

Conductivity sensor & transmitter

- Type Condumess - Separated version



FEATURES

- PRODUCT MONITORING AND QUALITY CONTROL
- ACCURATE PHASE SEPARATION OF DIFFERENT MEDIA
- 4-ELECTRODE CONDUCTIVITY SENSOR WITH TRANSMITTER AS SEPARATE VERSION
- 2 SWITCHABLE MEASURING RANGES
- HYGIENIC DESIGN
- OUTPUT FOR CONDUCTIVITY AND TEMPERATURE, 4...20 mA
- SHORT RESPONSE TIME
- SMOOTH SENSOR, NO RISK OF DEPOSITS
- RESISTANT AGAINST CONTAMINATION
- CIP- / SIP-COMPATIBLE

DESCRIPTION

The conductivity transmitter **Condumess** is suited for the measurement of conductivity, purity or concentration of liquids in industry processes. With the hygienic process connection PZM, the **Condumess** is predestined for use in applications with high hygiene processes, for example in the food and beverage industry and dairy.

High accuracy and resistance against contamination of the electrodes is achieved by using 4-electrode conductivity cells.

Condumess is equipped with two analog outputs and transfers temperature and conductivity measured values as a scaleable standard signal (4...20 mA) and also has 2 binary inputs. Via the binary inputs, the hold functions or measuring range selection can be actuated in the **Condumess** using potential-free contacts or logic signals.

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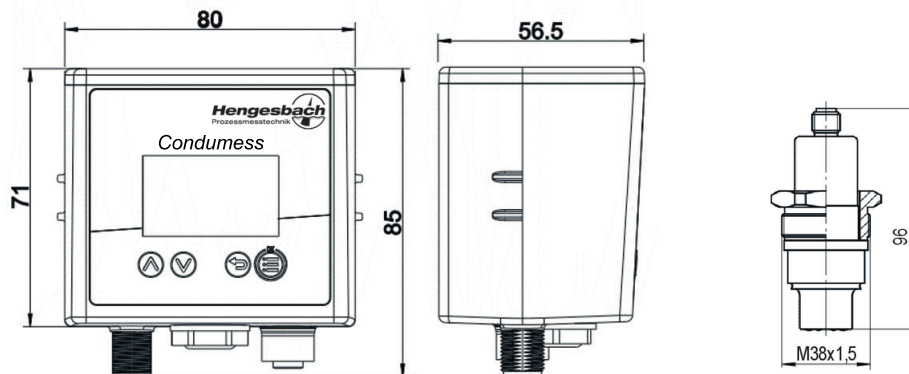
TECHNICAL DATA

General information	
Device type / measuring principle	Condumess / Conductivity measurement
Input	
Measuring range	0...500 mS/cm
Measuring rate	~ 2 / s
Temperature sensor	Pt1000 acc. to DIN EN 60751 class A
Temperature measuring range	-40...+160°C
Conductivity output	
Voltage supply	24 V DC $\pm$ 25 %, $\leq$ 4 W
Output signal	4...20 mA (4-wire)
Burden	max. 500 Ω
Cell constant	~ 0.3...0.4 typically
Standard error	~ 0.5 % FS
Temperature coefficient	< 100 ppm / °C
Temperature output	
Output signal	4...20 mA (4-wire)
Burden	max. 500 Ω
Accuracy	0.25 %
Ambient temperature influence	0.08 % / 10 K
Conditions of use	
Installation position	Arbitrary, sensor must be wetted
Site altitude	Max. 2000 m (6562 ft) above sea level
Sensor installation	Tank welding sleeve, pipe welding sleeve or VARIVENT® flange Type N (d68)
Medium temperature	-10...+120°C (short duration 140°C for max. 30 min)
Maximum pressure	16 bar at +25°C 6 bar at -10°C and +140°C
Environmental temperature	-20...+60°C
Storage temperature	-25...+80°C
Protection class EN 60529	IP 66, IP 67, IP 69k
Electromagnetic compatibility	According to DIN EN 61326-1, class B, industry
Shock resistance acc. to DIN EN 60654-3	Acceleration: 40 m/s ² Duration: 5 ms
Vibration resistance acc. to IEC 61298-3	Frequency range: 10 to 150 Hz Amplitude: 0,75 mm Acceleration: 2 m/s ²
Resistance to climatic conditions	Climate class 4K4H to EN 60721-3-4, relative humidity $\leq$ 100 % condensing
Construction	
Electrical connection	Circular connector M12, 8 pin
Process connection	Modular system PZM with O-ring seal 28x2,5; material EPDM (FDA-compliant)
Materials	Housing: ABS Process connection / sensor: PEEK, CrNi AISI 316L, EPDM (O-ring)
Materials in contact with the measuring medium (wetted) (FDA compliant)	Cell Housing: PEEK Electrodes: Stainless steel 1.4435 (316L) Temperature sensor: Stainless steel 1.4435 (316L) Seal: EPDM
Surface roughness	Stainless steel components $\leq$ 0.6 μ m Plastic components $\leq$ 0.8 μ m
Type	Separated: Sensor and transmitter connected by connection cable

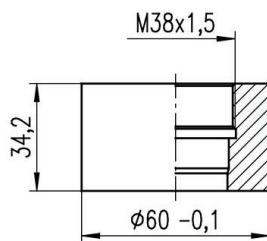
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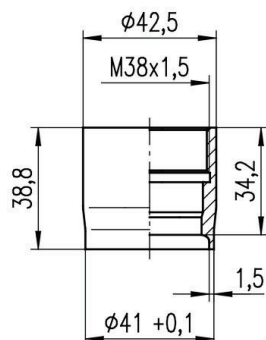
TECHNICAL DRAWINGS (Dimensions in mm)



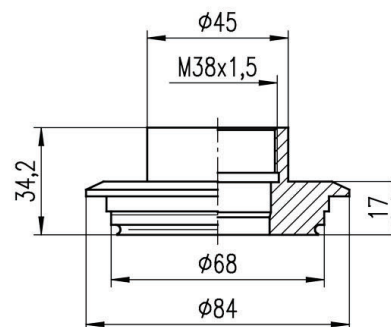
Process connection adapter (optional with 3 leakage holes; see order information Accessories for Condumess)



PEM5FPZM
Einschweißmuffe VPM Ø60 (Tank)
welding socket VPM Ø60 (tank)



PEM9FPZM
Einschweißmuffe VPM - Rohr DN40
welding socket VPM - pipe DN40



PVA6FPZM
VARIVENT-Flansch Ø68
VARIVENT-flange Ø68

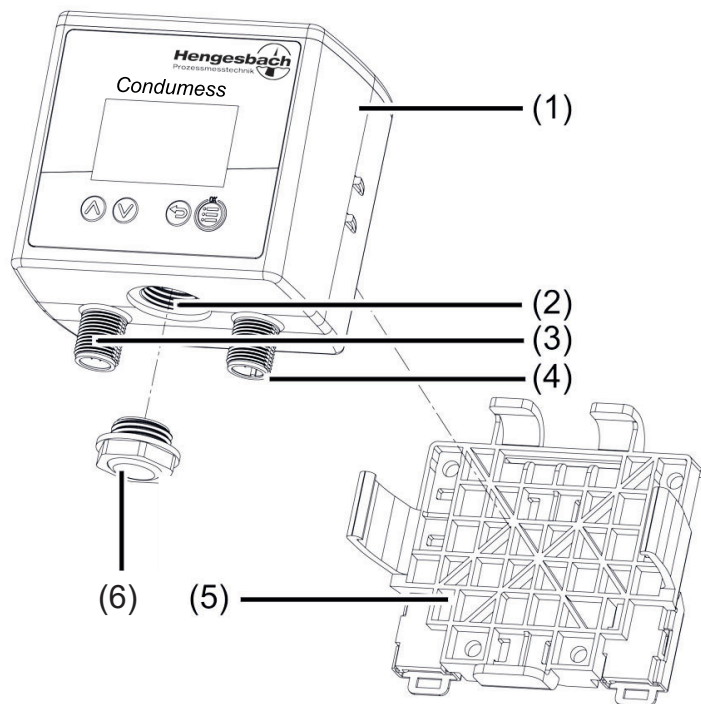
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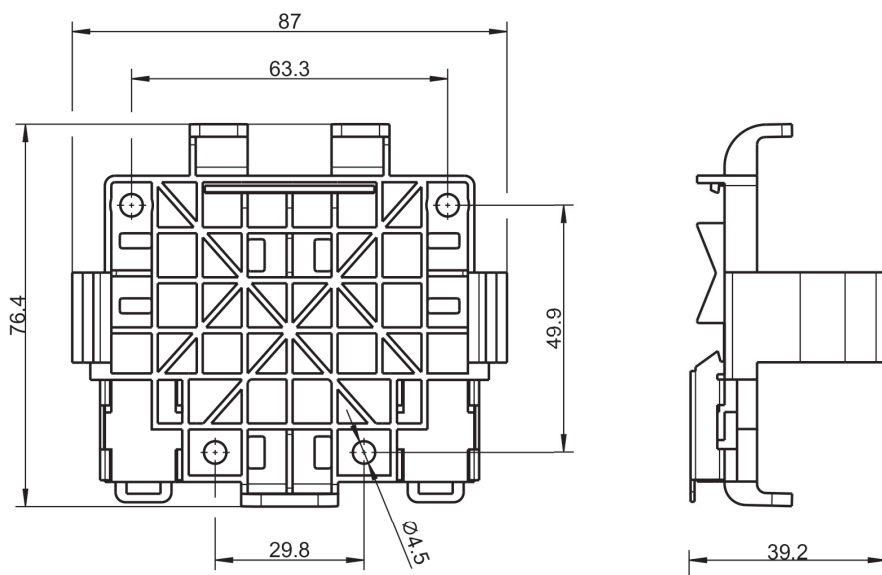
INSTALLATION AND CONNECTION

As separate version, the conductivity sensor and the transmitter are two separate modules that are interconnected by a cable. The sensor is integrated at the operating location in a suitable fitting. The holder allows the transmitter to be fastened to walls, pipes, masts and DIN rails. Electrical connection is made simply and quickly with preassembled cables via two M12 connections.

- (1) Transmitter for **Condumess** sensor
- (2) Status LED
- (3) M12 plug connector, 8 pin, for sensor connection
- (4) M12 plug connector, 8 pin, for output signals
- (5) Holder for wall, pipe and DIN rail mounting
- (6) Venting element (embedded in threaded coupling)



Dimensions of the holder (5) for wall, pipe and DIN rail mounting

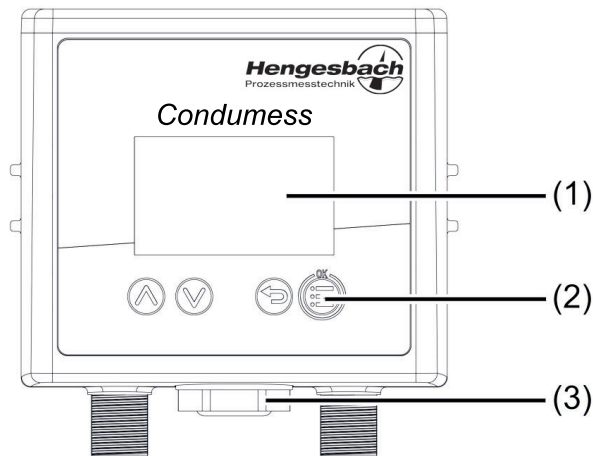


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DISPLAY AND CONTROL ELEMENTS

Condumess with display and push buttons



- (1) Display
- (2) Operating keys
- (3) Status display via transparent housing threaded coupling with internal status LED

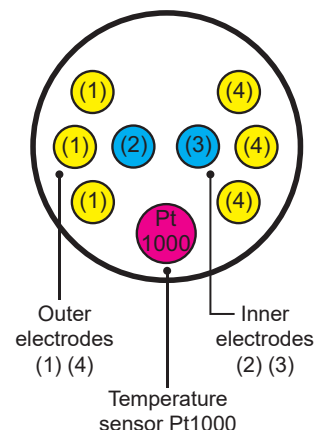
The status is always indicated via the display (1) and additionally via the internal status LED (3).

FUNCTION

The conductivity sensor has two pairs of electrodes. The transmitter applies an alternating current to the outer pair of electrodes. A voltage is released at the inner electrodes, subject to the conductivity of the measuring material. The transmitter acquires the voltage and uses it, in conjunction with the given current, to calculate the electrolytic conductivity value.

Functionally, excitation and measurement are kept separate. This has some advantages compared to 2-electrode conductivity sensors, as the effects of polarization recede into the background. Incoming resistances are automatically compensated. Measurement errors as a result of contamination or deposits are reduced.

Parametrizing is done by push buttons on the front combined with the local display. A second measuring range for conductivity can be activated with an external control signal.



ELECTRICAL CONNECTION

Pin	Description	Pin	Description	Socket
1	Binary input 1	5	+ Analog output 4...20 mA Temperature	
2	Binary input 2	6	- Analog output 4...20 mA Temperature	
3	+ Analog output 4...20 mA Conductivity	7	+ 24 V Supply voltage	
4	- Analog output 4...20 mA Conductivity	8	Reference ground	

Binary input

Signal type	Switching thresholds	
	On	Off
Potential-free contact	< 800 Ω	> 1.5 k Ω
Logic input (external voltage supply max. DC 28 V)	> 6 V	< 5 V

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Input for Condumess sensor

Units	$\mu\text{S/cm}$ mS/cm $\text{k}\Omega \times \text{cm}$ $\text{M}\Omega \times \text{cm}$
Display ranges ^a	0.000 to 9.999 00.00 to 99.99 000.0 to 999.9 0000 to 9999
Temperature compensation	TC linear ^b for -50 to +250°C and over 0.045 $\mu\text{S/cm}$ TC curve ^b for -20 to +150°C and over 0.055 $\mu\text{S/cm}$ Natural water DIN EN 27888 for 0 to 36°C Natural water with expanded range for 0 to 100°C ASTM D1125-95 neutral impurities for 0 to 100°C and over 0.045 $\mu\text{S/cm}$ ASTM D1125-95 alkali and acid impurities for 0 to 100°C and over 0.055 $\mu\text{S/cm}$
Measuring accuracy	0 to 20 μS $\pm(0.5 \% \text{ FS} + 0.3 \mu\text{S}) \times \text{cell constant}$ 0 to 100 μS $\pm(0.6 \% \text{ FS} + 0.3 \mu\text{S}) \times \text{cell constant}$ 0 to 1000 μS $\pm(0.6 \% \text{ FS} + 0.3 \mu\text{S}) \times \text{cell constant}$ 0 to 10 mS $\pm(0.6 \% \text{ FS} + 0.3 \mu\text{S}) \times \text{cell constant}$ 0 to 100 mS $\pm(0.6 \% \text{ FS} + 0.3 \mu\text{S}) \times \text{cell constant}$ 0 to 1000 mS $\pm 1 \% \text{ FS}$
Measuring range selection	2 configurable measuring ranges
Ambient temperature influence	0.2 % / 10 K

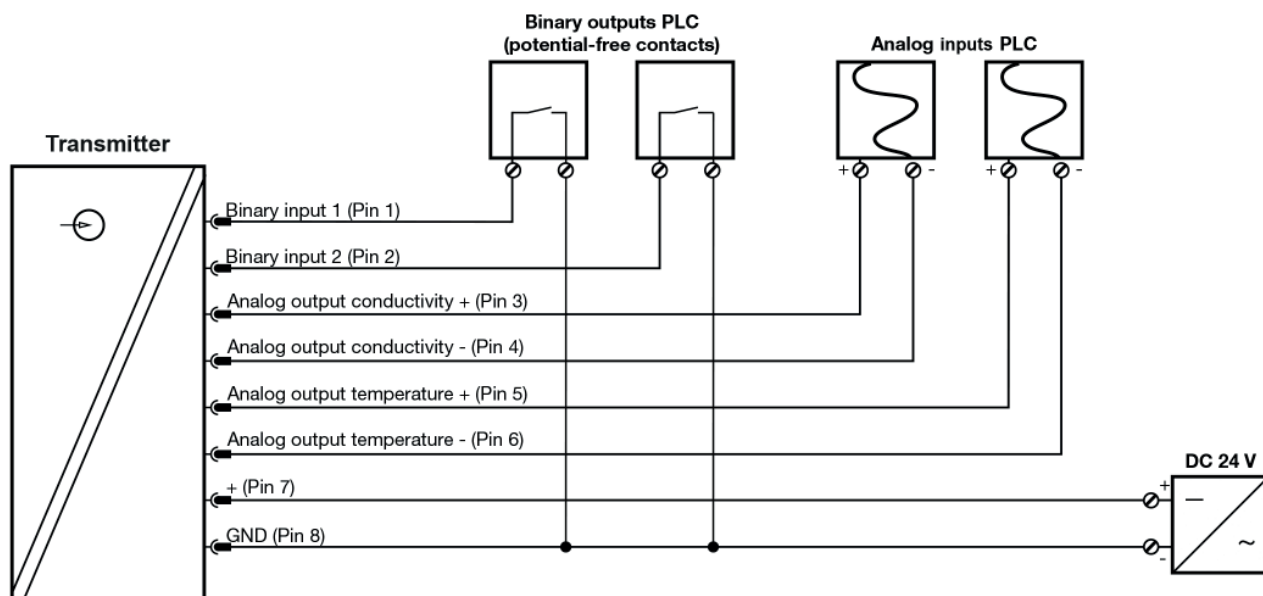
^a The measuring/display range is scalable. The decimal place is user configurable.

^b TC: temperature coefficient

^c TDS (Total Dissolved Solids)

^d MRE: Measuring range end value

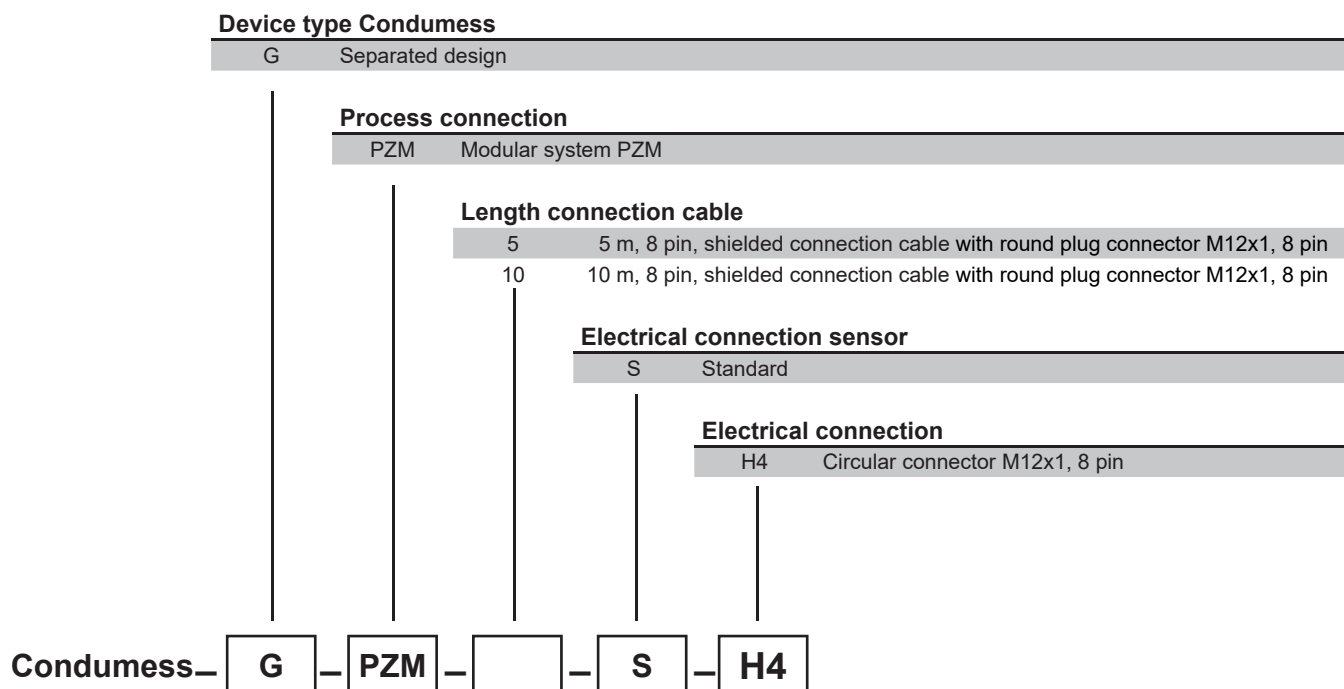
Condumess transmitter wiring diagramm



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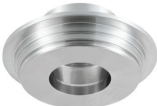
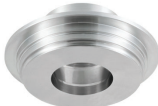
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ORDER INFORMATION for Condumess



ORDER INFORMATION Accessories for Condumess

Process connection adapter (please order separately)

Item number: Z-PEM5FPZM		Item number: Z-PEM9FPZM	
	Welded socket for tanks, Ø 60 mm, AISI 316L		Welded socket for pipes DIN EN 10357 series A pipes, DN 40, AISI 316L
Item number: Z-PVA6FPZM		Item number: Z-PVA6LPZM	
	VARIVENT®-flange Ø 68 mm, DN 40-125 / PN16, AISI 316L		VARIVENT®-flange Ø 68 mm, DN 40-125 / PN16, with 3 leakage drills, AISI 316L

Please observe the permissible nominal pressure of the process connection selected.
All specifications and certifications specified are only guaranteed when Hengesbach original components are used.
Our devices are subject to constant development; subject to technical modification.