MICRO-EPSILON

More Precision

induSENSOR // Linear inductive displacement sensors

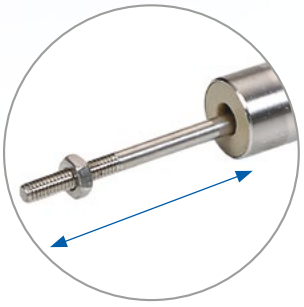
Linear displacement sensors
induSENSOR LDR

- Operating temperature up to 160 °C
- Compact design - short installation length
- High measurement signal quality
- IP67 Robust design IP67
- Sensor diameter of only ø8 mm

The specific sensor configuration of the LDR linear displacement sensors is characterized by its short, compact design and small diameter. Only three connections are required as interface to the sensor. Their compact design and the small sensor diameter allow the measuring systems to be installed in confined spaces.

Fields of application

Low-cost LDR sensors are also particularly suitable for large-scale installation under restricted spatial conditions and in industrial environments with a high measuring rate.



Freely moving plunger

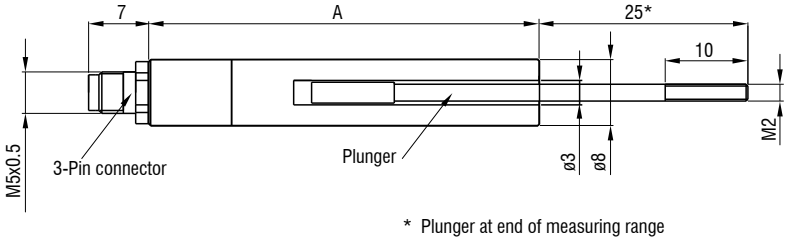
Article designation

LDR	-10	-CA
		Axial connections CA integral cable (2m) SA plug-in connection
	Measuring range in mm	
Principle: half-bridge sensor		

Model		LDR-10	LDR-25	LDR-50
Series		SA, CA	SA, CA	SA, CA
Measuring range		10 mm	25 mm	50 mm
Linearity	standard	≤ ±50 µm	≤ ±125 µm	≤ ±500 µm
	linearized [1]	≤ ±20 µm	≤ ±50 µm	≤ ±100 µm
Temperature stability	Zero	≤ 30 ppm FSO/K	≤ 30 ppm FSO/K	≤ 80 ppm FSO/K
	Max. temp. error	≤ 100 ppm FSO/K	≤ 100 ppm FSO/K	≤ 150 ppm FSO/K
Sensitivity		51 mV / mm/V	21 mV / mm/V	5.5 mV / mm/V
Excitation frequency		21 kHz	13 kHz	9 kHz
Excitation voltage		550 mV		
Connection	CA	integrated cable (2 m) with open ends; axial cable outlet; cable diameter 1.8 mm; min. bending radius 10 mm (fixed installation)		
	SA	3-pin connector; axial output (see accessories for connection cable)		
Temperature range [2]	Storage	SA: -40 … +80 °C; CA: -40 … +160 °C		
	Operation	SA: -15 … +80 °C; CA: -40 … +160 °C		
Pressure resistance		Atmospheric pressure		
Shock (DIN EN 60068-2-27)		40 g / 6 ms in 3 axes, 1000 shocks each 100 g / 6 ms in 3 axes, 3 shocks each		
Vibration (DIN EN 60068-2-6)		±1.5 mm / 10 … 58 Hz in 2 axes, 10 cycles each ± 20 g / 58 … 500 Hz in 2 axes, 10 cycles each		
Protection class (DIN EN 60529)		IP67 (plugged)		
Material		Stainless steel (housing)		
Weight	Sensor	approx. 9 g (SA); approx. 24 g (CA)	approx. 14 g (SA); approx. 28 g (CA)	approx. 23 g (SA); approx. 37 g (CA)
	Plunger	approx. 1.5 g	approx. 2.2 g	approx. 3.5 g
Compatibility		MSC7401, MSC7802, MSC7602		

[1] Only valid with linearized controller (factory service can be added to the overall system), observe installation environment
[2] Determined using the box method (-40 ... +80 °C)

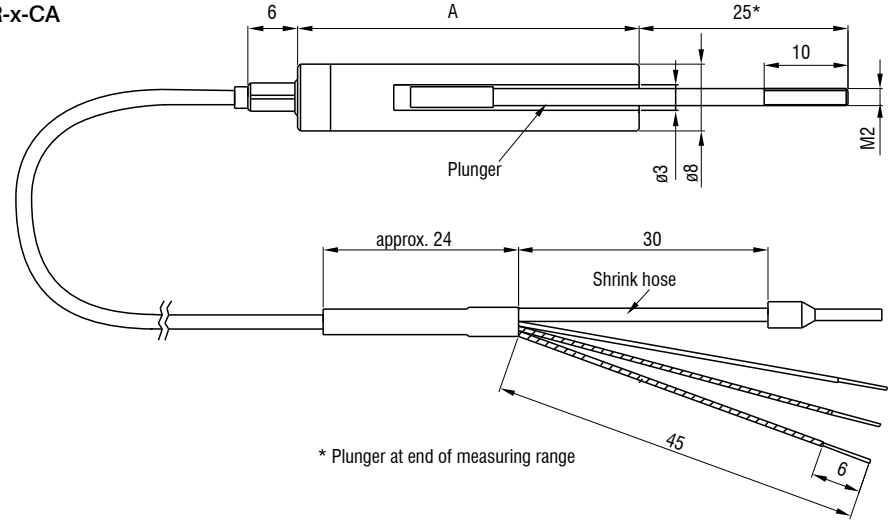
LDR-x-SA



* Plunger at end of measuring range

Model	A
LDR-10-SA	47 mm
LDR-25-SA	73 mm
LDR-50-SA	127 mm

LDR-x-CA



* Plunger at end of measuring range

Model	A
LDR-10-CA	41 mm
LDR-25-CA	67 mm
LDR-50-CA	121 mm

Dimensions in mm, not to scale

Mounting options and accessories
induSENSOR DTA / LDR

Connection cables

0157047	C7210-5/3	Sensor cable, 5 m, with cable connector
0157048	C7210/90-5/3	Sensor cable, 5 m, with 90° cable connector

Service (see page 34/35)

Connector assembly M9 and cable reduction XXXX mm - DTA-x
Connector assembly M9 - DTA-x (see page 34/35)

Power supply cable

2901087	PC710-6/4	Supply/output cable, 6 m

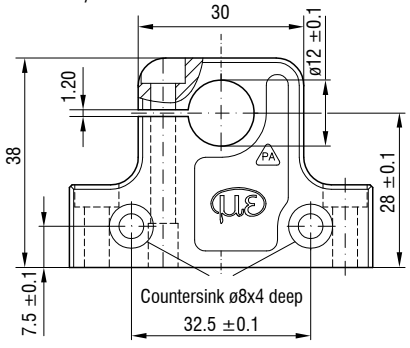
Spare plungers

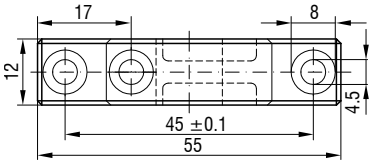
0800136	LDR-10	Spare plunger
0800137	LDR-25	Spare plunger
0800138	LDR-50	Spare plunger

Connector assembly

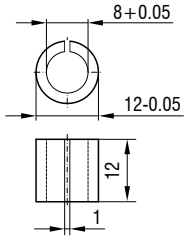
MBS12/8 Mounting block	Sensor installation for circumferential clamping
MBS12/8 Adapter ring	for reduction to D8 (gauge / LDR)

Mounting block MBS12/8



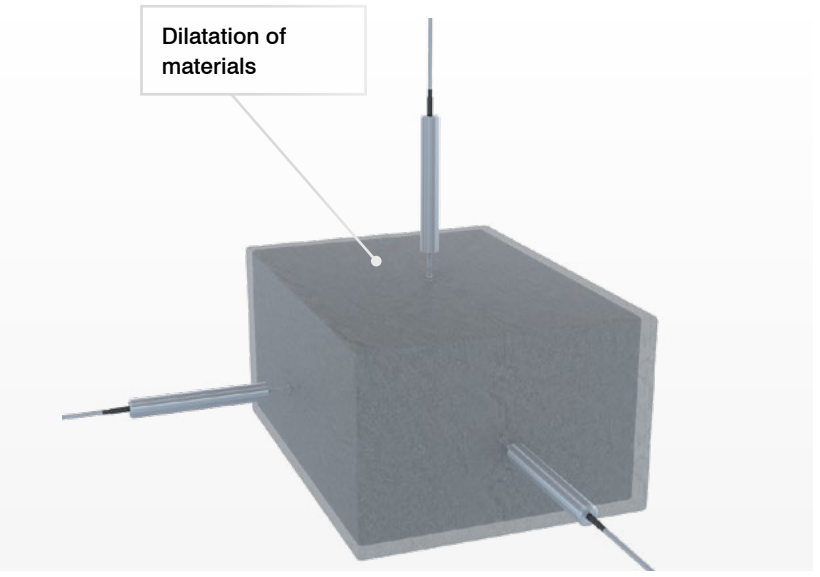


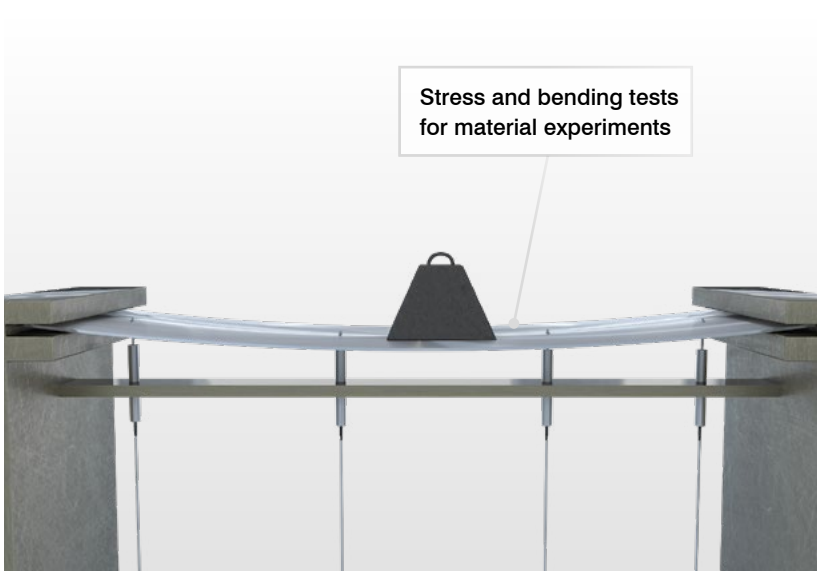
Adapter ring

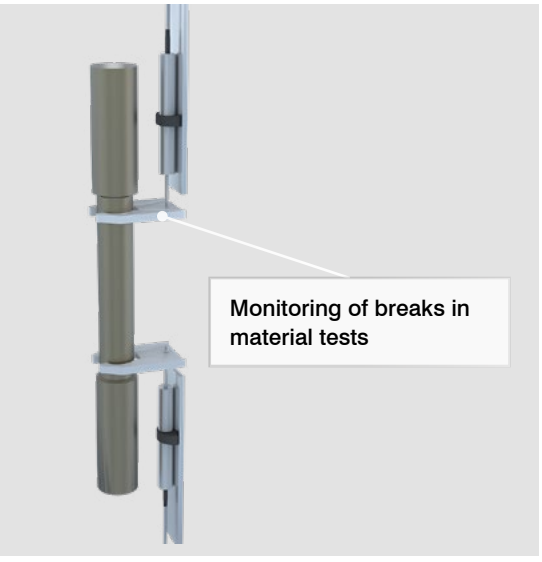


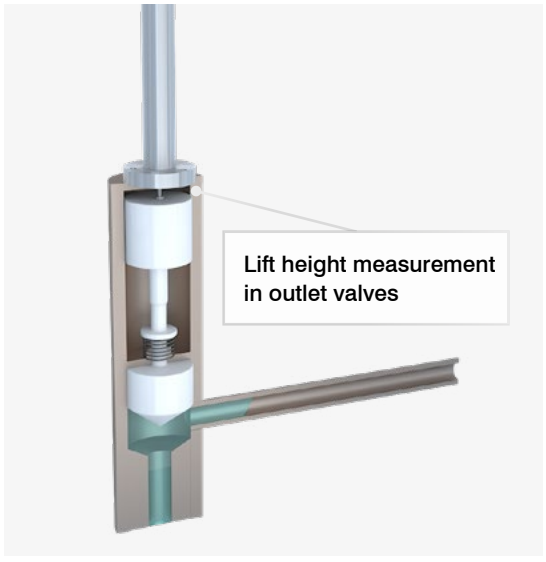
Applications
induSENSOR DTA / LDR

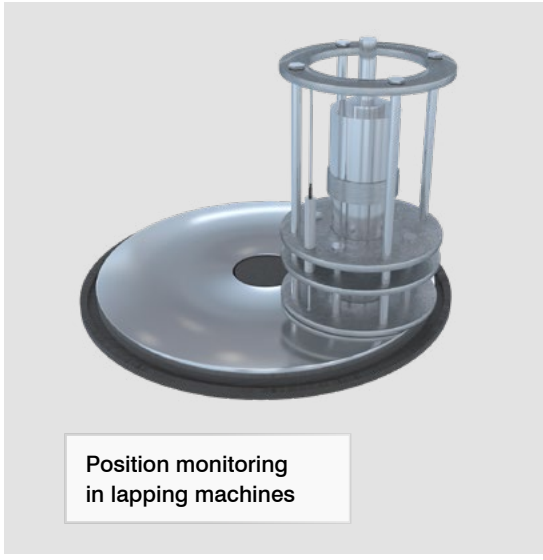
The DTA / LDR displacement sensors are suitable for numerous measurement tasks which require robust designs and high signal stability. Due to their wear-free design, the DTA / LDR sensors impress with longevity and long-term stability.

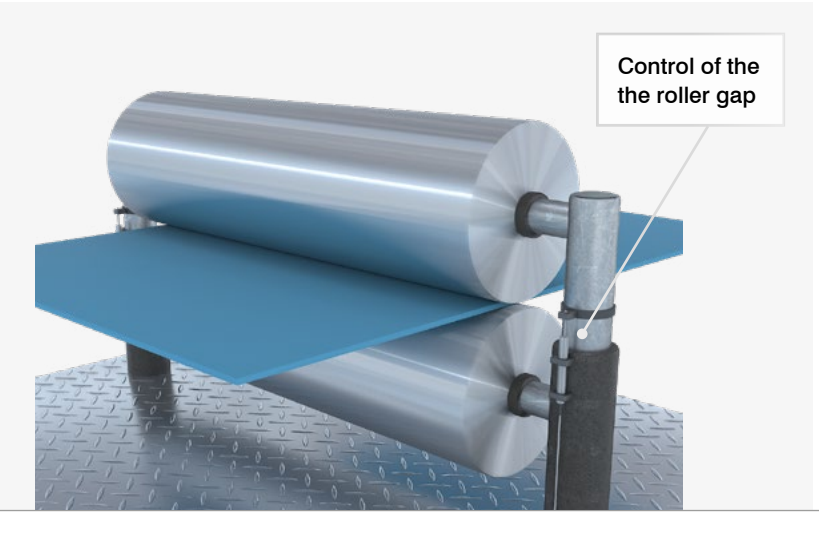


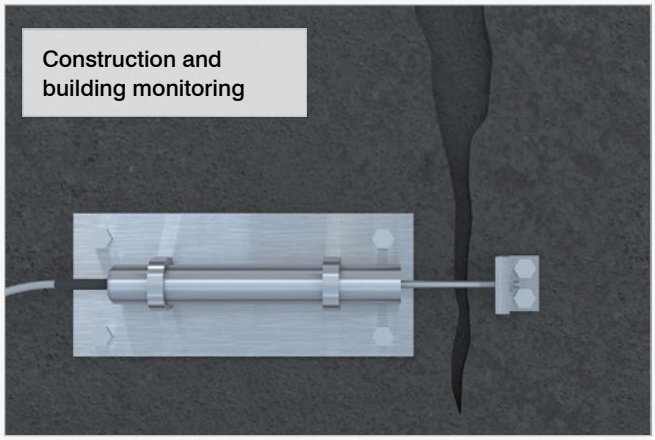












Accessories and connection possibilities
induSENSOR MSC

Accessories for MSC7401 / MSC7602 / MSC7802

Connection cables

PC7400-6/4	Supply and output cable, 6 m
PC5/5-IWT	Supply and output cable, 5 m (only MSC7401 / MSC7802)
IF7001	Single-channel USB/RS485 converter for MSC7xxx
MSC7602 connector kit	

MSC7602 connector kit

Service

Connection, adjustment and calibration including manufacturer certificate

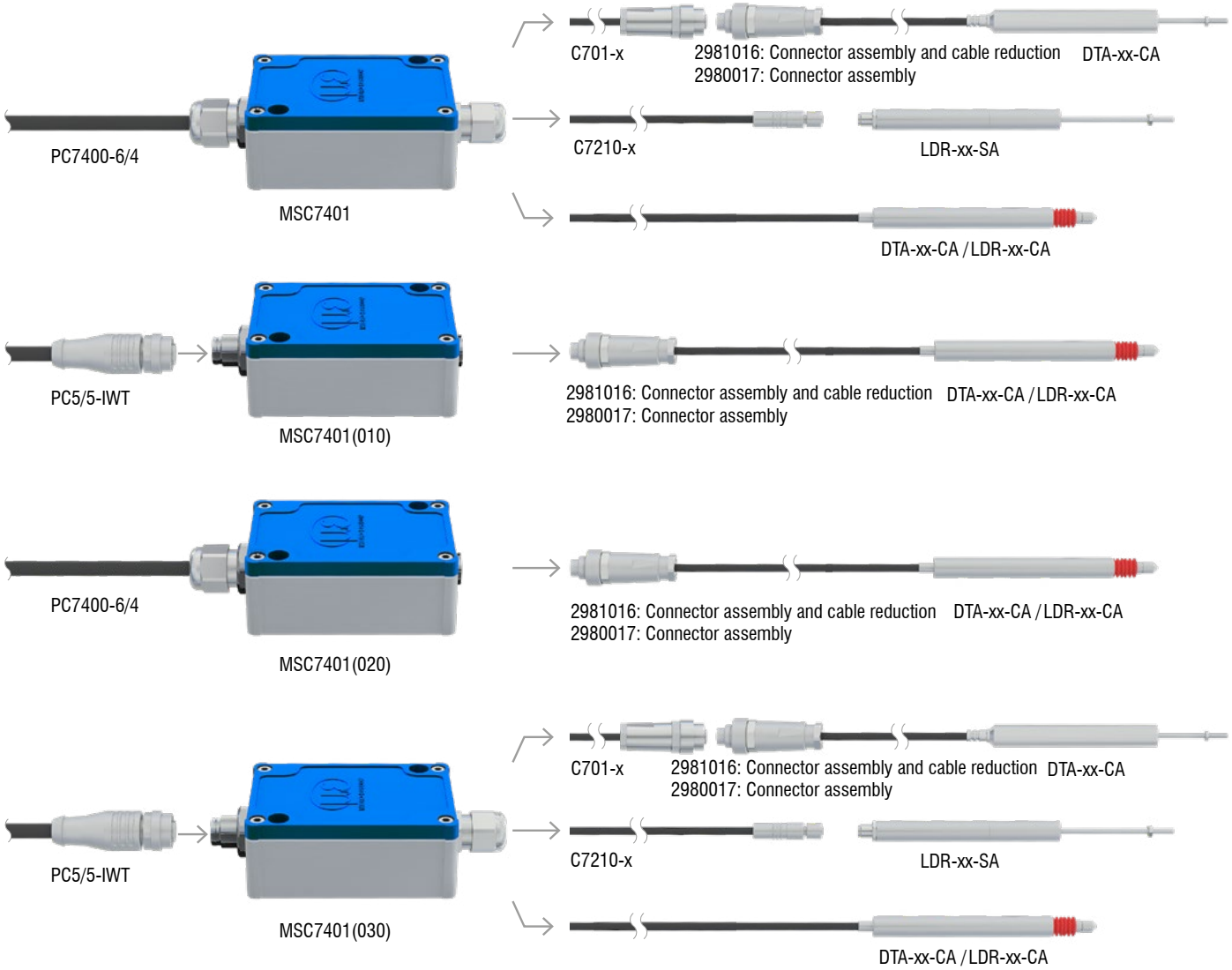
Interface modules

IF2035-EIP	DIN rail interface module for Ethernet/IP (multi-channel)
IF2035-PROFINET	DIN rail interface module for PROFINET (multi-channel)
IF2035-EtherCAT	DIN rail interface module for EtherCAT (multi-channel)
IF1032/ETH	Interface module for Ethernet/EtherCAT (single channel) (only MSC7401 / MSC7802)

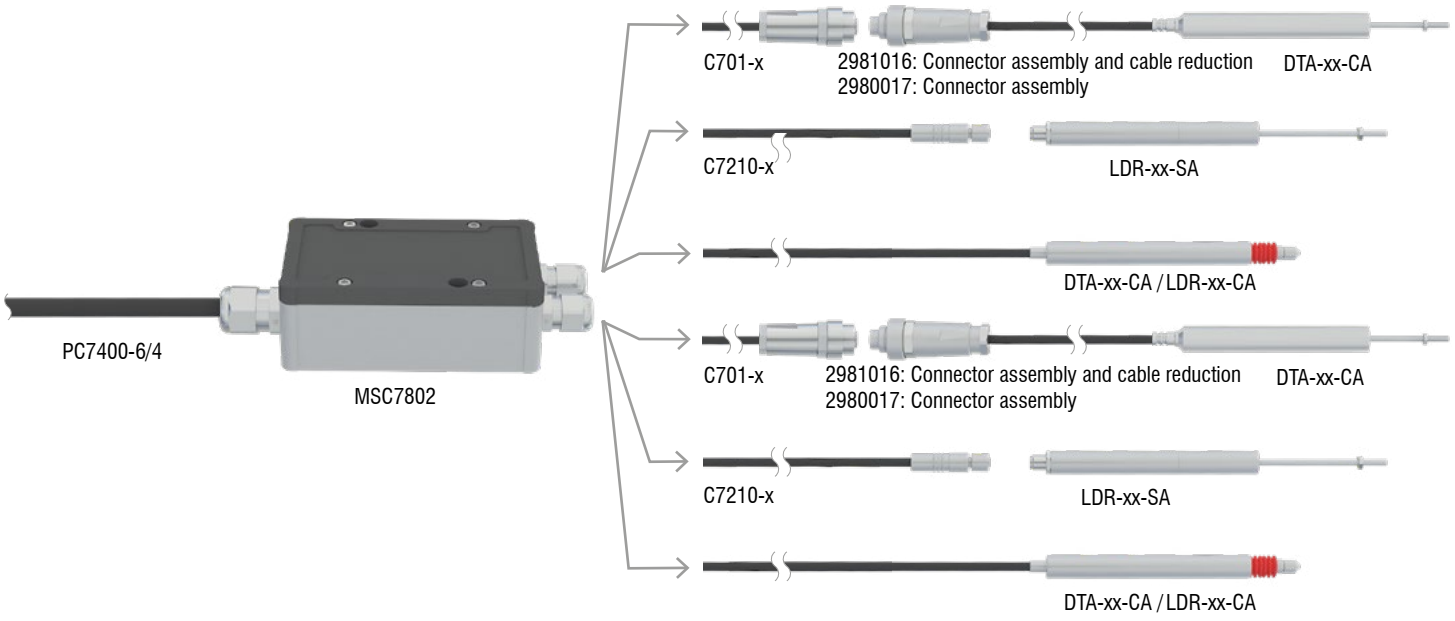
Power supply units

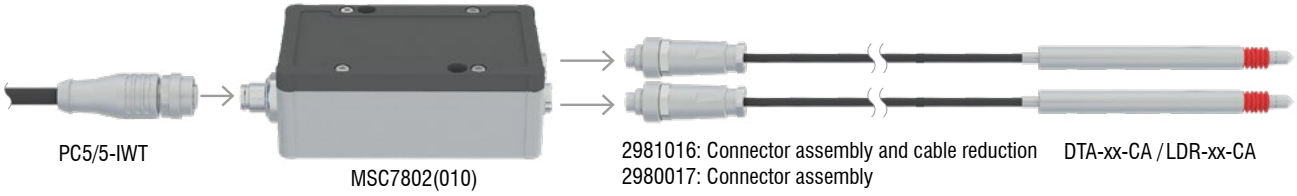
PS2401/100-240/24V/1A	Universal power supply unit with open ends

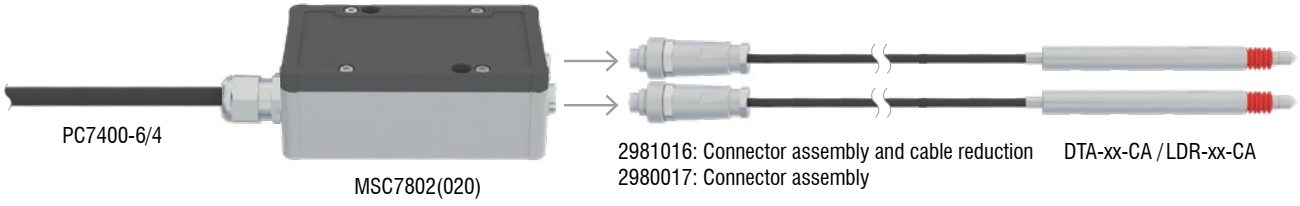
Connection options MSC7401

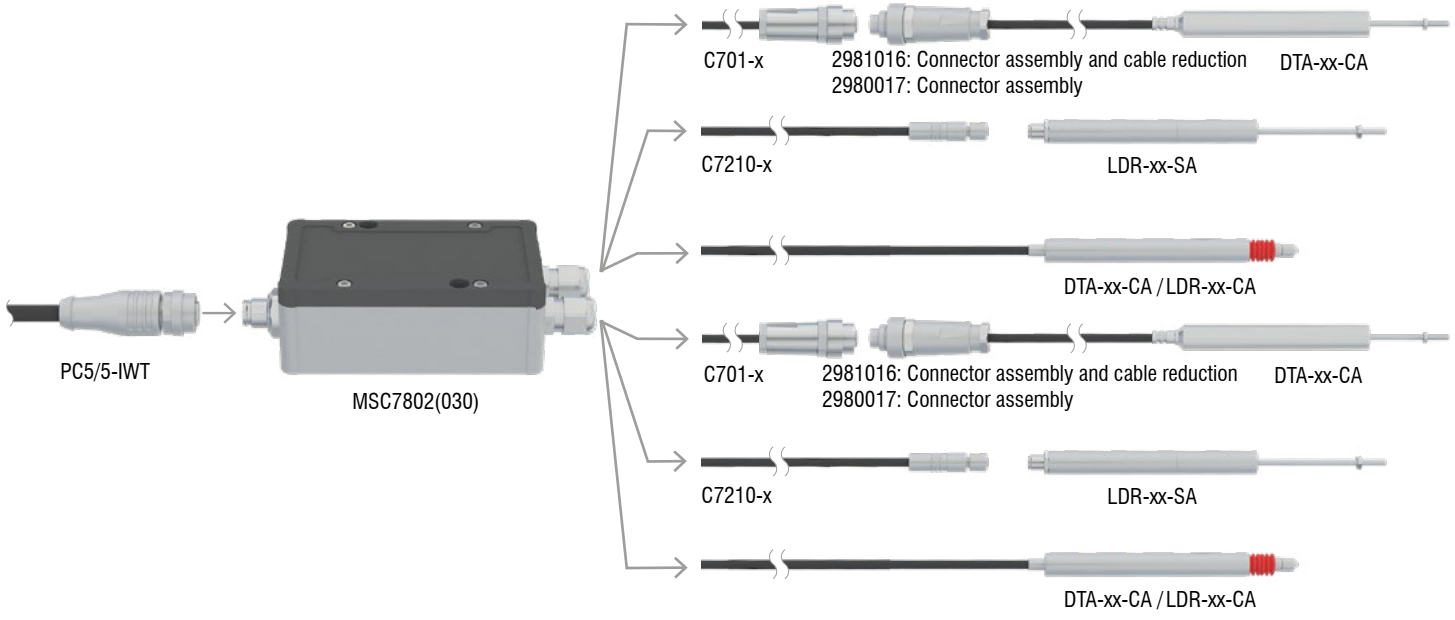


Connection options MSC7802









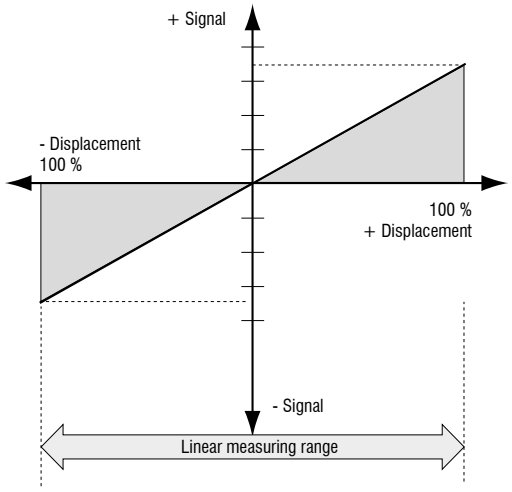
Technology and measuring principle
induSENSOR

LVDT Gauges and LVDT displacement sensors (DTA series)

LVDT displacement sensors and gauges (Linear Variable Differential Transformer) are constructed with a primary and two secondary coils, which are arranged symmetrically to the primary winding. As a measuring object, a rod shaped soft-magnetic core can be moved within the differential transformer. An electronic oscillator supplies the primary coil with an alternating current of constant frequency. The excitation is an alternating voltage with an amplitude of a few volts and a frequency between 1 and 10 kHz.

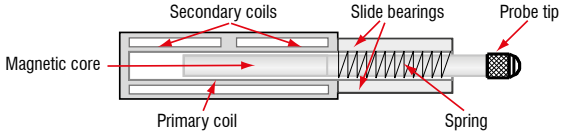
Depending on the core position, alternating voltages are induced in the two secondary windings. If the core is located in its "zero position", the coupling of the primary to both secondary coils is equally large. Movement of the core within the magnetic field of the coil causes a higher voltage in one secondary coil and a lower voltage in the second coil. The difference between the two secondary voltages is proportional to the core displacement. Due to the differential design of the sensor, the LVDT series has an output signal which is very stable.

Signal LVDT sensor



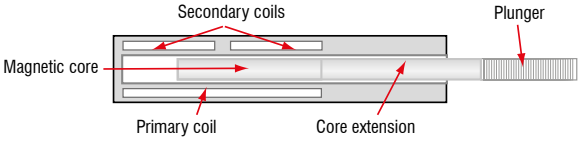
Probe tip

Measuring principle gauging sensor



Plunger

Measuring principle displacement sensor

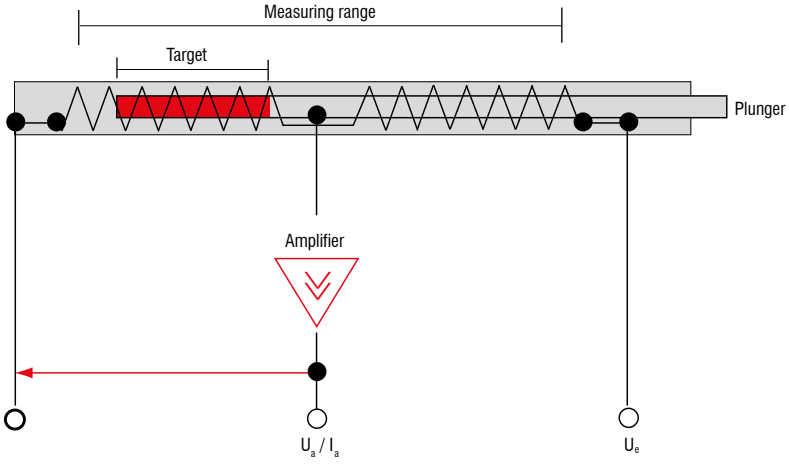


LDR Displacement sensors

The inductive sensors in the LDR series are constructed as half-bridge systems with center tap. An unguided plunger moves in the interior of the sensor coil, which consists of symmetrically constructed winding compartments. The plunger is joined to the moving measuring object via a thread.

Due to the movement of the plunger within the coil, an electrical signal is produced which is proportional to the displacement covered. The specific sensor configuration facilitates a short, compact design with a small diameter. Three connections are required as an interface to the sensor.

Block diagram LDR series

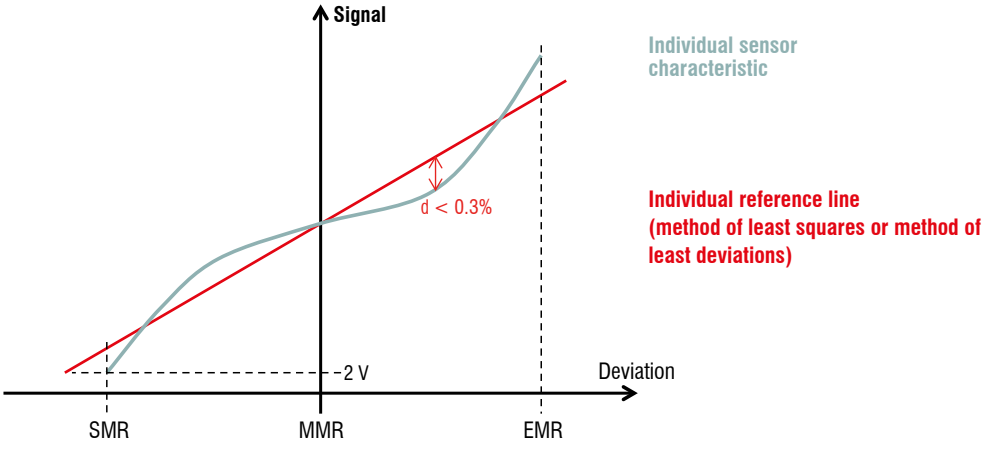


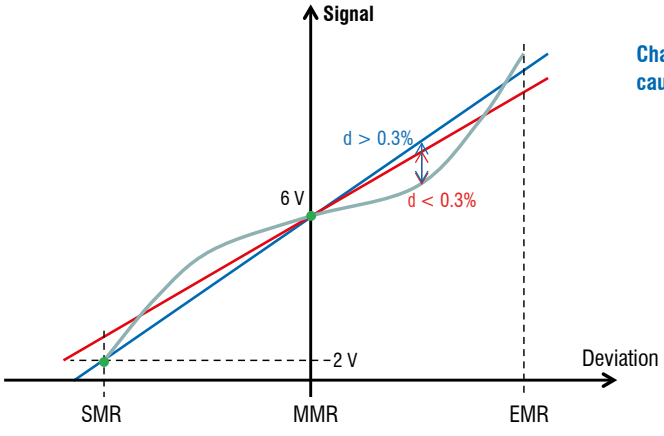
Independent and absolute linearity of LVDT sensors

Please consider that with LVDT sensors, two kinds of linearity must be distinguished:

With the independent linearity, an individual linearity characteristic is determined for the recorded sensor signal of each sensor. It describes the deviation of the recorded sensor signal from the individually calculated reference line (red, see figure). The maximum deviation (d) must not exceed the values specified in the datasheet.

With the absolute linearity, a new straight line is laid through two fixed points during the adjustment which may cause the gradient of the reference line to change. Therefore, the recorded values of the sensor signal may deviate more from the new line (blue) than is the case with the independent linearity (see figure), and also exceed the values specified in the datasheet.

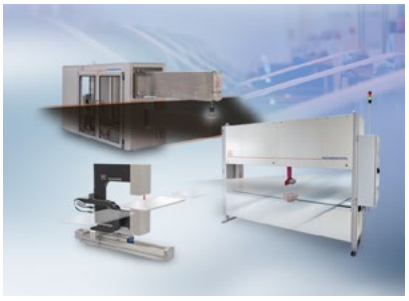




Sensors and Systems from Micro-Epsilon

Sensors and systems for displacement, distance and position

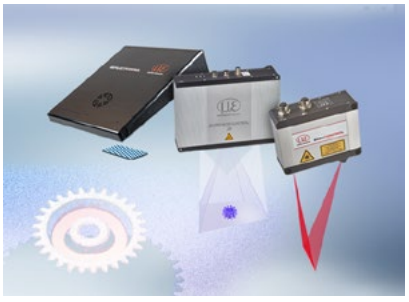
Sensors and measurement devices for non-contact temperature measurement



Measuring and inspection systems for metal strips, plastics and rubber

Optical micrometers and fiber optics, measuring and test amplifiers

Color recognition sensors, LED analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection

Modifications reserved / Y9766177-D022115GKE

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