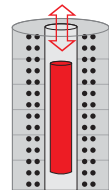




# More Precision.

**indu**SENSOR

Linear inductive displacement sensors



## LVDT series: Displacement sensors with external electronics



Measurement ranges  $\pm 1 \dots \pm 25 \text{ mm}$

Extremely accurate also under difficult ambient conditions

Long-term stability

Wear-free

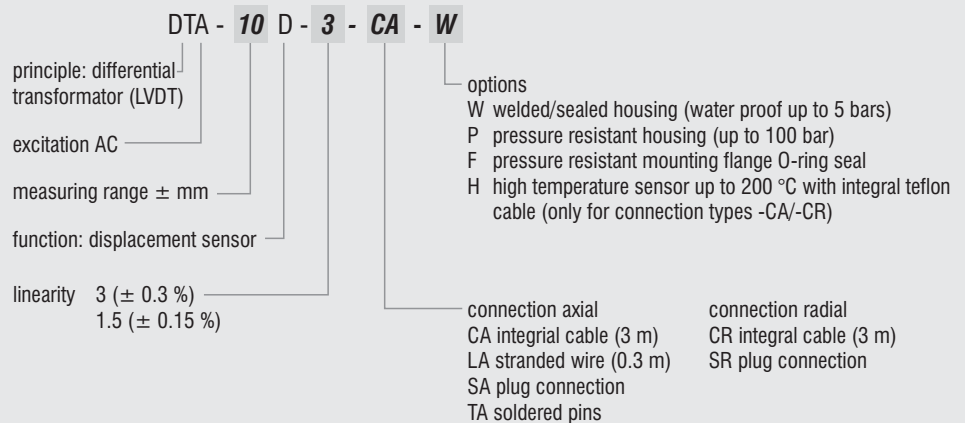
Easy installation

Displacement sensors have a plunger which moves freely in the sensor housing. The plunger is joined to the object by a thread to transfer the movement of the measurement object. The measurement process in the sensor takes place without contact and is therefore wear-free. The displacement sensors are mainly used to measure and monitor movements, displacements, positions, strokes, deflections, dislocations, etc. in vehicles, machines and systems.

The high sensor resolution is limited only by the noise in the sensor electronics. A further advantage of the symmetrically constructed sensors in the LVDT series is the zero-point stability of the systems. The sensors are supplied with an excitation frequency of 1 to 5 kHz depending on the measurement range and an excitation amplitude of 2.5 to 5 Vrms. Matched sensor electronics are available in this respect.

With appropriate setting possibilities for the excitation frequency and amplitude, the sensors can also be operated with alternative electronics.

### Article



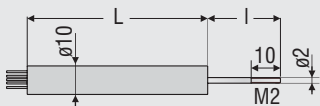
Model	DTA-1D-			DTA-3D-			DTA-5D-			DTA-10D-			DTA-15D-					DTA-25D-							
Connection	TA	CA	SA	TA	CA	SA	TA	CA	SA	LA	CA	SA	LA	CA	CR	SA	SR	LA	CA	CR	SA	SR			
Measuring range	±1 mm			±3 mm			±5 mm			±10 mm			±15 mm					±25 mm							
Linearity	standard ±0.3 %			6 μm			18 μm			30 μm			60 μm			90 μm					150 μm				
	option ±0.15 %			3 μm			9 μm			15 μm			30 μm			45 μm					-				
Excitation frequency	5 kHz						2 kHz						1 kHz												
Excitation amplitude	5 V <sub>eff</sub>										2.5 V <sub>eff</sub>														
Sensitivity	133 mV/Vmm			85 mV/Vmm			53 mV/Vmm			44 mV/Vmm			45 mV/Vmm					33 mV/Vmm							
Temperature range	-20 °C ... 80 °C			• • •			• • •			• • •			• • •			• • • • •					• • • • •				
	-20 °C ... 120 °C			•			•			•			•			•					•				
Storage temperature	-40 °C ... +80 °C / +120 °C																								
Temperature stability	zero ±50 ppm/°C																								
	sensitivity ±100 ppm/°C																								
Housing	stainless steel including magnetic shielding																								
Bending radius cable	20 mm																								
Outer cable diameter	~4.6 mm																								
Protection class	IP 67																								
Shock	IEC 68-2-29			40 g, 1000 shocks / axis																					
	IEC 68-2-27			100 g, 3 shocks/direction																					
Vibration	IEC 68-2-6			10 Hz ... 58 Hz ±1.5 mm / 58 Hz ... 500 Hz ±20 g																					

FSO = Full Scale Output

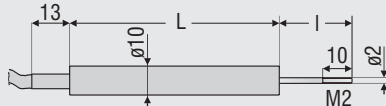
Basic model	DTA-1D-			DTA-3D-			DTA-5D-			DTA-10D-			DTA-15D-					DTA-25D-						
Connection	TA	CA	SA	TA	CA	SA	TA	CA	SA	TA	CA	SA	LA	CA	CR	SA	SR	LA	CA	CR	SA	SR		
Length of housing L mm	30	40	40	47	57	57	63	73	73	78	87	87	93	106.5					129.5	143.5				
Length of plunger l <sup>1</sup> mm	19			29			30			35			51					62						
Housing diameter mm	10										20													

1) Plunger in zero position (±10 % of measuring range ±1 mm)

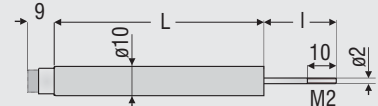
**sensor types with measuring range up to ±10 mm (inner diameter ø2.7 mm)**



**type - TA** with axial solder pins

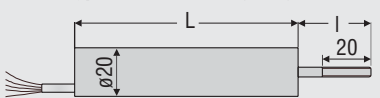


**type - CA** with integral cable

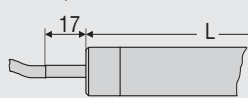


**type - SA** with axial plug connection

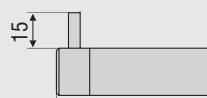
**sensor types with measuring range ±15 mm and ±25 mm (inner diameter ø4.8 mm)**



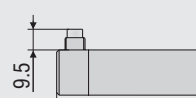
**type - LA** with axial stranded wire



**type - CA** with integral cable



**type - CR** with integral cable (radial)

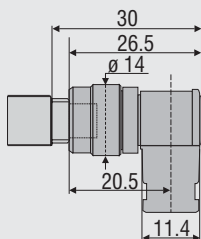


**type - SR** with radial plug connection

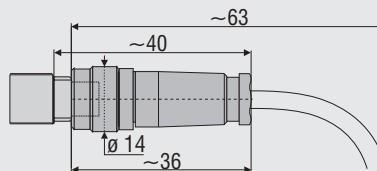


**type - SA** with axial plug connection

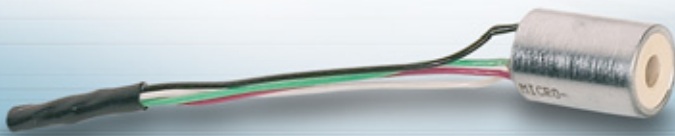
**female connector 90°**  
dimensions apply for all models



**female connector**  
dimensions apply for all models



## Sensor system with miniature sensor and on-board electronics KRS719(01)

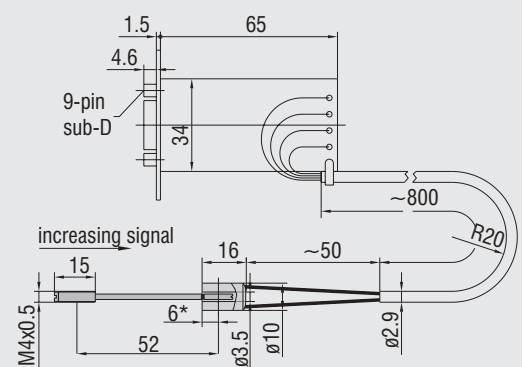


**Compact design**  
**Calibrated system**  
**On-board electronics**

<b>Model</b>	<b>KRS719(01)</b>	
Article	4350026.01	
Measuring principle	LVDT (page 6)	
Measuring range	$\pm 1$ mm	
Target (included)	plunger 0800080 ( $\varnothing 2 \times 62$ long) with thread M4x0.5 (15 mm long)	
Linearity	$\pm 0.15$ % FSO ( $3 \mu\text{m}$ )	
Resolution	0.07% FSO ( $1.4 \mu\text{m}$ )	
Frequency response	100 Hz (-3dB)	
Housing	nickel-plated steel	
Temperature stability	zero $\pm 50$ ppm / $^{\circ}\text{C}$	
Output	4 ... 20 mA options: 2 ... 20 mA / $\pm 3.9$ VDC	
Power supply	22.8 ... 25.2 VDC	
Temperature range	sensor	$-20^{\circ}\text{C}$ ... $+80^{\circ}\text{C}$
	electronics	$0^{\circ}\text{C}$ ... $+50^{\circ}\text{C}$
Adjustment	zero, gain	
Protection class	IP 67	
Electronics	incl. circuit board BSC719(02)-I, article 2208078.02	

FSO = Full Scale Output

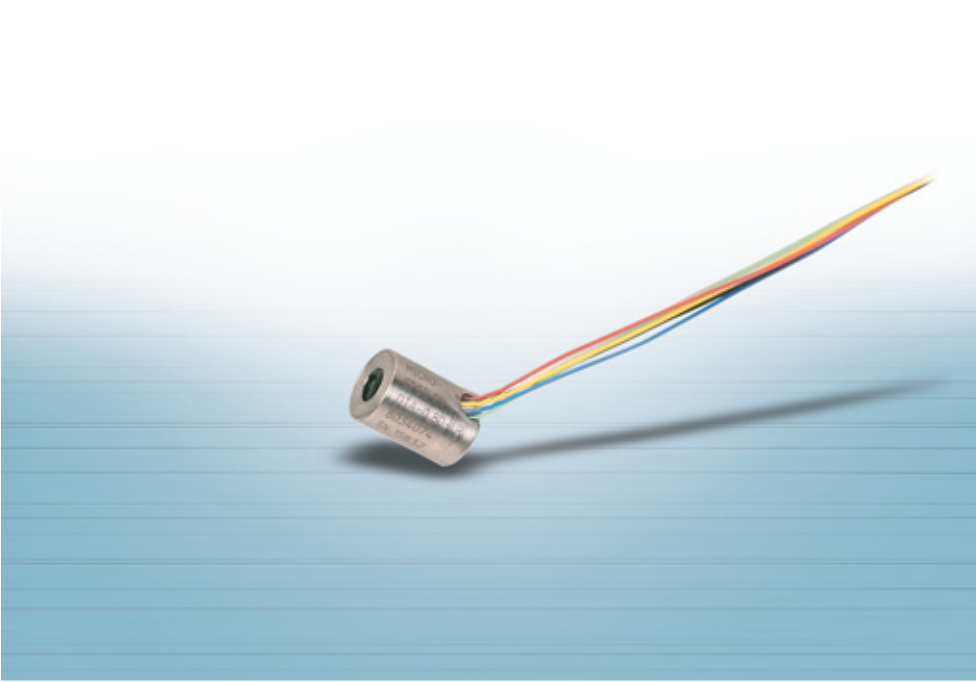
The KRS719 sensor system is used for monitoring the yarn thickness in textile machines. The miniaturized sensor and the board-mounted electronics can be cost-effectively integrated into the available installation spaces and machine controllers. The system is characterized by high stability and repeatability.



\* plunger in midrange

The plunger can be introduced into the sensor from both ends.

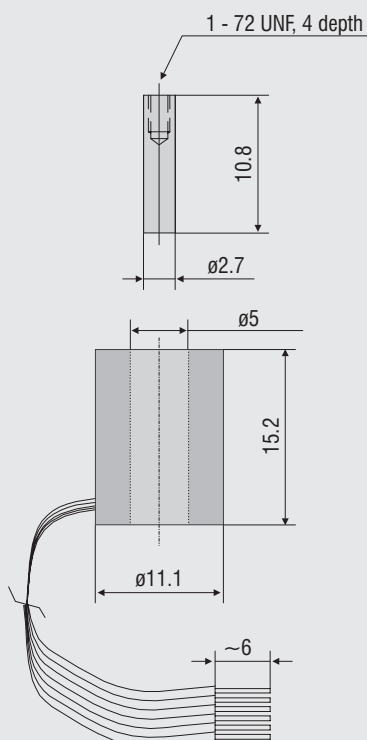
## Miniature sensor with radial cable output DTA-0,8D-2,5-LR



**OEM sensor for large-scale applications**  
**Miniaturized design**  
**Radial cable output**  
**High accuracy**

The miniature sensor DTA-0,8D-2,5-LR was designed and developed for use where the installation space is restricted. In addition, due to the low core weight the dynamic response of the measurement object is retained and mechanical loads are minimized.

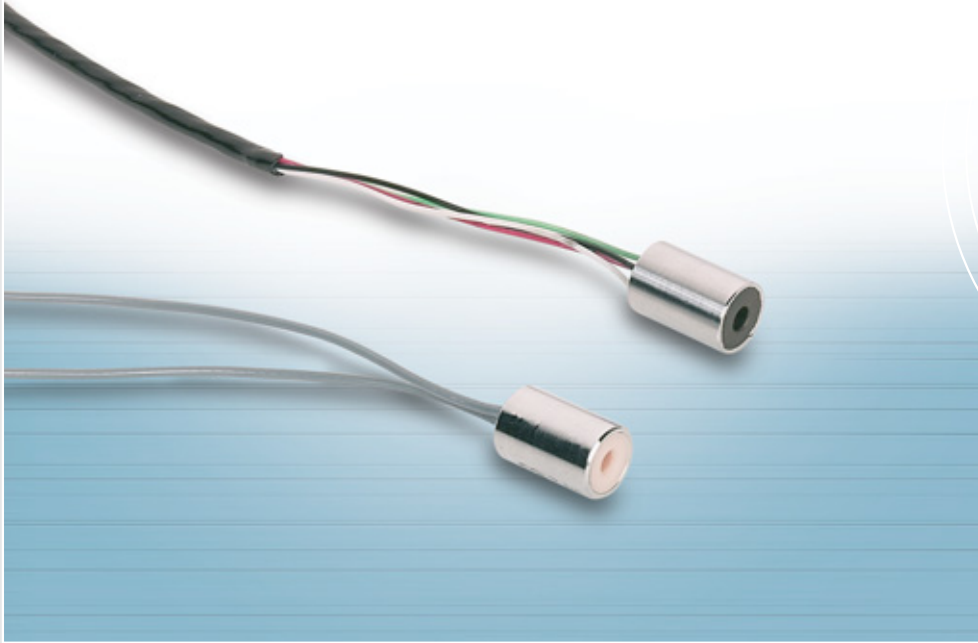
Due to the radial cable output, the installation space behind the sensor can be fully exploited. With a linearity of  $<0.25\%$  this sensor model is also suitable for measurements with high accuracy requirements.



Model	DTA-0,8D-2,5-LR
Article	2611045
Measuring principle	LVDT (page 6)
Measuring range	$\pm 0.8$ mm
Linearity	$<0.25\%$ FSO at $5 V_{\text{eff}}$ / 12.5 kHz ( $4 \mu\text{m}$ )
Excitation frequency	1 - 20 kHz
Excitation amplitude	up to $10 V_{\text{eff}}$
Target (included)	core 0304028 ( $\varnothing 2.7 \times 10.8$ long) with thread 1-72UNF (4 depth)
Housing	nickel-plated steel
Temperature stability sensor	zero: $\pm 50$ ppm / $^{\circ}\text{C}$
Temperature range sensor	$-20^{\circ}\text{C}$ ... $+80^{\circ}\text{C}$
Protection class sensor	IP 65
Electronics	ISC7001

FSO = Full Scale Output

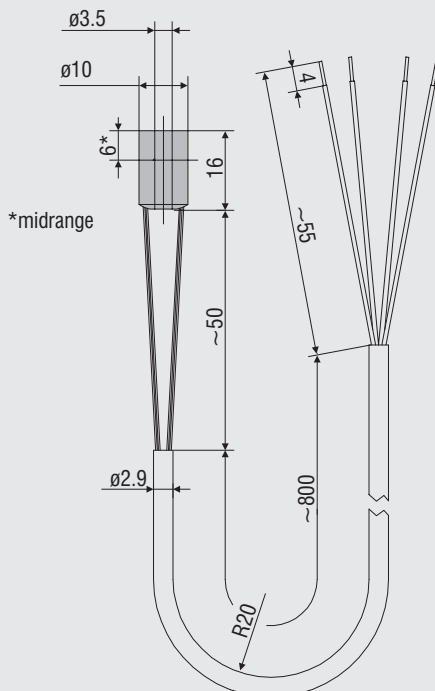
## Miniature sensor with axial cable output DTA-1D-CA-U



**OEM sensor for large-scale applications**  
**Miniaturized design**  
**Axial cable output**

As the sensor DTA-0,8D-2,5-LR, the miniature sensor DTA-1D-CA-U was designed and developed especially for used in restricted installation space. Due to the low core weight, the measurement object dynamic response is retained and mechanical loads are minimized.

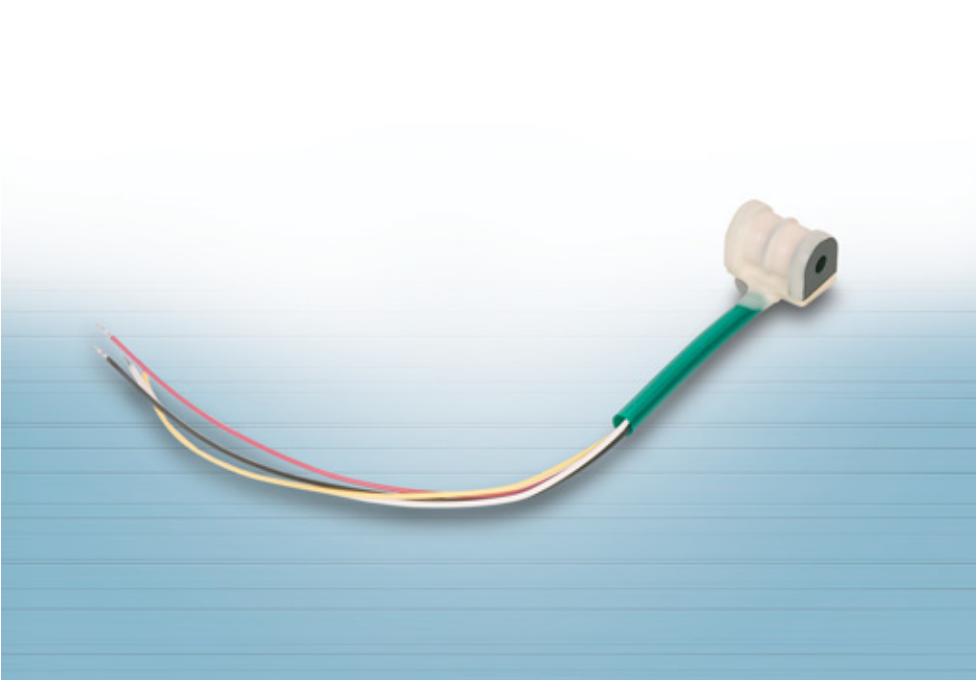
With this configuration the cable output is brought out axially so that the installation space surrounding the sensor can be fully exploited. This means, for example, that the sensor can be installed sunk into a hole.



Model	DTA-1D-CA-U
Article	2611037
Measuring principle	LVDT (page 6)
Measuring range	$\pm 1.0$ mm
Linearity	$< 0.5\%$ FSO at $2.5 V_{\text{eff}} / 5$ kHz (0.01 mm)
Excitation frequency	1 - 20 kHz
Excitation amplitude	up to $10 V_{\text{eff}}$
Target (not included)	plunger 0800080 ( $\varnothing 2 \times 62$ long) with thread M4 x 0.5 (15 long)
Sensitivity	$155 \text{ mV} / \text{Vmm}$ at $2.5 V_{\text{eff}} / 5$ kHz
Housing	nickel-plated steel
Temperature stability sensor	zero: $\pm 50$ ppm / $^{\circ}\text{C}$
Temperature range sensor	$- 20^{\circ}\text{C} \dots + 80^{\circ}\text{C}$
Protection class sensor	IP 67
Electronics	MSC710 ISC7001

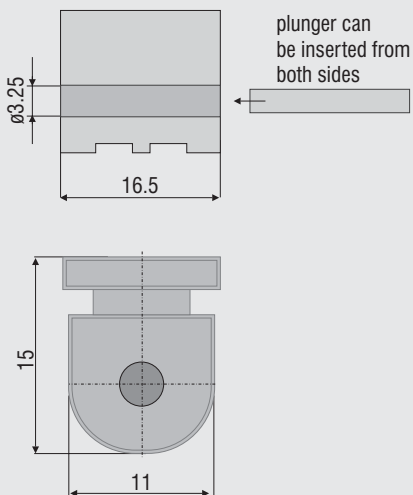
FSO = Full Scale Output

## Sensor with coated coil DTA-1D-20-DDV.02



**Proven OEM sensor**  
**Miniature design**  
**Low cost sensor**

Taking into account economic boundary conditions, with the sensor line DTA-1D-20-DDV the external, mechanical sensor housing has been omitted. To protect the measurement coils the sensor has been fully coated with a protective epoxy.



Model	DTA-1D-20-DDV.02
Article	2611011
Measuring principle	LVDT (page 6)
Measuring range	$\pm 1$ mm
Excitation frequency	0.5 ... 10 kHz
Excitation amplitude	up to 10 V <sub>eff</sub>
Target	customer specific
Linearity	< 1% FSO (0.02 mm)
Housing	protective epoxy
Temperature stability sensor	zero: $\pm 50$ ppm / °C
Temperature range sensor	-20° C ... + 85° C
Protection class sensor	IP 64
Electronics	MSC710
	ISC7001

FSO = Full Scale Output

## Sensor for valve stroke measurements DTA-6D-20 (07)



**Sensor for large-scale use for valve stroke measurements**

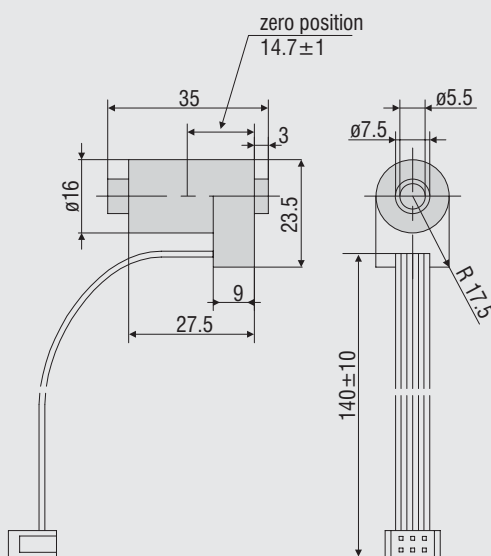
**Well-proven OEM sensor**

**Plastic housing**

Due to the use of a plastic housing, the sensor DTA-6D-20(07) can be offered at a very reasonable price. The configuration of the sensor facilitates, depending on the plunger used, a useful measurement range of  $\pm 2$  mm to  $\pm 8$  mm.

In a typical application this sensor is used for the measurement of the piston position in hydraulic valves. To facilitate exact dosage and therefore also a controlled movement, displacement sensors of the product line DTA-6D-20 are integrated into these valves.

The sensors acquire the position of the control plunger, controlling the volume flow. To do this, an accurate, non-contacting and primarily dynamic position acquisition is required. The sensor is mounted here outside of the pressurized area on a pressure pipe.



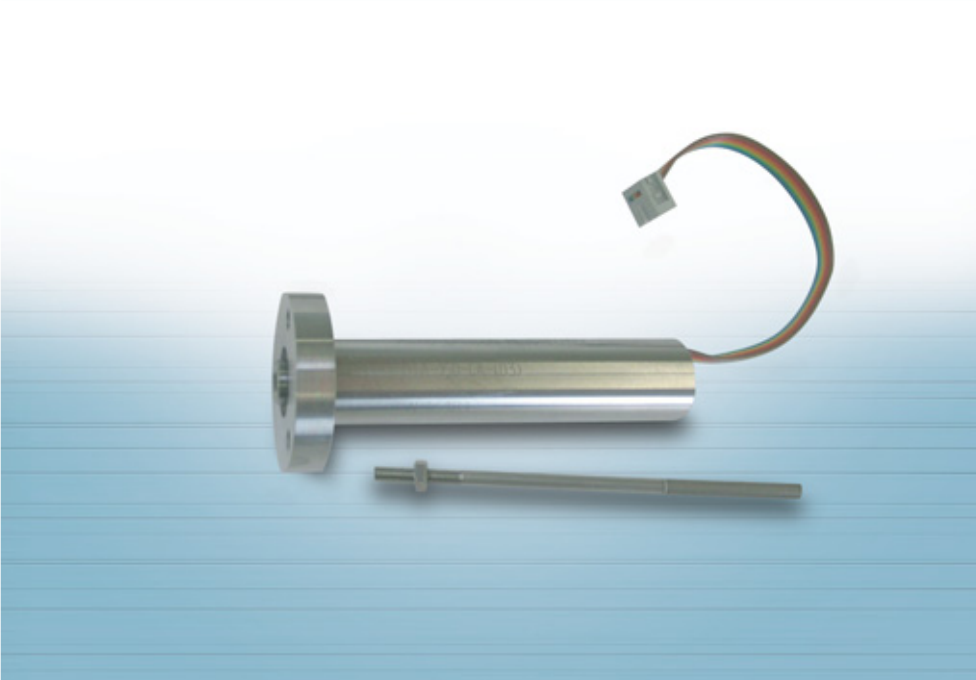
Model	DTA-6D-20(07)
Article	2611043
Measuring principle	LVDT (page 6)
Measuring range	$\pm 2 \dots \pm 8$ mm
Linearity	$< 0.5\%$ FSO at $2.5 V_{\text{eff}} / 5$ kHz*
Frequency	1 - 20 kHz
Input voltage	up to $10 V_{\text{eff}}$
Target (not included)	core 0304034 ( $\varnothing 2 \times 28$ ) pressure tube 0483331 ( $\varnothing 5 \times 0.2$ )
Housing	plastics
Temperature stability sensor	zero: $\pm 50$ ppm / °C
Operating temperature sensor	$-20^\circ \text{C} \dots + 80^\circ \text{C}$
Protection class sensor	IP 67
Electronics	MSC710
	ISC7001

FSO = Full Scale Output

\* measuring range  $\pm 6$  mm



## Pressure resistant sensor with welded flange DTA-15D-5-CA-(03)

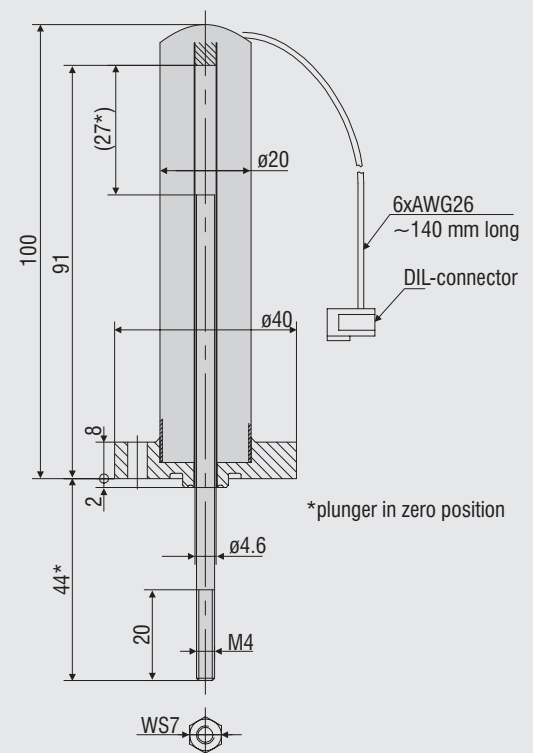


**Pressure resistant version**  
**Laser-welded stainless steel housing**  
**Integrated flange**  
**External electronics**

For displacement measurements in applications with a very high ambient pressure, sensors of the series LVDT are integrated into a laser-welded, pressure resistant housing with an O-ring seal. The integrated flange facilitates simple sensor mounting.

Model	DTA-15D-5-CA-(03)
Article	2607026.03
Measuring principle	LVDT (page 6)
Measuring range	$\pm 15$ mm
Linearity	$\pm 0.5$ % FSO
Excitation frequency	1 kHz
Excitation amplitude	2.5 V <sub>eff</sub>
Target (not included)	plunger 0800062 ( $\varnothing 4$ mm, 108 mm long) thread M4 (20 mm long)
Housing	stainless steel
Temperature stability sensor	zero: $\pm 50$ ppm / °C
Temperature range sensor	-20° C ... + 85° C
Pressure resistance	150 bar
Electronics	MSC710 ISC7001

FSO = Full Scale Output



## Half-bridge sensor with plastic housing DRA-25D-20-SR-02

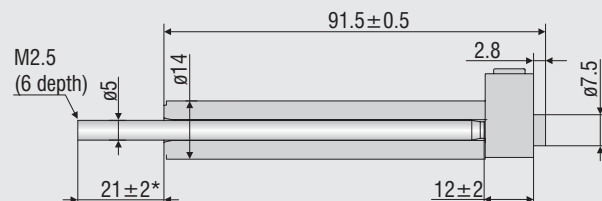
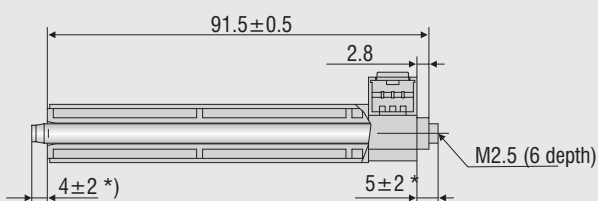


**Plastic housing**  
**Integrated Rast 2.5 plug**  
**Extrusion coated core**

The displacement sensor DRA-25D-20-SR(02) has been derived from the well-proven large-scale applications system for loading and unbalance detection in washing machines. The sensor is particularly well suited for applications in which displacements of up to 50 mm must be acquired economically and reliably. The sensor is integrated and protected within the machine or equipment. The integral 3-pole plug corresponds to the standardized Rast 2.5 dimensions.

Model	DRA-25D-20-SR
Article	2611031
Measuring principle	half-bridge
Measuring range	50 mm ( $\pm 25$ mm)
Linearity	$\pm 1$ % FSO (0.5 mm)
Excitation frequency	500 Hz
Excitation amplitude	5 V <sub>eff</sub>
Target (not included)	plunger 0800077 ( $\varnothing 4.76 \times 98$ long) with inner thread M2.5 (6 depth)
Housing	plastic
Temperature stability sensor	$\pm 0.01$ % / °C (core in midrange)
Temperature range sensor	-20° C ... +70° C
Protection class sensor	IP 40
Electronics	MSC7210
	ISC7001

FSO = Full Scale Output



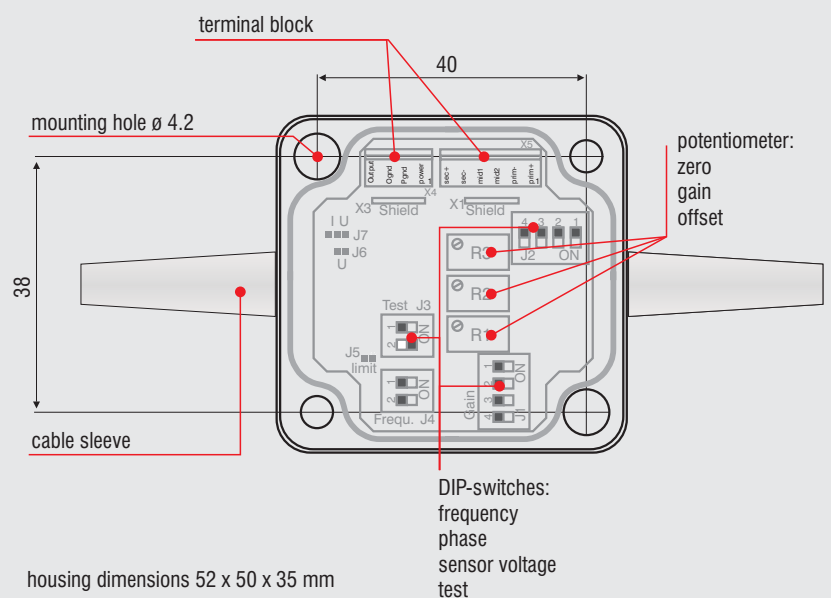
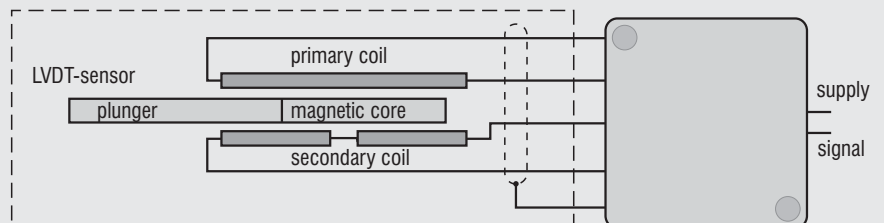
\*) midrange

## MSC710 sensor controller for LVDT series



**Excellent linearity and resolution**  
**Zero and gain adjustable coarse/fine**  
**Excitation frequency 1 ... 10 kHz (selectable)**  
**Compact and robust EMI-proofed housing**

The MSC710 is a single-channel miniature sensor controller for the operation of inductive displacement sensors based on the LVDT principle (Linear Variable Differential Transformer). Its compact, but rugged design, makes it suitable for both industrial and laboratory applications. Easily accessible and simple to operate, by using DIP-switches. The electronic unit can be matched to a wide range of sensors.



Model		MSC710-U	MSC710-I
Power supply		18 ... 30 VDC (18 ... 45 mA)	
Protection		Reverse polarity protection, overvoltage protection	
Sensor principle		for LVDT sensors	
Sensor excitation		150 ... 400 mV	
		1/2/5 kHz (selectable by DIP-switches)	
Input impedance	sensor	10 kOhm	
Range	gain	-20 ... +350 % (trimpot)	
	zero	±50 % (trimpot)	
Output signal		2 ... 10 VDC ( $R_a > 1$ kOhm)	4 ... 20 mA (load < 500 Ohm)
Noise		< 1.5 mV <sub>eff</sub> *	< 3 μA <sub>eff</sub> *
		< 15 mV <sub>ss</sub>	< 30 μA <sub>ss</sub>
Linearity		< 0.02 % FSO	
Frequency response		300 Hz (-3dB)	
Temperature range	storage	-40 °C ... +85 °C	
	operating	0 °C ... +70 °C	
Temperature stability		± 100 pmm / °C	
Protection class		IP 65	
Weight		80 g	
Housing material		ABS-plastic	
Electromagnetic compatibility (EMC)		EN 50081-2 (spurious emission)	
		EN 50082-2 (immunity to interference)	
Vibration		EN 60068-2-64 (noise)	
Shock		EN 60068-2-29 (continuous shock)	

FSO = Full Scale Output

\* RMS AC-Measuring, Frequency 3 Hz ... 300 Hz

# More Precision.

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### Sensors and systems

for displacement, position and dimension

### Sensors and measurement devices

for non-contact temperature measurement

### Measurement systems

for online/offline quality control

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