter the low neutral density filter value. Refer to the Easycal™ calibration certificate for the correct value.	75050/000 to 75050/039
	NIST filter Re-cert. date (with Easycal™ only)	Deadline for recertification of NIST filter. You will be reminded when this date arrives.	75055/000 to 75055/039
	Damping/filter	The more unwanted interference there is on the measurement signal the higher the value that should be entered here. Result: fast changes will be damped/suppressed. Factory setting: **0.0 s**	75135/000 to 75135/039
	Individual channel output (OUSAF21/22/23 only)	Enable the absorbance measurement on individual channels of a dual beam optical sensor if required.	75120/000 to 75120/039
	Absorbance monitoring (OUSTF10/OUSAF30 only)	Enable absorbance monitoring for turbidity measurement over 200 NTU. When absorbance monitoring is enabled, the absorbance of the direct beam is measured and displayed.	75110/000 to 75110/039
	Ref. ch. ident. (OUSAF21/22/23/30, OUSTF10 only)	Enter an identification text for the reference channel.	75125/000 to 75125/039
	Meas. ch. ident. (OUSAF21/22/23 only)	Enter an identification text for the measurement channel.	75130/000 to 75130/039

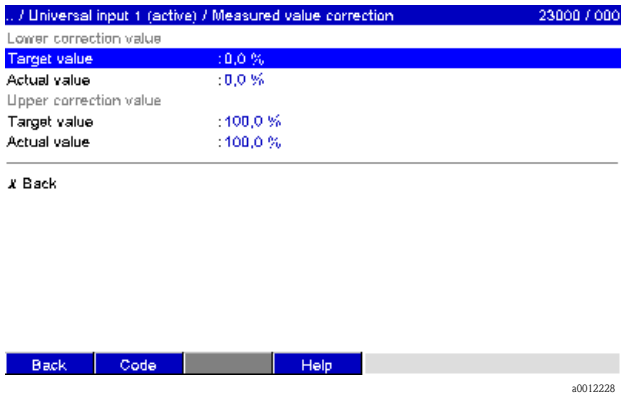
Setup - Inputs submenu: Universal inputs

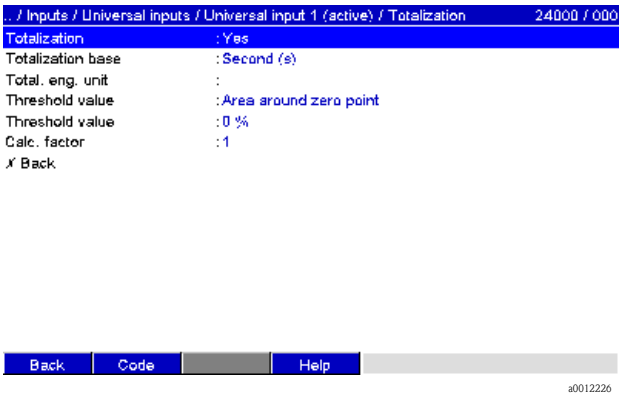
Procedure for the signal settings of the universal inputs:

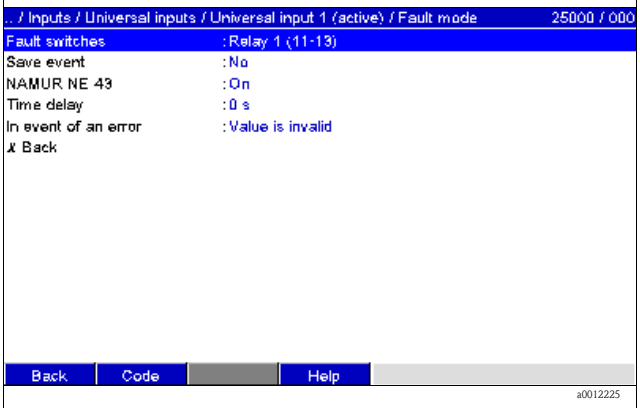


"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Universal inputs, universal input x	View or change settings of the connected measuring points for the selected channel.  a0012227 *Fig. 36: Setup - Inputs, submenu: Universal inputs, Universal input*		
	Signal	Select the type of signal connected (current, voltage, etc.). The channel is switched off if no signal type is selected (factory default). Picklist: **switched off**, current, voltage, resistance therm. RTD, thermocouple, pulse counter, frequency input, Profibus DP	20000/000 to 20000/039
	Range	Select the input range or which resistance thermometer/thermocouple is connected. The terminal assignment is provided in Section 4.	20005/000 to 20005/039
	Connection Only for "Resistance thermometer"	Specify whether RTDs are connected as 2-, 3- or 4-wire systems. Factory setting: **3-wire**	20010/000 to 20010/039
	Channel ident.	Identifier for the measurement point connected to this input (e.g. "Pressure", "Temperature", "Heater", ...). 16-character entry. **Factory setting: analog x**	20015/000 to 20015/039
	Plot type	The universal inputs are scanned at 100ms cycles. Depending on the save cycle, the selected data are determined from the scanned values and saved (e.g. with a save cycle of 1 min., the average of 600 values (10x60) is calculated and saved). **"Instantaneous value":** the value pending for the save cycle is saved. "Average": the average value during the save cycle is calculated and saved. "Minimum value": the minimum value is calculated and saved. "Maximum value": the maximum value is calculated and saved. "Minimum + Maximum": both minimum and maximum values are saved (requires higher memory capacity) "Counter": the counter is recorded and saved. "Current value + counter": a current value can also be determined from the pulses recorded.	20025/000 to 20025/039
	Pulse counter Only with "Pulse counter"	Specify whether the pulse counter is a fast or slow (up to max. 25Hz) counter. If you are recording the number of switching routines of the relays, you should definitely set "up to 25Hz". Picklist: **up to 13kHz**, up to 25Hz ✎ Note! This operating item does not affect analog cards whose software version <= 1.00.05. These cards always work in the "up to 13kHz" mode.	20039/000 to 20039/039
	1 pulse = Only with "Pulse counter"	Impulse factor = factor which, when multiplied by the input signal, results in the required physical value. Example: 1 impulse equals 5 m –> enter "5".	20040/000 to 20040/039

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Time base Only for the "Current value + counter" plot mode	With the aid of the time base, a current value can be determined from the counter reading e.g. input liters, time base = second –> current value = liters/second.	20045/000 to 20045/039
	Engineering unit	Input of the engineering (physical) unit for the measuring point connected to this input (e.g. %, bar, °C, m/h, etc.). 6-character entry. ✎ Note! Cannot be changed for resistance thermometers and thermocouples!	20050/000 to 20050/039
	Unit/dimension counter Only with "Pulse counter"	Technical unit of the counter input, e.g. liter m3 etc. 6-character entry.	20055/000 to 20055/039
	Decimal point	Number of places after decimal point for the display. Picklist: 0 to 5 number of places after the decimal point. This information is only used to better display the measured value. Factory setting: **one (X,Y)** e.g. measured value: 20.12348 l/s The display shows: None: 20 l/s One: 20.1 l/s Two: 20.12 l/s Three: 20.123 l/s Four: 20.1235 l/s Five: 20.12348 l/s ✎ Note! The value is rounded off where necessary.	20060/000 to 20060/039
	Lower frequency Only for "Frequency input"	Specify the lower frequency that corresponds to the start of the measuring range. A maximum frequency of 12.5 kHz can be configured here. Factory setting: **5 Hz**	20065/000 to 20065/039
	Range start	Transmitters convert the physical measurement into a standard signal. Example: 0-14 pH from the sensor is converted to 4-20 mA. Enter the starting point of the measurement range. A "0" for 0-14 pH. ✎ Note! Cannot be changed for resistance thermometers and thermocouples!	20070/000 to 20070/039
	Upper frequency Only for "Frequency input"	Specify the upper frequency that corresponds to the end of the measuring range. A maximum frequency of 12.5 kHz can be configured here. Factory setting: **1000 Hz**	20075/000 to 20075/039
	Meas. range end	The same as "Range start". Enter the end value for the measurement range here, e.g. "14" for a 0-14 pH transmitter. ✎ Note! Cannot be changed for resistance thermometers and thermocouples!	20080/000 to 20080/039
	Zoom start	If the total transmitter range is not being used then the lower value of the required range can be entered here (higher resolution). Example: transmitter 0-14 pH, required range: 5-9 pH. Set up "5" here. The zoom has no influence on the storage.	20085/000 to 20085/039
	Zoom end	As in "Zoom start". Enter the upper value of the required range here. Example: transmitter 0-14 pH, required range: 5-9 pH. Enter "9" here.	20090/000 to 20090/039
	Damping/filter	The more unwanted interference there is on the measurement signal the higher the value that should be entered here. Result: fast changes will be damped/suppressed. Factory setting: **0.0 s**	20095/000 to 20095/039

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Comparison point Only for "Thermocouples"	Only used when directly connecting thermocouples. **"Internal":** compensation of the voltage error by measuring the terminal temperature. "External": compensation of error voltage by using thermostated comparison points.	20100/000 to 20100/039
	Comparison temp. Only for "Comparison point - external"	Settings for the external comparison temperature (only when connecting thermocouples directly).	20105/000 to 20105/039
	Submenu: Measured value correction	For determining the correction values to offset measurement section tolerances. Follow these instructions: 1. Measure the current value at the lower measurement range. 2. Measure the current value at the upper measurement range. 3. Enter the lower and upper target and actual value.  *Fig. 37: Setup - Inputs - Universal inputs, Universal input x, "Measured value correction" submenu*	
		Lower correction value: **Target value:** enter the lower target value here (e.g. measuring range 0°C to 100°C: 0°C).	23000/000 to 23000/039
		Actual value: enter the lower value that is actually measured here (e.g. measuring range 0°C to 100°C: 0.5°C measured).	23005/000 to 23005/039
		Upper correction value: **Target value:** enter the upper target value here (e.g. measuring range 0°C to 100°C: 100°C).	23010/000 to 23010/039
		Actual value: enter the upper value that is actually measured here (e.g. measuring range 0°C to 100°C: 100.5°C measured).	23015/000 to 23015/039
		Correction RPT: Rear panel temperature correction value for this universal input (only required for thermocouples). ✎ Note! Only appears once the service code has been entered!	23500/000 to 23500/039

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Submenu: Totalization	Settings only required if this analog measuring point is to be integrated for calculating the volume for example. For analysis periods, see "Signal analysis".  *Fig. 38: Setup - Inputs - Universal inputs, Universal input x, "Totalization" submenu*	
		Totalization: using the totalization function, the volume (in m^3) can be calculated from an analog signal (e.g. flow in m^3/h). Picklist: **no**, yes	24000/000 to 24000/039
		Totalization base: select the corresponding time base here. Example: ml/s -> time base **seconds (s)**; m^3/h -> time base hours (h). Picklist: **second (s)**, minutes (min), hour (h), day (d)	24005/000 to 24005/039
		Total. eng. unit: here, enter the unit for the volume determined by totalization (e.g. "m^3").	24010/000 to 24010/039
		Threshold value: specify how the device should execute low flow cut off. Picklist: **area around zero point**, absolute value	24015/000 to 24015/039
		Threshold value: analog values that are lower than the set threshold value (absolute value) are not integrated ("low flow cut off"). User input: 6-digit; factory setting: **0**	24020/000 to 24020/039
		Calc. factor: factor for converting the integrated value (e.g. the transmitter returns l/s -> integration base = second -> desired unit is m^3 -> select 0.001 as the factor). Picklist: 0.00001 to 10000, free configuration; factory setting: **1**	24025/000 to 24025/039
	Only if "Free configuration" is selected for "Calc. factor":	**Calc. factor:** user-defined entry of the factor for converting the integrated value. Factory setting: **1.000**	24030/000 to 24030/039

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Submenu: Fault mode (only available in the Expert setup!)	Settings that lay down how this channel is to react under fault conditions (e.g. cable open circuit, over range).  *Fig. 39: Setup - Inputs - Universal inputs, Universal input x, "Fault mode" submenu*	
		Fault switches: switches the selected relay under fault conditions. The terminal numbers are shown in brackets. Picklist: **not used**, relay x (xx-xx) Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	25000/000 to 25000/039
		Save event: stores a message in the event memory when a fault condition occurs. Picklist: **no**, yes	25005/000 to 25005/039
	Only for "Current" as the signal and "4-20 mA" as the range	**NAMUR NE43:** Switch monitoring of the 4 to 20 mA range as per NAMUR Recommendation NE43 on and off. The following error ranges apply when NAMUR NE43 is switched on: ≤ 3.8 mA: under range (display shows: vvvvvv) ≥ 20.5 mA: overrange (displays shows: ^^^^^^) ≤ 3.6 mA or ≥ 21.0 mA: cable open circuit (display shows: - - - -) Picklist: **on**, off	25015/000 to 25015/039
	Only for "4-20 mA" or "1-5 V" as the range and if "NAMUR NE43" is "on"	**Time delay** The system only reacts to a cable open circuit/under range/overrange (e.g. relay is switched) if this condition is present for the set duration at least. Factory setting: **0 s**	25045/000 to 25045/039
	Only for "Voltage" as the signal and "1-5 V" as the range	**Cable open circuit:** Switch cable open circuit detection of the 1-5 V range on or off. If the cable open circuit detection function is switched on, all values < 0.8 V or > 5.2 V are regarded as a cable open circuit (display shows: - - - -) Picklist: **on**, off	25015/000 to 25015/039
	Not available if "Pulse counter" is the signal!	**In the event of an error** Specify the value the unit should continue to use (for calculations) if the measured value is not valid (e.g. cable open circuit). Picklist: last valid value, range start, meas. range end, zero[1)], LOW[1)], HIGH[1)], **value is invalid**, free configuration	25035/000 to 25035/039
	Only if "Free configuration" is selected for "In event of an error"	**Error value** The unit continues calculating with this value if a fault occurs. See table	25040/000 to 25040/039
	Copy settings	Copies settings from actual channel to selected channel. Picklist: **no**, in universal input x	20115/000 to 20115/039

1) Only visible for mathematics

Fault mode

Failsafe mode if an input signal/variable is invalid (e.g. cable open circuit, invalid result of mathematics calculation; e.g. dividing by zero).

Set failsafe mode	"Invalid" channel	Dependent channels
Value is invalid	■ "– – – – –" or "******" are displayed ■ Channel name is highlighted in red ■ Status "F" is displayed ■ Limit value monitoring is suspended ■ Totalization is suspended ■ A relay is switched if set. ■ Analysis: if the error is pending during the entire analysis period, the value in the analysis is invalid. If there was at least 1 valid value, the result of the analysis is valid.	■ "– – – – –" or "******" are displayed ■ Channel name is highlighted in red ■ Status "F" is displayed ■ Limit value monitoring/totalization: depends on the set failsafe mode of this channel ■ A relay is switched if set. ■ Analysis: if the error is pending during the entire analysis period, the value in the analysis is invalid. If there was at least 1 valid value, the result of the analysis is valid.
All other settings	■ "– – – – –" or "******" are displayed ■ Channel name is highlighted in red ■ Status "F" is displayed ■ Value is totalized ■ A relay is switched if set. ■ Analysis: if the error is pending during the entire analysis period, the value in the analysis is invalid. If there was at least 1 valid value, the result of the analysis is valid.	■ Calculated value is displayed ■ Channel name is highlighted in red ■ Status "F" is displayed The channel is treated as "valid", i.e.: ■ Value is totalized ■ Limit value monitoring remains active ■ If the result of the calculation for this channel is invalid, the set failsafe mode for this channel applies ■ Analyses: the channel is analyzed as normal

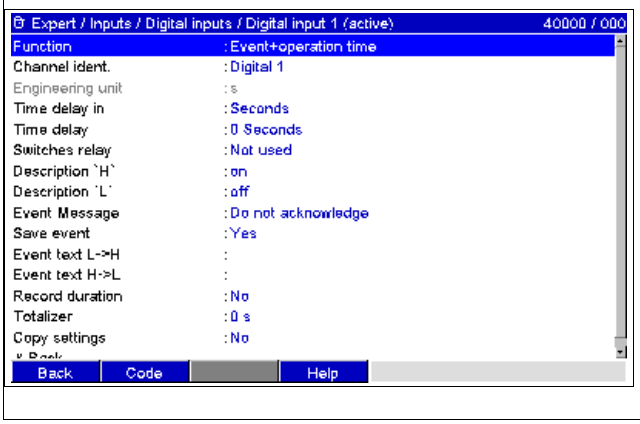
Setup - Inputs submenu: digital inputs

Procedure for setting the signals of the digital inputs:

1. Start					
▼					
2. Select the function of the digital channel (also optionally possible via "Modbus" or "Profibus" fieldbus)					
▼	▼	▼	▼	▼	▼
3. Control input	3. On/off event	3. Pulse counter	3. Operational time	3. Event + operation time	3. Quantity from time
▼	▼	▼	▼	▼	▼
4. Enter channel identifier	4. Enter channel identifier	4. Enter channel identifier	4. Enter channel identifier	4. Enter channel identifier	4. Enter channel identifier
▼	▼	▼	▼	▼	▼
5. Select the action	5. Enter description for "HIGH" and "LOW" conditions	5. Enter the unit/dimension	5. Where necessary, enter the current counter reading to continue a totalizer	5. Enter description for "HIGH" and "LOW" conditions	5. Enter the unit/dimension
▼	▼	▼	▼	▼	▼
6. End	6. Select whether the event message has to be acknowledged	6. Select the number of decimal places	6. Select the display for the counter type (e.g. totalizer)	6. Select whether the event message has to be acknowledged	6. Select the number of decimal places
	▼	▼	▼	▼	▼

7. Choose whether the event should be saved in the event log		7. Enter the pulse factor	**7. End**	7. Choose whether the event should be saved in the event log		7. Select the factor
Yes ▼	No ▼	▼		Yes ▼	No ▼	▼
8. Enter event text for change in status from L->H and H->L	**8. End**	8. Where necessary, enter the current counter reading to continue a totalizer		8. Enter event text for change in status from L->H and H->L	▼	8. Where necessary, enter the current counter reading to continue a totalizer
▼		▼		▼	▼	▼
9. Record duration?		9. Select the display for the counter type (e.g. totalizer)		9. Record duration?	▼	9. Select the display for the counter type (e.g. totalizer)
▼		▼		▼		▼
10. End		**10. End**		10. Where necessary, enter the current counter reading to continue a totalizer		**10. End**
				▼		
				11. Select the display for the counter type (e.g. totalizer)		
				▼		
				12. End		

Note!
The descriptions of the operating items for optional application packages can be found in the additional Operating Instructions on the CD-ROM or as hardcopy (part of the scope of delivery).

"Inputs" menu items	**Configurable parameters** (factory settings are highlighted in bold)	Direct access code
Submenu: Digital inputs, digital input x	Setting up only required if the digital inputs (e.g. events) are to be used. View or change the settings for the selected digital channel. Note! Digital input 7 – 14 can only be selected if the "Digital inputs" option card is available. 	

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Function	Select the required function. Digital inputs are High active; this means the described effect is achieved by a high input. Low = -3 to +5 V, High = +12 to +30 V ✎ Note! Depending on the selected function, the unit's user interface adapts itself, so that each time only parameters that are required for safe unit functioning have to be checked/set. The following functions are available: **"Switched off"**: digital input is not active. "Control input": various control functions can be activated using the digital input. "On/off event": switch conditions of connected units (e.g. pump on/off) are displayed and stored. "Pulse counter": pulses are added up and saved as a numerical value (max. 25 Hz). "Operational time": running times of external units are recorded e.g. for maintenance purposes. **Example:** if the daily run time of a pump is to be saved, activate "Operating time" here and "Daily analysis" under "Signal analysis". "Event+operation time": both the on/off events and the operating time of an external unit are recorded and stored. "Quantity from time": a quantity is calculated from the time (e.g. for pumps with constant throughput). "Modbus" or "Profibus": the data are transmitted to the unit via the fieldbus (option).	40000/000 to 40000/013
	Function Only for the "Modbus" or "Profibus" function	Specifies how the data are interpreted/processed by the fieldbus. For a description, see "Function".	40005/000 to 40005/013
	Channel ident.	Measurement point name (e.g. "Pump") or description of the function of this input (e.g. "Fault message"). 16-character entry. **Factory setting: digital x**	40010/000 to 40010/013
	Engineering unit Only for the "Pulse counter" and "Quantity from time" functions	Technical units of the count input, e.g. gal, cf, ... 6-digit entry.	40030/000 to 40030/013
	Decimal point Only for the "Pulse counter" and "Quantity from time" functions	Number of places after decimal point for the display. Picklist: 0 to 5 number of places after the decimal point. This information is only used to better display the measured value. Factory setting: **one (X,Y)** e.g. measured value: 20.12348 l/s The display shows: None: 20 l/s One: 20.1 l/s Two: 20.12 l/s Three: 20.123 l/s Four: 20.1235 l/s Five: 20.12348 l/s ✎ Note! The value is rounded off where necessary.	40035/000 to 40035/013
	Input factor in Only for the "Quantity from time" function	Specifies whether the factor entered relates to 1 second or 1 hour. Picklist: **seconds**, hours	40040/000 to 40040/013

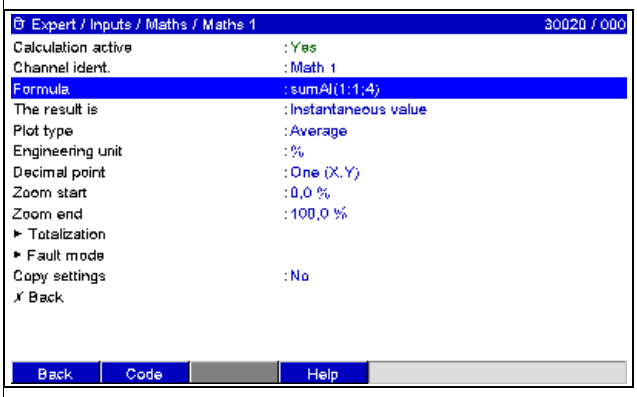
"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	1 pulse = Only for "Pulse counter" function	Impulse factor = factor which, when multiplied by the input signal, results in the required physical value. Example: 1 pulse corresponds to 5 m^3 -> enter "5" here. **Factory setting: 1.0**	40045/000 to 40045/013
	1 second/hour = Only for the "Quantity from time" function	Impulse factor = factor which, when multiplied by the operation time, results in the required physical value. Example: 1 second equals 8 liters –> enter "8" here. **Factory setting: 1.0**	40045/000 to 40045/013
	Time delay in Only for "On/off event" and "Event+operation time" functions.	Configure the engineering unit for entering the time delay. Picklist: **seconds**, minutes, hours	40115/000 to 40115/013
	Time delay Only for "On/off event" and "Event+operation time" functions.	The high signal must be present for the set time at least before the channel in the device is set from low to high. However, the transition from high to low takes place immediately. User input: **0** to 999	40120/000 to 40120/013
	Switches relay Only for "On/off event" and "Event+operation time" functions.	Switches the corresponding relay if the digital input is low or high. The terminal numbers are shown in brackets. Picklist: **not used**, relay x (xx-xx) ✎ Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	40130/000 to 40130/013
	Description ´H´ Only for "On/off event" and "Event+operation time" functions.	Description of the status if the digital input is activated. This text is both shown in the display and saved to memory. Factory setting: **On**	40050/000 to 40050/013
	Description ´L´ Only for "On/off event" and "Event+operation time" functions.	Description of the status if the digital input is not activated. This text is both shown in the display and saved to memory. Factory setting: **Off**	40055/000 to 40055/013
	Event message Only for "On/off event" and "Event+operation time" functions.	**"Do not acknowledge"**: no message is output if the digital input switches. "Acknowledge": an event message is displayed and has to be confirmed by pressing a button.	40060/000 to 40060/013
	Save event Only for "On/off event" and "Event+operation time" functions.	Determines whether the condition change from low to high or high to low is stored in the event log. Note: increased memory capacity needed. Picklist: **yes**, no	40065/000 to 40065/013
	Event text L->H Can only be saved for "Event message – acknowledge" or "Save event – yes"	Description of condition change from low to high. Event text is stored (e.g. start filling). 22-character entry.	40070/000 to 40070/013
	Event text H->L Can only be saved for "Event message – acknowledge" or "Save event – yes"	Description of condition change from high to low. Event text is stored (e.g. stop filling). 22-character entry.	40075/000 to 40075/013
	Record duration Can only be saved for "Event message – acknowledge" or "Save event – yes"	The duration between "On" and "Off" can be recorded. The duration is appended to the "Off" event text (format: <hhhh>h<mm>:<ss>). Times when the power has failed do not affect the duration. If the digital channel was "on" before the power failure and is still "on" when the power is restored, the duration continues to be counted. Picklist: **no**, yes	40080/000 to 40080/013

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Action Only for "Control input"	Set up the function of the control input. "Start recording": data are displayed/stored only if the input is active. "Screensaver on": display is switched off so long as the input is active. "Block setup": the setup can only be changed if a low signal is pending. "Block keyboard/navigator": the unit can only be operated if a low signal is pending. Otherwise all key activation and navigator actions are discarded. "Time synchronization": if the input is enabled (signal jump from low to high), the internal second counter is set to zero. The minute does not change if the second indicator is between 0 and 29. The minute is increased by one if the second indicator is between 30 and 59. ✎ Note! Use this function in conjunction with a master clock. All the units used in this way are synchronized. Signals measured on different units can thus be compared against one another on the same time basis. **"Change group":** you can either display a specific group or switch to the next active group. The system reacts to the Low —> High change. **"Set point monitoring on/off":** the complete set point monitoring function for the unit can be switched on (for High) or switched off (for Low) (e.g. during cleaning cycles). "Individual LV on/off": monitoring for a selected limit value can be switched on (for High) or switched off (for Low). "Start/stop analysis 1 – 4": all the active channels are analyzed as long as the control input is enabled, i.e. analysis based on the Min/Max/average values, amounts and totalization does not take place cyclically at fixed intervals. Analysis routines are controlled by this digital input. The analysis starts when the input is activated. The analysis is completed and saved when the input is deactivated. Measured value recording for the graphic display continues. Batches can also be started/finished via this function.	40085/000 to 40085/013
	Group Only for "Action - Change group"	Select the group which should be displayed in the event of a change from Low–>High. Alternatively, the next active group can be displayed. Picklist: **next group**, group x	40090/000 to 40090/013
	Set point Only for "Action – Individual LV on/off"	Select what limit value should be switched on and off by means of this control input. Picklist: **switched off**, set point x	40095/000 to 40095/013
	Totalizer Only for the "Pulse counter", "Operational time" and "Event + operation time" and "Quantity from time" functions.	Initial setting for the totalizer. Useful when continuing a measurement performed to date with an electromechanical counter. 12-character entry. **Factory setting: 0**	40100/000 to 40100/013
	Copy settings	Copies settings from actual channel to selected channel. The last two characters in the channel name of the target channel are replaced by the channel number. Note: makes unit setup easier if practically the same settings apply for several measuring points (e.g. several operation time counters).	40110/000 to 40110/013

Setup - Inputs submenu: Mathematics

Settings only required if measured values of the input signals are to be mathematically linked. Up to 8 mathematics channels can be used.

Note!
Depending on the selected function, the unit's user interface adapts itself, so that each time only parameters that are required for safe unit functioning have to be checked/set.

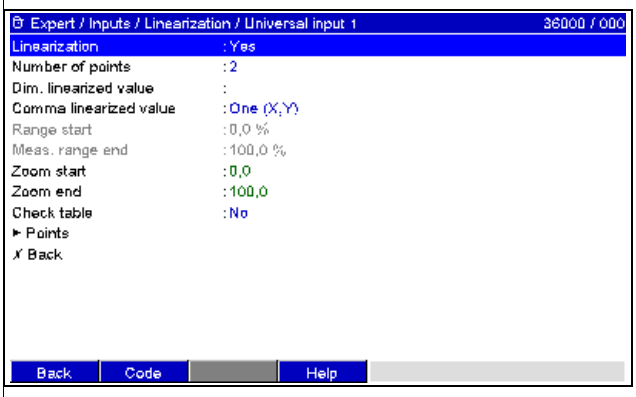
"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Maths, Maths 1 - 8	Configuration of the mathematics channels.  a0012242 *Fig. 40: Setup Inputs - Maths, "Maths 1" submenu*		
	Calculation active	Switch the mathematics channel on or off. Picklist: yes, **no**	30000/000 to 30000/007
	Channel ident.	Name of the mathematics channel for identification purposes. 16-character entry. **Factory setting: maths x**	30005/000 to 30005/007
	Formula editor Is only displayed in the supplied PC software	The formula can be any combination of arithmetic calculations and logical operations. Analog and digital channels can be used, as can mathematics channels that are already active.	30015/000 to 30015/007
	Formula	Individual channels can be mathematically linked and calculated with functions. The mathematics channels calculated in this way are treated as "real" channels, regardless of whether they are connected conventionally of via fieldbus. Enter the desired formula for calculation. The formula can be any combination of arithmetic calculations and logical operations. Analog and digital channels can be used, as can mathematics channels that are already active. (See information in the Operating Instructions on the supplied PC software.)	30020/000 to 30020/007
	The result is	Specify what data type the calculation returns. This setting affects how the channel saves and is displayed. For example, if you add 2 analog channels, the result is an "instantaneous value". If, for example, you logically link 2 channels (Digital 1 AND Digital 2), the result is a "state" (on/off). Picklist: **instantaneous value**, state, counter, operating time, control input	30025/000 to 30025/007

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Action Only for "The result is – control input"	Set up the function of the control input. "Start recording": data are displayed/stored only if the input is active. **"Set point monitoring on/off":** the complete set point monitoring function for the unit can be switched on (for High) or switched off (for Low) (e.g. during cleaning cycles). "Individual LV on/off": monitoring for a selected limit value can be switched on (for High) or switched off (for Low). "Start/stop analysis 1 – 4": starts or stops external analysis (the analysis only runs if the signal is high). Measured value recording for the graphic display continues. ✎ Note! This function is not available for the "Batch" option!	30105/000 to 30105/007
	Set point Only for "Action – Individual LV on/off"	Select what limit value should be switched on and off by means of this control input. Picklist: **switched off**, set point x	30110/000 to 30110/007
	Plot type Only for "The result is – instantaneous value"	"Start/stop analysis 1 – 4": all the active channels are analyzed as long as the control input is enabled, i.e. analysis based on the Min/Max/average values, amounts and totalization does not take place cyclically at fixed intervals. Analysis routines are controlled by this digital input. The analysis starts when the input is activated. The analysis is completed and saved when the input is deactivated. Measured value recording for the graphic display continues. Batches can also be started/finished via this function.	30026/000 to 30026/007
	Engineering unit Only for "The result is – "Instantaneous value" or "Counter"	Unit of the calculated value, e.g. if several flow inputs are calculated together, the unit of the result can be entered here, e.g. m/h. 6–digit entry.	30045/000 to 30045/007
	Decimal point Only for "The result is – "Instantaneous value" or "Counter"	Number of places after decimal point for the display. Picklist: 0 to 5 number of places after the decimal point. This information is only used to better display the measured value. Factory setting: **one (X,Y)** e.g. measured value: 20.12348 l/s The display shows: None: 20 l/s One: 20.1 l/s Two: 20.12 l/s Three: 20.123 l/s Four: 20.1235 l/s Five: 20.12348 l/s ✎ Note! The value is rounded off where necessary.	30050/000 to 30050/007
	Zoom start Only for "The result is" – "Instantaneous value"	If the total value range is not being used then the lower value of the required range can be entered here. The zoom has no influence on the storage.	30055/000 to 30055/007
	Zoom end Only for "The result is" – "Instantaneous value"	As in "Zoom start". Enter the upper value of the required range here.	30060/000 to 30060/007
	Description ´H´ Only for "The result is – state"	Description of the status if the result is "HIGH". This text is both shown in the display and saved to memory. Factory setting: **on**	30065/000 to 30065/007
	Description ´L´ Only for "The result is – state"	Description of the status if the result is "LOW". This text is both shown in the display and saved to memory. Factory setting: **off**	30070/000 to 30070/007

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Event message Only for "The result is – state"	**"Do not acknowledge"**: no message is output if the status of the mathematics channel changes. "Acknowledge": an event message is displayed and has to be confirmed by pressing a button.	30075/000 to 30075/007
	Save event Only for "The result is – state"	Determines whether the condition change from low to high or high to low is stored in the event log. Note: increased memory capacity needed. Picklist: **yes**, no	30080/000 to 30080/007
	Event text L->H Can only be saved for "Event message – acknowledge" or "Save event – yes"	Description of condition change from low to high. Event text is stored (e.g. start filling). 22-character entry.	30085/000 to 30085/007
	Event text H->L Can only be saved for "Event message – acknowledge" or "Save event – yes"	Description of condition change from high to low. Event text is stored (e.g. stop filling). 22-character entry.	30090/000 to 30090/007
	Switches relay Only for "The result is – state"	Outputs the status of the mathematics channel on the selected relay. Picklist: **not used**, relay x (xx-xx) ✎ Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup –> Outputs –> Relay –> Relay x".	30095/000 to 30095/007
	Submenu: Totalization Only for "The result is – instantaneous value"	Settings only required if the calculated value is to be integrated for calculating the volume for example. For analysis periods, see "Signal analysis".	
		Totalization Using the totalization function, the volume (in m) can be calculated from an analog signal (e.g. flow in m/h). Picklist: **no**, yes	34000/000 to 34000/007
		Totalization base Select the corresponding time base. Example: ml/s –> time base seconds (s); m/h –> time base hours (h). Picklist: **second (s)**, minutes (min), hour (h), day (d)	34005/000 to 34005/007
		Total. eng. unit Here, enter the unit for the volume determined by totalization (e.g. "m").	34010/000 to 34010/007
		Threshold value Specify how the device should execute low flow cut off. Picklist: **area around zero point**, absolute value	34015/000 to 34015/007
		Threshold value Analog values that are lower than the set threshold value (absolute value) are not integrated ("low flow cut off") User input: 6-digit; factory setting: **0**	34020/000 to 34020/007
		Calc. factor Factor for converting the integrated value (e.g. the transmitter returns l/s –> integration base = second –> desired unit is m –> enter 0.001 as the factor).	34025/000 to 34025/007
	Submenu: Fault mode Only in the Expert setup	Settings that specify how this channel behaves in the event of a fault (e.g. if an input channel has a cable open circuit or the system tries to divide by 0).	

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
		In the event of an error Specify the value/status the unit continues to work with if the result of the calculation is invalid. Picklist: last valid value, range start, meas. range end, zero, LOW, HIGH, free configuration, **value is invalid** ✎ Note! The picklist entries depend on the "The result is" option.	35000/000 to 35000/007
		Error value (Only if "In event of an error – free configuration" is selected.) The unit continues calculating with this value if a fault occurs.	35005/000 to 35005/007
		Fault switches Switches the selected relay under fault conditions. The terminal numbers are shown in brackets. Picklist: **not used**, relay x (xx-xx) ✎ Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	35010/000 to 35010/007
	Copy settings	Copies settings from actual channel to selected channel.	30100/000 to 30100/007

Setup – Inputs, submenu: Linearization

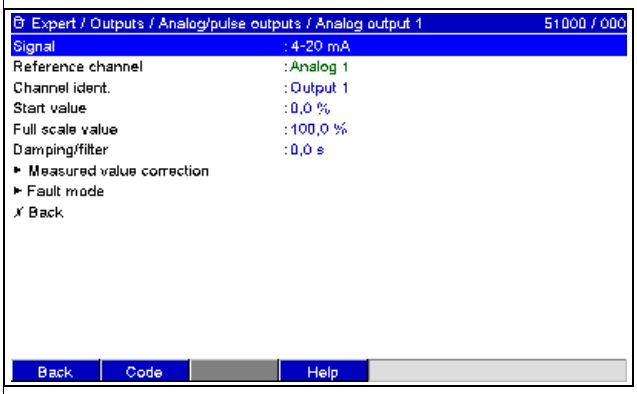
"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Linearization, universal input x	First select the analog input to be linearized. The "Linearization" menu item only appears for active analog inputs. ✎ Note! Only optical sensor, mathematical and voltage/current signals from universal input channels can be linearized.  a0012262 *Fig. 41: Setup – Inputs – Linearization, submenu "Universal input 1"*	
	Linearization	Specify whether this analog input should be linearized. Picklist: **no**, yes	36000/000 to 36000/015
	Number of points	Specify how many points your linearization table has. Note: the first and last points always have to be the start and end of the measuring range. Up to 32 points can be configured. Factory setting: **2 points**	36005/000 to 36005/015

"Inputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Dim. linearized value	Unit/dimension for the linearized value.	36010/000 to 36010/015
	Comma linearized value	Number of places after decimal point for the display. Picklist: 0 to 5 number of places after the decimal point. This information is only used to better display the measured value. Factory setting: **one (X,Y)** e.g. measured value: 20.12348 l/s The display shows: None: 20 l/s One: 20.1 l/s Two: 20.12 l/s Three: 20.123 l/s Four: 20.1235 l/s Five: 20.12348 l/s ✎ Note! The value is rounded off where necessary.	36015/000 to 36015/015
	Range start	The start of measuring range is displayed here. Fixed settings - cannot be changed.	36020/000 to 36020/015
	Meas. range end	The end of measuring range is displayed here. Fixed settings - cannot be changed.	36025/000 to 36025/015
	Zoom start	If the total transmitter range is not being used then the lower value of the required range can be entered here (higher resolution). Example: transmitter 0-14 pH, required range: 5-9 pH. Set up "5" here. The zoom has no influence on the storage.	36026/000 to 36026/015
	Zoom end	As in "Zoom start". Enter the upper value of the required range here. Example: transmitter 0-14 pH, required range: 5-9 pH. Enter "9" here.	36027/000 to 36027/015
	Edit table Only if operating via PC software	Edit the linearization table here.	36030/000 to 36030/015
	Check table	Here, you can check whether the linearization table has been entered correctly. Picklist: **no**, yes	36035/000 to 36035/015
	Submenu: Points x Number depends on the setting under "Number of points"	Enter the points for the linearization table here. Note: the first and last points always have to be the start and end of the measuring range. In the PC software, only the points can be viewed here. To change the points, use the "Edit table" function.	
		x-value x–value of the linearization (value that comes from the input of the unit). e.g. if 10 cm corresponds to 20 liters —> enter 10.	36100/000 to 36100/031
		y-value Here, enter the y–value the measured x–value corresponds to. e.g. if 10 cm corresponds to 20 liters —> enter 20.	36105/000 to 36105/031

6.4.5 Setup - Outputs

Settings only required if outputs (e.g. relays or analog outputs) are to be used.

Setup - Outputs, submenu: Analog/pulse outputs, Analog output 1-2

"Outputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Analog/ pulse outputs, analog output x **Only for the "Digital card" option**	The unit optionally has 2 analog outputs. These work either as a current output or a pulse output. Settings only required if analog outputs are to be used. View or change the settings for the selected analog output channel.  a0012264 *Fig. 42: Setup Outputs, submenu: Analog/pulse outputs, Analog output 1*		
	Signal	Select the output signal for this channel. Picklist: **switched off**, 4-20 mA, 0-20 mA, pulse output	51000/000 to 51000/001
	Reference channel	Select the input the analog output refers to. Picklist: **switched off**, optical sensor x, analog x, digital x, maths x	51005/000 to 51005/001
	Channel ident.	User-definable name for this output. Factory setting: **Output x**	51010/000 to 51010/001
	Start value Only for signal "0/4-20 mA"	Specify what value corresponds to 0/4 mA. Factory setting: **0.0**	51025/000 to 51025/001
	Full scale value Only for signal "0/4-20 mA"	Specify what value corresponds to 20 mA. Factory setting: **100.0**	51030/000 to 51030/001
	Damping/filter Only for signal "0/4-20 mA"	Time constant of the first order low pass for the output signal. This is used to prevent large fluctuations in the output signal (can only be selected for the signal type 0/4 to 20 mA). Factory setting: **0.0 s**	51035/000 to 51035/001
	Pulse value Only for signal "Pulse output"	The pulse value is used to specify the volume an output pulse corresponds to (e.g. 1 pulse = 5 liters). Factory setting: **1 %**	51045/000 to 51045/001
	Pulse width Only for signal "Pulse output"	The pulse width limits the max. possible output frequency of the pulse output. Specify a fixed or dynamic pulse width. Picklist: **user-defined**, dynamic (max. 50 ms)	51050/000 to 51050/001
	Pulse width Only for signal "Pulse output"	Here, you can set the pulse width in the range from 0.5 to 1000 ms. Factory setting: **100 ms**	51055/000 to 51055/001

"Outputs" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Submenu: Measured value correction Only for signal "0/4-20 mA"	Here, you can correct the current value output (only required if the unit processing the values further cannot balance possible measurement section tolerances). Follow these instructions: 1. At the connected unit, read the value displayed in the lower and upper measuring range. 2. Enter the lower and upper target and actual value.	
		Lower correction value **Target value:** enter the target value here.	51200/000 to 51200/001
		Actual value: here, enter the lower actual value that is displayed at the connected unit.	51205/000 to 51205/001
		Upper correction value: **Target value:** enter the target value here.	51300/000 to 51300/001
		Actual value: here, enter the upper actual value that is displayed at the connected unit.	51305/000 to 51305/001
	Submenu: Fault mode Only for signal "0/4-20 mA"	Specify how the analog output should behave in the event of a fault (e.g. if the input channel has a cable open circuit).	
		Namur NE43 Switch outputting the 4 to 20 mA range as per NAMUR Recommendation NE 43 on and off. The following error ranges apply when NAMUR NE43 is switched on: ≤ 3.8 mA: under range ≥ 20.5 mA: overrange ≤ 3.6 mA or ≥ 21.0 mA: cable open circuit Picklist: off, **on**	51400/000 to 51400/001
		In the event of an error What value should the output assume in the event of an error (e.g. cable open circuit or calculated value invalid)? Picklist: last valid value, **range start**, meas. range end, 3.6 mA, 21 mA, free configuration	51405/000 to 51405/001
		Error value This value is output in the event of an error. Note: the value must be between 0 and 22 mA.	51410/000 to 51410/001

Setup - Outputs, submenu: Relay

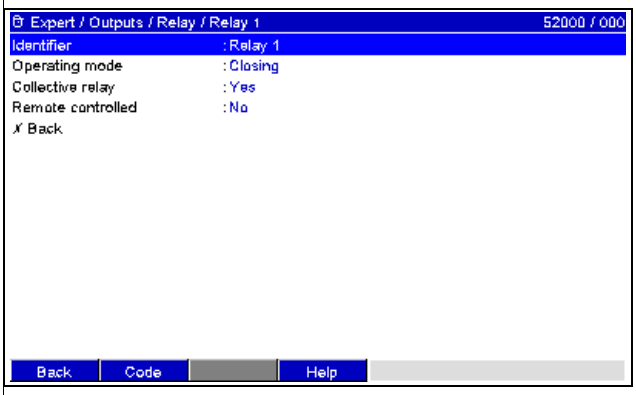
<table>
<tr><th>"Outputs" menu items</th><th colspan="2">Configurable parameters
(factory settings are highlighted in bold)</th><th>Direct access code</th></tr>
<tr><td>Submenu: Relay, relay x</td><td colspan="2">Various relay settings (e.g. operating mode)
The basic version of the unit has 6 relays. 6 additional relays are also available on the optional "Digital card".
✎ Note!
Relay 1 has been assigned to be the optical sensor alarm relay. If one of the following failure events occurs Relay 1 will be triggered:
■ Lamp failure
■ Sensor failure
■ Lamp life lower than 20% (for UV sensor only)
■ Lamp power supply connector open
Setup for the selected relay:


Fig. 43: Setup Outputs, submenu: Relay, relay 1</td><td></td></tr>
<tr><td></td><td>Identifier</td><td>User-definable name for the relay.
Factory setting: relay x</td><td>52000/000 to 52000/011</td></tr>
<tr><td></td><td>Operating mode</td><td>Function of the relay:
"Opening": the relay is closed in the quiescent state (maximum safety).
"Closing": the relay is open in the quiescent state.</td><td>52005/000 to 52005/011</td></tr>
<tr><td></td><td>Collective relay</td><td>"No": there can only be one reason for triggering the relay (if several trigger factors are assigned, the last trigger factor controls the relay)
"Yes": the relay can be triggered by several factors (e.g. 2 different limit values) (OR logical operation).</td><td>52010/000 to 52010/011</td></tr>
<tr><td></td><td>Remote controlled</td><td>Specify whether the relay can be controlled remotely.
Picklist: no, yes
✎ Note!
Remote-controlled relays may not be assigned to any other trigger factor (e.g. limit value alarm).</td><td>52015/000 to 52015/011</td></tr>
</table>

6.4.6 Setup - Application

Specify the various application-specific settings (e.g. limit values, signal grouping, text, softkeys, Web server).

Note!
- Depending on the selected function, the unit's user interface adapts itself, so that each time only parameters that are required for safe unit functioning have to be checked/set.

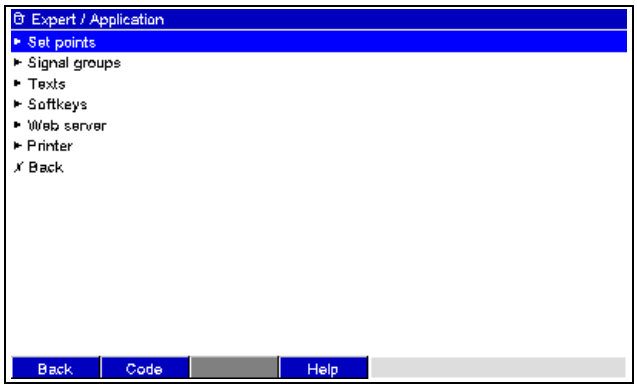


Fig. 44: Setup Application

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Set points	**Change set points**	Specify where the set points can be changed. If you select "Also in menu "Extras"", you can also change the set points in the Extras menu in addition to during the setup. Here, you can adapt your set points to suit the process even if the setup is locked. Note: this function can/should be protected by the set point code. Picklist: **only in the setup**, also in menu "Extras"	60000/000
Submenu: Set points, set point x	The measured values can be monitored for alarm set point violation. A relay can be switched or an event message displayed on violation. Channels can be individually assigned to the set points. View or change the setup for the selected alarm set point. Up to 100 set points can be monitored. Set points can also be changed outside the Setup menu, i.e. the user does not have to switch to the "Setup" menu. This increases the certainty that no other parameters are changed. Activate function: select "Main menu –> Setup –> Application –> Change set points: Also in menu "Extras"". If the user administration function is active, the user and the password also have to be entered with this setting before a set point can be changed.		
	Channel	Select the input the alarm set point refers to. Picklist: **switched off**, analog input x, digital input x, maths x	37000/000 to 37000/099

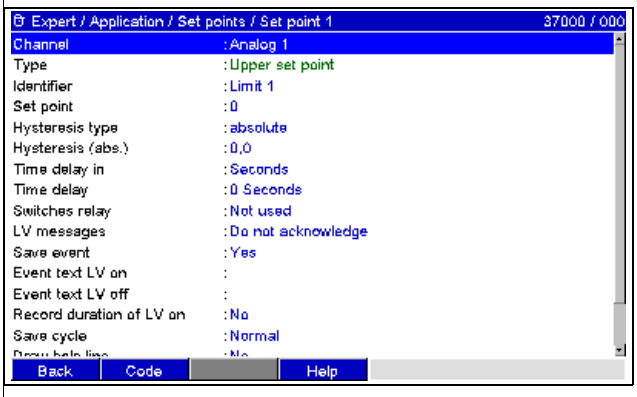


Fig. 45: Setup Application, submenu "Set points, Set point x"

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Type	Type of alarm set point (dependent on the input signal): "Lower set point": analog signal drops below the set point. **"Upper set point"**: analog signal exceeds the set point. "Analysis 1–4": counter exceeds the set point. Note: the counters are reset cyclically to 0. "Gradient dy/dt": is used to monitor the change in the input signal over time. If the measured value changes too quickly, the alarm is triggered. The alarm stops when the gradient drops below the set value again. Note: pay attention to the settings in "Signal analysis"	37005/000 to 37005/099
	Identifier	Identifier of the set point. Factory setting: **Limit x**	37008/000 to 37008/099
	Range start Only for "Analog input x" with "Upper or lower set point"	The lower value of the set measuring range is displayed here.	37015/000 to 37015/099
	Meas. range end Only for "Analog input x" with "Upper or lower set point"	The upper value of the set measuring range is displayed here.	37020/000 to 37020/099
	Set point	Analog set point in the preset engineering unit, e.g. in °C, bar, etc.	37025/000 to 37025/099
	Signal change dy Only for the "Gradient dy/dt" type	Here, enter the value for the signal change to be detected as the set point.	37025/000 to 37025/099
	Time span dt Only for the "Gradient dy/dt" type	Time span within which the signal has to change by the specified value so it can be detected as a set point. Note: max. 60 seconds.	37030/000 to 37030/099
	Set point	Counter alarm set point in the engineering units set up, e.g. m, piece, ...	37035/000 to 37035/099
	Hysteresis type Only for the "Upper or lower set point" type	**"Percentual":** set hysteresis in %. "Absolute": enter hysteresis in the preset engineering unit (e.g. °C, bar, etc.)	37040/000 to 37040/099
	Hysteresis (%) Only for "Percentual" hysteresis type	The alarm condition is only canceled when the signal has changed into the normal operation range by the preset value. **Factory setting: 1.0%**	37045/000 to 37045/099
	Hysteresis (abs.) Only for "Absolute" hysteresis type	The alarm condition is only canceled when the signal has changed into the normal operation range by the preset value. **Factory setting: 0.0**	37050/000 to 37050/099
	Time delay in	Configure the engineering unit for entering the time delay. Picklist: **seconds**, minutes, hours	37054/000 to 37054/099
	Time delay	In order to be interpreted as an alarm the signal must exceed or undercut the preset value by at least the time set up. User input: **0** to 999	37055/000 to 37055/099

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Switches relay	Switches the respective relay in alarm condition. The terminal numbers are shown in brackets. Picklist: **not used**, relay x (xx-xx) ✎ Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	37060/000 to 37060/099
	LV messages	**"Do not acknowledge"**: the tag name is highlighted in red to signal an alarm condition (no message is output). "Acknowledge": in the event of an alarm, a message is also displayed and this message has to be acknowledged. ✎ Note! The screensaver is automatically disabled in the event of a limit value message!	37065/000 to 37065/099
	Save event	Stores a message in the event log on limit value violation. Picklist: no, **yes**	37070/000 to 37070/099
	Event text LV on	If the limit value is violated, this text (including date and time) is shown on the display and stored in the event log. Only available when "LV messages" is set to "Acknowledge" or "Save event" is set to "Yes". If no text is entered, the unit generates its own text (e.g. Analog 1 > 100%). 22-character entry.	37075/000 to 37075/099
	Event text LV off	The same as "Event text LV on", but on return from alarm to normal condition. 22-character entry.	37080/000 to 37080/099
	Record duration of LV on	The duration of the limit value violation can be recorded. The duration is appended to the limit value "Off" event text (format: <hhhh>h<mm>:<ss>). Times when the power has failed do not affect the duration. If the limit value was violated before the power failure and is still violated when the power is restored, the duration continues to be counted. Picklist: **no**, yes	37085/000 to 37085/099
	Reset relay	**"If LV no longer violated"**: the relay remains switched as long as the limit value is violated. "After acknowledging message": even if the limit value is no longer violated, the relay remains switched until the message has been acknowledged. If the limit value is still violated when the message is acknowledged, the relay remains switched until the limit value is no longer violated. "Until message is acknowledged": the relay remains switched until the message has been acknowledged or the limit value is no longer violated.	37090/000 to 37090/099
	Save cycle	**"Normal":** save in normal save cycle. "Alarm cycle": fast storage during an alarm violation, e.g. every second. Attention: requires higher memory capacity! The save cycles are set up in the menu "Signal groups".	37095/000 to 37095/099
	Draw help line	You can specify whether this limit value should be displayed in the graphic as a help line (in the color of the channel). Note: a maximum of 4 help lines can be displayed per group. Picklist: **no**, yes	37100/000 to 37100/099
	Copy settings	Copies the setup of the actual alarm set point into the selected alarm set points. Picklist: **no**, in set point x	37110/000 to 37110/099

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)	Direct access code
Submenu: Signal groups, Group x	Various general settings for the measured value display of the unit, e.g. grid division, etc. Channels are only displayed and saved if they are assigned to a group. Group the analog, digital and/or mathematics channels in groups in such a way that you can call up all the important information during operation at the touch of a button (e.g. temperatures, signals in plant unit 1). ✎ Note! – Maximum 8 channels per group! – Channels can be assigned to several groups. – High-speed saving (100ms) is only available in Group 1. – A maximum of 10 groups can be formed.	

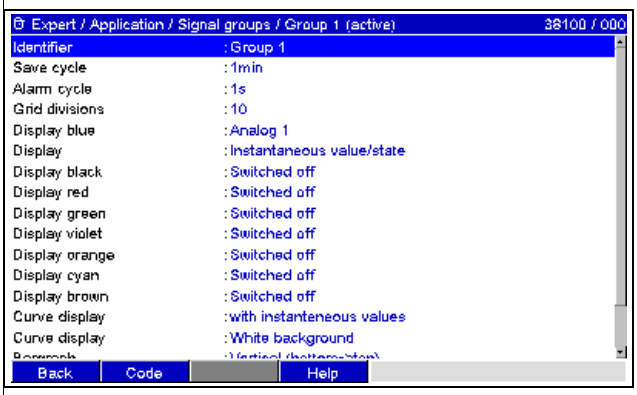
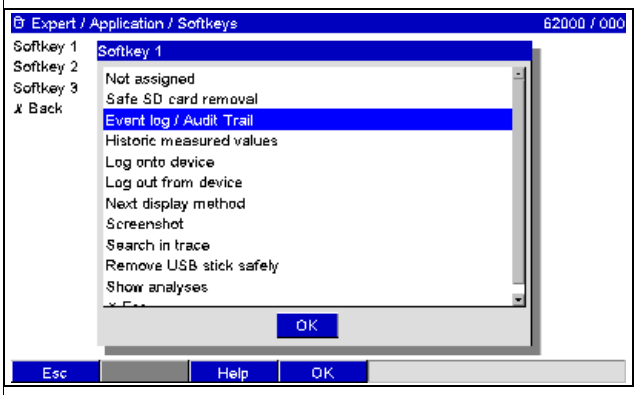


Fig. 46: Setup Application - Signal groups, "Group 1" submenu

Identifier	Group identifier which is used by the PC software. Factory setting: **group x**	38100/000 to 38100/009
Save cycle	Specify the save cycle for saving this group during normal operation (see also limit value / save cycle). Note: the save cycle is independent of the measured value display. ✎ Note! The recording length available changes depending on the save cycle set. Tables on the typical recording length are provided in the technical data. Picklist: off, 100ms, 1s, to **1min** to 1h	38105/000 to 38105/009
Alarm cycle	Specify the save cycle for saving this group during an alarm condition (e.g. in the event of limit value violation). Picklist: off, 100ms, **1s**, to 1h	38110/000 to 38110/009
Grid division	Indicates the number of lines ("amplitude grid") that should be displayed on the screen in the display mode "Curve". Example: display of 0 to 100%: select 10 divisions, display 0 to 14 pH: select 14 divisions. Picklist: logarithmic, 1, 2, to **10** to 20	38115/000 to 38115/009
Min. decade Only if the grid division is "Logarithmic"	Set the decade as of which the display should be split. Picklist: **1**, 10, 100 to 10000000	38120/000 to 38120/009
Max. decade Only if the grid division is "Logarithmic"	Set the decade up to which the display should be split. Picklist: 1, 10, 100, **10000** to 10000000	38125/000 to 38125/009
Display blue	Color for displaying the assigned input. ✎ Note! Only the channels that were assigned to a group are saved. Channels can be assigned to several groups. However, these groups then have to have the same save cycle (except when the save and alarm cycle are set to "off"). Picklist: **switched off**, analog x, digital x, maths x	38130/000 to 38130/009

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Display	Please select what data from the selected channel should be displayed. Picklist: **instantaneous value/state**,... (depending on the channel settings)	38135/000 to 38135/009
	Display black	Color for displaying the assigned input. ✎ Note! Only the channels that were assigned to a group are saved. Channels can be assigned to several groups. However, these groups then have to have the same save cycle (except when the save and alarm cycle are set to "off"). Picklist: **switched off**, analog x, digital x, maths x	38140/000 to 38140/009
	Display	Please select what data from the selected channel should be displayed. Picklist: **instantaneous value/state**,... (depending on the channel settings)	38145/000 to 38145/009
	Display red	Color for displaying the assigned input. ✎ Note! Only the channels that were assigned to a group are saved. Channels can be assigned to several groups. However, these groups then have to have the same save cycle (except when the save and alarm cycle are set to "off"). Picklist: **switched off**, analog x, digital x, maths x	38150/000 to 38150/009
	Display	Please select what data from the selected channel should be displayed. Picklist: **instantaneous value/state**,... (depending on the channel settings)	38155/000 to 38155/009
	Display green	Color for displaying the assigned input. ✎ Note! Only the channels that were assigned to a group are saved. Channels can be assigned to several groups. However, these groups then have to have the same save cycle (except when the save and alarm cycle are set to "off"). Picklist: **switched off**, analog x, digital x, maths x	38160/000 to 38160/009
	Display	Please select what data from the selected channel should be displayed. Picklist: **instantaneous value/state**,... (depending on the channel settings)	38165/000 to 38165/009
	Display violet	Color for displaying the assigned input. ✎ Note! Only the channels that were assigned to a group are saved. Channels can be assigned to several groups. However, these groups then have to have the same save cycle (except when the save and alarm cycle are set to "off"). Picklist: **switched off**, analog x, digital x, maths x	38170/000 to 38170/009
	Display	Please select what data from the selected channel should be displayed. Picklist: **instantaneous value/state**,... (depending on the channel settings)	38175/000 to 38175/009
	Display orange	Color for displaying the assigned input. ✎ Note! Only the channels that were assigned to a group are saved. Channels can be assigned to several groups. However, these groups then have to have the same save cycle (except when the save and alarm cycle are set to "off"). Picklist: **switched off**, analog x, digital x, maths x	38180/000 to 38180/009

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	Display	Please select what data from the selected channel should be displayed. Picklist: **instantaneous value/state**,... (depending on the channel settings)	38185/000 to 38185/009
	Display cyan	Color for displaying the assigned input. ✎ Note! Only the channels that were assigned to a group are saved. Channels can be assigned to several groups. However, these groups then have to have the same save cycle (except when the save and alarm cycle are set to "off"). Picklist: **switched off**, analog x, digital x, maths x	38190/000 to 38190/009
	Display	Please select what data from the selected channel should be displayed. Picklist: **instantaneous value/state**,... (depending on the channel settings)	38195/000 to 38195/009
	Display brown	Color for displaying the assigned input. ✎ Note! Only the channels that were assigned to a group are saved. Channels can be assigned to several groups. However, these groups then have to have the same save cycle (except when the save and alarm cycle are set to "off"). Picklist: **switched off**, analog x, digital x, maths x	38200/000 to 38200/009
	Display	Please select what data from the selected channel should be displayed. Picklist: **instantaneous value/state**,... (depending on the channel settings)	38205/000 to 38205/009
	Curve display	The current instantaneous values are displayed with the measured value curves as standard. Alternatively, this instantaneous value display can also be hidden. As a result, more data can be shown on the display. Picklist: no instantaneous values, **with instantaneous values**	38210/000 to 38210/009
	Curve display	Specify the background color for the curve display. Picklist: **white background**, black background	38215/000 to 38215/009
	Bar graph	Specify the direction in which the bar graphs should be drawn. Picklist: **vertical (bottom->top)**, vertical (top->bottom), horiz. (left->right), horiz. (right->left), centered/vertical, centered/horiz.	38220/000 to 38220/009
	Submenu: Circular chart	Setting for the circular chart.	
		1 revolution = Specify how long it takes for the circular chart to be completely written to once (one complete revolution). Note: the unit always only shows 1/4 of the chart. Picklist: **1 hour** to 8 hours, 1 day to 7 days	38500/000 to 38500/009
Submenu: Texts	Settings only required if you want to save text for subsequent reporting. Here, specify the text that can be saved in the event log during operation. Up to 30 different texts with a maximum of 22 characters each can be entered.		
	Text 1 - 30	Create or change the text here.	61001/000 to 61030/000

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Softkeys	You can specify the function assigned to softkeys 1 to 3 of the unit.		
	 a0012275 *Fig. 47: Setup Application, Softkeys submenu*		
	Softkey 1 **Softkey 2** **Softkey 3**	Specify what function should be assigned to this softkey. Picklist: – Not assigned – Safe SD card removal - Event log/audit trail – Historic measured values – Log onto device – Log out from device – Next display method – Screenshot – Search in trace – Remove USB stick safely – Show analyses	62000/000 62005/000 62010/000

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)	Direct access code
Submenu: Web server	Setup for operation of the unit as a Web server. Instantaneous values can be read off using an Internet Browser, e.g. MS Internet Explorer. **Call: http://<IP address>** You can find the IP address of the device under "Setup -> System -> Communication -> Ethernet". A fixed IP address is required! Caution! Do not enter any leading zeros in the IP address! You can specify that the page should be automatically refreshed by calling up "http://<IP address>/web?refresh=x". (Note: x refers to the refresh interval in seconds e.g. http://10.55.81.109/web?refresh=20)	

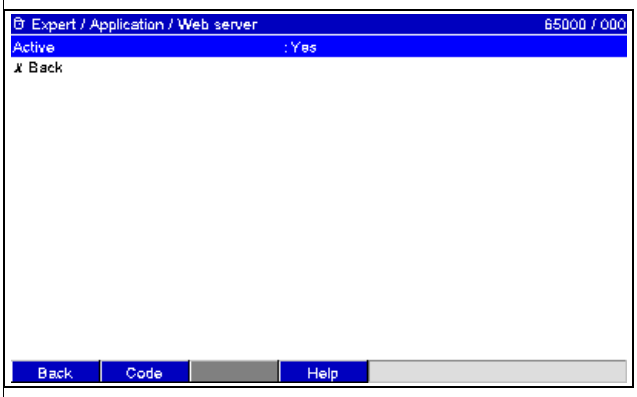


Fig. 48: Setup Application, submenu Webserver

Using a Web server to remotely monitor process values
The unit is equipped with an integrated Web server. This makes it possible for the user to display the instantaneous values in a standard Web browser, such as Internet Explorer or Firefox, on a PC. A maximum of 4 users can access the unit simultaneously via the Web server.

Note!
The port "80" must be enabled at the firewall of the Internet PC. Please contact your system administrator!

A physical Web link must be established via LAN or Internet to display the values on the Web browser of a PC:

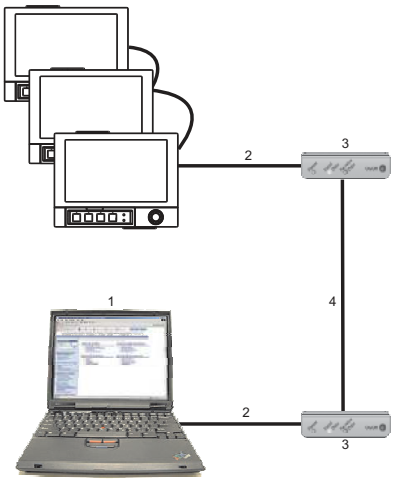


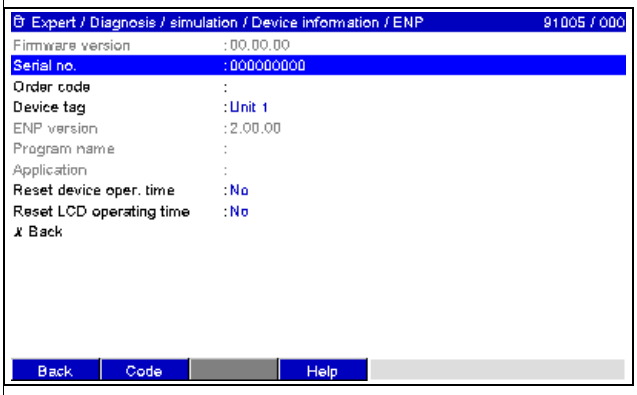
Fig. 49: Remote monitoring with Web browser

Active	Switch the Web server function on or off (= factory default). The instantaneous values can only be displayed by means of an Internet browser when the Web server is active. Note! Only possible using the Ethernet interface! Picklist: **no** (off), yes (on)	65000/000

"Application" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Printer	Printer settings Note! Only relevant if a printer is directly connected to the device.		
	Color printer	Please set up if you're using a black and white or a color printer. Picklist: **Yes (=color printer)**, No (=b/w printer)	67025/000
	Paper size	Please select the paper format of your printer. Picklist: **DIN A4**, US Letter	67000/000
	Fault switches	You can switch a relay if an error occurred when printing out. The relay remains switched until the printer is ready again or the device is restarted. Picklist: **not used**, relay x (xx-xx) Note! If there are several reasons for triggering a relay (e.g. 2 different limit values), this must be set to "Collective relay" under "Setup -> Outputs -> Relay -> Relay x".	67005/000

6.4.7 Expert - Diagnosis/Simulation

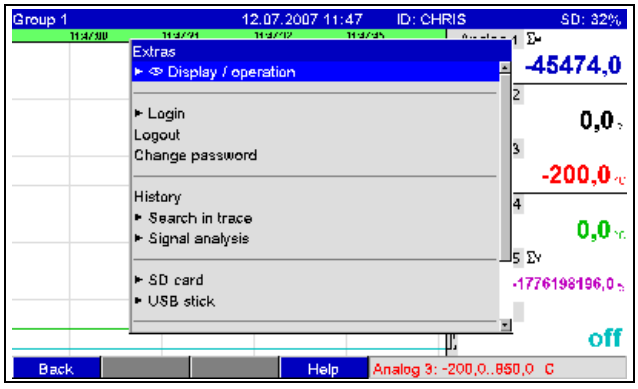
Unit information and service functions for a swift unit check.

"Expert" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
Submenu: Diagnosis/Simulation, Device information/ENP	Displays important device information.  a0012277 *Fig. 50: Expert, submenu: Diagnosis/Simulation, Device information/ENP*		
	Firmware version	Displays the firmware version of the unit. Cannot be changed.	91000/000
	Serial No.	Displays the serial number of the unit. Note! Only appears once the service code has been entered!	91005/000
	Order code	Displays the order code of the unit. Note! Only appears once the service code has been entered!	91010/000
	Device tag	Individual unit identifier (max. 22 characters).	91015/000

"Expert" menu items	Configurable parameters (factory settings are highlighted in bold)		Direct access code
	ENP version	Displays the ENP (electronic name plate) version of the unit. Cannot be changed.	91020/000
	Program name	Displays the program name of the unit. Cannot be changed.	91025/000
	Application	Displays the installed application packages of the unit. Cannot be changed.	91030/000
	Reset device oper. time	Resets the unit operating time to 0 hours. Picklist: **no**, yes Note! Only appears once the service code has been entered!	91035/000
	Reset LCD operating time	Resets the LCD operating time to 0 hours. Picklist: **no**, yes Note! Only appears once the service code has been entered!	91040/000
Submenu: Diagnosis / Simulation, Simulation	Settings for the simulation mode. Note! If required, use the "Signal analysis- Reset to zero" function, so that the values of the simulated signals do not corrupt your true minima/maxima/quantities after switching back to normal operation. If the previous signals are still needed, save them on the SD card beforehand.		
	"Normal operation": the unit records the connected measuring points. "Simulation": instead of operating with the real measurement points connected, the signals are simulated (using the actual settings).		92000/000

6.5 The "Extras" menu

Call up the "Extras" menu by pressing softkey 4:



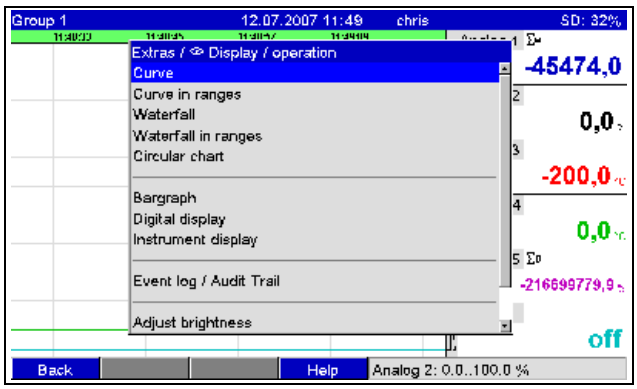
a0012278

Fig. 51: "Extras" menu

6.5.1 Extras - Display/Operation

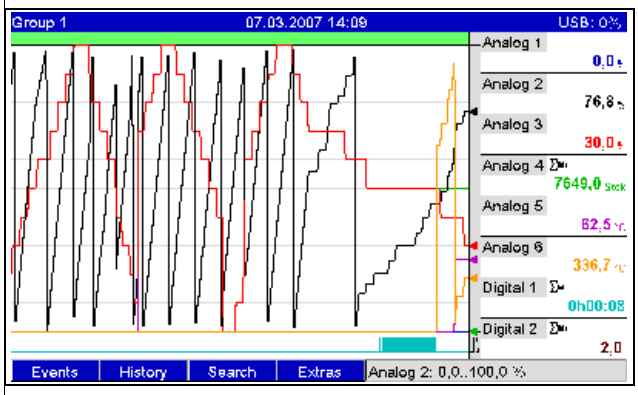
Changes the display mode, e.g. curve display, bar graph, digital display or event list. The various display modes have no influence on the signal recording. You can also call up the menu in the main menu. To do so, press the navigator.

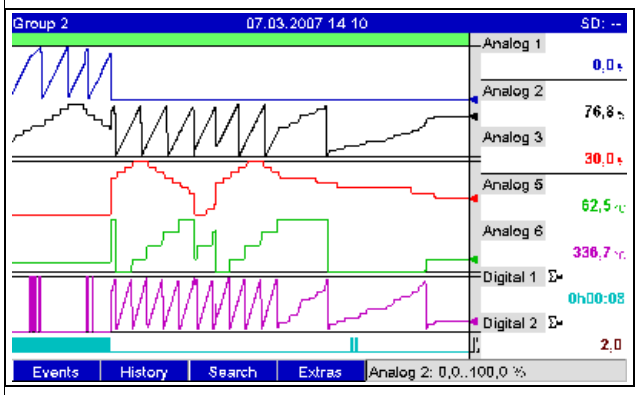
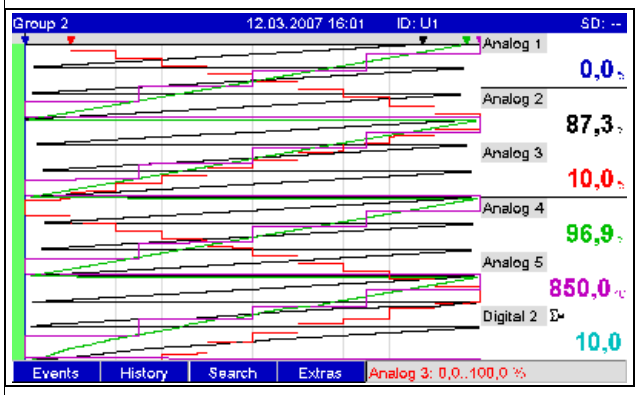
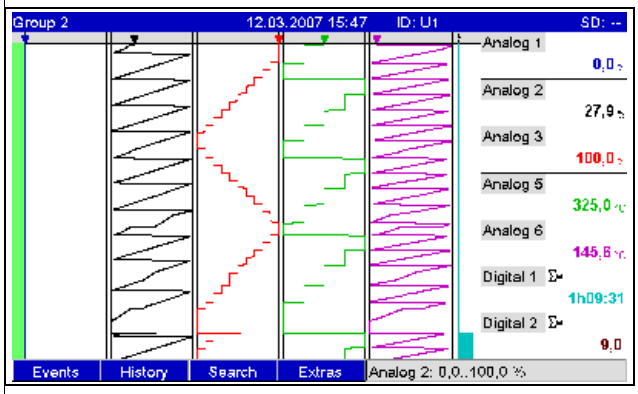
Note!
You can switch directly between the various active groups by turning the navigator "counter-clockwise" or "clockwise".

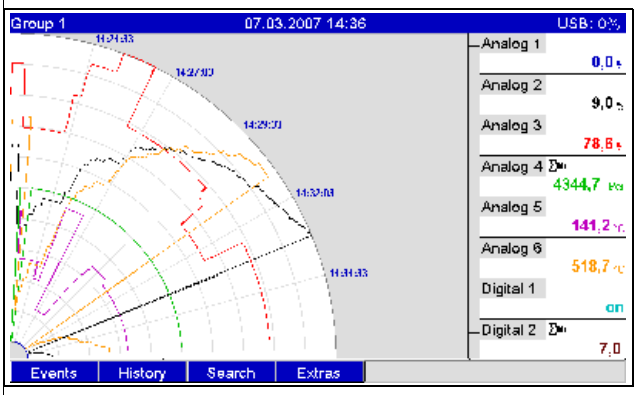
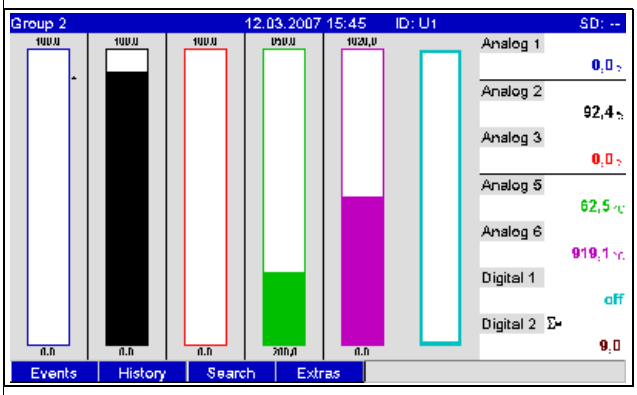
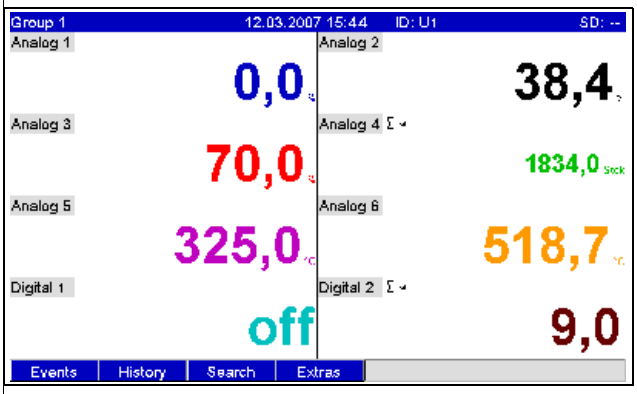


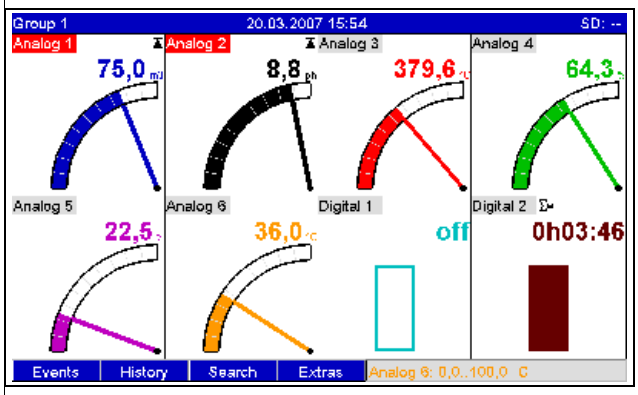
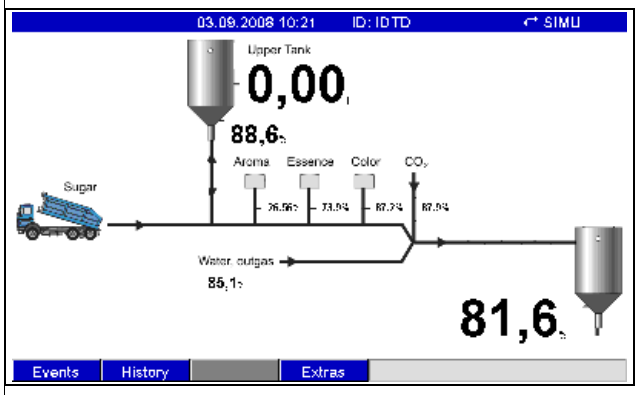
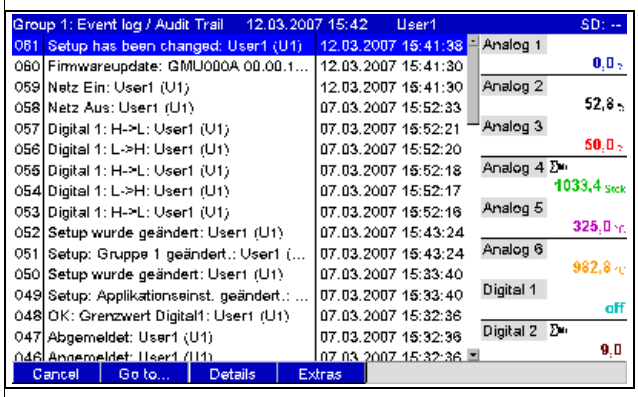
a0012280

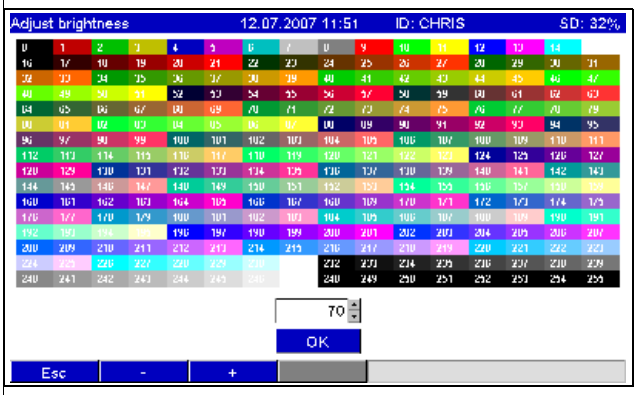
Fig. 52: "Extras" menu, display/operation

"Extras" menu items, submenu: Display/operation	Description
Change group	Select the group which should be displayed. Note: only the active groups are displayed. Picklist: group 1 – x
Curve	All channels are displayed over the total width. Maximum resolution in upscale direction. All the channels in a group are displayed horizontally (from right to left).  a0012091 *Fig. 53: Curve display*

"Extras" menu items, submenu: Display/operation	Description
Curve in ranges	All the channels in a group are displayed horizontally (from right to left). Each channel is displayed in its own chart zone. Accuracy of the plot is not influenced in this display mode.  a0012092 *Fig. 54: Curve in ranges*
Waterfall	All the channels in a group are displayed vertically (from top to bottom).  a0012097 *Fig. 55: Waterfall*
Waterfall in ranges	All the channels in a group are displayed vertically (from top to bottom). Each channel is displayed in its own chart zone. Accuracy of the plot is not influenced in this display mode.  a0012098 *Fig. 56: Waterfall in ranges*

"Extras" menu items, submenu: Display/operation	Description
Circular chart	All the channels in a group are displayed as a 1/4-circular chart.  a0012090 *Fig. 57: Circular chart*
Bar graph	Display of the active analog measured values as bar graphs including values. The digital input is displayed as a status or counter/operating time counter.  a0012089 *Fig. 58: Bar graph*
Digital display	Display of the active analog measured values as digital values. The digital input is displayed as a status or counter/operating time counter.  a0012093 *Fig. 59: Digital display*

"Extras" menu items, submenu: Display/operation	Description
Instrument display	All the analog channels in a group are displayed as analog instruments. The digital input is displayed as a status or counter/operating time counter.  a0012095 *Fig. 60: Instrument display*
Process-related graphic	A process-related graphic created by the user can be displayed at the device including the instantaneous values. This display method is only available if a process-related graphic is stored. The process-related graphic can be transferred to the device using an SD card or a USB stick (Extras -> SD card or USB stick -> Process-related graphic).  a0012096 *Fig. 61: Example of process-related graphic*
Event log/audit trail	Events such as alarm set point infringement and power failure are listed in the correct time sequence.  a0012281 *Fig. 62: Event log/audit trail*

"Extras" menu items, submenu: Display/operation	Description
Adjust brightness	Here, you can adjust the brightness of the display.  a0012279 *Fig. 63: Adjust brightness*

6.5.2 Extras - Login

The user can log in here. A list with all the permitted users is displayed. Select your user ID to log on. Then you are asked to enter your password. Function only visible if the option "Protected by: FDA 21 CFR Part 11" is selected under "Main menu > Setup > System > Security (direct access code: 18000/000).

6.5.3 Extras - Logoff

Log off the user currently logged on. Function only visible if the option "Protected by: FDA 21 CFR Part 11" is selected under "Main menu > Setup > System > Security (direct access code: 18000/000), and a user is logged on.

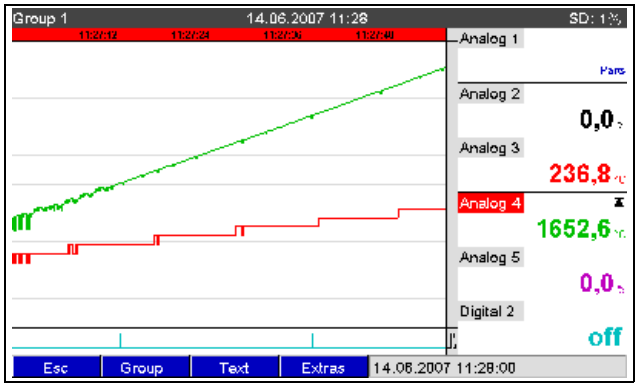
6.5.4 Extras - Change password

The user password can be changed here. Pay attention to the rules for passwords. Function only visible if the option "Protected by: FDA 21 CFR Part 11" is selected under "Main menu > Setup > System > Security (direct access code: 18000/000), and a user is logged on.

6.5.5 Extras - History (scrolling through saved measured values)

You can scroll through the saved measured values here. Turn the navigator clockwise or counterclockwise to scroll back and forth between the measured value curves. You can change the speed with softkey 3 (slow "<" to fast "<<<<"). This function can also be called up in the instantaneous value display mode during ongoing operation by pressing softkey 2 "History". To go back to the instantaneous value display mode, press softkey 1 "Esc".

Note!
The gray header indicates that historical values are being displayed (this header is blue during instantaneous value display):



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Fig. 64: Extras "History"

Note!
- If no key has been pressed for 5 minutes, the unit automatically returns to normal operation.
- With extreme configurations, loading and scrolling can take a very long time (e.g. if save cycle Group 1 "100ms", Groups 2 to 9 "1s" and Group 10 "1h"). The unit cannot be operated during the loading procedure.
- Only the data of the current configuration (after a setup change) can be accessed at the unit.

Subsequent reporting

Under "Store text", comments can be entered on the specific time selected by pressing softkey 4 "Extras". The date and time are automatically taken from the history value. A predefined text can be selected or a new text can be entered (see "Setup –> Application –> Text). These texts are stored in the event log/audit trail.

Note!
When user administration is activated ("Setup –> System –> Security –> Protected by: "FDA 21 CFR Part 11"), this function is only available if a user is logged on and this user has the necessary rights.

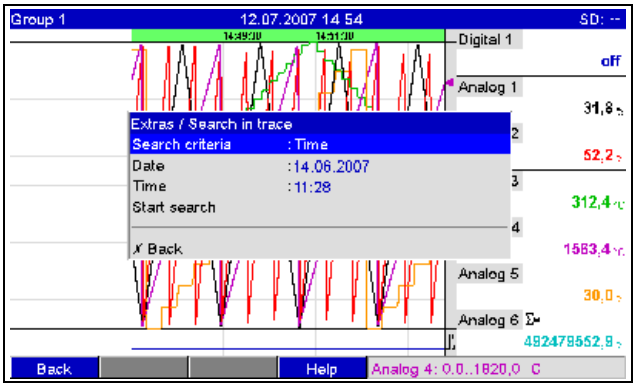
Zoom

In the history display, a larger time range can be configured by pressing softkey 4 "Extras" under "Zoom".
Picklist:
"1:1": Every measured value is displayed.
"1:n": Only every nth measured value is displayed.

Note!
- The zoom function is only available for the following display modes: Curves, Curve in ranges, Waterfall, Waterfall in ranges.
- The zoom value has to be configured separately for every group and display mode.
- No interpolation is performed, nor is the mean value determined.
- If the value for "n" is large, this can result in extended loading times.
- The zoom value does not affect the process for storing the measured value.

6.5.6 Extras - Search in trace

Search for events or times in the internal memory.



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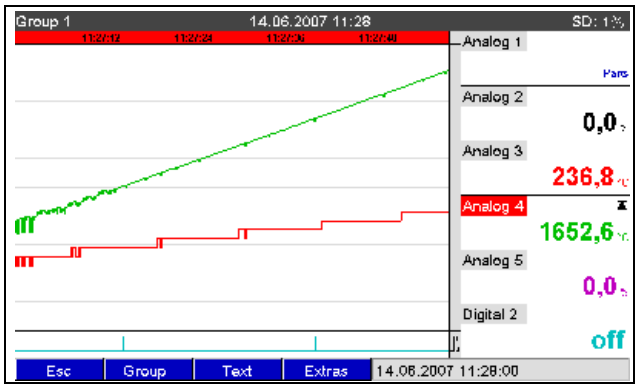
Fig. 65: Extras "Search in trace"

"Search in trace" menu items	Description (factory settings are highlighted in bold)
Search criterion	You can search for a specific time or event in the memory. When you are searching by **"Time"** this point is shown in the graphic. When you are searching by "Events", the ones found are displayed as a list.
Date **Only when searching by "Time"**	Enter the required date. **Default value: today's date**
Time **Only when searching by "Time"**	Enter the required time. **Default value: current time**
Search filter **Only when searching by "Events"**	For a better overview a search can be conducted looking for specific events (e.g. only setup changes). In the standard all events are shown. Picklist: **all events**, alarm limit violation, on/off events, setup change, power on/off, service, external memory, user administration, acknowledging messages, miscellaneous
Start search	Start search with setup parameters

Search results when "Searching by time"

The time you are searching for appears as a curve on the display shortly after the search is started. Turn the navigator clockwise or counterclockwise to scroll back and forth between the measured value curves. You can change the speed with softkey 3 (slow "<" to fast "<<<<"). This function can also be called up in the instantaneous value display mode during ongoing operation by pressing softkey 3 "Search". To go back to the instantaneous value display mode, press softkey 1 "Esc".

Note!
The gray header indicates that historical values are being displayed (this header is blue during instantaneous value display):



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Fig. 66: Extras "Search in trace" - Search results

Subsequent reporting

Under "Store text", comments can be entered on the specific time selected by pressing softkey 4 "Extras". The date and time are automatically taken from the search result. A predefined text can be selected or a new text can be entered (see "Setup > Application > Text). These texts are stored in the event log/audit trail.

Note!
When user administration is activated ("Setup > System > Security > Protected by: "FDA 21 CFR Part 11"), this function is only available if a user is logged on and this user has the necessary rights.

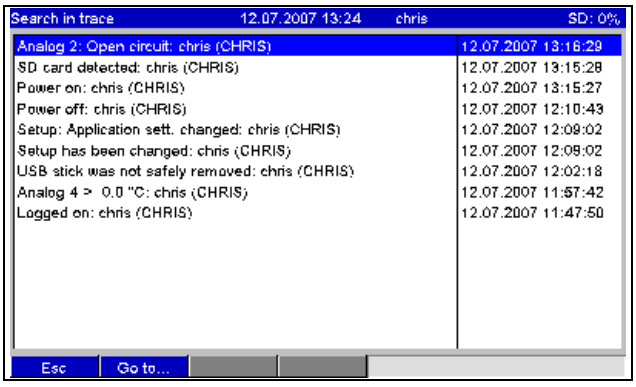
Zoom

In the history display, a larger time range can be configured by pressing softkey 4 "Extras" under "Zoom".
Picklist:
"1:1": Every measured value is displayed.
"1:n": Only every nth measured value is displayed.

Note!
- The zoom function is only available for the following display modes: Curves, Curve in ranges, Waterfall, Waterfall in ranges.
- The zoom value has to be configured separately for every group and display mode.
- No interpolation is performed, nor is the mean value determined.
- If the value for "n" is large, this can result in extended loading times.
- The zoom value does not affect the process for storing the measured value.

Search results when "Searching by event"

The search results appear in a list on the display shortly after the search is started:

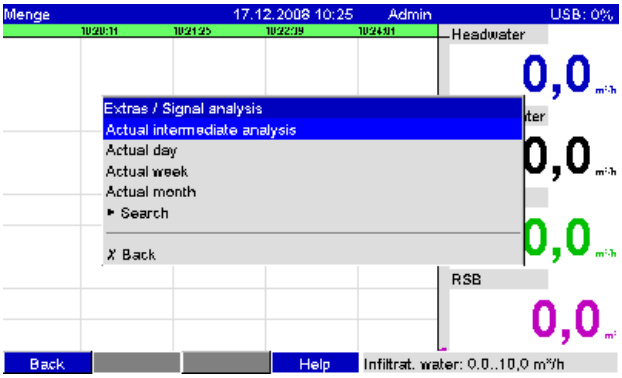


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Fig. 67: Extras "Search by events" - events list

6.5.7 Extras - Signal analysis

Displays the analyses stored in the device.



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Fig. 68: Extras "Signal analysis"

"Signal analysis" menu items	Description (factory settings are highlighted in bold)	
Analysis 1-4	You can display the current analysis here (i.e. the analysis that is currently ongoing). ✎ Note! This option can only be selected if settings were made under "Setup > System > Signal analysis".	
Submenu "Search"	Searching and displaying analyses.	
	Kind	Select what analyses the system should search for/display. Picklist: analysis 1-4
	Start search	Start search with setup parameters

6.5.8 Extras - SD card or USB stick

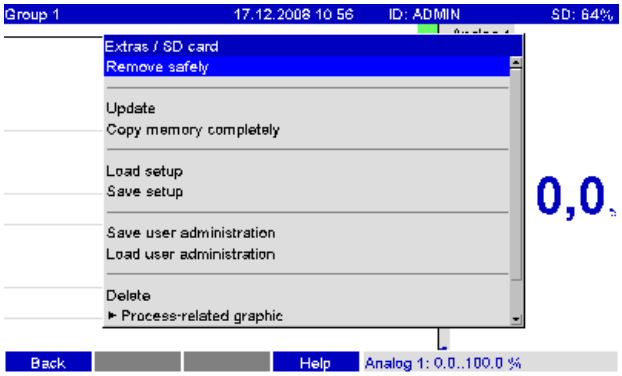


Fig. 69: Extras "SD card"

Functions for measured data storage and unit setup on SD card or USB stick. The following functions are possible:

Menu items "SD card" or "USB stick"	Description	
Remove safely	In order to ensure safe removal of the data carrier from the unit, all internal access is ended. You will receive a message when the data carrier can be safely removed. ✎ Note! Remove the SD card within 5 minutes otherwise the unit will start to automatically store data onto the card again. Only remove the data carrier using this function as otherwise data can be lost!	
Update	Data that have not been transferred to the data carrier are now stored. Please be patient! Measured value recording continues in parallel and has the highest priority. Note: you can store data from multiple units onto one data carrier.	
Copy memory completely	The content of the internal memory is completely copied to the data carrier. Please be patient! Measured value recording continues in parallel and has the highest priority. Note: you can store data from multiple units onto one data carrier.	
Submenu "Copy time frame"	A time range you defined can be saved on the USB stick. ✎ Note! Function not available with SD card.	
	Date "from"	Enter the date as of which you want to copy data to the USB stick.
	Time "from"	Enter the time as of which you want to copy data to the USB stick.
	Date "until"	Enter the date up until which you want to copy data to the USB stick.
	Time "until"	Enter the time up until which you want to copy data to the USB stick.
	Save as	**"Protected format"**: all the data are stored in a way that protects them from data manipulation. They can only be interpreted by our PC program. "Open format": the data are stored in CSV format. This can be opened by a number of different programs (caution: no manipulation protection).
	Start copying process	Save the data of the selected time frame on the USB stick.
Load setup	Loads unit parameters (setup) from the data carrier into the internal nonvolatile memory of the unit. The file has the extension .rpd.	
Save setup	All unit parameters (setup) are copied to the data carrier. They can be archived and used for other units. The file has the extension .rpd.	
Save user administration	Saves all the settings and user accounts to the data carrier. The file has the extension .ids.	

Menu items "SD card" or "USB stick"	Description	
Load user administration	Loads all the settings and user accounts from the data carrier. The file has the extension .ids. Caution! All the existing settings/accounts are overwritten!	
Screenshot	Save the current measured value display as a bitmap on the SD card or on the USB stick.	
Submenu "Process-related graphic"	Load, export or delete process-related graphics. Note! Process-related graphics have to be created on a PC. Please pay attention to the information provided in Section 6.6.7.	
	Group	Select the group for which the action should be executed. Note! A process graphic can only be loaded if the corresponding group was configured beforehand.
	Load	Loads a process-related graphic from an external memory medium to the device memory. Note! Function is only possible if an appropriate bitmap (bmp) is on the data carrier. The process-related graphic can then be edited in the "Process-related graphic editor" context menu (see Section 6.6.8).
	Export	Saves the process-related graphic available in the device to the external memory medium to transfer the graphic to another device.
	Delete	Deletes the selected process-related graphic from the memory.
Delete **Only with SD card**	Deletes all the data generated by the device that are on the SD card. Note! If a release code has been set up then the SD card can only be deleted after this code has been entered. When the user administration function is active, this action can only be performed by the administrator.	

Without affecting the internal memory, data packages are copied block-by-block to the data carrier. Tests are also made to determine whether the data have been written onto the data carrier without any errors. The same happens when storing the data on the PC with the associated PC software.

Note!

- Before removing the data carrier, select "Update". The current data block is closed and saved to the data carrier. This ensures that all current data (until the last save) are included on the data carrier.
- You are informed before the data carrier is 100 % full. This is achieved by an acknowledgeable message on the display, which indicates that the data carrier being written to needs changing (only for "Stack memory" ext. save mode, not for "Ring memory FIFO".) In addition, a relay can be switched.
- Your unit knows which data have already been copied onto the data carrier. Should you ever forget to change the data carrier in time (or if no data carrier has been inserted), the new data carrier is filled with the missing data from the internal memory – in as far as the data are still available there.
- Since measured value acquisition/registration has highest priority, it can take some minutes until the contents of the internal memory are copied onto the data carrier.
- If a user is accessing the SD card or the USB stick, the LED lights up. During this time, the data carrier should not be removed.

6.5.9 Extras - Store text

Save the text comments ("subsequent reporting") for a specific time. After entering the desired date and time, a predefined text can be selected or a new text can be entered (see "Setup > Application > Text). These texts are stored in the event log/audit trail.

Note!
When user administration is activated ("Setup > System > Security > Protected by: "FDA 21 CFR Part 11"), this function is only available if a user is logged on and this user has the necessary rights.

6.5.10 Extras - Printout

If a printer is connected to the device, device settings, events and measured values can be printed out here.

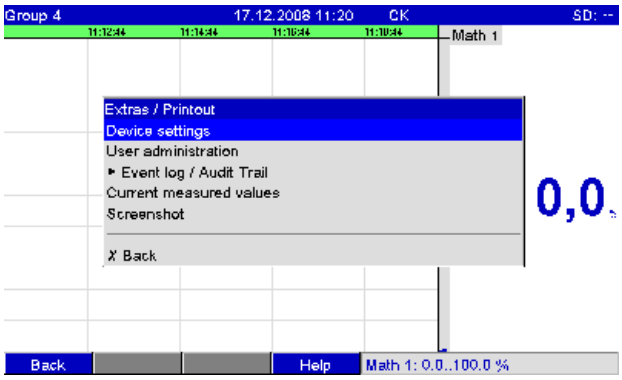


Fig. 70: Extras "Printout"

"Printout" menu items	Description (factory settings are highlighted in bold)	
Device settings	For printing out device settings (incl. date/time).	
User administration	All the user administration data are printed out. Note! Passwords are not visible. When user administration is activated ("Setup –> System –> Security –> Protected by: "FDA 21 CFR Part 11"), this function is only available if a user is logged on and this user has the necessary rights.	
Submenu "Event log/audit trail"	Print out event log/audit trail.	
	Search filter	For a better overview a search can be conducted looking for specific events (e.g. only setup changes). Picklist: **all events**, alarm limit violation, on/off events, setup change, power on/off, service, external memory, user administration, acknowledging messages, miscellaneous
	From	Enter the time as of which the events should be printed out. Entry: time
	To	Enter the time up to which the events should be printed out. Entry: time
	Print	Start printing.
Current measured values	Print out instantaneous measured values (all active channels).	
Screenshot	Print out current measured value display (screenshot).	

6.5.11 Extras - Screenshot

Save the current measured value display as a bitmap on the SD card or the USB stick.

Note!
This function is not available if no SD card or USB stick is plugged into the unit. If an SD card and a USB stick is plugged into the unit, the screenshot is only saved onto the USB stick.

6.5.12 Extras - Set point

Here, you can change set points during operation. In this way, the set points can be changed outside the actual setup. The advantage is that all the other parameters cannot be changed in this way. A list with all the set points currently set is displayed. To change a limit value, select the desired limit value from the list. Function is only visible if "Also in menu Extras" is selected under in "Main menu > Setup > Application > Change set points.

Note!
When user administration is activated ("Setup > System > Security > Protected by: "FDA 21 CFR Part 11"), this function is only available if a user is logged on and this user has the necessary rights.

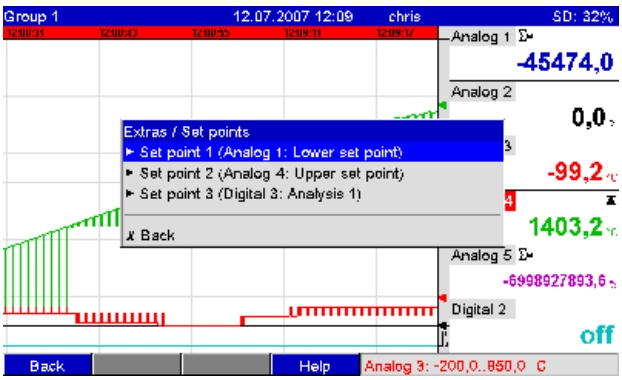


Fig. 71: Extras "Set point"

"Set points" menu items	Configurable parameters (factory settings are highlighted in bold)	
Submenu: Set point x	This is used to change the set point during operation.	
	Channel	Displays the channel assigned to the set point selected. Cannot be changed.
	Type	Displays the type assigned to the set point selected (e.g. upper set point). Cannot be changed.
	Range start Only with analog channels	Displays the start of measuring range for the selected channel. Cannot be changed.
	Meas. range end Only with analog channels	Displays the end of measuring range for the selected channel. Cannot be changed.
	Set point Only with analog channels	Enter the analog set point in the preset engineering unit, e.g. in °C, bar, etc.
	Time span dt Only for the "Gradient dy/dt" type	Time span within which the signal has to change by the specified value so it can be detected as a set point. Note: max. 60 seconds.
	Set point Only with digital channels	Enter the counter alarm set point in the engineering unit set up, e.g. m, piece, etc.

6.6 The "Main" menu

Call up the main menu by pressing the navigator:

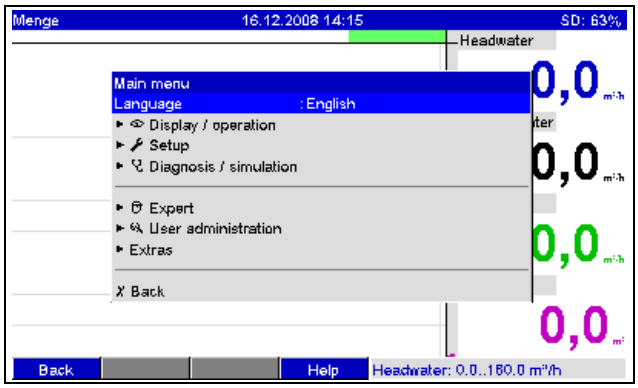


Fig. 72: Main menu

6.6.1 Main menu - Language

The default setting for the operating language is English. A different operating language can be configured here.

6.6.2 Main menu - Display/Operation

Changes the display mode, e.g. curve display, bar graph, digital display or event list. The various display modes have no influence on the signal recording. You can also launch the menu under "Extras" (descriptions, see Section 6.5).

6.6.3 Main menu - Setup

Start the setup. Note: the most common/important operation items can be configured in this setup (quick setup). Special settings can also be made via "Expert" (see Section 6.4).

6.6.4 Main menu - Diagnosis/simulation

Unit information and service functions for a swift unit check.

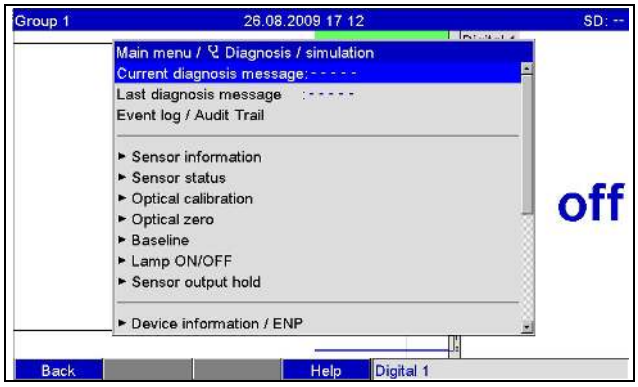
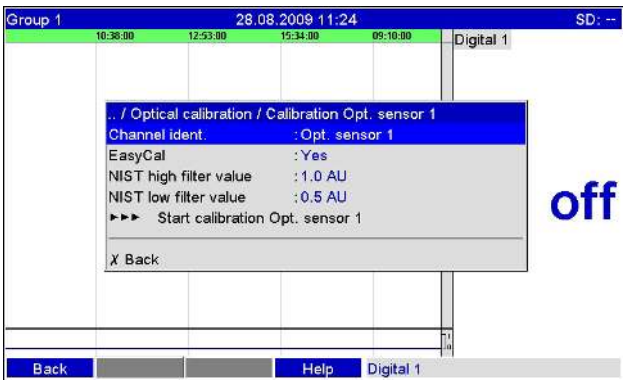


Fig. 73: Main menu, submenu: Diagnosis/simulation

"Diagnosis/Simulation" menu items	Configurable parameters (factory settings are highlighted in bold)	
Current diagnosis message	Displays the current diagnosis message.	
Last diagnosis message	Displays the last diagnosis message.	
Event log/audit trail	Events such as alarm set point infringement and power failure are listed in the correct time sequence.	
Submenu: Sensor information	Displays important sensor information.	
	Channel ident.	Displays the identification of the connected optical sensor.
	Order code	Displays the order code of the connected optical sensor.
	Serial no.	Displays the serial number of the connected optical sensor.
	Sensor type	Displays the connected optical sensor type.
Submenu: Sensor status	Displays the current status of the sensor.	
	Channel ident.	Displays the identification of the connected optical sensor.
	Meas. detector current	Displays the signal strength of the measurement detector. Reading is for diagnosis only and will not be available from the signal group.
	Ref. detector current	Displays the signal strength of the reference detector. Reading is for diagnosis only and will not be available from the signal group.
	Lamp voltage	Displays actual lamp voltage at the sensor end.
	Lamp running time (only available for OUSAF44/OUSAF46)	Displays the overall running time of the lamp. The value is reset when a new lamp is installed and the lamp life indicator is reset.
	Lamp life	Displays the remaining lamp life by percentage. Should be reset every time a new lamp is installed.
	Submenu: Lamp life reset	Resets the lamp life indicator. Perform a reset every time a new lamp is installed.
Submenu: Optical calibration	Starts calibration of optical sensor	
	Submenu: Calibration opt. sensor 	
	Channel ident.	Displays the identification of the connected optical sensor.

"Diagnosis/Simulation" menu items	Configurable parameters (factory settings are highlighted in bold)	
	Easycal™	Select "Yes" if you want to perform an Easycal™ calibration. Select "No" if you want to perform a liquid calibration. Perform a liquid calibration if you need to adjust the measuring point to your process value. Perfom an Easycal™ calibration to determine the deviation of the measured absorbance and the stored NIST filter absorbance.
	Zero solution (only if Easycal™ is not selected)	Displays the process solution used to set up the zero point of the measurement.
	Standard solution (only if Easycal™ is not selected)	Enter the value of the standard solution used to set up the calibration point of the measurement.
	NIST high filter value (only for Easycal™)	Displays the NIST traceable density filter used to simulate the high point of Easycal™ absorbance. The value has been entered in the "Setup > Inputs > Optical sensor" menu.
	NIST low filter value (only for Easycal™)	Displays the NIST traceable density filter used to simulate the low point of Easycal™ absorbance. The value has been entered in the "Setup > Inputs > Optical sensor" menu.
	Submenu: Start calibration: Liquid calibration	The calibration menu provides step-by-step instructions for the calibration.
		Confirm calibration Press OK to confirm that current calibration values may be overridden and to start the calibration.
		Zero solution adjustment Fill zero solution into the flowcell. Press OK to continue.
		Standard solution adjustment Fill standard solution into the flowcell. Press OK to continue.
		Calbration completed Press OK to exit the calibration.
	Submenu: Start calibration: Easycal™ calibration	The calibration menu provides step-by-step instructions for the calibration.
		Confirm calibration Press OK to confirm that current calibration values may be overridden and to start the calibration.
		Both filters out Make sure that both Easycal™ filters are in OUT position. Press OK to continue.
		High filter in Move the high filter to IN position. Press OK to continue.
		Both filters in Also move the low filter to IN position. Press OK to continue.
		High filter out Move the high filter to OUT position. Press OK to continue.
		Both filters out Also move the low filter to OUT position. Press OK to continue.
		Calibration complete The deviation between measured NIST filter absorbance and stored NIST filter value is displayed. If the deviation is greater than 0.02 AU, a warning message is displayed. Check if your sensor needs cleaning or maintenance.
Submenu: Optical zero	Sets permanent zero point.	

"Diagnosis/Simulation" menu items	Configurable parameters (factory settings are highlighted in bold)	
	Set zero for opt. sensor	Sets current reading as a process-related zero. This function is not reversable.
Submenu: Baseline	Sets temporary zero point.	
	Set baseline for opt. sensor	Uses the current reading as temporary process-related zero point. If you toggle the baseline off, the measurement value is recovered.
Submenu: Lamp on/off	Switches the lamp power supply on or off.	
	Opt. sensor	The optical sensor lamp needs to be turned off for maintenance or replacement. The lamp power supply can be switched off individually for each connected optical sensor.
Submenu: Sensor output hold	Holds the sensor associated analog outputs.	
	Hold analog output	The hold function is used to hold the sensor associated analog outputs (e.g. 4 to 20 mA output) during system maintenance. The measurement is continued and the front display keeps updating the measured values. Each sensor channel can be hold individually.
Submenu: device information/ENP	Displays important device information.	
	Firmware version	Displays the firmware version of the unit. Cannot be changed.
	Serial No.	Displays the serial number of the unit.
	Order code	Displays the order code of the unit.
	Device tag	Individual unit identifier (max. 22 characters).
	ENP version	Displays the ENP (electronic name plate) version of the unit. Cannot be changed.
	Program name	Displays the program name of the unit. Cannot be changed.
	Application	Displays the installed application packages of the unit. Cannot be changed.
	IP	If the unit gets its Ethernet settings by DHCP, the current IP address is displayed here.
	Modbus TCP	If the unit gets its Ethernet settings by DHCP, the current IP address is displayed here.
	Device operating time	Indicates how long the unit was in operation.
	LCD operating time	Indicates how long the display of the unit was in operation.
	Submenu: Hardware	Information on the hardware components, and what slots are assigned, with information on the software version.
		Submenu: USB devices Overview of the USB devices currently connected. **Device 1-8**: information on the USB device connected.
	Submenu: Protocols Internal unit logs.	
	Boot log	Logs the boot procedure of the unit (for diagnosis purposes). ✎ Note! Can only be accessed using the service code.

"Diagnosis/Simulation" menu items	Configurable parameters (factory settings are highlighted in bold)	
	Error log	Only for diagnosis purposes. ✎ Note! Can only be accessed using the service code.
Submenu: Simulation	Various functions/signals can be simulated for test purposes here. ✎ Note! During the simulation mode normal recording of the measured values is interrupted and the intervention is logged in the event log.	
	Outputs	Output simulation (analog/pulse output, relay). ✎ Note! Only possible if switched on/assigned.
	Display test	Test whether all pixels are being controlled or whether the colors can be easily identified from each other.
	Test bar code reader	Test the function of the bar code reader (e.g. to determine if the right character set is being used). ✎ Note! Only possible if a bar code reader is connected to the device.
Initialize modem	Initializes the modem connected (to automatically answer calls). ✎ Note! The modem has to be connected to the serial interface of the device. Only use the RXU10-A1 modem cable (see Accessories, Section 8). Beforehand, set the baud rate to be used to transmit the data under "Setup -> System -> Communication -> Serial interface".	
Submenu: Memory information	Information on the size of the memory and how long data can be saved.	
	Internal memory **SD card**	Indicates the size of the memory in MB (or GB) and how long data can be saved until the memory is full. ☝ Caution! ■ Normal operation (i.e. standard save cycle) is presumed when calculating the memory duration. Higher save speeds, due to alarms or many event messages, can reduce the storage duration considerably! ■ With regard to external storage media, third-party files, or the creation of screenshots, can also reduce the duration of the memory. For this reason, read out the memory on time or change the external storage medium. ✎ Note! Even if the (external) memory is not yet full, it is advisable to read out the data frequently or to back up the data on the PC. The storage information for a USB stick is not displayed.
Delete internal memory	Deletes the entire internal measured value memory. ✎ Note! The SD card or the USB stick is not cleared. If a release code has been set up then the memory can only be deleted after this code has been entered. When the user administration function is active, this action can only be performed by the administrator.	
Calibration	Calibration of inputs and outputs. Carry out calibration only by Endress+Hauser Service. ☝ Caution! Malfunctions possible if not performed correctly! Normal recording of the measured values is interrupted while this function is being used and the intervention is logged in the event log. Can only be changed using the service code.	

6.6.5 Main menu - Expert

Start the Expert setup. All the operating items of the device can be changed here (see 6.4).

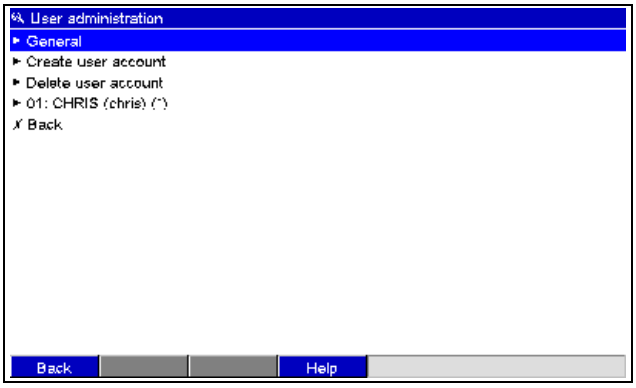
6.6.6 Main menu - User administration

Activate user administration

Activate the security system if you want to protect the unit against unauthorized operation. Only then is the user administration function active in the device (Main menu > Setup > System > Security > Protected by: "FDA 21 CFR Part 11" see Section 6.4.3).

User administration

The administrator then has to create the users in the unit (max. 50).
You can manage the user accounts here (e.g. create new users).



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Fig. 74: Main menu, submenu: User administration

"User administration" menu items	Configurable parameters (factory settings are highlighted in bold)	
Submenu: General	General settings for the user administration function.	
	Submenu: Administrators General settings for administrator accounts. Note: at least one administrator account must be created. It is better, however, to define 2 or 3 administrators.	
	Password length	Set the minimum number of characters passwords should contain. Note: this setting only affects new passwords entered. Picklist: 1, 2, 3, 4, **5**, 6, 7, 8, 9, 10 characters
	Password valid for	Specify how frequently the password has to be changed. The user has to change the password after this specified period at the very latest. The user receives appropriate notification a few days before the password expires. Picklist: **unlimited**, x days
	Block account temporarily	Specify after how many invalid logon attempts the administrator account is blocked for 10 minutes.
	Submenu: User General settings for user accounts.	

"User administration" menu items	Configurable parameters (factory settings are highlighted in bold)	
		Password length Set the minimum number of characters passwords should contain. Note: this setting only affects new passwords entered. Picklist: 0, 1, 2, 3, 4, **5**, 6, 7, 8, 9, 10 characters **Password valid** Specify how frequently the password has to be changed. The user has to change the password after this specified period at the very latest. The user receives appropriate notification a few days before the password expires. Picklist: **unlimited**, x days **Block account** Specify after how many invalid logon attempts a user account is blocked. If an account is blocked, the account can only be released by an administrator.
	Submenu: Password rules Specify how passwords should be structured. A secure password should contain upper and lower-case letters, numbers and special characters. Note: these settings only affect new passwords.	
		Changing a password Specify how many old passwords a user is not allowed use when changing his/her password. Picklist: **no check**, the last password, the last x passwords **Upper and lower-case letters** Specify whether passwords have to contain upper- and lower-case letters. Picklist: **no**, yes **Must contain numbers** Specify whether passwords have to contain numbers. Picklist: **no**, yes **Must contain spec. characters** Specify whether passwords have to contain special characters (e.g. %$@^!). Picklist: **no**, yes
	Submenu: Define authorization rights Define the rights of the various user groups here. Note: administrator rights cannot be changed.	
	Submenu: Main user, user level x	Specify the functions this user group can perform. 3 different user levels are available.
		Change setup The user is allowed change the setup. Picklist: **no**, yes **Change set points** The user is allowed change set points in the setup and in the Extras menu. The user cannot change any other operating items in the setup. Picklist: no, yes **Subsequent reporting** The user is allowed save individual texts. Picklist: no, yes **Confirm messages** The user is allowed confirm messages. Picklist: no, yes **Batch entry** (batch option) The user may enter batch information (name, number, etc.). Picklist: no, yes **Remote control** (telealarm option) The user can control the device remotely using a Web server (e.g. switching relays, confirming messages). Picklist: no, yes

"User administration" menu items	Configurable parameters (factory settings are highlighted in bold)	
	Automatic logout	A user is logged off automatically if a key is not pressed for a specific time. Note: the user is not logged off if he/she is in the Setup menu. If users are automatically logged off while they are in the Setup menu, the changes made to the settings are discarded. Picklist: **no**, after x minutes
	Acknowledging message	"No": messages do not have to be confirmed with a password. "Yes same user": messages have to be confirmed with an ID and password. The user logged onto the unit beforehand remains logged on. **"Yes, new user":** messages have to be confirmed with an ID and password. This user is logged onto the unit from this point onwards.
Submenu: Create user account	Create a new user.	
	Available IDs	Indicates how many users can still be created.
	New ID	Enter a unique ID for the user. This ID can only occur once in the system. The first ID entered automatically has administrator rights.
	Name	Enter the name of the new user.
	Access level	Assign the rights to the new user here. Picklist: **administrator**, main user, user level x
	Password	Enter the initialization password here. The first time the user logs on, he/she has to replace this password with his/her own password. Note: the password cannot start or finish with empty characters.
	Create	The new user is created when you confirm with "Yes". Picklist: **no**, yes
Submenu: Delete user account	Delete a user that already exists.	
	ID	Here, select the unique ID of the user that is to be deleted.
	Delete ID	The selected user is deleted when you confirm with "Yes".
Submenu: User account x	Edit this user account.	
	ID	Displays the user ID to be edited.
	Name	Change the name of the user.
	Access level	Change the authorization rights of the user. Note: administrator accounts cannot be changed. Picklist: **administrator**, main user, user level x
	Password	Assign a new initialization password for this user, e.g. if the user has forgotten his/her password. The first time the user logs on, he/she has to replace this password with his/her own password.
	User blocked	Blocking and releasing the user account. Picklist: **no**, yes

6.6.7 Creating process-related graphics on the PC

The process-related graphic always consists of two files:

1. The background graphic (*.bmp)
2. A configuration file (*.ini)

Note!
- Process-related graphics can only be created on the PC.
- The file names are prespecified:
  "PP_GROUP_<xx>.bmp" and "PP_GROUP_<xx>.ini"
  <xx> = 01..10 (Group 1..10, caution: always 2 digits).
- An individual process-related graphic can be created for every group (max. 10).
- To be able to load the process-related graphic at the device, the two files for the process-related graphic have to be in the root directory of the SD card or the USB stick.
- Templates for creating process-related graphics can be found in the "Templates" directory on the CD-ROM of the PC software provided.

Background graphic (*.bmp)

Prerequisites:

- Size: 800x480 pixels
- 256 colors (8-bit palette)
- You have to use the color palette of the device or the template.
- The bitmap should not be compressed.

Procedure for creating the background graphic:

1. Open one of the templates on the CD-ROM (e.g. with Adobe® Photoshop® or Corel® PHOTO-PAINT®).
2. Adapt the template to your needs.
3. Save the file on an SD card or a USB stick (observe the information on the filenames!).

Caution!
When inserting graphics into the template, make sure that the graphic program used adjusts the colors. Otherwise, the colors are not displayed correctly on the device. The Paint® program supplied with Windows®, for example, does not adjust colors. Programs like Adobe® Photoshop® or Corel® PHOTO-PAINT® perform color adjustment.

Configuration file (*.ini)

The configuration file can be edited with a text editor.
One row is entered for every channel and terminated with CR/LF:
<no>=<x>;<y>;<font>;<left-aligned/right-aligned>;<channel name>

Legend:

Abbreviation:	Description:
<no>	Channel 1 to 8 of the group in question
<x>	Select the x-position where the measured value should be displayed (in pixels). Note: with "left-aligned", the x-position is the upper left-hand corner of the measured value. With "right-aligned", the x-position is the upper right-hand corner of the measured value. Entry: 0 to 799 (pixels). The channel is switched off if x = -1.
<y>	Select the y-position where the measured value should be displayed (in pixels). Entry: 26 to 452 (pixels). The channel is switched off if x = -1. ✎ Note! No measured values can be displayed in the area of the header and the softkeys/status bar. Pay attention to the size of the font.
<font>	Select the font size to be used for displaying the measured value: 0 = small (16 pixels) 1 = medium (24 pixels) 2 = large (38 pixels) 3 = very large (78 pixels) Font 0 is used for all other values.
<Left/right-aligned>	Specify how the measured value should be aligned. 0 = left-aligned, 1 = right-aligned
<channel name>	Specify whether the channel name should also be displayed in addition to the measured value. The channel name is displayed above the measured value. 0 = hide channel name; 1 = display channel name

Procedure for creating the configuration file:

1. Open one of the templates on the CD-ROM in a text editor.
2. Adapt the template to your needs.
3. Save the file on an SD card or a USB stick (observe the information on the filenames!).
4. Load the process-related graphic (=background graphic + configuration file) in the device (see 6.5.9)

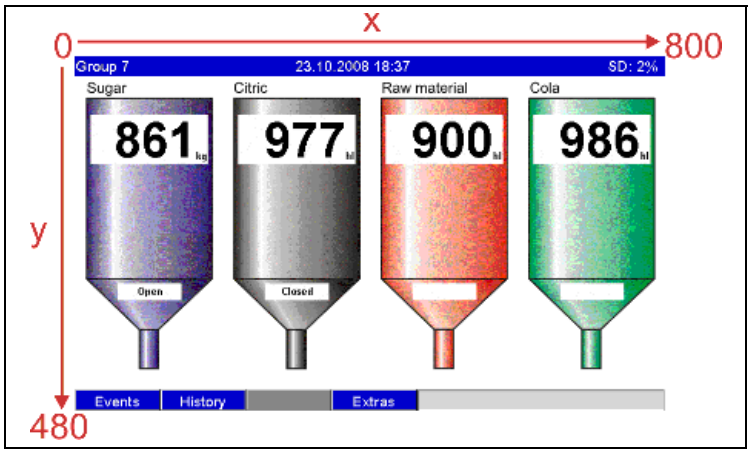
✎ Note!

- To determine the x/y positions, where possible use the coordinates display function/grid of the graphic program (caution: configure "Pixel" for the dimension).
- The configuration (e.g. x/y position) can also be modified subsequently at the device (see Section 6.6.8).
- A short comment can be optionally added to the end of every line. A comment starts with "//" (see example). However, comments may not be inserted between the lines.
- The configuration file must always have one entry for all 8 channels (even if individual channels are not used, see the example below).
- The process-related graphic is not displayed if there are errors in the syntax.

Example of a configuration file:

```
1=182;75;3;1;0  // sugar
2=382;75;3;1;0  // citric acid
3=582;75;3;1;0  // base
4=782;75;3;1;0  // sparkling apple juice
5=90;310;0;0;0  // sugar valve
6=290;310;0;0;0 // acid valve
7=-1;-1;0;0;0   // not used
```

8=-1;-1;0;0;0 // not used

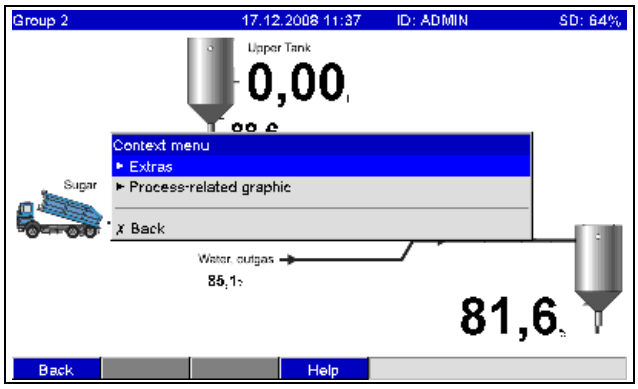


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Fig. 75: Example: coordinate system on the process-related graphic

6.6.8 The "Context" menu

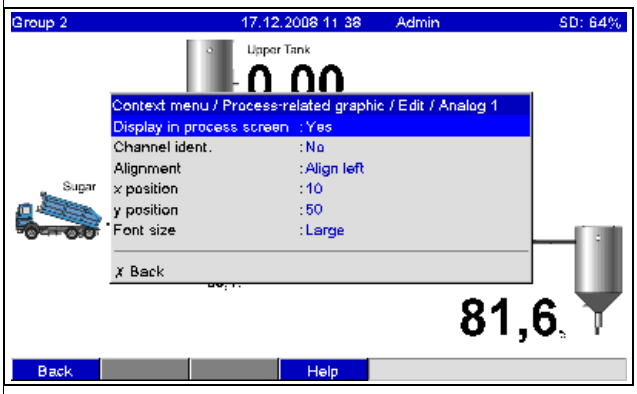
The context menu is available for all the measured value displays (apart from the event log). Launch: press the navigator 3-4 seconds. If an external keyboard is connected, the context menu can also be called using Shift+Enter.



a0012302

Fig. 76: Context menu

"Context menu" menu items	Configurable parameters (factory settings are highlighted in bold)	
Submenu: Extras	The "Extras" menu can be called here. Alternatively, softkey 4 "Extras" can be pressed in the measured value display.	
Submenu: Process-related graphic	You can make changes to the process-related graphic here.	
	Submenu: Edit	You can edit the process-related graphic currently displayed here (position, font size, etc.).

"Context menu" menu items	Configurable parameters (factory settings are highlighted in bold)	
	Submenu: Edit, channel x	You can edit this channel of the process-related graphic here (activate, change position/font size etc.).  a0012303 *Fig. 77: Context menu, submenu: Edit process-related graphic*
		Display in process screen Switch the channel in the process-related graphic on or off. Note: This does not affect the process for storing the measured value or the configuration. Picklist: **no**, yes **Channel ident.** Specify whether the channel name should also be displayed in addition to the measured value. The channel name is displayed above the measured value. Picklist: **no**, yes **Alignment** Specify how the measured value should be aligned. Picklist: **left-aligned**, right-aligned **x position** Select the x-position where the measured value should be displayed. Note! With "left-aligned", the x-position is the upper left-hand corner of the measured value. With "right aligned", the x-position is the upper right-hand corner of the measured value. User input: 0 to 799 pixel **y position** Select the y-position where the measured value should be displayed. Note! No measured values can be displayed in the area of the header and the softkeys/status bar. Pay attention to the size of the font. User input: 26 to 452 pixel **Font size** Select the font size to be used for displaying the measured value. Picklist: **small**, medium, large, very large
	Submenu: Edit, Accept changes	Saves the changes to the process-related graphic in the device memory.
	Delete	Deletes the selected process-related graphic from the memory.

6.7 Meeting the requirements of 21 CFR 11

6.7.1 General notes

Prior to using electronic signatures, a hand-signed letter should be sent to the

Office of Regional Operations (HFC—100)
5600 Fishers Lane
Rockville, MD 20857
USA

informing it that the company intends to use electronic documents/signatures in the future. Administrators and users have to be trained on 21 CFR 11 or already have to be knowledgeable in this field. Commercial software that is used in electronic recording systems in accordance with 21 CFR 11 must be validated. The suitability of the unit and the related PC software (incl. operating system) for the required application has to be defined, validated and documented (e.g. with regard to data confidentiality, printing device parameters, backup copies of the set parameters, assigning access authorization in the PC software, suitability of the software commercially used – such as the operating system etc.).
Prior to assigning/specifying the electronic signature (or elements of this electronic signature such as a unique ID/initialization password), the identity of the person in question has to be verified. The administrator has to ensure that IDs are unique and assigned correctly to the appropriate parties and must document this information. Electronic signatures may only be used by the legitimate users. They may not be disclosed to third parties. The administrators and users must be committed to ensuring the user IDs and passwords (including the initialization passwords) are not abused. Procedural requirements stating that each individual will be held responsible for any action taken using his/her signature must be defined and observed to have a mechanism in place to act as a deterrent to document and signature forging. To meet the requirements of the FDA with regard to 21 CFR 11 compliance, please ensure that the correct settings for the unit and related PC software are made. Suitable controls have to put in place with regard to the system documentation (distribution, access and use of the documentation for operating and maintaining the system). Revision and change control processes have to be put in place for the system documentation (audit trail documenting the advancement of, and modifications to, the system documentation over time). The system is not designed for use in Internet applications/open systems.

6.7.2 Important PC software settings

Compliance with the requirements of 21 CFR 11 demands certain functions in the related PC software. In particular, settings have to be made that automatically record PC software access and operation in an audit trail.



Note!
- Only use operating systems with user administration (e.g. MS Windows® NT/2000/XP).
- Activate user administration, audit trail recording and password protection as per 21 CFR Part 11: "Extras > Program options > Setup" select "General", "Audit trail activate recording" switch to "Security", click "Protected by" and "Password protection per FDA 21 CFR Part 11".
- Assign the permitted rights to the users: click "User administration"; new users can be added here. Recommendation: password valid for 60 days to prevent the user getting used to the password.
- Where applicable, use the powerful automatic functions of the PC software (e.g. automatic readout, automatic backup function, automatic alarm by e-mail). Note: this requires a series connection to a PC that has to work in the automatic mode. Detailed instructions are provided on the CD-ROM of the PC software supplied.

6.8 Measured value storage

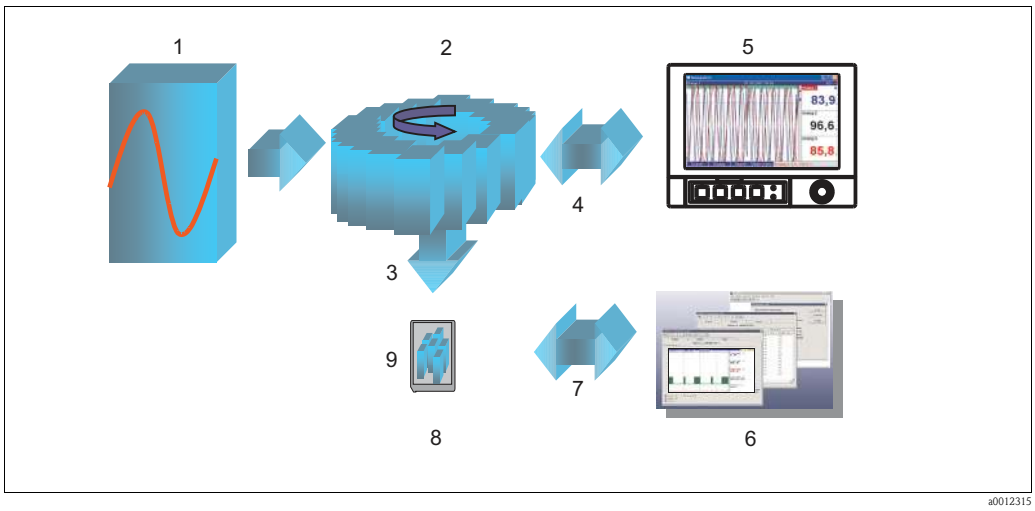


Fig. 78: Schematic illustration of the process for storing measured values

1	*Measure*	*6*	*Database/analysis (at PC)*
2	*Save (Internal FIFO)*	*7*	*Data transfer using CF/USB*
3	*Copy saved on SD card or USB stick*	*8*	*Archiving (external, batch)*
4	*Display by access to intermal memory*	*9*	*SD/USB*
5	*Display*		

6.8.1 Internal memory

Measured value saving shows signal changes and provides access to processes which took place long ago. They are stored (nonvolatile) in a Flash memory which is secure on power failure. This large internal memory works as a ring memory. If it is full, the oldest data are overwritten (FIFO – first in/first out principle). As a result, the current data are always available.
In ongoing operation, the measured values saved can be called up in the instantaneous value display by pressing softkey 2 "History". This function can also be accessed via the "Extras" menu (see Section 6.5.5). Turn the navigator clockwise or counterclockwise to scroll back and forth between the measured value curves. You can change the speed with softkey 3 (slow "<" to fast "<<<<"). To go back to the instantaneous value display mode, press softkey 1 "Esc".

6.8.2 Operating mode of the SD card and USB stick

Without affecting the internal memory, data packages are copied block-by-block to the SD card. Tests are also made to determine whether the data have been written without any errors. The same happens when storing the data on the PC with the PC software contained in the scope of delivery. The data, monitored against manipulation, are available here. If you wish, you can export these data to other programs, such as MS Excel®, without losing the protected data basis.
The use of a USB stick is only recommended if certain data ranges should be copied. The USB stick is not designed for continuous measured value storage.

Note!
- Only use new, formatted SD cards recommended by the manufacturer (see "Accessories", Section 8). Any data on the SD card or USB stick are overwritten once the card/stick is inserted into the slot.
- The SD card or USB stick memory being written to is shown in normal operation at the top right of the display ("SD: xx%" or "USB: xx%")
- Dashes "–" on this display mean that no SD card is inserted.
- No information is output if no USB stick is connected.
- The SD card should not be write-protected.
- Prior to removing the external data carrier, select "Extras > SD card (or USB stick) > Update". The current data block is closed and saved to the external data carrier. This ensures that all current data (until the last save) is included on it.

- Depending on the configuration of your unit (see "Setup > System > Ext. memory > Warning at"), an acknowledgeable message on the display informs you that the data carrier has to be changed before the external data carrier is 100 % full.
- Your unit knows which data have already been copied onto the SD card or USB stick. Should you ever forget to change the data carrier in time (or if no SD card has been inserted), the new external data carrier is filled with the missing data from the internal memory – in as far as the data are still available there. Since measured value acquisition/registration has highest priority, it can take several minutes until the data are copied from the internal memory to the SD card or USB stick.

6.9 Important functions of the supplied PC software

Note!
The current PC software must be installed on a PC (for installation instructions, see description on CD–ROM or Section 5.6 of these Operating Instructions).

6.9.1 Data transmission to the supplied PC software

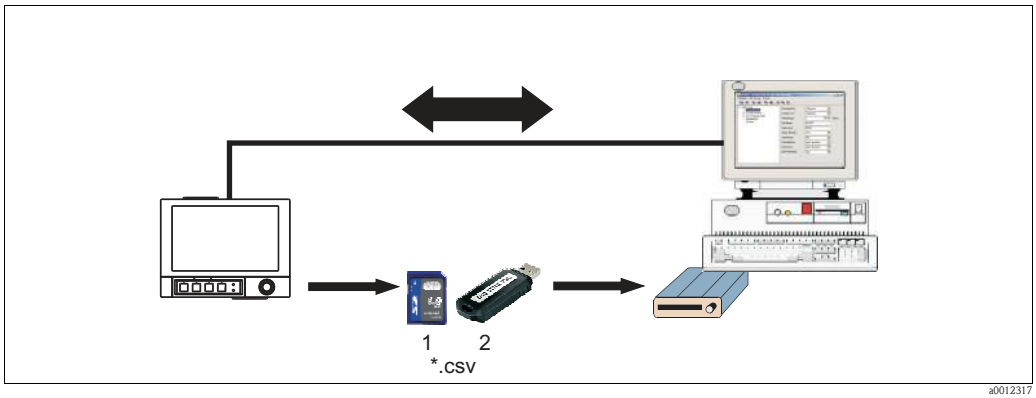


Fig. 79: Data transmission to the supplied PC software

1 SD card
2 USB stick

Data can be transferred to the installed PC software in one of the following ways:
- Using USB, RS232/485 or Ethernet. Communication and download of data to PC using the function "Read out –> Read out measured values using interface/Modem".

- Saving the data on the SD card or USB stick in the device using the function "Extras > SD card or USB stick > Update". Remove the SD card or USB stick from the device with the function "Extras > SD card or USB stick > Remove safely".
  Now insert the SD card or USB stick into the PC and read the data using the function "Read out > Read out measured values from PC card drive".

- Using the PC software, read out the internal memory as a file: the data is read out via RS232/RS485, Ethernet or USB. Start the PC software provided. Select "Read out > Read out memory card by interface/modem". Select the relevant device from the PC database. Select "Unit > Open unit(s) ". The connection is made. Select the relevant files in the internal memory and confirm with "OK". The measured values are read out. The measured values are kept in internal memory.

6.9.2 Offline data verification, analysis and printout

The data saved offline or downloaded to the PC (using one of the methods described above) can be viewed in the supplied PC software using the function "Display –> Display measured values from database".
All data received can be viewed as trend graphics and in tabular form and printed out (see corresponding print function in the main menu of the supplied PC software). A detailed description of the functions can be found on the CD–ROM of the supplied PC software.

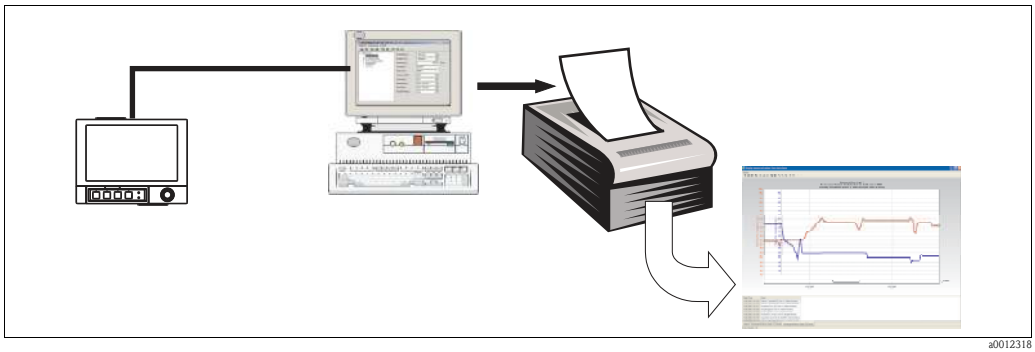


Fig. 80: Data analysis at the PC

6.9.3 Viewing data in a spreadsheet (e.g. MS Excel®)

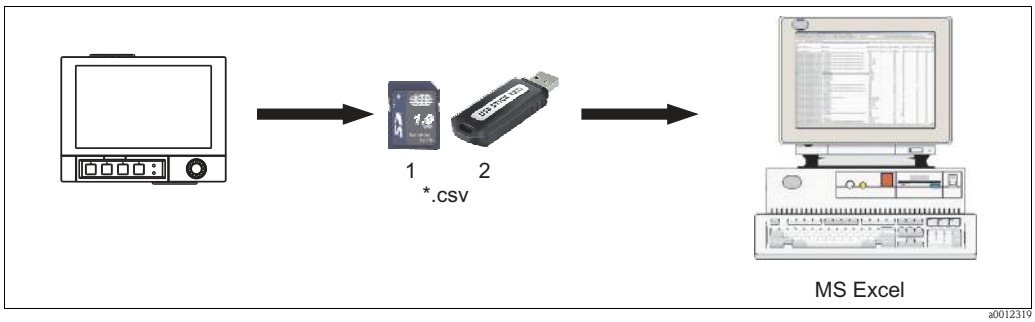


Fig. 81: Data analysis in spreadsheet

1 SD card
2 USB stick

Select "Open format (*.csv)" (comma separated values) as the save mode in the unit under " Main menu > Setup > System > Ext. memory > Save as" to be able to open saved data directly in the spreadsheet for analysis and printout.

Note!
To open the data directly in MS-Excel®, select the semicolon ";" as the separator in the unit under "Main menu > Setup > System > Ext. memory > Separator for CSV". The open format (*.csv) is restricted to a maximum of 60000 lines.

The CSV files are comprised as follows:

File name (=name + consecutive number + date and start time of the first value)	Description
rec_analysis01 00000000000 0009 2008-08-07 14-00-00.csv	Contains the signal analyses of the active channels from the starting time indicated in the file name. An individual CSV file is created for every analysis (01 – 04).
rec_events 00000000000 0009 2008-08-07 13-40-13.csv	Contains the event log from the starting time indicated in the file name.
rec_group01 00000000000 0009 2008-08-07 13-44-19.csv	Contains all the measured values of the group from the starting time indicated in the file name. An individual CSV file is created for every group (01 – 10).

Alternatively, the data saved in a protected format can be exported to *.xls, *.csv or *.txt format in the supplied PC software under "Extras > Export measured values".

7 Maintenance

The unit is maintenance-free.

7.1 Software update via the supplied PC software



Caution!
When the program is updated, all measurement data in the memory are deleted. If the measured values saved in the unit are still required, they should first be read out or the SD card should be updated and removed from the unit. After the program transfer, all unit settings are reset to the factory settings.
Function only possible via USB or RS232, not via Ethernet or modem!

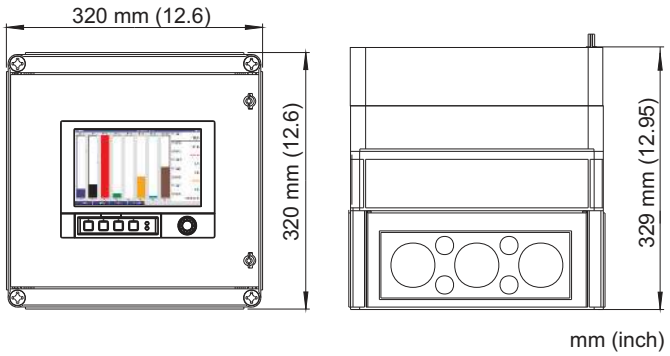
Procedure:

1. Start the supplied PC software.
2. Connect the unit to the PC.
3. Open the "Extras -> Special device functions -> (Select unit) -> Transfer program" menu.
4. Select interface parameters (Com port or USB device)
5. Select desired program file (*.prg) and confirm with OK.

8 Accessories

Note!
In the following sections, you find the accessories available at the time of issue of this documentation.
For information on accessories that are not listed here, please contact your local service or sales representation.

The following accessories are available:

Order code	Accessory
71105872	Interface cable USB-A – USB-B, 2 m (6.6 ft)
71104343	"Industrial Grade" SD memory card 256 MB
71104340	"Industrial Grade" SD memory card 512 MB
71104347	Field housing, IP65/NEMA 4x 

8.1 Sensors

OUSAF44
- Optical, single-wavelength sensor for measurement of UV absorption
- Hygienic design with flow assembly OUA260
- Ordering according to product structure, see Technical Information TI416C/07/EN

OUSAF45
- Optical, single-wavelength sensor for measurement of absorption in the high UV region
- CIP-, SIP-resistant design with flow assembly OUA260
- Ordering according to product structure

OUSAF46
- Optical, dual-wavelength sensor for measurement of UV absorption
- Hygienic design with flow assembly OUA260
- Ordering according to product structure

OUSAF11
- Optical sensor for measurement of VIS/NIR absorption
- Hygienic and glassfree design
- Ordering according to product structure, see Technical Information TI474C/07/EN

OUSAF12
- Single-wavelength sensor for measurement of color and NIR absorption
- Hygienic design with flow assembly OUA260
- Ordering according to product structure

OUSAF21
- Dual wavelength sensor for measurement of low concentration and color
- Hygienic design
- Ordering according to product structure

OUSAF22
- Dual wavelength sensor for measurement of concentration and color
- Hygienic design with flow assembly OUA260
- Ordering according to product structure

OUSTB66
- NIR absorption sensor for measurement of cell growth and biomass
- CIP-, SIP-resistant and autoclaveable
- Ordering according to product structure

OUSTF10
- Turbidity sensor for measurement of low turbidity values
- Uses scattered light technology
- Hygienic design with flow assembly OUA260
- Ordering according to product structure

8.2 Flow assembly

OUA260 flow assembly for hygienic sensors
- For sensor installation in pipe lines
- Materials: stainless steel 316, 316L or Kynar (further materials available on request)
- Many process connections and pathlength versions available
- Ordering according to product structure, see Technical Information TI418C/07/EN

8.3 Cables

OUK10 cable set
- Pre-terminated and labeled cables for connection of OUSAF12 sensors
- Ordering according to product structure

OUK20 cable set
- Pre-terminated and labeled cables for connection of OUSTF10 and OUSAF2x sensors
- Ordering according to product structure

OUK40 cable set
- Pre-terminated and labeled cables for connection of OUSAF4x sensors
- Ordering according to product structure

OUK60 cable set
- Pre-terminated and labeled cables for connection of OUSBT66 sensors
- Ordering according to product structure

9 Troubleshooting

9.1 Diagnosis/simulation in the main menu

Unit information and service functions for a swift unit check. For descriptions, see Section 6.6.4.

9.2 Troubleshooting instructions

Dead pixels:
Dead pixels refer to pixels on LCD and TFT displays that are defect due to the technology or manufacturing techniques used. The TFT display used can have up to 10 dead pixels (Class III as per ISO 13406-2). These dead pixels do **not** entitle the user to a warranty claim.

9.3 System error messages

If an error occurs in the unit, the red LED lights up. If warnings occur or if the unit needs to be serviced, the red LED starts flashing. The red LED can also start flashing for limit value alarms if this is configured in the setup (standard setting = off).

- M-code (maintenance required): warning or maintenance needed
- F-code: failure



Note!
All the error messages are displayed in the event log.

9.3.1 M-code messages

Code	Brief error description	Remedial action
M304	SD card is full!	Replace SD card
M305	USB stick is full!	Replace USB stick
M308	SD card is write-protected!	Disable write protection on SD card
M330	Not all USB units could be switched on since the max. current limiting level was reached.	Use active USB hub (hub with own power supply)
M432	Analog card x is not calibrated!	Calibrate the analog card (technical personnel only) or contact the service department of the supplier!

9.3.2 F-code messages

Code	Brief error description	Remedial action
F306	File not found or is corrupt!	
F307	Parameter file not found or is corrupt!	
F309	Analog card x is out of order!	Replace the analog card or contact the service department of the supplier! Switch the unit off and then on again if necessary.
F310	Digital card is out of order!	Replace the digital card or contact the service department of the supplier! Switch the unit off and then on again if necessary.
F311	Power unit is out of order!	Replace the power unit or contact the service department of the supplier! Switch the unit off and then on again if necessary.
F312	Fieldbus card is out of order!	Contact the supplier's service department! Switch the unit off and then on again if necessary.
F313	Screenshot could not be saved!	Change the SD card or USB stick and try again
F314	Error occurred when calibrating!	Repeat the calibration
F315	Cannot save run times!	Contact the supplier's service department!
F316	Cannot save setup to file!	Contact the supplier's service department!
F317	Cannot save unit data!	Contact the supplier's service department!
F318	Cannot save user administration!	Contact the supplier's service department!
F319	No IP address could be obtained from the DHCP server!	Check the connections and communication settings. Contact your network administrator.
F320	No connection to the e-mail server.	Check the connections and communication settings
F321	E-mail could not be sent!	Check the connections and communication settings
F322	SMS could not be sent!	Check the connections and communication settings
F323	Mathematics channel x: settings are invalid!	Check formula
F324	Mathematics settings are invalid!	Check formula
F325	Incompatible hardware detected! Please update firmware.	Firmware update necessary. Contact the supplier's service department!
F332	DNS server not found! (x)	Check settings in the setup under "System – Communication – Ethernet – DNS"

9.4 Process errors

Problem:	Cause:	Remedy:
Display does not function	Screen saver is active	Press a key. Check settings for screen saver in the setup.
	No LED lights up beside the keys or on the rear of the unit (Ethernet) => no power supply	Check power supply and mains connection.
	No LED lights up beside the keys or on the rear of the unit (Ethernet) => power unit defective	Replace the power unit or call the service department of the supplier!
	An LED lights up beside the keys or on the rear of the unit (Ethernet) => display defective	Contact the supplier's service department!
Lamp does not function	Lamp power supply lost load	Check lamp condition and the cable connection.
Sensor does not function	Optical signal lost	Check sensor detector or detector cable connection.
SD card slot does not work	CPU defective	Contact the supplier's service department!
No data on the SD card	Setup changed	Save the data onto a data carrier before making any changes to the setup.
	Software update/upgrade	Save measured values onto a data carrier before making any changes to the software.
	SD card defective	Replace the SD card, use genuine cards from the manufacturer! (Accessories, see Section 8)
	CPU defective	Contact the supplier's service department!
Setup is locked	Setup lock active, i.e. the setup is only released with a digital signal	Create a digital signal to remove setup lock.
	Operation is locked by a user code	Enter the correct user code to disable the lock.
Relay does not function	Incorrect connection	Check the connection and circuit of the relay.
	Incorrect configuration	Check the configuration of the relay.
	Power supply defective	Replace the power unit card or call the service department of the supplier!
	Digital card (optional) defective	Replace the digital card or call the service department of the supplier!
No connection to the unit possible via the USB	Cable defective	Replace cable
	Driver for USB connection not installed on the PC	Install driver
RS232/RS485, Ethernet interface not working	Cable defective	Replace cable (Accessories, see Section 8)
	Incorrect connection assignment	Use original cables.
	Incorrect unit address	Check and set correctly.
	Incorrect interface parameters	Check and set correctly.
	CPU defective	Contact the supplier's service department!
Modem connection not working	Modem not initialized on unit	Initialize the modem again (see Section 5.6.4)
	Incorrect or faulty connecting cable	Replace cable (Accessories, see Section 8)

Problem:	Cause:	Remedy:
Digital input does not function	Incorrect connection Incorrect configuration Power supply defective CPU defective	Check the connection and circuit of the digital input. Check the digital input configuration. Replace the power unit card or call the service department of the supplier! Contact the supplier's service department!
Analog input shows "– – – –" This means cable open circuit	The signal lines are incorrectly connected or not connected.	Check connections.
Analog input shows "*****" This means the measured value is invalid**	The input signal does not correspond to the configured signal.	Check the input signal and the configuration.
Analog input shows "^^^^^^^" This means overranging	The sensor is defective.	Check the input signal and replace the sensor.
Analog input shows "vvvvvv" This means underranging	The sensor is defective.	Check the input signal and replace the sensor.
Analog output does not function	Digital card (optional) defective	Replace the digital card or call the service department of the supplier!
Communication to fieldbus (Profibus DP or Modbus) not working	Wrong settings Anybus communicator module defective Incorrect terminal assignment	Check communication settings. Contact the supplier's service department! Check the wiring to the fieldbus.

9.5 Spare parts

9.5.1 Illustration of the spare parts

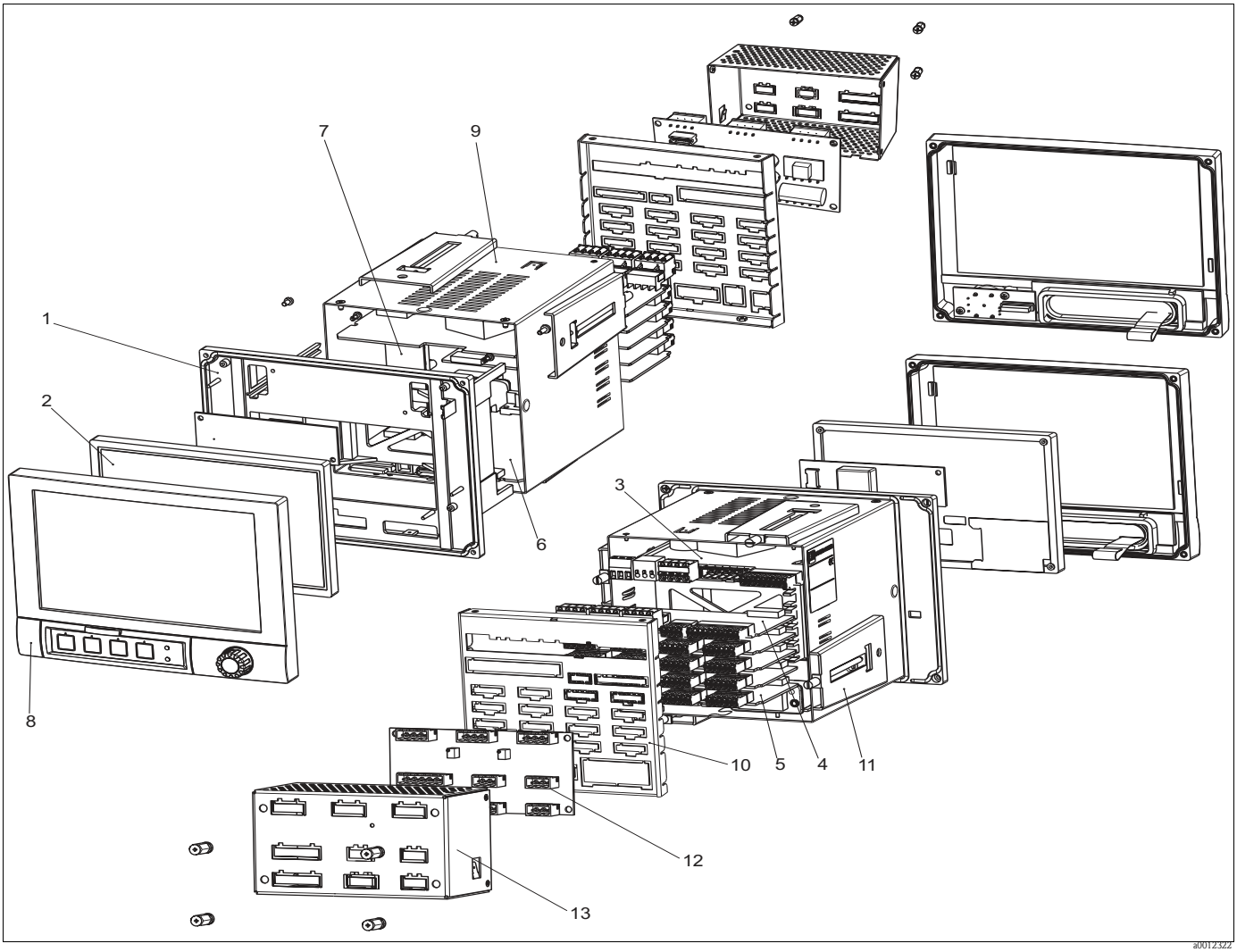


Fig. 82: Illustration of spare parts

9.5.2 List of spare parts / retrofit parts

Pos.	Order no.	Identifier
3	50078843	Terminal, 3-pin, for power supply
3	71037408	Terminal, pluggable, 3-pin for relay 1 (changeover)
3	71037411	Terminal, pluggable, 6-pin for relay 4+5+6 on power unit card
3	71037363	Terminal, pluggable, 9-pin for digital inputs on power unit card
3	RSG40X–NA	Power unit 100-230 V AC (±10%)
3	RSG40X–NC	Power supply 24 V AC/DC
4	71037410	Terminal, pluggable, 4-pin for relay 2+3 and relay on digital I/O card

Pos.	Order no.	Identifier
4	71037351	Terminal, pluggable, 10-pin for digital inputs on digital I/O card
4	71037350	Terminal, pluggable, 4-pin for analog outputs on digital I/O card
4	RSG40X–BA	Digital card extension (8x digital input + 6x relay + 2x analog output) (for slot 5), with connector
5	RSG40X–A1	Analog card with 4 multifunction inputs (for slot 1-5), with connector
5	51009211	Terminal, pluggable, 6-pin, for analog input
7	RSG40X–MA	Motherboard
10	71035192	Rear wall, analog+digital, stamped, for units in which analog cards and the digital I/O card are integrated
11	71035184	Jack screws short, 1 piece
12	71105873	Terminal strip kit for 1 channel
12	71105874	Terminal strip kit for 2 channels
12	71105875	Terminal strip kit for 4 channels
13	71105815	Cover electronic rear panel (no screws included)

9.6 Return

If the device has to be repaired, please return it *cleaned* to the sales center responsible.
Please use the original packaging, if possible.

9.7 Disposal

The device contains electronic components and must therefore be disposed of in accordance with regulations on the disposal of electronic waste.
Please observe local regulations.

10 Technical data

10.1 Input

Input types	■ Up to 4 optical sensor inputs for up to two sensors (depending on sensor type) ■ 2 universal analog inputs ■ 6 digital inputs		
Measured variables	Optical channels: ■ Absorbance (UV, color, NIR, cell growth) ■ Turbidity Analog inputs: ■ Voltage ■ Current ■ Resistance thermometer ■ Thermocouples ■ Pulse input ■ Frequency input		
Measuring range	Optical photometric sensor inputs (S1, S2, S3, S4) OUSAF11 OUSAF12 OUSAF21 OUSAF22 OUSAF44 OUSAF45 OUSAF46 OUSTF10 OUSBT66	0 to 2.5 AU (Absorbance Unit) up to 50 OD (depending on OPL) 0 to 500 FTU or ppm DE	0.3 % at 25 °C oMR 1 % max. oMR over all conditions 2 % max. oMR over all conditions
	Universal input (A1, A2)		
	Current (I)	0 to 20 mA 0 to 5 mA 4 to 20 mA Overrange: up to 22 mA	± 0.10 % oMR
	Voltage (U) > 1 V	0 to 10 V 0 to 5 V 1 to 5 V ± 10 V ± 30 V	± 0.10 % oMR
	Voltage (U) ≤ 1 V	0 to 1 V ± 1 V ± 150 mV	± 0.10 % oMR

	Resistance thermometer (RTD)	Pt 100: -200 to 850 °C (-328 to 1562 °F) (IEC751, GOST) Pt 100: -200 to 649 °C (-328 to 1200.2 °F) (JIS1604) Pt 500: -200 to 850 °C (-328 to 1562 °F) (IEC751) Pt 500: -200 to 649 °C (-328 to 1200 °F (JIS1604) Pt 1000: -200 to 600 °C (-328 to 1112 °F) (IEC751, JIS1604)	4-wire: ± 0.10 % oMR 3-wire: ± (0.10 % oMR + 0.8 K) 2-wire: ± (0.10 % oMR + 1.5 K)
		Cu 100: -200 to 200 °C (-328 to 392 °F) (GOST) Cu 50: -200 to 200 °C (-328 to 392 °F) (GOST) Pt 50: -200 to 850 °C (-328 to 1562 °F) (GOST)	4-wire: ± 0.20 % oMR 3-wire: ± (0.20 % oMR + 0.8 K) 2-wire: ± (0.20 oMR +1.5 K)
		Cu 53: -50 to 180 °C (-58 to 356 °F) (GOST) Pt 46: -200 to 650 °C (-328 to 1202 °F) (GOST)	4-wire: ± 0.30 % oMR 3-wire: ± (0.30 % + 0.8 K) 2-wire: ± (0.30 % oMR + 1.5 K)
	Thermocouples (TC)	Type J (Fe-CuNi): -210 to 1200 °C (-346 to 2192 °F) (IEC581-1) Type K (NiCr-Ni): -270 to 1372 °C (-454 to 2501.6 °F) (IEC581-1) Type T (Cu-CuNi): -270 to 400 °C (-454 to 752 °F) (IEC581-1) Type N (NiCrSi-NiSi): -270 to 1300 °C (-454 to 2372 °F) (IEC581-1) Type L (Fe-CuNi): -200 to 900 °C (-328 to 1652 °F) (DIN43710) Type L (Fe-CuNi): -200 to 659 °C (-328 to 1218.2 °F) (GOST) Type D (W3Re-W25Re): 0 to 2315 °C (32 to 4199 °F) (ASTME998) Type C (W5Re-W26Re): 0 to 2315 °C (32 to 4199 °F) (ASTME998) Type B (Pt30Rh-Pt6Rh): 0 to 1820 °C (32 to 3308 °F) (IEC581-1) Type S (Pt10Rh-Pt): -50 to 1768 °C (-58 to 3214.4 °F) (IEC581-1) Type R (Pt13Rh-Pt): -50 to 1768 °C (-58 to 3214.4 °F) (IEC581-1)	± 0.10 % oMR as of -100 °C (-148 °F) ± 0.10 % oMR as of -130 °C (-202 °F) ± 0.10 % oMR as of -200 °C (-328 °F) ± 0.10 % oMR as of -100 °C (-148 °F) ± 0.10 % oMR as of -100 °C (-148 °F) ± 0.10 % oMR as of -100 °C (-148 °F) ± 0.15 % oMR as of 500 °C (932°F) ± 0.15 % oMR as of 500 °C (932°F) ± 0.15 % oMR as of 600 °C (1112°F) ± 0.15% oMR as of 100 °C (212°F) ± 0.15% oMR as of 100 °C (212°F)
	Pulse input (I)	Min. pulse length 30 µS, max. 13 kHz	
	Frequency input (I)	0 to 10 kHz, overrange: to 12.5 kHz 0 to 7 mA = LOW 13 to 20 mA = HIGH	± 0.01 % oMR
	Digital input (D11 to D61)	To IEC 61131-2: Logical "0" (corresponds to -3 to +5 V), activation with logical "1" (corresponds to +12 to +30 V) Input frequency: Max. 25 Hz Pulse length: Min. 20 mS Input current: Max. 2 mA Input voltage Max. 32 V	

10.2 Output

Relay outputs	Standard version (power supply slot): 1 alarm relay with changeover contact, 5 relays with NO contact e.g. for limit value alarms (can be configured as NC contact).	
	Response time: Maximum DC contact load: Maximum AC contact load:	max. 400 ms 30 V / 3 A 230 V / 3 A
Analog outputs	Output current: Max. output voltage: Accuracy: Temperature drift: Resolution: Load: Error signal to NAMUR NE43:	0/4 to 20 mA with 10 % overrange approx. 16 V ≤ 0.1 % of output range ≤ 0.015 %/K 13 bit 0 to 500 Ohm configurable, 3.6 mA or 21 mA
Digital outputs	Output voltage as per IEC 61131-2: Frequency: Pulse width: Max. measured error: Temperature drift: Load:	≤ 5 V corresponds to LOW ≥ 12 V corresponds to HIGH short-circuit proof (maximum 25 mA) 0 to 2 kHz 0.5 to 1000 mS ≤ 0.1 % of output range ≤ 0.1 % ≥ 1 kOhm
Communications port	Combined RS232/485 connection	

10.3 Power supply

Supply voltage	Input (according to product structure): Output: Optical lamp power supply:	100 to 230 VAC (±10 %) 24 VAC/DC 2.5 to 12 V adjustable, 6 W
Frequency	Nominal frequency: 50 / 60 Hz	
Cable specification	Screw or spring terminal block with reverse polarity protection:	
	Wire cross-sections: Digital I/O and analog inputs: Power supply: Relays:	 max. 1.5 mm^2 (14 AWG) (spring terminals) max. 2.5 mm^2 (13 AWG) (screw terminals) max. 2.5 mm^2 (13 AWG) (spring terminals)
Power consumption	100 to 230 V: 24 V:	max. 40 VA max. 40 VA

10.4 Performance characteristics

Reference operating conditions	Reference temperature: Humidity:	25 °C ± 5 K (77 °F ± 9 °F) 55 % ± 10 % r.h.
Maximum measured error	See "Input" section.	
Temperature drift	Cu50, Cu53, Cu100, Pt46, Pt50: All other ranges:	max. ± 0.02 %/K (of measuring range) ±5 % of reading max. ± 0.01 %/K (of measuring range)
Long-term drift	According to IEC 61298-2: <1 %/year (of measuring range)	

10.5 Environment

Ambient temperature range	–10 to 50 °C (14 to 122 °F)	
Storage temperature	–20 to +60 °C (-4 to 140 °F)	
Electromagnetic compatibility	**Interference immunity:** Compliant to IEC 61326 (industrial environment) and NAMUR NE21. **Interference emission:** Compliant to IEC 61326: Class A (operation in industrial environment) **Interference voltage suppression:** ■ Common mode interference voltage suppression: IEC 61298-3 Analog inputs: 80 dB at 60 V and 50 Hz / 60 Hz ■ Push-pull interference voltage suppression: IEC 61298-3 Analog inputs: 40 dB at 50 Hz / 60 Hz, for measuring range / 10	
Ingress protection	Front panel: Rear panel:	IP65 (IEC 60529, Cat. 2), NEMA 4 IP20 (IEC 60529, Cat. 2)
Climate class	Compliant to IEC 60654-1: B1	
Electrical safety	IEC 61010-1, protection class I Low voltage: over voltage category II Environment < 3000 m (9843 ft) above MSL (mean sea level)	

10.6 Mechanical construction

Dimensions	See section "Installation".	
Weight	Maximum configuration: approx. 2 kg (4.4 lb)	
Materials ✎ Note! All materials are free from silicone.	Front (front part incl. display panel):	GD-Z410 (zinc diecast) (border area powder-coated)
	Flap (front):	plastic (ABS UL94-V2)
	Membrane keypad:	polyester (PC-ABS UL94-V2)
	Navigator:	plastic (ABS UL94-V2)
	Intermediate frame (front to panel):	plastic (PA6-GF15 UL94-V2)
	Housing:	St 12 ZE (galvanized sheet steel)
	Rear panel:	St 12 ZE (galvanized sheet steel)

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Endress+Hauser

People for Process Automation

Declaration of Hazardous Material and De-Contamination
Erklärung zur Kontamination und Reinigung

RA No. ☐☐☐☐☐☐☐☐

Please reference the Return Authorization Number (RA#), obtained from Endress+Hauser, on all paperwork and mark the RA# clearly on the outside of the box. If this procedure is not followed, it may result in the refusal of the package at our facility.
Bitte geben Sie die von E+H mitgeteilte Rücklieferungsnummer (RA#) auf allen Lieferpapieren an und vermerken Sie diese auch außen auf der Verpackung. Nichtbeachtung dieser Anweisung führt zur Ablehnung ihrer Lieferung.

Because of legal regulations and for the safety of our employees and operating equipment, we need the "Declaration of Hazardous Material and De-Contamination", with your signature, before your order can be handled. Please make absolutely sure to attach it to the outside of the packaging.
Aufgrund der gesetzlichen Vorschriften und zum Schutz unserer Mitarbeiter und Betriebseinrichtungen, benötigen wir die unterschriebene "Erklärung zur Kontamination und Reinigung", bevor Ihr Auftrag bearbeitet werden kann. Bringen Sie diese unbedingt außen an der Verpackung an.

Type of instrument / sensor
Geräte-/Sensortyp _____

Serial number
Seriennummer _____

☐ Used as SIL device in a Safety Instrumented System / *Einsatz als SIL Gerät in Schutzeinrichtungen*

Process data/ *Prozessdaten*
Temperature / *Temperatur*_____ [°F] _____ [°C]
Conductivity / *Leitfähigkeit* _____ [µS/cm]
Pressure / *Druck* _____ [psi] _____ [Pa]
Viscosity / *Viskosität* _____ [cp] _____ [mm^2/s]

Medium and warnings
Warnhinweise zum Medium



	Medium /concentration *Medium /Konzentration*	Identification CAS No.	flammable *entzündlich*	toxic *giftig*	corrosive *ätzend*	harmful/ irritant *gesundheits-schädlich/ reizend*	other * *sonstiges**	harmless *unbedenklich*
Process medium *Medium im Prozess*								
Medium for process cleaning *Medium zur Prozessreinigung*								
Returned part cleaned with *Medium zur Endreinigung*								

* explosive; oxidising; dangerous for the environment; biological risk; radioactive
* *explosiv; brandfördernd; umweltgefährlich; biogefährlich; radioaktiv*

Please tick should one of the above be applicable, include safety data sheet and, if necessary, special handling instructions.
Zutreffendes ankreuzen; trifft einer der Warnhinweise zu, Sicherheitsdatenblatt und ggf. spezielle Handhabungsvorschriften beilegen.

Description of failure / *Fehlerbeschreibung* _____

_____

_____

Company data / *Angaben zum Absender*

Company / *Firma* _____

_____

Address / *Adresse*

_____

_____

Phone number of contact person / *Telefon-Nr. Ansprechpartner:*

_____

Fax / E-Mail _____

Your order No. / *Ihre Auftragsnr.* _____

"We hereby certify that this declaration is filled out truthfully and completely to the best of our knowledge.We further certify that the returned parts have been carefully cleaned. To the best of our knowledge they are free of any residues in dangerous quantities."
"Wir bestätigen, die vorliegende Erklärung nach unserem besten Wissen wahrheitsgetreu und vollständig ausgefüllt zu haben. Wir bestätigen weiter, dass die zurückgesandten Teile sorgfältig gereinigt wurden und nach unserem besten Wissen frei von Rückständen in gefahrbringender Menge sind."

_____ (place, date / *Ort, Datum)*

_____ Name, dept./*Abt.* (please print / *bitte Druckschrift*)

_____ Signature / *Unterschrift*

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