Density and temperature sensor
For real-time monitoring of gases
Model DTG-30

MesoScale®

Applications

- Fuel gas combustion control (integration into Wobbe index and BTU analysis)
- Gas quality control
- Determination of average molecular weight, binary gas concentrations and specific gravity
- Improved flow measurement

Density and temperature sensor, with circular connector, model DTG-30

Special features

- Real-time monitoring of the density and temperature of gas mixtures
- Easy integration, compact design
- Resistant wetted parts from stainless steel 316L
- Suitable for hazardous areas (ATEX- and IECEx-certified, zone 0 and FM-certified Class I Div I)
- Patented design allowing for fast response time and high repeatability

Description

The model DTG-30 measures, continuously and in real time, the density and temperature of gases. This enables gas monitoring in combustion processes, quality control of gases and determination of concentrations in gas mixtures. It also allows improved flow measurement.

In addition to these measurements, the sensor calculates a confidence factor in real time. This factor gives insight into the quality and validity of the measurements. On request, a direct output by the sensor of the calculated variables is also possible.

The model DTG-30 is based on an innovative microresonator technology originating from the microsystems industry. This principle provides accurate measuring results in a wide range of gases and operating conditions. Due to its high computational power, the measuring results can be output at a refresh rate of 1 Hz.

The compact sensor housing allows easy handling, the robust design, with no moving parts, makes it resistant to harsh conditions. Due to its approval for use in hazardous areas, the model DTG-30 is ideally suited for OEM applications in industrial and field environments.

Smart in sensing

Data sheets showing similar products:
Density and temperature sensor, model DTL-30; see data sheet: SP 89.01
Gas density and temperature sensor, model DTG-30; see data sheet: SP 89.03

Specifications

Accuracy specifications	
Accuracy	
Density	±0.015 kg/m³ (for 10...70°C [50...158°F])
	±0.030 kg/m³ (for -20...+65°C [-4...+149°F])
Temperature	±0.5 °C
Non-repeatability	
Density	0.0025 kg/m³
Temperature	0.1 °C
Measuring rate	1/s

Measuring range	
Density	■ 0.3 … 3 kg/m³ ■ 1.5 … 8 kg/m³ ■ 2.5 … 10 kg/m³
Temperature	■ 10 … 70 °C [50 … 158 °F] ■ -20 ... +65 °C [-4 ... +149 °F] (not available for 0.3 … 3 kg/m³)

→ Other temperatures on request.

Process connection	
Thread size	■ Base plate (flow through): ⅛ NPT ■ Base plate (flow through): ¼ NPT ■ Base plate (flow through): ½ NPT

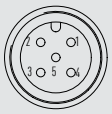
Output signal	
Signal type	
Analogue	4 … 20 mA
Digital	Modbus® RTU (RS-485)
Voltage supply	
Auxiliary power	DC 12 ... 24 V
Power consumption	< 600 mW
Dynamic behaviour	
Switch-on time	≤ 3 s

Electrical connection	
Connection type	■ DIN EN 175301-803 C angular connector, 4-pin ■ Circular connector M12 x 1, IEC -61076-2-101, 5-pin ■ Circular connector DBPLU 104 Z066-130VGF, 8-pin, 2 m [6.56 ft] cable length ■ Circular connector DBPLU 104 Z066-130VGF, 8-pin, 5 m [16.40 ft] cable length ■ Circular connector DBPLU 104 Z066-130VGF, 8-pin, 10 m [32.81 ft] cable length
Ingress protection (IP code) per IEC 60529	IP65 → The stated IP codes only apply when plugged in using mating connectors that have the appropriate IP code.

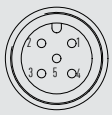
Pin assignment

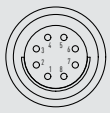
Angular connector, 4-pin	Pin	Name	Signal type: RS-485 [1]	Signal type: 4 ... 20 mA
	1	PVIN+	Power supply terminal	Power supply terminal
	2	A / A1+	RS-485-A	4 ... 20 mA, temperature
	3	B / A2+	RS-485-B	4 ... 20 mA, density
	4/GDS	0 V	Ground	Ground

1) Outputs available for RS-485, temperature, density, temperature-compensated density at 0 °C [32 °F]

Circular connector M12 x 1, 5-pin	Pin	Name	Signal type: RS-485 [1]
	1	0 V	Ground
	2	PVIN+	Power supply terminal
	3	0 V	Ground
	4	A	RS-485-A
	5	B	RS-485-B

1) Outputs available for RS-485, temperature, density, temperature-compensated density at 0 °C [32 °F]

Circular connector M12 x 1, 5-pin	Pin	Name	Signal type: 4 ... 20 mA
	1	PVIN+	Power supply terminal
	2	A1+	4 ... 20 mA, temperature
	3	A2+	4 ... 20 mA, density
	4	A3+	4 ... 20 mA, temperature-compensated density at 0 °C [32 °F]
	5	0 V	Ground

Circular connector, 8-pin	Pin	Name	Signal type: RS-485 [1]	Signal type: 4 ... 20 mA
	1	A	RS-485-A	Must be disconnected
	2	A1+	Must be disconnected	4 ... 20 mA, temperature
	3	0 V	Ground	Ground
	4	PVIN+	Power supply terminal	Power supply terminal
	5	0 V	Ground	Ground
	6	A3+	Must be disconnected	4 ... 20 mA, temperature-compensated density at 0 °C [32 °F]
	7	B	RS-485-B	Must be disconnected
	8	A2+	Must be disconnected	4 ... 20 mA, density

1) Outputs available for RS-485, temperature, density, temperature-compensated density at 0 °C [32 °F]

Material		
Material (wetted)	Stainless steel 316L	
Material (in contact with the environment)		
Seal	■ FPM/FKM ■ FFKM	

Operating conditions		
Medium temperature limit	■ -40 ... +105 °C [-40 ... +221 °F] ■ -40 ... +85 °C [-40 ... +185 °F] for instruments with explosion protection	
Ambient temperature limit	■ -40 ... +105 °C [-40 ... +221 °F] ■ -40 ... +85 °C [-40 ... +185 °F] for instruments with explosion protection	
Max. operating pressure	20 bar [290 psi]	
Flow velocity	< 10 m/s recommended	
Recommended mounting position [1]	→ Observe the flow direction indicated on the sensor → Inserted in a straight section of the gas line or in a bypass line	
Vibration resistance	2g per IEC 60068-2-6	
	0.1 ... 5.8g per IEC 60068-2-64	
Shock resistance per IEC 60068-2-27	40g	
EMC tests	In addition, observe the installation instructions of the operating instructions	
Immunity per IEC 61000-4-3	At 80 MHz to 1.4 GHz	10 V/m
	At 1.4 GHz to 6 GHz	3 V/m
Burst per IEC 61000-4-4	1 kV	
Surge immunity per IEC 61000-4-5	2 kV/1kV common mode	
ESD per IEC 61000-4-2	4 kV/8 kV, contact/air	
High-frequency fields per IEC 61000-4-6	3 V	

1) Other factors such as the presence of particles, humidity, vapour, contamination, turbulence etc. must be taken into account to determine the best mounting position. If you have any questions, please contact our application consultant.

Approvals

Logo	Description	Region
CE	**EU declaration of conformity**	European Union
	EMC directive EN 61326 emission (group 1, class B) and immunity (industrial application)	
	RoHS directive	

Optional approvals

Logo	Description	Country
Ex	**EU declaration of conformity**	European Union
	ATEX directive Hazardous areas - Ex ia Zone 0 gas II 1G Ex ia IIC T4 Ga	
IEC IECEx	**IECEx** Hazardous areas - Ex ia Zone 0 gas Ex ia IIC T4 Ga	International
FM APPROVED	**FM** Hazardous areas CL I, Div I, GPS A, B, C, D T4	USA and Canada

Patents, property rights

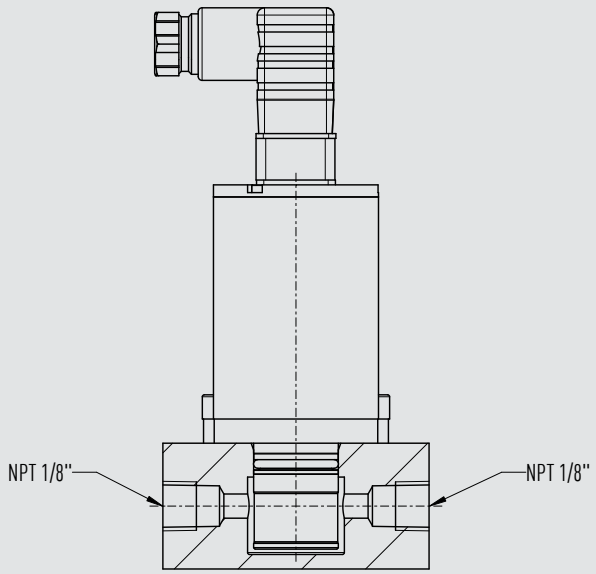
Patent number	Description
EP 3.353.526 **US 10.481.060**	Density sensor and density sensor manufacturing method

→ For approvals and certificates, see website

Dimensions in mm [in]

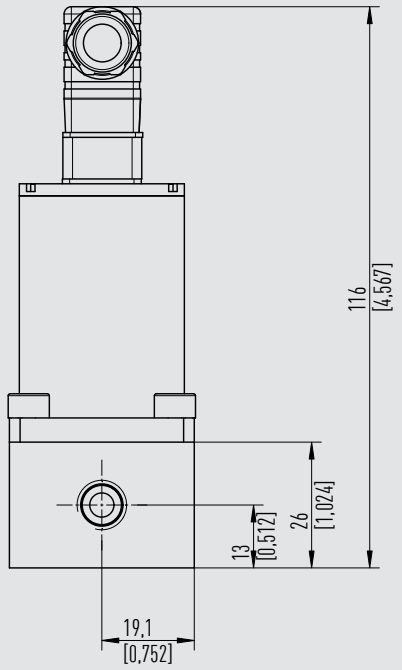
DIN EN 175301-803 C angular connector, 4-pin

Mounted on ⅛" NPT base plate

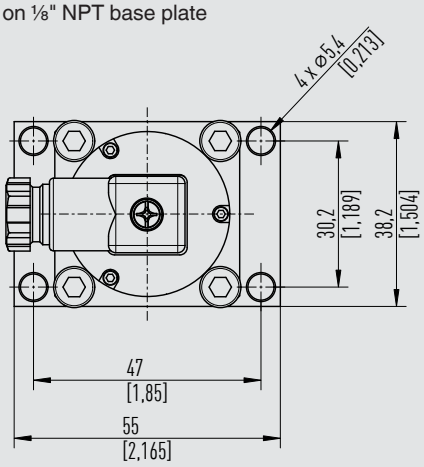


Weight: approx. 0.5 kg [1.1 lb]

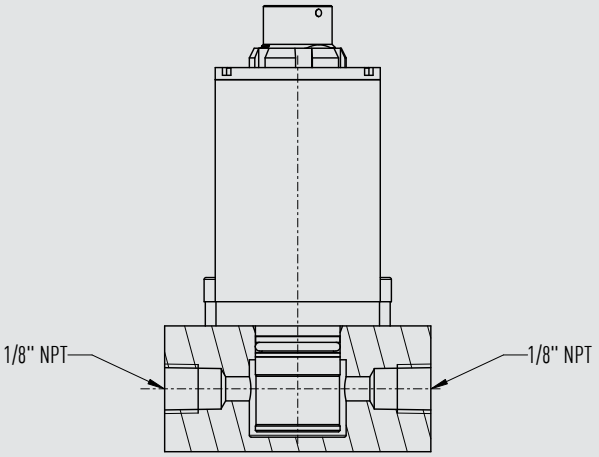
Mounted on ⅛" NPT base plate



Mounted on ⅛" NPT base plate

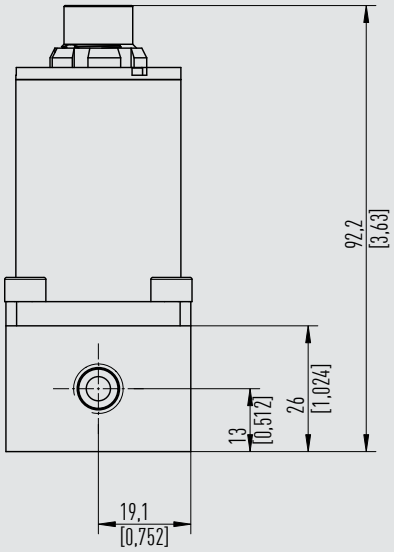


Mounted on ⅛" NPT base plate

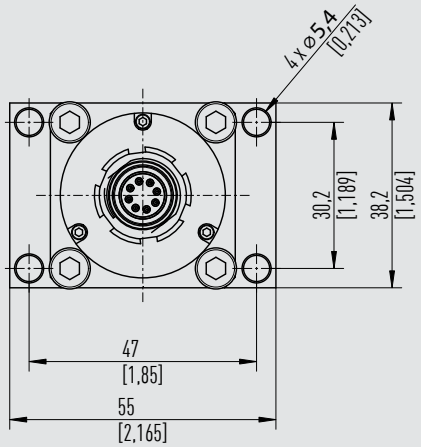


Weight: approx. 0.5 kg [1.1 lb]

Mounted on ⅛" NPT base plate

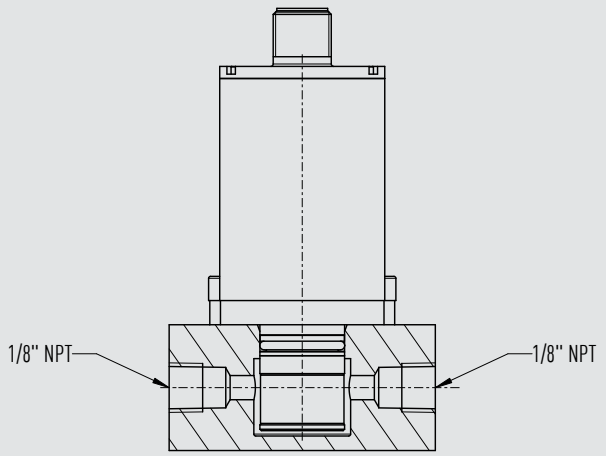


Mounted on ⅛" NPT base plate



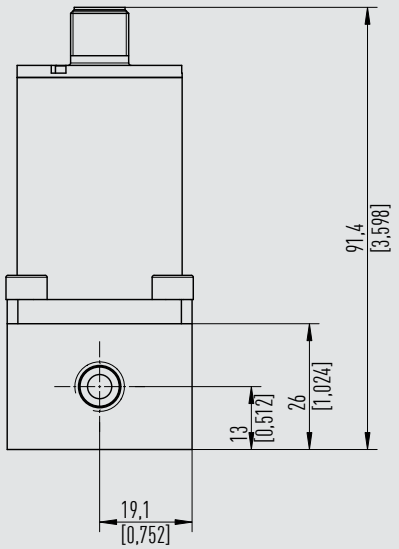
IEC-61076-2-101 circular connector M12 x 1, 5-pin

Mounted on ⅛" NPT base plate

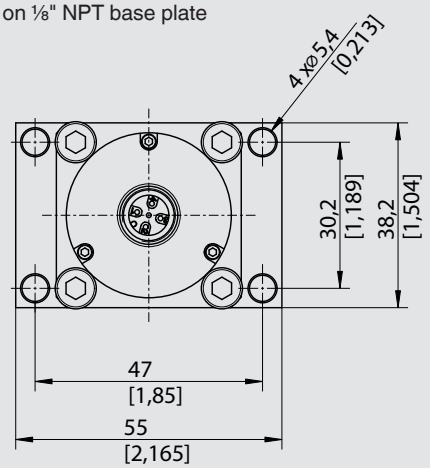


Weight: approx. 0.5 kg [1.1 lb]

Mounted on ⅛" NPT base plate



Mounted on ⅛" NPT base plate



Accessories and spare parts

Model	Description
Cable	
For circular connector M12 x 1, IEC-61076-2-101, 5-pin, analog	■ 2 m [6.56 ft]
	■ 5 m [16.40 ft]
	■ 10 m [32.81 ft]
	■ 2 m [6.56 ft], right angle
	■ 5 m [16.40 ft], right angle
	■ 10 m [32.81 ft], right angle
For circular connector M12 x 1, IEC-61076-2-101, 5-pin , digital	■ 2 m [6.56 ft]
	■ 5 m [16.40 ft]
	■ 10 m [32.81 ft]
	■ 2 m [6.56 ft], right angle
	■ 5 m [16.40 ft], right angle
	■ 10 m [32.81 ft], right angle
For circular connector, DBPLU 104 Z066-130VGF, 8-pin	■ 2 m [6.56 ft]
	■ 5 m [16.40 ft]
	■ 10 m [32.81 ft]
BSU-30	Smart measuring bridge
	→ For multiple sensor inputs and calculation of specific parameters
Ex protection	→ For a detailed description of the appropriate Ex protection, see the additional operating instructions of the product.
Intrinsically safe isolated barrier	For the power supply, applications in hazardous areas.
	For 4 ... 20mA analog outputs, applications in hazardous areas
	For RS-485 digital outputs, applications in hazardous areas

Ordering information

Model / Output Signal / Processs connection / Electrical connection / Seal / Measuring range temperature / Measuring range density / Accuracy density / Cable length / Approvals

MesoScale® is a trademark of WIKA Tech.

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