

PumpMeter

Assembled and Parameterised in Europe

Type Series Booklet



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Type Series Booklet PumpMeter

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Monitoring Systems

Intelligent Pressure Sensors

PumpMeter



General description

The PumpMeter device is designed for monitoring pump operation. It is an intelligent pressure transmitter for pumps, with on-site display of measured values and operating data.

Technical data

Technical data of the display unit

Characteristic	Value
Power supply	+24 V DC $\pm 15\%$
Current input	150 mA
Analog signal output	4 - 20 mA, 3-wire
Digital connection	RS485, Modbus RTU (Slave)
Enclosure	IP65 ¹⁾
Service interface	RS232
Storage temperature	-30 °C to +80 °C
Operating temperature	-10 °C to +60 °C

Technical data of the sensors

Characteristic	Value
Signal	4 - 20 mA
Enclosure	IP67 ²⁾
Fluid temperature	-30 °C to +140 °C
Fluid temperature (with insulated sensors)	-30 °C to +80 °C
Installation torque	10 Nm
Ambient temperature	-10 °C to +60 °C

It records the load profile of the pump in order to indicate any potential for optimising energy efficiency and availability. The device comprises two pressure sensors and a display unit.

PumpMeter is supplied completely assembled and parameterised for the pump it is used with. It is ready for operation as soon as the M12 plug connector is plugged in.

Main applications

Industry:

- Air-conditioning systems
- Cooling circuits
- Heating systems
- Water treatment
- Cooling lubricant distribution
- Water extraction
- Service water supply

Water:

- Water supply systems
- Water treatment / water conditioning
- Water distribution / water transport

Building services:

- Air-conditioning systems
- Heating systems
- Water supply systems

¹ Provided that the connectors are connected correctly

² Provided that the connectors are connected correctly

Sensor pressure limits

Sensor measuring range		Overpressure limit	Burst pressure
Min.	Max.		
[bar]	[bar]	[bar]	[bar]
-1	3	40	60
-1	10	40	60
-1	16	40	60
-1	25	50	75
-1	40	80	120
-1	65	130	195
-1	80	160	240

Materials

Overview of materials

Wetted components	Material
Pressure sensor measuring unit	1.4542
Pressure sensor measuring unit	Titanium ³⁾
Pressure sensor process connection	1.4301
Pressure sensor process connection	Titanium ³⁾
Adapter for fitting a sensor ⁴⁾	1.0037 or 1.4571
Joint ring	Centellen

³ Special design for seawater applications

⁴ Depending on the basic material variant of the pump

Product benefits

- Transparent pump operation by on-site display of all relevant operating data, e.g. the operating point of the pump
- Identifies potential energy savings by recording and analysing the load profile and displaying the energy efficiency icon (EFF) if applicable.
- Saves time and money as the sensors are fitted to the pump at the factory, unlike conventional instruments used in systems.
- Higher availability of the pump through detection and prevention of non-intended use

Functions

Pressure transmitter function

The discharge pressure or differential pressure of the pump are transmitted as a 4-20 mA signal. Connection via the RS485 serial interface with Modbus protocol is also possible.

Operating data display

The device alternately displays the suction pressure and discharge pressure as well as the differential pressure or head.

Recording and analysing of the load profile

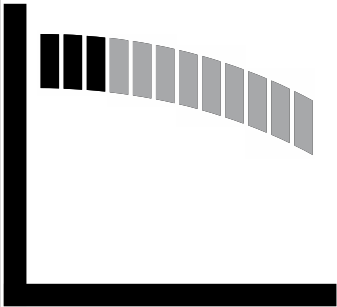
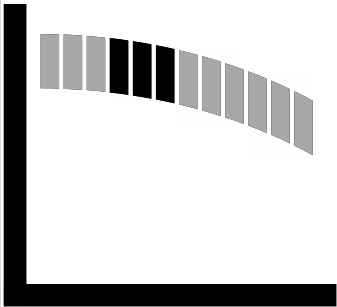
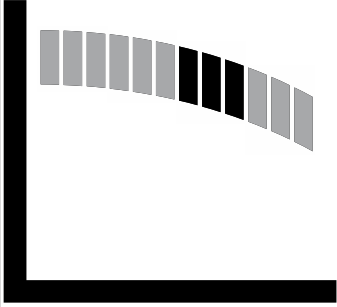
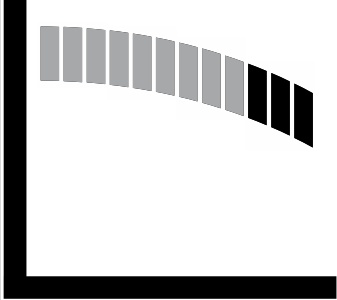


The operating hours of the pump in the different modes of operation are recorded in a load profile and saved in a non-volatile memory (protected against power failure). The energy efficiency symbol is displayed when a potential for optimisation is recognised.

Qualitative indication of the pump's current operating point

The flashing segment indicates the position of the current operating point on the generalised characteristic curve.

Qualitative indication of the pump's current operating point

Operating range	Segment display	Description
Operation in extreme part load conditions ⁵⁾ 	First quarter flashing (1)	<ul style="list-style-type: none"> Pump possibly not operated in accordance with its intended use Increased load on the components
Operation in moderate part load conditions ⁵⁾ 	Second quarter flashing (2)	<ul style="list-style-type: none"> Operation with potential for optimising energy efficiency
Operation near BEP 	Third quarter flashing (3)	<ul style="list-style-type: none"> Operation within intended operating range. Optimum energy efficiency
Operation in overload conditions 	Fourth quarter flashing (4)	<ul style="list-style-type: none"> Limit of the intended operating range Possibly overload of pump and/or motor

⁵⁾ For some pump characteristics, no differentiation is made between the part load operating conditions in the curve's first two quarters (both flashing simultaneously).

Design variants

- **Adapter:**
Depending on thread type and size of the pump's pressure gauge connections
- **Cable length:**
600 mm, 1200 mm or 1800 mm, depending on the pump size
- **Measuring ranges of the pressure sensors:**
The measuring ranges are selected as a function of the maximum pump inlet pressure specified (suction-side sensor) and the maximum pump discharge pressure at zero flow (discharge-side sensor). If no maximum inlet pressure is specified, calculation is based on a maximum inlet pressure of 5 bar.

Available measuring ranges

Label colour of sensor	Colour code	Measuring range [bar]	
		Minimum	Maximum
-	Red	-1	3
-	Blue	-1	10
-	Light grey	-1	16
-	Green	-1	25
-	Black	-1	40
Silver	None	-1	65
Yellow	None	-1	80

Electrical connections

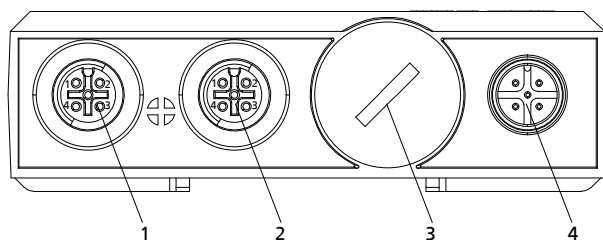


Fig. 1: Connections at the device

1	IN1 / port for the suction-side pressure sensor
2	IN2 / port for the discharge-side pressure sensor
3	Service interface
4	EXT / external port for energy supply and signal output

PumpMeter

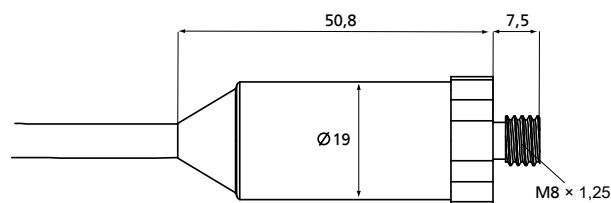


Fig. 2: Dimensions of sensor, measuring range up to 40 bar

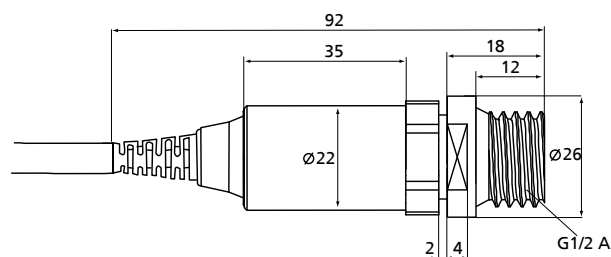


Fig. 3: Dimensions of sensor, measuring range 65 bar and above

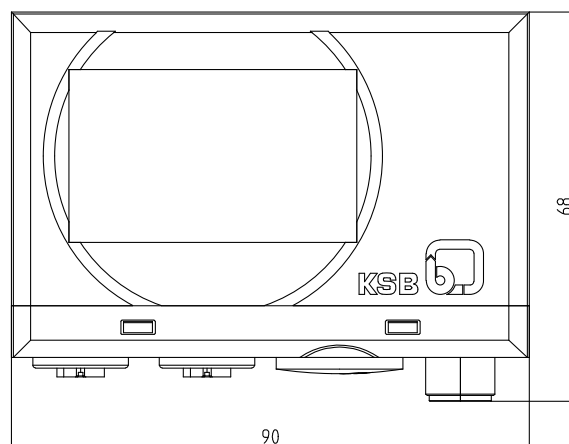
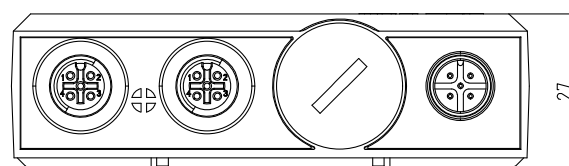


Fig. 4: Dimensions of the display unit

Scope of supply

Depending on the model, the following items are included in the scope of supply:

- Display unit fitted
- Sensors fitted with adapter

Fluids handled

Overview of fluids handled

Fluid handled	Concentration	Max. temperature	Fluid handled	Concentration	Max. temperature
	[%]	[°C]		[%]	[°C]
Alum, acid-free	3	80	Water-oil emulsion (95 % / 5 %), free of solids	–	80
Alkaline solution, bottle rinsing, max. 2 % sodium hydroxide	–	40	Propanol	–	80
Alcohol	–	–	Cleaning agents	–	–
Aluminium sulphate, acid-free	5	60	Fuel	–	–
Ammonium bicarbonate	10	40	Water	–	–
Ammonium sulphate	20	60	Deionised water (fully desalinated)	–	140
Anolyte (dialyte) with acetic acid or formic acid, free of solids	–	30	Dealkalised water	–	120
Accelerator (as preparation)	–	–	Decarbonised water	–	120
Drilling/grinding emulsion	–	60	Fire-fighting water ⁶⁾	–	60
Spirits (40 % ethanol)	–	60	River water	–	60
Service water	–	60	Heating water ⁷⁾	–	140
Brewery applications	–	–	Boiler feed water to VdTÜV1466	–	140
Brewing water	–	60	Cooling water ⁶⁾ (without antifreeze)	–	60
Ice water (brewery)	–	60	Closed circuit cooling water	–	100
Vapour condensate (brewery)	–	140	Open circuit cooling water	–	100
Butanol	–	60	Cooling water pH > 7.5 (with antifreeze) ⁸⁾	–	110
Calcium acetate, acid-free	10	60	Slightly contaminated water ⁶⁾	–	60
Calcium nitrate, acid-free	10	60	Tap water	–	60
Diethylene glycol	–	100	Seawater	–	60 ⁹⁾
Aqueous dipping paint for electrochemical coating, anodic E-coating (anaphoresis)	–		Pure water ¹⁰⁾	–	60
Aqueous dipping paint for electrochemical coating, cathodic E-coating (cataphoresis)	–	35	Raw water ⁶⁾	–	60
Ethanol	–	35	Swimming pool water (fresh water) ⁶⁾	–	60
Ethylene glycol	–	60	Lake water (fresh water)	–	60
Ethylene glycol base antifreeze, inhibited, closed system	50	100	Barrier fluid	–	70
Glycerine	40	110	Fresh water	–	60
Potassium hydroxide	5	80	Sulphuric acid ⁹⁾	5	60
Potassium nitrate, acid-free	5	40	Dam water	–	60
Potassium sulphate, acid-free	3	30	Partly desalinated water	–	120
Jet fuel	–	20	Drinking water ⁶⁾	–	60
Condensate ⁷⁾	–	80	Permeate (osmosis)	–	140
Condensate, not conditioned	–	120	Fully desalinated water, free of solids	–	60
Copper sulphate	5	120	Fully desalinated water	–	120
Magnesium sulphate	10	80	Hot water (brewery)	–	60
Sodium carbonate	6	80	Water treated to VdTÜV1466	–	140
Sodium hydroxide	5	60	Water with antifreeze, pH > 7.5 ⁶⁾⁸⁾	–	110
Sodium nitrate, acid-free	10	40	Water, waste water, slightly contaminated water, surface water	–	60
Sodium sulphate, acid-free	5	60	Water, fire-fighting water	–	60
Sodium hydroxide	15-20	60	Water, surface water	–	60
Diesel oil	–	20	Water, rainwater, with strainer	–	60

⁶⁾ General criteria for results of water analysis: pH ≥ 7; chloride content (Cl) ≤ 250 mg/kg. Chlorine (Cl 2) ≤ 0.6 mg/kg

⁷⁾ Treatment to VdTÜV 1466; additional requirement: O2 ≤ 0.02 mg/l

⁸⁾ Antifreeze on ethylene glycol basis with inhibitors. Content: > 20 % to 50 % (e.g. Antifrogen N)

⁹⁾ Can only be used in combination with suitably certified sensors made of titanium.

¹⁰⁾ No ultra-pure water: conductivity at 25 °C: < 800 µS/cm, neutral with regard to chemical corrosion

Fluid handled	Concentration	Max. temperature	Fluid handled	Concentration	Max. temperature
	[%]	[°C]		[%]	[°C]
Diesel oil, extra light fuel oil	–	80	Water, raw water	–	60
Lubricating oil, turbine oil, does not apply to SF-D oils (hardly flammable)	–	60	Water, drinking water	–	60
Fuel oil	–	80	Lyes for bottle rinsers	–	90

Spare parts

Pressure gauge

Description	Measuring range [bar]	Signal [mA]	Cable length [m]	Colour code	[kg]	Mat. No.
Pressure gauge	-1..3	4-20	0,6	Red	0,4	01426463
			1,2	Red	0,4	01426468
			1,8	Red	0,4	01367526
Pressure gauge	-1..10	4-20	0,6	Blue	0,4	01426464
			1,2	Blue	0,4	01426470
			1,8	Blue	0,4	01367657
Pressure gauge ¹¹⁾	1..-10	4-20	1,8	Blue	0,4	05079171
Pressure gauge	-1..16	4-20	0,6	Light grey	0,4	01426465
			1,2	Light grey	0,4	01426471
			1,8	Light grey	0,4	01367658
Pressure gauge ¹¹⁾	-1..-16	4-20	1,8	Light grey	0,4	05079172
Pressure gauge	-1..25	4-20	0,6	Green	0,4	01426466
			1,2	Green	0,4	01426472
			1,8	Green	0,4	01367659
Pressure gauge	-1..40	4-20	0,6	Black	0,4	01426467
			1,2	Black	0,4	01426469
Pressure gauge	-1..65	4-20	0,6	Silver label	0,4	01517385
Pressure gauge	-1..80	4-20	0,6	Yellow label	0,4	01517386
Pressure gauge with silicone coating	-1..3	4-20	1,2	Red, with yellow label	0,4	01601787
	-1..10	4-20	1,2	Blue, with yellow label	0,4	01601788
	-1..16	4-20	1,2	Light grey, with yellow label	0,4	01601789

Threaded adapter for fitting a sensor

Description	Connection	Material	[kg]	Mat. No.
Threaded adapter for fitting a sensor	R 1/4 " to M8	Steel	0,023	01146970
		Stainless steel	0,023	01186472
Threaded adapter for fitting a sensor	R 3/8 " to M8	Steel	0,036	01146973
		Stainless steel	0,036	01191765
Threaded adapter for fitting a sensor	R 1/2 " to M8	Steel	0,063	01146976
		Stainless steel	0,063	01191766
Threaded adapter for fitting a sensor	G 1/4 " to M8	Steel	0,024	01146971
		Stainless steel	0,024	01186474
Threaded adapter for fitting a sensor	G 3/8 " to M8	Steel	0,038	01146974
		Stainless steel	0,031	01191857
Threaded adapter for fitting a sensor	G 1/2 " to M8	Steel	0,069	01146977
		Stainless steel	0,059	01191858
Threaded adapter for fitting a sensor	NPT 1/4 " to M8	Stainless steel	0,023	01146972
Threaded adapter for fitting a sensor	NPT 3/8 " to M8	Stainless steel	0,036	01146975
Threaded adapter for fitting a sensor	NPT 1/2 " to M8	Stainless steel	0,063	01146978







¹¹⁾ Special design made of titanium

Other spare parts

Description	[kg]	Mat. No.
Display unit	-	05092336
Joint ring A	0,01	01015232

Electrical accessories

Overview of electrical accessories

	Description	Length	Mat. No.	[kg]
		[m]		
	Connection cable	1	01146982	0,056
	5-pole cable with M12 connector for power supply and signal output	5	01146983	0,118
		10	01146984	0,35
	Extension cord	5	01146980	0,186
	For extending the sensor cables	10	01146981	0,33
	M12 bus cable, PumpMeter, pre-configured, shielded	1	01533775	0,2
	Colour: black; M12 socket, straight; M12 connector, angled	2	01533776	0,2
		3	01533777	0,3
		5	01533778	0,3
	Power supply unit for the PumpMeter 24 V / 750 mA (for maximum 5 PumpMeter devices)	-	01147695	0,149
	Power supply unit for the PumpMeter 24 V / 330 mA with CEE plug (for 1 PumpMeter max.)	2	01494036	0,25
	RS232 parameterisation cable	-	47117698	0,2
-	Service dongle	-	47121256	0,1
-	USB/RS232 adapter	-	01111255	0,1



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