

**TREMON**

Density transducer DM-91
DM-91-0-0-SF6-SS-22-DN20-SIS-H
Serial No.: 2101059
Gas: SF6
Measuring ranges:
Density: 0...60 g/l
Pressure: 0...22 bar abs
Temperature: -60...+85 °C
Supply: 24 V DC

MULTIFUNCTION DENSITY TRANSDUCER

DM-91

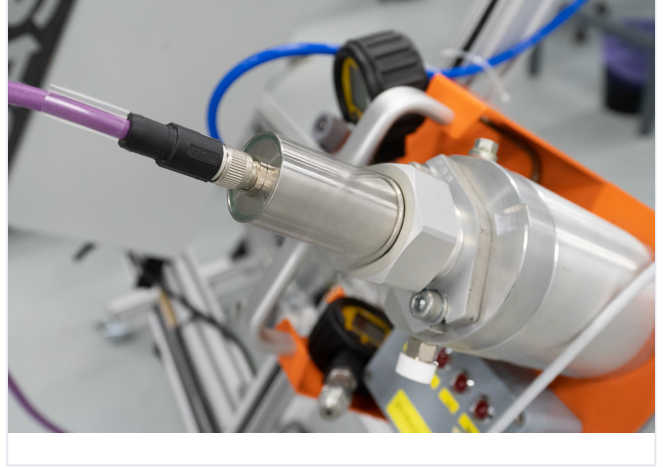
Density, temperature, pressure & humidity monitoring of insulating gases — SF₆, N₂, CF₄, Novec™ 4710 and mixtures · Modbus RTU · IP68 · -60 ... +85 °C

■ INSULATION-CONDITION MONITORING

Insulation-condition monitoring raises the safety of power assets

Using **DM-91** digital multifunction primary transducers to measure the insulation condition of switchgear is a step into the Industry-4.0 era and the full digital transformation of the power sector.

They enable on-line density-monitoring and leak-control systems — especially relevant at remote sites — and avoid emergencies caused by human error. With DM-91 you move to predictive diagnostics and plan maintenance and repair of gas-filled equipment from the real-time condition of the system.



DM-91 transducer on a gas-filled equipment test rig

■ DESCRIPTION

DM-91 transducers are high-accuracy digital density sensors with a **calibration interval extended to 3 years** and a **Modbus RTU** digital output. They directly measure pressure, temperature and humidity and calculate density for any specified gas mixture containing SF₆, N₂, CF₄, O₂, CO₂, 3M™ Novec™ 4710, He, Ar or other gases.

DM-91 is suitable for outdoor installation and operation at ambient temperatures of **-60¹ ... +85 °C**.

■ MODBUS® DATA INTERFACE

The RS-485 interface provides Modbus® RTU communication with a time stamp. The output parameters of the instrument and their units can be configured to the specific requirements.

RS-485	Modbus RTU	time stamp	configurable units
3-year calibration interval	IP68	outdoor	

¹ A special polar version with an extended temperature range can be ordered

OUTPUT PARAMETERS

Measured and calculated values available over Modbus RTU; units are selectable per parameter.

Absolute pressure at 20 °C [68 °F]	bar, MPa, kPa, psi, Pa, N/cm ²
Gauge pressure relative to 1013 mbar at 20 °C [68 °F]	bar, MPa, kPa, psi, Pa, N/cm ²
Density	g/l, kg/m ³ — configurable parameter depending on the specified gas mixture containing SF ₆ , N ₂ , CF ₄ , O ₂ , CO ₂ , 3M™ Novec™ 4710, He, Ar or other gases
Temperature	°C, °F, K
Absolute pressure	bar, MPa, kPa, psi, Pa, N/cm ²
Gauge pressure relative to 1013 mbar	bar, MPa, kPa, psi, Pa, N/cm ²
Freezing point	°C
Dew point	ppmw
Moisture content by volume	°C
Relative humidity	%

OPERATING CHARACTERISTICS

Operating conditions	Ambient temperature -60 ¹ ... +85 °C Relative humidity ≤ 98 % Atmospheric pressure 66 ... 106.7 kPa
Ingress protection	IP68
Mass	≤ 0.6 kg

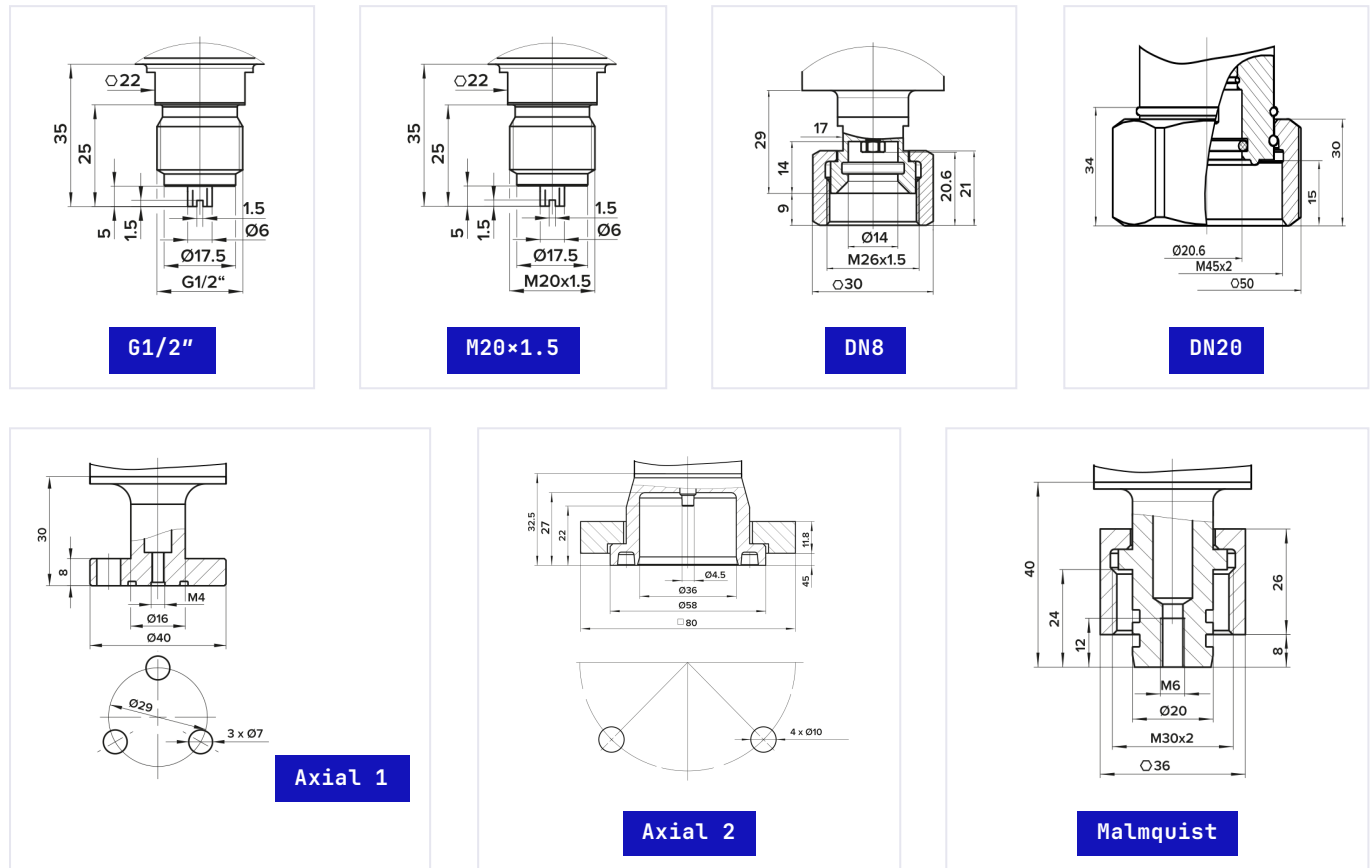
¹ A special polar version with an extended temperature range can be ordered



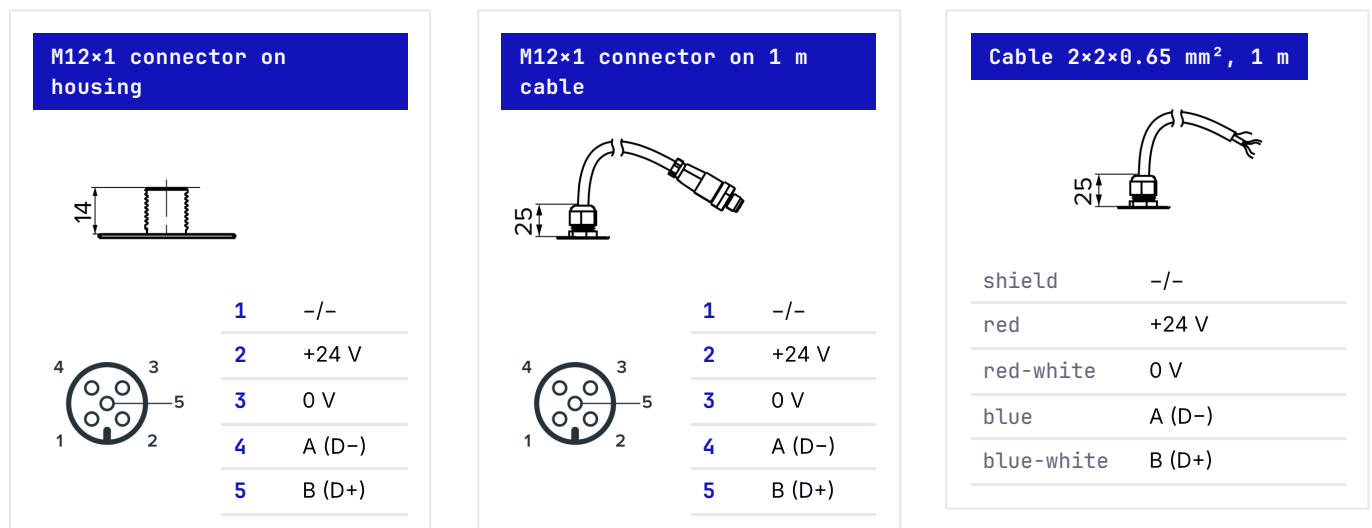
DM-91 transducers on the calibration bench

PROCESS CONNECTION – THREAD / FLANGE VARIANTS

Custom connections available on request.



ELECTRICAL CONNECTION



Pin assignment is identical for the housing-mounted and cable-mounted M12x1 connectors. RS-485 A (D-) / B (D+) polarity as marked; supply 24 V DC.

METROLOGICAL CHARACTERISTICS

CHARACTERISTIC	UNIT	VALUE
Temperature measuring range	°C	-60 ¹ ... +85
Limits of permissible absolute error, temperature	°C	±0.2
Upper range limits (URL), absolute pressure ²	MPa	0.6; 1.2; 1.6; 2.2
Upper limits of density conversion (function of pressure)	g/cm ³	0.06; 0.12; 0.16; 0.22
Limits of permissible error, absolute pressure (referred to URL)	%	±0.2
Limits of permissible error, density conversion (referred to upper limit)	%	±0.2
Relative-humidity measuring range of the medium	%	0 ... 100
Limits of permissible absolute error, relative humidity	%	±5

¹ A special polar version with an extended temperature range can be ordered · ² Upper range limit depends on the order

TECHNICAL CHARACTERISTICS

CHARACTERISTIC	UNIT	VALUE
Overall dimensions (height × diameter)	mm	≤ 30 × 125
Mass	kg	≤ 0.5
Ingress protection (IEC 60529)		IP68
Supply voltage, DC	V	24 (±10 %)
Average service life	years	30
Mean time between failures	h	265 000
Output signal ³		RS-485; LCD display
Reference operating conditions: ambient temperature	°C	-60 ¹ ... +85
Reference operating conditions: relative humidity	%	0 ... 98
Reference operating conditions: atmospheric pressure	kPa	90.6 ... 107

¹ A special polar version with an extended temperature range can be ordered · ³ Depending on the order

SCOPE OF DELIVERY

ITEM	QTY	NOTE
DM-91 density transducer	1	Transducer designation per order
Product certificate (passport)	1	
Connection cable	–	Order item

ORDER CONFIGURATOR

The transducer configuration is defined by a nine-position order code. Each position is selected from the option groups below.

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#	OPTION GROUP	CODE	DESCRIPTION
1	Model code	0	without display and discrete outputs
		1	with display and discrete outputs
2	Humidity measurement	H	humidity channel
		0	no humidity channel
3	Measured medium	SF ₆ , CF ₄ , ...	SF ₆ / N ₂ mixtures
4	Housing material	SS	stainless steel AISI 304
		AL	aluminium alloy
		ABS	plastic (up to 12 bar)
5	Upper pressure limit	6 / 12 / 16 / 22	bar abs
6	Process connection	DN-8, DB-20, G 1/2, G 3/4, Malmkvist	or custom on request
7	Pressure-transducer type	SIS	strain gauge
		Q	quartz resonant
8	Connection type	MC	M12 on cable
		M	M12 on housing
		C	cable
9	Temperature version	Heated	operating temperature down to –60 °C
		Unheated	operating temperature down to –25 °C

Example: **DM-91-0-0-SF₆-SS-22-DN20-SIS-M** – no display, no humidity channel, SF₆, stainless-steel housing, 22 bar abs, DN20 flange, strain-gauge pressure transducer, M12 on housing.



CONTACT

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