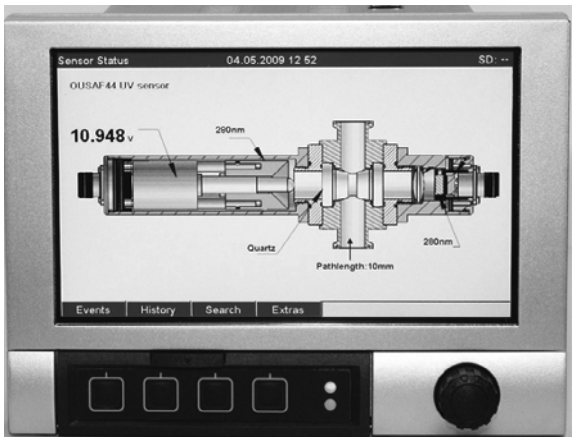
Technical Information
Memograph CVM40

Graphic transmitter for inline photometers and data manager



Measure, analyze, record, visualize, and communicate

Application

The graphic transmitter for inline photometers & data manager Memograph CVM40 provides information on all photometric process variables. It can operate up to two photometric sensors for UV absorption, color, NIR absorption, turbidity and cell growth. Values are correctly measured, analyzed, and recorded. The measurement data are stored in the 256 MB internal memory & on an SD card or USB stick. CVM40 boasts a modular design, intuitive operation & a comprehensive security concept.

The solution for all your tasks. For example, for:
- Life science and pharmaceutical industry
- Food and beverage industry
- Process measuring technology
- Environmental applications

Your benefits

- UL-listed for Canada and USA, CE approval
- Memograph CVM40 provides precise measurement values under any condition.
- Up to 4 optical channels for operation of max. 2 photometric sensors, 2 universal analog channels support multiparameter combined measuring or recording purposes.
- Menu-guided calibration of photometric sensors. Maintenance and service cycle reminders will pop up and be logged in device history.
- Security package with person-specific access authorization and electronic signature (FDA 21 CFR Part 11).
- Integrated Web server, fieldbus (PROFIBUS, Modbus), common standard protocols and interfaces such as USB, TCP/IP, OPC & Ethernet are supported.

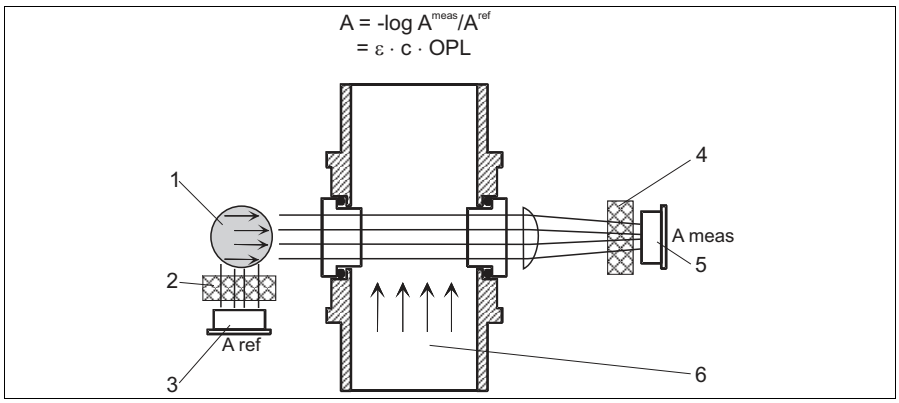
Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

Absorption light method

The measuring principle is based on the Lambert-Beer law. There is a linear dependency between the light absorption and the concentration of the absorbing substance. A light source emits radiation through the medium and the transmitted radiation is measured on the detector side. After passing through a filter for wavelength selection, the light intensity is determined by a photodiode and converted into a photo current. The final conversion into transmission (%) or absorption (AU, OD) units is done by the related transmitter.



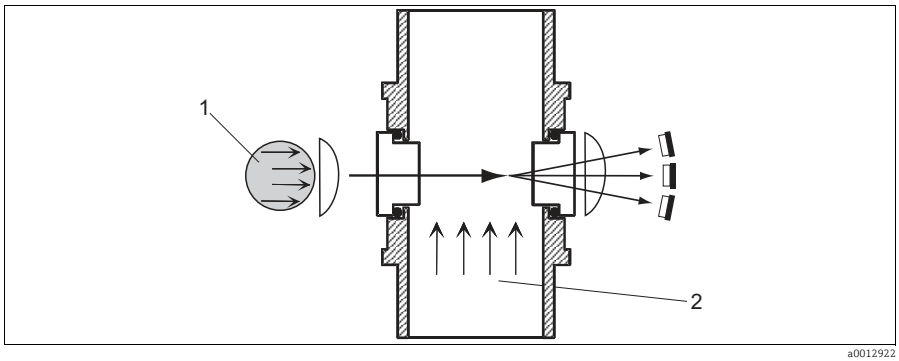
E.g. Single-wavelength absorption sensor with reference

A	*Absorption*
ε	*Extinction coefficient*
c	*Concentration*
OPL	*Optical pathlength*

1	*Light source*
2	*Reference filter*
3	*Reference detector*
4	*Measurement filter*
5	*Measurement detector*
6	*Medium*

Scattered light method

The scattered light instruments use the characteristics of particles which cause a scattering of light. A light source emits radiation through the medium and the transmitted radiation is measured on the detector side. Besides the detection of the direct light, the forward scattered light is also determined by several photodiodes. Based on the ratio of the scattered and direct light, the transmitter allows the detection of particles and turbidity at very low concentration.



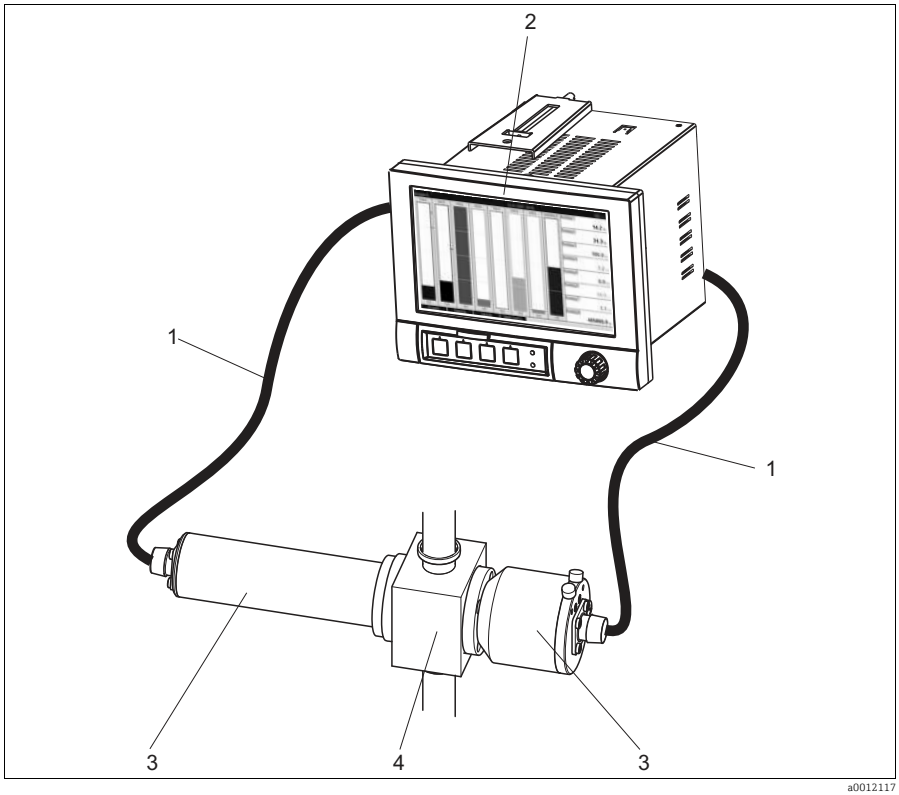
E.g. Scattered light

1	*Light source*
2	*Medium*

The photo currents provided from the sensors are continuously and precisely converted by the transmitter CVM40.
The basic units like FTU (Formazine turbidity units) and ppm DE (Diatomaceous earth) or AU (Absorption units) and OD (Optical density) for direct light can be easily converted into customer-specific units by using the mathematical and linearization functionalities.

Measuring system

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



Example of a measuring system

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

Input

Measured variables

Optical channels:

- Absorption (UV, color, NIR, cell growth)
- Turbidity

Analog inputs:

- Voltage
- Current
- Resistance thermometer
- Thermocouples
- Pulse input
- Frequency input

Measuring ranges

Measured variable	Measurement range	Maximum measured error
Optical photometric sensor inputs (S1, S2, S3, S4) OUSAF11 OUSAF12 OUSAF21 OUSAF22 OUSAF44 OUSAF45 OUSAF46 OUSTF10 OUSBT66	0 to 2.5 AU (Absorption Unit) up to 50 OD (depending on OPL)	0.3 % at 25 °C oMR 1 % max. oMR over all conditions
	0 to 200 FTU or ppm DE	1 % at 25 °C oMR 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	

Type of input

- Up to two sensors (depending on sensor type) with four optical inputs.
- 2 universal analog inputs
- 6 digital input channels

Optical sensor connectivity

The sensor support capability is related to power consumption of the specific sensor and photometer version. The number of supported sensors depends on the configuration and is shown in the following table:

						Memograph CVM40		
Parameter	**Sensor**	**Number of detectors**	**Cable**	**Flow assembly**		**1 optical channel**	**2 optical channels**	**4 optical channels**
Absorption Color and NIR	OUSAF11	1	-	-		1	2	2 [1)]
	OUSAF12	1	OUK10	OUA260		1	1/2 [2)]	1/2 [2) 1)]
	OUSAF21	2	OUK20	-		-	1	1 [1)]
	OUSAF22	2	OUK20	OUA260		-	1	1 [1)]
UV absorption	OUSAF44	2	OUK40	OUA260		-	1	1 [1)]
	OUSAF45 [3)]	2	OUK40	OUA260		-	1	1 [1)]
	OUSAF46	4	OUK40	OUA260		-	-	1
Turbidity	OUSTF10	2	OUK20	OUA260		-	1	1 [1)]
Cell growth	OUSBT66	1	OUK60	-		1	2	2 [1)]

1) These configurations are possible but can be achieved with a version with fewer optical channels.

2) Supports 2 OUSAF12 sensors with Standard Incandescent lamp for NIR long pass and Broadband (without any filter) measurements

3) OUSAF45 sensors require an external high-voltage power supply to power the lamp up.

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:	max. 400 ms
Maximum DC contact load:	30 V / 3 A
Maximum AC contact load:	230 V / 3 A

Analog outputs (current outputs)

Output current:	0/4 to 20 mA with 10 % overrange
Max. output voltage:	approx. 16 V
Accuracy:	≤ 0.1 % of output range
Temperature drift:	≤ 0.015 %/K
Resolution:	13 bit
Load:	0 to 500 Ohm
Error signal to NAMUR NE43:	configurable, 3.6 mA or 21 mA

Digital outputs (pulse outputs)

Output voltage as per IEC 61131-2:	≤ 5 V corresponds to LOW ≥ 12 V corresponds to HIGH short-circuit proof (maximum 25 mA)
Frequency:	0 to 2 kHz
Pulse width:	0.5 to 1000 mS
Max. measured error:	≤ 0.1 % of output range
Temperature drift:	≤ 0.1 %
Load:	≥ 1 kOhm

Optical lamp

Output:
Optical lamp power supply: 2.5 to 12 V adjustable, 6 W

Power supply

Supply voltage

Input (according to product structure): 100 to 230 VAC (±10 %)
24 VAC/DC

Power consumption

100 to 230 V:	max. 40 VA
24 V:	max. 40 VA

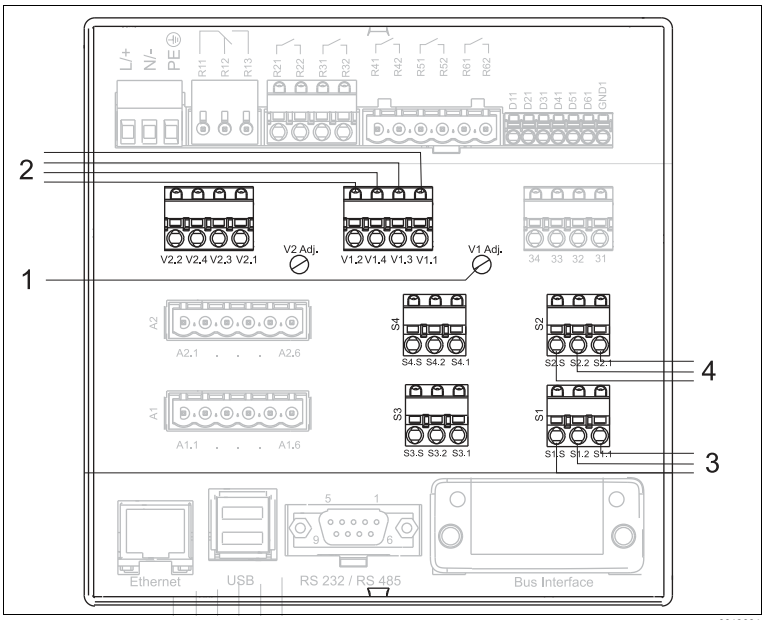
Frequency

Nominal frequency: 50 / 60 Hz

Electrical connection

Memograph CVM40 sensor terminal chart				
Parameter	**Sensor**	**1 optical channel**	**2 optical channels**	**4 optical channels**
Absorption Color and NIR	OUSAF11	S1	S1 / S2 [1)]	S1 / S3 [1)]
	OUSAF12	S1	S1 / S2 [1)]	S1 / S3 [1)]
	OUSAF21	n/a	S1 & S2	S1 & S2
	OUSAF22	n/a	S1 & S2	S1 & S2
UV absorption	OUSAF44	n/a	S1 & S2	S1 & S2
	OUSAF45	n/a	S1 & S2	S1 & S2
	OUSAF46	n/a	n/a	S1 & S2 S3 & S4
Turbidity	OUSTF10	n/a	S1 & S2	S1 & S2
Cell growth	OUSBT66	S1	S1 / S2 [1)]	S1 / S3 [1)]

1) One sensor: S1 or S2 / S3
Two sensors: S1 and S2 / S3



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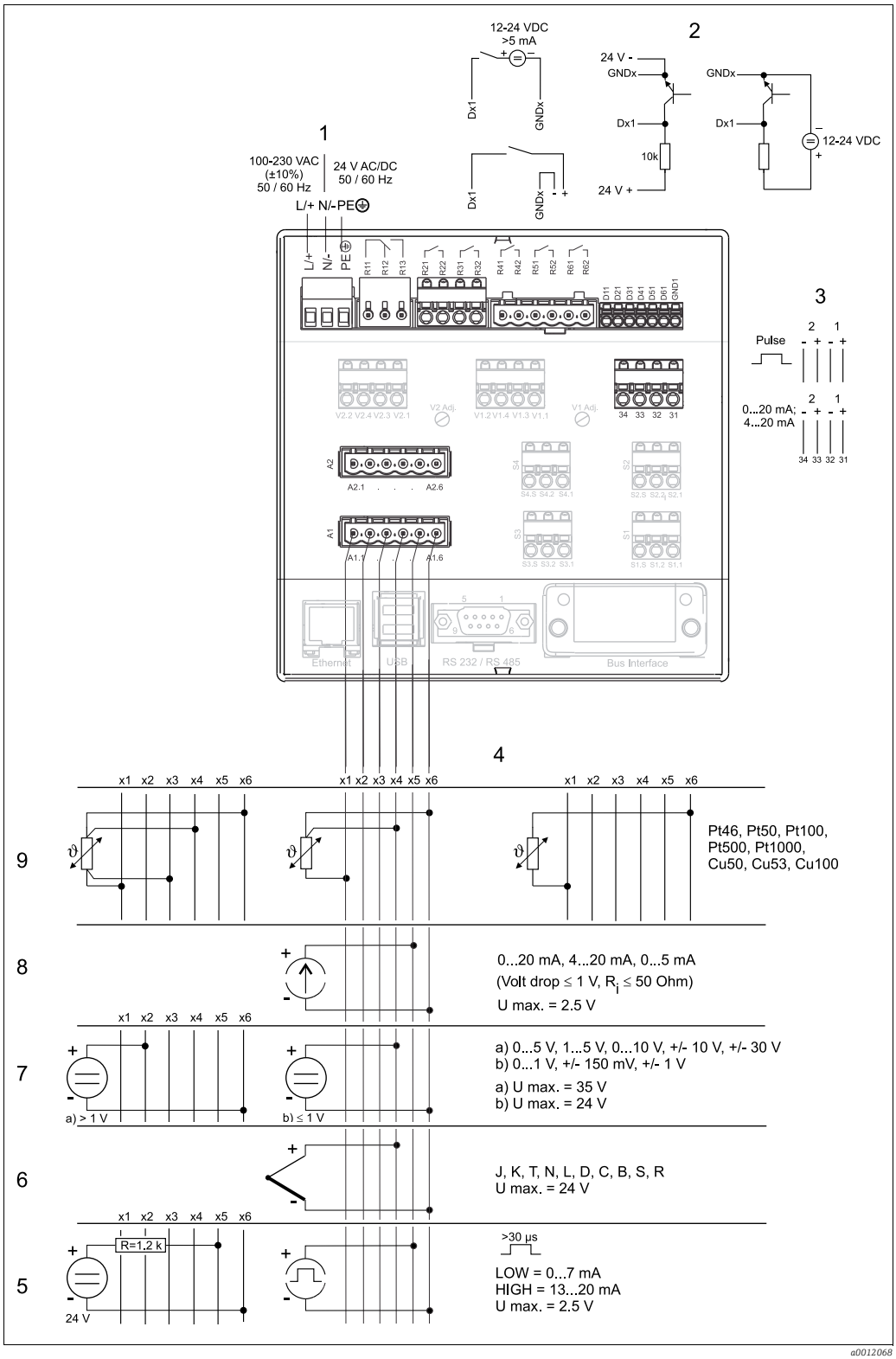
Wiring diagram with terminals for lamps and sensors

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)



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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)*

Cable specification

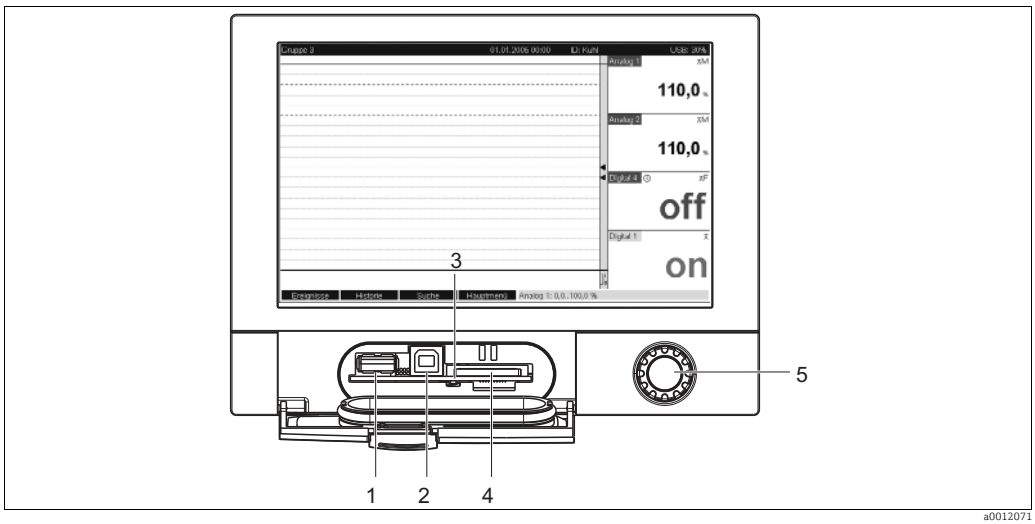
Screw or spring terminal block with reverse polarity protection:

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)

Communication

Connection data interface, communication, operation



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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

Ethernet interface

An IEEE 802.3-compatible connection is available on a shielded RJ45 plug connector on the rear of the unit as the network connection. It can be used to connect the unit with a hub or switch to units in an office environment. For safe spacing distance, 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 m (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 be connected to the Ethernet interface.
The unit can be used in the network as a "Web server". Two Ethernet function LEDs on the rear of the unit.

Serial RS232/RS485 interface

A combined RS232/RS485 connection is available on a shielded SUB D9 socket at the rear of the unit. It 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.

Supported baudrates:	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Max. line length with shielded cable:	2 m (6.6 ft) (RS232) or 1000 m (328 ft) (RS485)

Both interfaces are galvanically isolated from the system.
The RS232/RS485 interfaces cannot be used simultaneously.

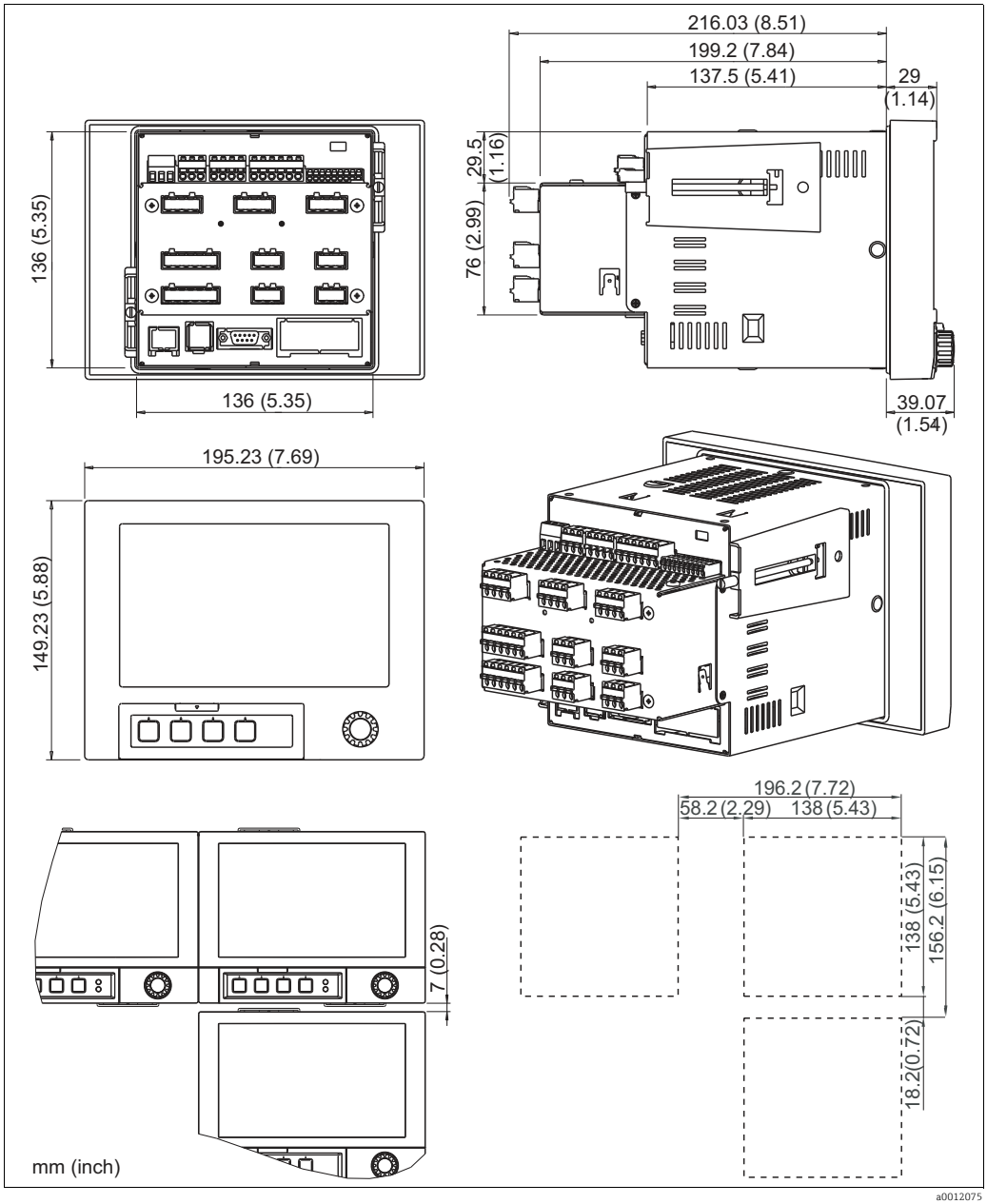
Bus interface

- 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: max. 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.

Installation

Installation instructions

Panel cutout and installation / design, dimensions



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

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

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).

Environment

Ambient temperature range	−10 to 50 °C (14 to 122 °F)
Storage temperature	−20 to +60 °C (-4 to 140 °F)
Ingress protection	Front panel: IP65 (IEC 60529, Cat. 2), NEMA 4 Rear panel: IP20 (IEC 60529, Cat. 2)
Climate class	Compliant to IEC 60654-1: B1
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
Electrical safety	IEC 61010-1, protection class I Low voltage: over voltage category II Environment < 3000 m (9843 ft) above MSL (mean sea level)

Mechanical construction

Dimensions

See section "Installation".

Weight

Maximum configuration: approx. 2 kg (4.4 lb)

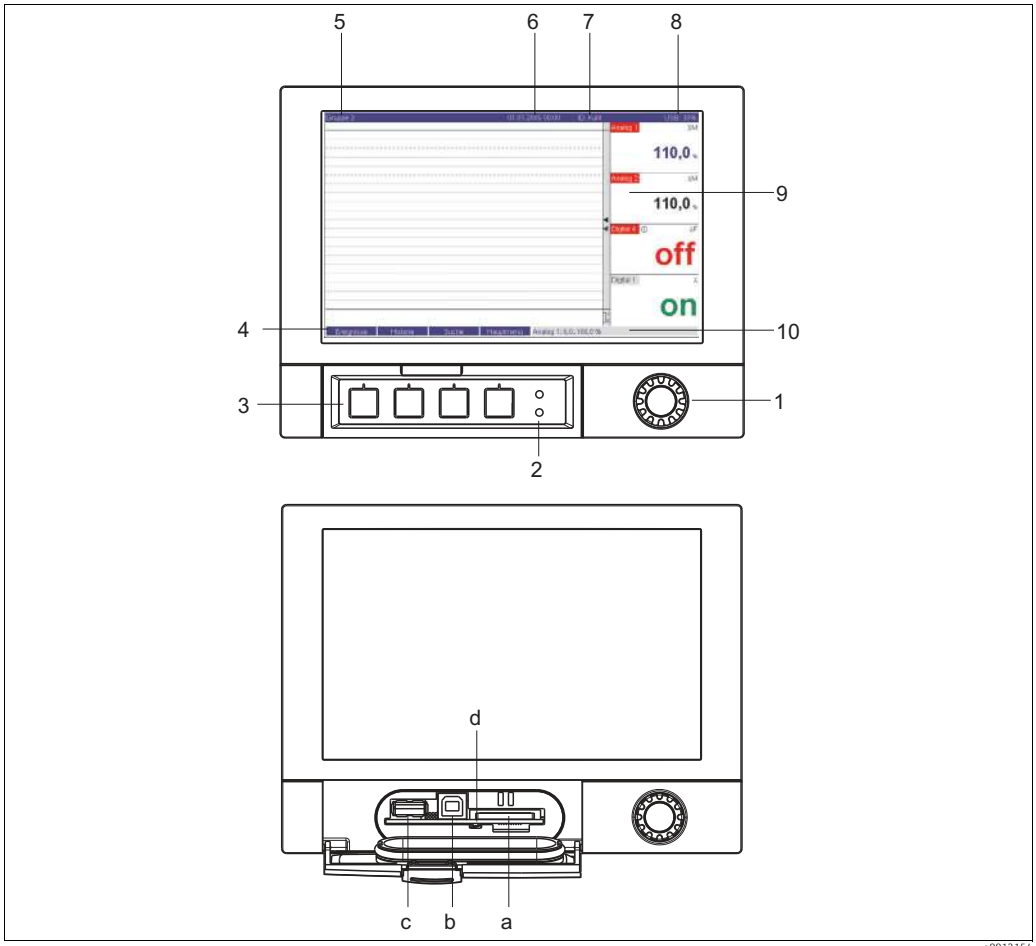
Material

Front (front part incl. display panel):	GD-Z410 (zinc diecast) (border area powder-coated)
Display screen (front):	transparent plastic (Makrolon®)
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)

All materials are free from silicone.

Human interface

Operating elements



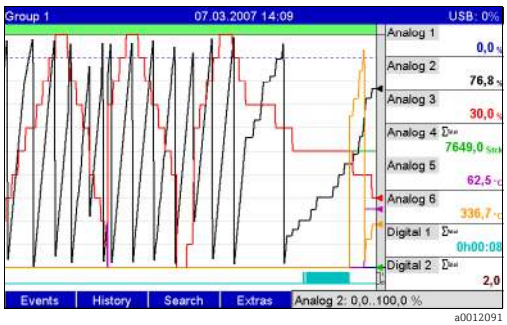
Device display/operating units

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)
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)]. 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 **NOTICE** **Removing the SD card while yellow LED (d) is lit** Risk of data loss! ▪ Wail until yellow LED does not flash anymore.
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. **NOTICE** **Removing the SD card while yellow LED (d) is lit** Risk of data loss! ▪ Wail until yellow LED does not flash anymore.

1) Overview of symbols, see Chapter "Overview of the symbols used" in BA00457C.

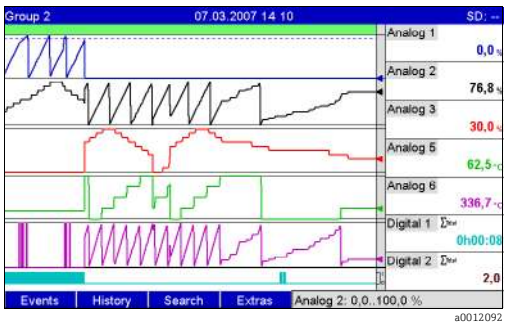
Display elements

Type:	widescreen TFT color graphic display
Screen size:	178 mm (7")
Resolution:	wide VG 384,000 dots (800 x 480 dots)
Background illumination:	50,000 h half life (= half brightness)
Colors:	262,000 viewable colors, 256 colors used
Screen display:	▪ black or white background, selectable ▪ assignment of active sensor or math values to up to 10 groups with names for clear identification ▪ linear or logarithmic scales ▪ replay function; rapid call-up of data history with zoom function ▪ preformatted screen displays e.g. horizontal or vertical curves, bar graphs, instrument display, circular chart or digital display for rapid and uncomplicated commissioning



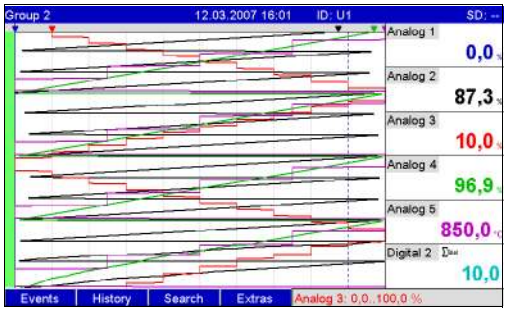
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Curve display



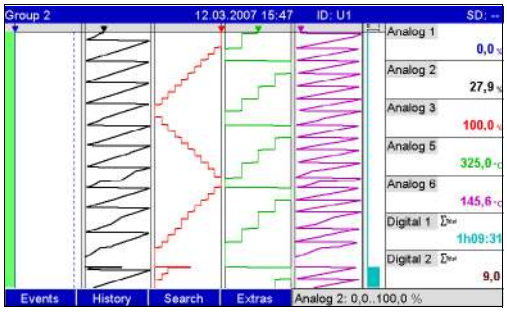
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Curve in ranges



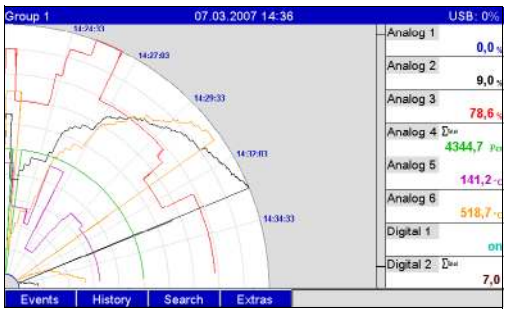
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Waterfall



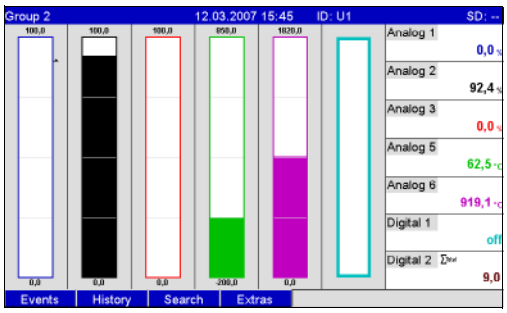
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Waterfall in ranges



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Circular chart



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Bar graph



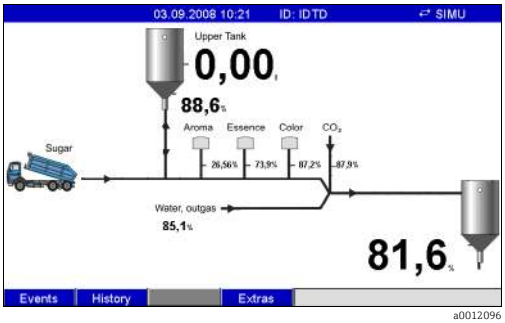
Digital display



Instrument display



Event log



Process display

Data saving

Memory cycle

- Selectable memory cycle: off / 100ms / 1s / 2s / 3s / 4s / 5s / 10s / 15s / 20s / 30s / 1min / 2min / 3min / 4min / 5min / 10min / 30min / 1h
- High-speed saving (100 ms) can be configured for up to 8 channels of group 1

Internal memory

- Setup data memory, measured data memory and program memory: permanent backup of setup data and measured data in internal flash memory with power failure protection (256 MB, nonvolatile)
- Data buffering and RTC buffering with lithium cell (buffering for 6 years; replace after 10 years).
- Even after being exported to a USB stick or SD card, measured data remain in the unit for a long time and can be exported. This is important for official audits or if the external data storage unit is lost.
- Plant monitoring functions with operating hours counter, calibration monitoring, monitoring of storage medium exchange and other functions for monitoring the unit status.

External memory

- Cyclic copy of the measured data for archiving on SD card (secure digital memory card)
- SD cards supported: 256 MB and 512 MB. Only use "Industrial Grade" SD cards (see Accessories).
- USB sticks supported: 256 MB, 512 MB, 1 GB, 2 GB. It cannot be ensured that USB stick from all manufacturers will work perfectly. For this reason, an "Industrial Grade" SD card is recommended for safe data recording (see Accessories).
- A yellow LED beside the SD slot indicates data access.

NOTICE

Removing the SD card while yellow LED is lit.

Risk of data loss!

- Wait until yellow LED does not flash anymore.

Typical recording length

Prerequisites for the following tables:

- No limit value violation / event storage
- Digital input not used
- Signal analysis deactivated

Internal memory 256 MB (week, days, hours):

Analog inputs	Memory cycle 5 min.	Memory cycle 1 min.	Memory cycle 30 s.	Memory cycle 10 s.	Memory cycle 1 s.
1	7211, 5, 16	1869, 5, 2	957, 4, 15	324, 3, 11	32, 3, 18
4	3169, 2, 5	718, 6, 20	363, 5, 5	121, 4, 1	12, 1, 9
12	1198, 3, 23	254, 6, 7	128, 2, 8	42, 6, 18	4, 2, 3
20	739, 0, 4	155, 2, 22	78, 0, 5	26, 0, 18	2, 4, 7

External SD card 256 MB (weeks, days, hours):

Analog inputs	Memory cycle 5 min.	Memory cycle 1 min.	Memory cycle 30 s.	Memory cycle 10 s.	Memory cycle 1 s.
1	9703, 3, 19	2515, 5, 3	1288, 3, 19	436, 4, 7	43, 5, 11
4	4264, 2, 8	967, 2, 18	489, 2, 22	163, 4, 3	16, 2, 21
12	1612, 4, 19	342, 6, 19	172, 4, 14	57, 5, 17	5, 5, 13
20	994, 2, 13	209, 0, 20	104, 6, 22	35, 0, 22	3, 3, 15

Remote control, communication

- 6 digital input channels can be configured to control varieties of transmitter functions (see Operation Instructions for detailed information)
- USB interface (front panel), Ethernet interface and additional RS232/RS485 interface (rear)
- OPC server (3.0) for direct data exchange with databases or/and visualization systems
- Integrated Internet page (Web server) allows password-protected access to the device with every PC (e.g. for displaying the measured data)
- DHCP-enabled (dynamic allocation of an IP address)
- Device-internal summer time/winter time changeover
- Configuring and archiving the device settings with SD card, USB stick or with PC software supplied via rear-mounted serial interface RS232/RS485 (e.g. modem), Ethernet or USB port

Functions of the supplied PC software:

- Device configuration, measured data visualization, measured data administration and measured data export
- Exports the measured data of individual channels or separate files or several channels to one file

Certificates and approvals

CE approval

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 Part 11
The device meets the requirements of the Code of Federal Regulation, Food and Drug Administration guidelines on electronic records and electronics signatures.

Ordering information

Product structure

For sensor capability please refer to table on page 5.

	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)		
					B	Central/western Europe (de, en, fr, es, it, nl)		
					C	Eastern Europe (de, en, po, ru, cs)		
					D	Asia (de, en, ja, zh, ko)		
						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

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.

Scope of delivery

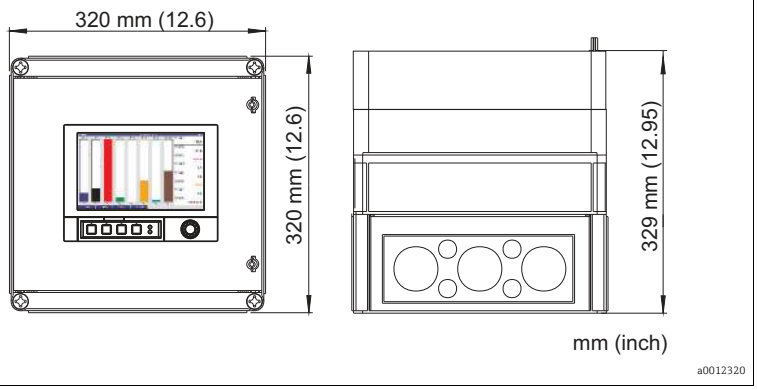
The scope of delivery comprises:
- Device (with terminals, as per your order)
- 2 fastening clips
- USB interface cable, length 1.5 m (4.9 ft)
- Optional secure digital (SD) card (card not in device but is supplied)
- PC operating and configuration software on CD-ROM
- Lamp voltage sense tool
- Brief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

When ordered as a complete measuring system the device is factory-calibrated and delivered together with sensor and/or armature and cable.

Accessories

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 center.

The following accessories are available:

Order code	Accessory
71105872	Interface cable USB-A - USB-B, 2 m (6.6 ft)
71155115	Kit CVM40 Memory Card SD 256 MB
71155116	Kit CVM40 Memory Card SD 512 MB
70035184	Jack screws short, 1 piece
71155113	Kit CVM40 Field Housing 

Sensors

OUSAF44
- Optical, single-wavelength sensor for measurement of UV absorption
- Hygienic design
- 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-resilient design
- Ordering according to product structure

OUSAF46
- Optical, dual-wavelength sensor for measurement of UV absorption
- Hygienic design
- 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
- NIR sensor for measurement of suspended solids with optical density
- Hygienic design
- 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
- Ordering according to product structure

OUSBT66
- 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
- CIP and SIP resistant
- Ordering according to product structure

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 acc. to product structure, see Technical Information TI418C/07/EN

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

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