

Inductive, Robust Displacement Sensor

Robust, splash-proof, configurable

MODEL 8744 NEW

Preliminary data sheet



Highlights

- Measuring ranges from 0 ... 5 mm to 800 mm
- Linearity deviation from ≤ 0.1 % F.S.
- Extra long service life
- Protection class IP67
- Impact and vibration resistant
- Operating temperature range -40 °C to $+125$ °C
- Minimal temperature dependence

Options

- Linearity deviation of 0.1 % F.S., 0.25 % F.S. bzw. 0.5 % F.S.
- Output signal 0.5 ... 4.5 VDC or 9.5 VDC / 4 ... 20 mA
- Various connection options: plug and cable length
- Various mounting options for easy installation

Areas of application

- Special machine construction, special plant construction
- Structure & building monitoring (weirs, foundations, etc.)
- Transport infrastructure (bridges, railway systems)
- Monitoring of static and dynamic structural stress
- Special usecases

Product description

The high-precision and durable Model 8744 position sensor is suitable for all applications where a large measuring range needs to be precisely resolved and a highly robust design is required.

Thanks to its high IP67 protection rating (depending on the connection) and a temperature range from -40 °C to $+125$ °C, it can be used for demanding measuring tasks in many industrial and infrastructure-related applications.

The inductive displacement sensor delivers a highly linear output signal from 0.1 % of full scale. Its performance, repeatability, and stability are excellent over a wide temperature range.

The Model 8744 position sensor has a robust stainless-steel housing with a diameter of 35 mm and is easy to install and align.

Possible mounting options include mounting with housing clamps, screw connection using an M5 thread, or alternatively mounting using ball joint heads.

The push rod can be equipped with an M5 female thread, spring-return with a domed sensing tip, or with a ball joint head.

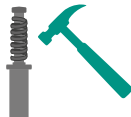
With output signals of 0.5 to 9.5 V or 4 to 20 mA, the sensors can be easily integrated into process control systems and monitoring measuring points.



Protection class



Vibration resistant



Impact resistant



Technical Data

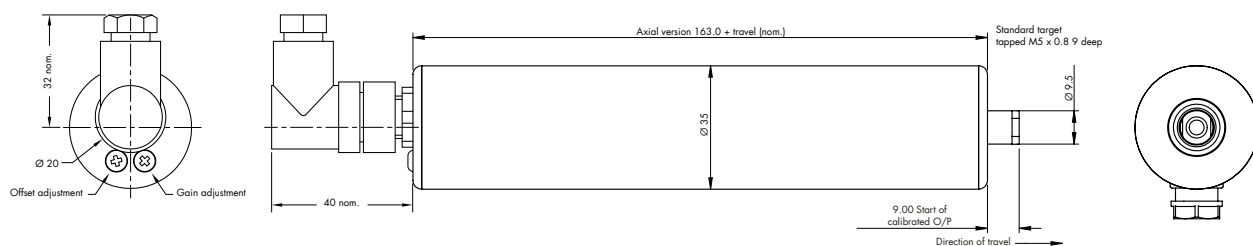
8744	–	5050	5100	5200	5300	5500	5800
Measuring range from 0 ...		50 mm	100 mm	200 mm	300 mm	500 mm	800 mm
		Customized measuring ranges available on request: 0 ... 5 mm to 800 mm					
Accuracy							
Maximum relative linearity deviation at +20 °C		Measuring ranges up to 450 mm ±0.25 % F.S. or optional from 10 mm measuring range ≤ ±0,1 % F.S.					
		Measuring ranges from 450 mm ±0.5 % F.S. or optional: ±0.25 % F.S. up to 600 mm measuring range					
Maximum relative temperature dependence		±0.01 %/K v.M. ±0.01 %/K F.S.					
Reverse span		0.05 % F.S.					
Mechanical specifications							
Full mechanical travel		Measuring range full scale + nominal 12 mm Consisting of 4 mm at the start of the push rod travel and 8 mm* at the end of the push rod travel. * sensors with spring return: 1 mm					
Displacement force		5 cN/mm spring constant (only 8744-5xxx-xxxxx2xx and 8744-5xxx-xxxxx4xx)* Spring precompressed: See „Force-displacement diagram“ * only available for measuring ranges up to 300 mm < 6 N Release force**					
Material		Stainless steel					
Housing outer diameter		35 mm					
Outer diameter of the push rod		9.5 mm					
Cable properties		Minimal bending radius: 15 x cable diameter, Diameter 4 mm, suitable for drag chains					
Output signal							
Output signal Options (Characteristic value)		0.5 ... 9.5 V 0.5 ... 4.5 V 4 ... 20 mA Customized output signals available on request.					
Characteristic value tolerance		±0.25 % of nominal value					
Ripple		< 0.02 % F.S.					
Frequency response		> 10 kHz with -3dB					
Environmental conditions							
Operating temperature range		-40 ... +125 °C short periods -20 ... +85 °C continuous (thermal coupling to heat bath)					
Storage temperature range		-40 ... +125 °C					
Protection class		IP67					
Electromagnetic compatibility		DIN EN 61000-6-2, DIN EN 61000-6-3					
Vibration resistance		IEC 68-2-6: up to 10 g					
Maximum mechanical shock		IEC 68-2-29: up to 40 g					
Service life		MTBF: 350.000 h at 40 °C, type of use: ground stationary (Gf)					

F.S.: of full scale
rdg.: of reading

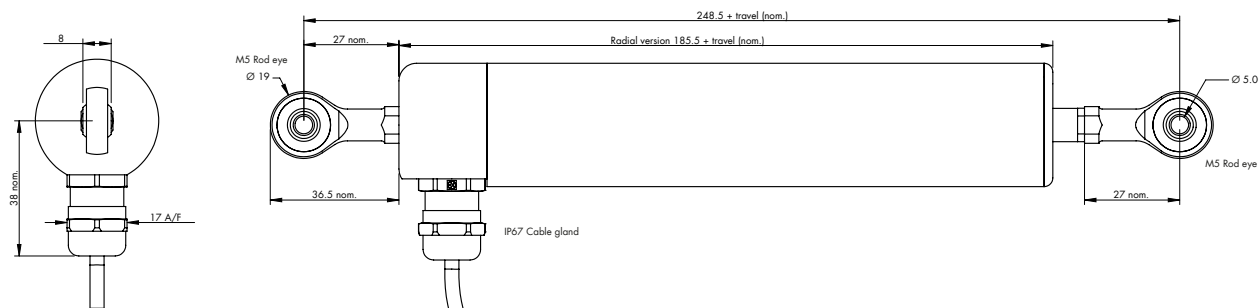
**with regular movement and occasional maintenance with silicone oil



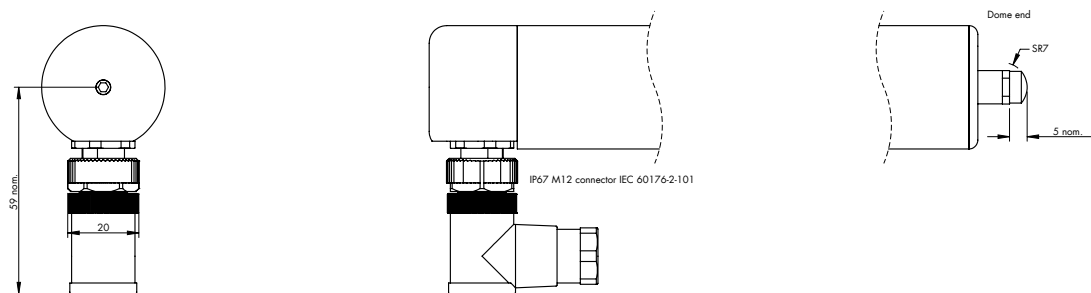
Dimensional drawing 1 – Threaded push rod; axial M12 plug with radial outlet



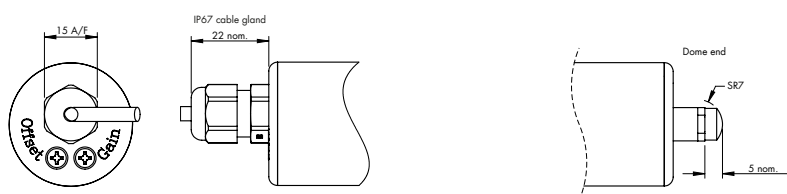
Dimensional drawing 2 – Push rod and housing with ball joint head; radial cable gland



Dimensional drawing 3 – Push rod with probe tip; radial M12 plug with axial outlet

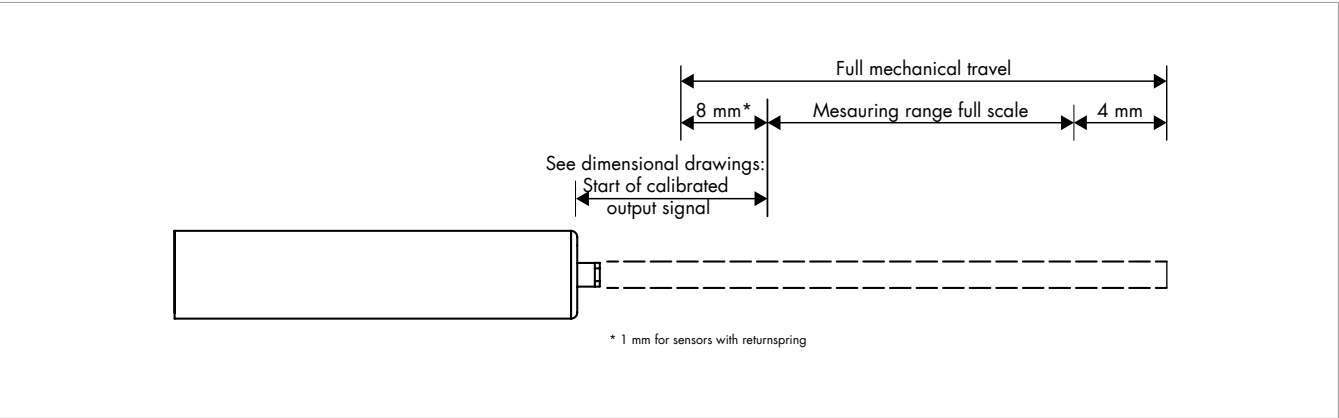
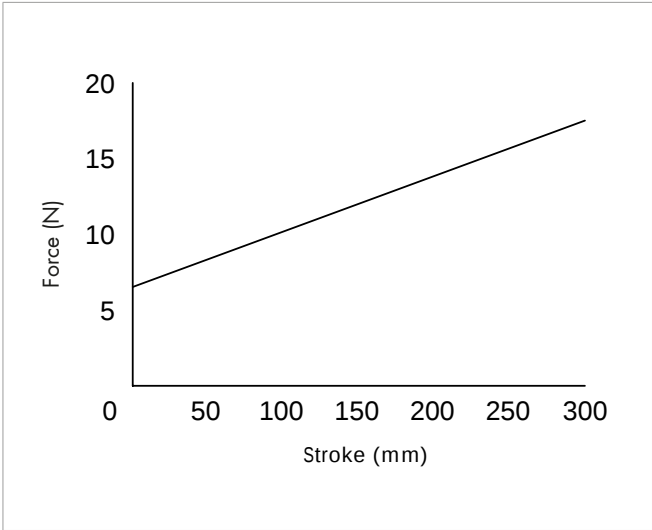


Dimensional drawing 4 – Push rod with probe tip; axial cable gland



Force-displacement diagram

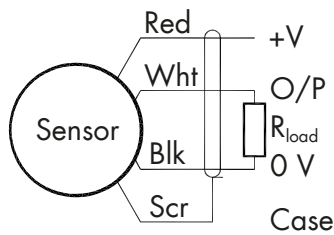
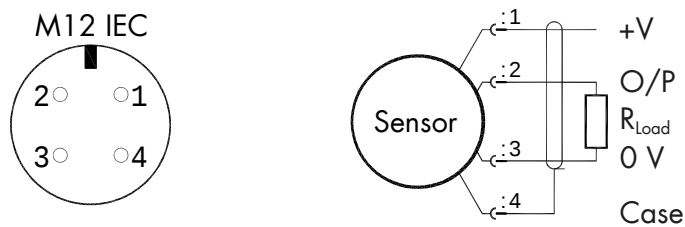
A spring return is available for sensors with a measuring range of up to and including 300 mm. The required nominal displacement force plotted over the measuring range is shown in the adjacent diagram. Please note: the return spring is pre-compressed: A mechanical path of < 300 mm results in a higher release force according to this diagram.



Electrical connection

	Load resistors	Supply voltage	Nominal supply current
Version 8744-5xxx-Cxxxxxxx 0.5 ... 9.5 V	≥ 5 kΩ	24 V DC nominal (13 ... 28 V DC)	10 mA (12 mA max.)
Version 8744-5xxx-Dxxxxxxx 0.5 ... 4.5 V	≥ 5 kΩ	5 V DC nominal (4.5 ... 5.5 V DC)	10 mA (12 mA max.)
Version 8744-5xxx-lxxxxxxx 4 ... 20 mA	0-300 Ω max. (generated Voltage: 1.2 ... 6 V DC at 300 Ω)	24 V DC nominal (13 ... 28 V DC)	32 mA (35 mA max.)

Protective functions in case of incorrect connection		
Version 8744-5xxx-Cxxxxxxx 0.5 ... 9.5 V		Supply lines are protected by a diode. A maximum of 0 ... 12 V may be applied to the signal line.
Version 8744-5xxx-Dxxxxxxx 0.5 ... 4.5 V		The sensor is not protected against reverse polarity or overvoltage. Limiting the current to below 50 mA minimizes the risk of damage.
Version 8744-5xxx-lxxxxxxx 4 ... 20 mA		Protected against any misconnection within the rated voltage.

Electrical connection – **cable gland**Electrical connection – **plug**

Accessories

Order code

8744-Z001	Plastic mounting block (1 included in delivery)
8744-Z002	Push rod and housing mountable joint head
99625-000A-0090030	Connection cable, M12 connector 90°, 3-wire, length 3 m, one end free

Calibration

Test and calibration protocol

Included in the scope of delivery of the sensor	Including specification of the linearity deviation, excitation voltage and output signal.
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Standard factory calibration certificate for displacement sensors or measuring chains (WKS)

87WKS-87XX	Factory calibration certificate for displacement sensors or measuring chains. Measuring ranges from 0 mm to 500 mm, 10 steps evenly distributed over the measuring range with increasing displacement. The calibration is not covered by the accreditation of the calibration laboratory. The calibration certificate does not contain a accreditation symbol and is therefore not covered by EA MLA.
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Order code

Measuring range	Code			
0 ... 50 mm	5	0	5	0
0 ... 100 mm	5	1	0	0
0 ... 200 mm	5	2	0	0
0 ... 300 mm	5	3	0	0
0 ... 500 mm	5	5	0	0
0 ... 800 mm	5	8	0	0

8	7	4	4	-					-								0	0
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Output signal

■ 0.5 ... 9.5 V	C
■ 0.5 ... 4.5 V	D
■ 4 ... 20 mA	I

Cable length

■ Plug	X
■ 1 m	A
■ 3 m	D
■ 5 m	E
■ Customer-specific length on request	K

Plug or cable outlet

■ Axial M12 connector	1
■ Axial metal cable gland	4
■ Radial M12 connector, with out adjustments for offset and gain	7
■ Radial metal cable gland, with out adjustments for offset and gain	A

Cable end connector options

■ Open cable ends with individual strands	0
■ 9 pins Sub-D connector model 9900-V209 for 9163-V3xxxx	A
■ 9 pins Sub-D connector model 9900-V209	B
■ 12 pins round connector model 9941 for burster desktop devices	E
■ Additional connector options available on request	

Linearity deviation

■ Standard: ± 0.25 % or ± 0.5 % F.S. from 450 mm measuring range	0
■ Improved: ± 0.1 % or ± 0.25 % F.S. from 450 mm to 600 mm measuring range	1

Mechanical options

■ Probe tip glued and spring returned (available up to 300 mm)	2
■ M5 thread spring returned (available up to 300 mm)	4
■ M5 thread	5
■ Push rod with ball joint (eye)	7
■ Push rod and sensor housing with ball joint (eye)	8

