Density Transducer Type DIMF 2.0

Oscillating element density meter

- Swagelok screw connection, flange DN 15 PN 40, milk thread according to DIN 11851 PN 10
- Measuring accuracy ± 0.2 kg/m³
- Reproducibility ± 0.05 kg/m³
- Media temperature depending on the version -40°C to +210°C

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Measuring principle
The basic sensor of the density transducer is an oscillating element. The liquid to be measured passes continuously through this element. Excited electromagnetically by an excitation coil, it will oscillate at its natural frequency. Changes in the density of the liquid lead to changes in the natural frequency. This change in frequency, sensed by a pickup coil, represents the measurement effect. An additional built-in resistance thermometer measures the process temperature, which can also be used to compensate the temperature influence in the transducer. Each meter is calibrated with reference liquids of different densities. In the configuration data sheet you can see the parameter for the calculation of the density out of the frequency and the correction coefficient of the influence of temperature.

Range of applications
The density transducer type DIMF allows the continuous measurement of the density of liquids and liquid mixtures. The proven oscillating element principle ensures great accuracy in combination with outstanding long-term stability. The robust design assures reliable operation, even under rough process conditions.

System configuration
Sensor element: oscillating pipe loop

Preamplifier PVS and PKS
Output:
operating density dependent frequency, non linearized, modulated on power supply, duty cycle 1:1, ca. 1400 Hz(depend on sensor type), linearization and temperature compensation in connected flow computer.

Power supply:
24 VDC (min. 15 VDC / max. 30 VDC)
intrinsically safe

Density connection:
2-wire-technology, connection over screw terminal and cable gland M20x1,5

Temperature connection:
4-wire-technology, connection over screw terminal and cable gland M20x1,5 (Pt 100 in DIMF integrated)

Cable specification
2- or 4-wired, twisted paired and shielded

Transmitter TVS, TWS and TWH
HART®-protocol:
Operating over PC or Laptop with the software PACTware (HART®-modem necessary) or a handheld terminal (for example HH275 or HH375). FDT1.2 driver available.

Output:
4-20 mA, linearized and temperature compensated, configurable for every calculated ore measured value (for example operating density, reference density, concentration, °Brix, °Plato or other derived units).

Power supply:
24 V DC (min. 14 V DC / max. 30 V DC)
intrinsically safe

Connection:
2-wire-technology, connection over screw terminal and cable gland M20x1,5 or ½“ NPT thread for pipe installation (Conduit-System)

Cable specifcation
2- or 4-wired, twisted paired and shielded

Displayed values:
Density, concentration, operating temperature and others

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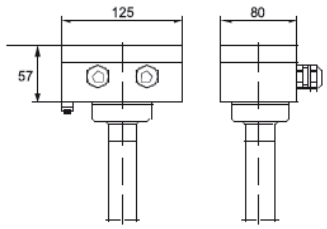
Types

- **V** Compact version - transmitter mounted on the sensor
- **W** Version with separate transmitter for wall mounting (cable 1,5m)
- **S** Standard temperature: - 40 ... +150°C
- **H** High temperature: - 40 ... +210°C, (only for transmitter „TWx“

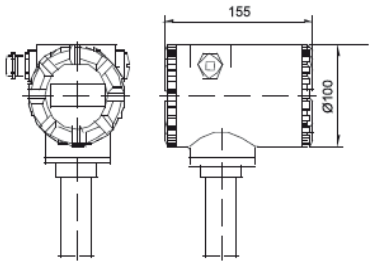
Input	
Measured value	Operating density, reference density, concentration
Measuring range	Operating density, density at reference temperature (reference density)
Density range	0 up to 5000 kg/m³
Calibration range	400 up to 2000 kg/m³
Accuracy	Better than ±0,02% Better than 0,01% with special calibration
Repeatability	better than ±0,005%

Design, dimensions

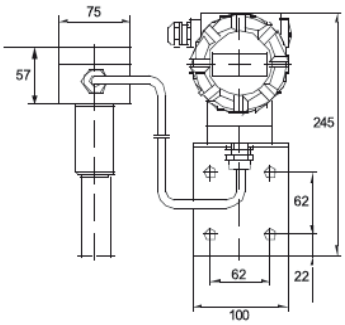
PV, PK preamplifier

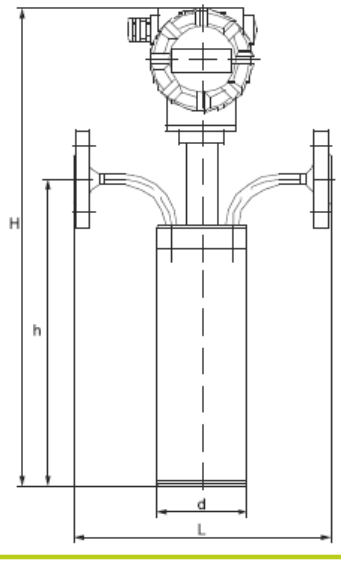


TV transmitter



TW wall mounted with cable length 1,5m





Dimensions (mm)			DIMF 2.0 PV	DIMF 2.0 TV	DIMF 2.0 TW
Length acc. connection type (L)					
Swagelok, Sanitary thread others on request	Flanges				
50	50				
DIMF 2.1 only with flanges Type L = 450 mm		H	430	468	464
		h	301	301	301
		d	88,9	88,9	88,9

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Material	
Materials of wetted parts	Stainless steel 1.4571 (SS316), Stainless steel 1.4306 (SS304L), Inconel 600 (.4816.10), Tantalum 2.6051.9, Monel 400 (.4360), Hastelloy C4 (.4610), Hastelloy B (.4617)
Material of sensor housing	Stainless steel 1.4571 (SS316)
Specialties	Version without gaskets
Attention: Please refer to “Pressure limit and process connection” for possible combinations of type and material.	

Degree of protection			
	Ambient temperature	**Housing**	**Ex-protection**
DIMF 2.0 TVS EExi	-40 to +58°C	IP67	II 1/2 G EEx ia IIC T4 Sensor element suitable for Zone 0. Observe special conditions.
DIMF 2.0 TVS EExd	-40 to +58°C	IP67	II 2 G EEx d [ib] IIC T4 Observe special conditions.
DIMF 2.0 PV EExi	-50 to +70°C / +85°C	IP65	II 2 G EEx ib IIC T6 / T5 Sensor element suitable for Zone 0. Observe special conditions.
Protection for housing IP according IEC 59 / EN 6059, Ex-approval directive 94/9/EC Attention: The LC-display of the transmitter TV work from -10°C up to +70°C. Tantalum type with TVS: EExi IIG EEx ia IIC T4.			

Pressure limit and process connection	
Pressure limit	Max. 100 bar depending on the process connection
Process connection	Swagelok for pipe diameter 12 mm
	Sterile connection
	Flange connection acc. DIN545: DN15 PN40, DN5 PN40
	Flange connection acc. DIN547: DN15 PN100, DN5 PN100
	Flange connection acc. ANSIB16.5: ½“ ANSI 150 RF, ½“ ANSI 300 RF 1“ ANSI 150 RF, 1“ ANSI 300 RF ½“ ANSI 600 RF, 1“ ANSI 600 RF
Attention: • DIMF 2.0 with Swagelok or sanitary connection is available only with stainless steel 1.4571, stainless steel 1.4306 or Hastelloy C4. • DIMF 2.0 with NAUE-thread or TRI-Clamp connection is available only with stainless steel 1.4571	

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Temperature limit	
Operating temperature	-40 up to +150°C, high temperature version (H) is available with DIMF 2.0

Flow range and pressure loss	
Flow in l/min recommended limits	 1,5 to 6 0 to 50
Pressure loss in bar (H_2O, 20°C)	6 l/min : 0,04

Certificates and approvals

EC-certificate of conformity CE-DIMF

Directive 94/9/EG (Ex-protection)
EN 13463-1: Non-electrical equipment for use in potentially explosive atmospheres
EN 1127-1: Ex-protection, basic concepts and methodology
EN 60079-0: Explosive atmospheres. Equipment. General requirements.
EN 60079-11: Intrinsically safety „i“
EN 60079-1: Flameproof enclosures „d“
• DIMF with transmitter Type TVS EEx ia ZELM 99 ATEX 0008 X
• DIMF with transmitter Type TVS EEx d BVS 04 ATEX E 020 X
• DIMF with preamplifier PV24 EEx ib DMT 00 ATEX E 092 X
• DIMF1.3 with preamplifier PV24 EEx d DMT 00 ATEX E 092 X

Directive 2004/108/EC (EMC Electromagnetic Compatibility)
• EN 61000-6-2: Generic standards. Immunity for industrial environments
• EN 61000-6-3: Generic standards. Emission standard for residential, commercial and light-industrial environments

Directive 97/23/EC (PED – Pressure Equipment Directive)
• Classification acc. §3 Abs. 3 “Sound engineering practice”
• Pamphlets

Type-approval certificate under German law
Measuring Equipment Directive – MID

Other approvals and certificates
GOST- approval (GOST R Ex-approval, GOST R Pattern approval)
Gortechnadzor, NEPSI

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Important instructions!
Technical changes and errors reserved.
Pictures can be similar.
The operating instructions belonging to this device must be observed! Download at www.schmidt-messtechnik.com.

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