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# More Precision

**induSENSOR** // Linear inductive displacement sensors





- *Wear-free and maintenance-free*
- *Temperature stability*
- *Operating temperature range up to 160 °C*
- *Compact design – short installation length*
- *Small sensor diameter*
- *High measurement signal quality*

The specific sensor configuration of the LDR series of linear displacement sensors is characterized by its short, compact design and small diameter. Three connections are required as an interface to the sensor. The compact design and the small sensor diameter facilitate the installation of the measuring systems in locations where space is restricted.

#### **Typical applications**

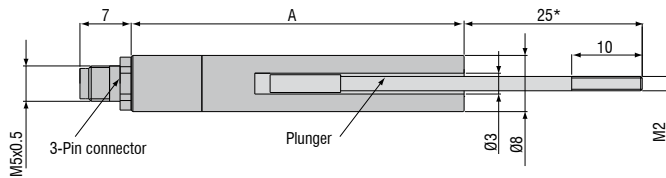
Low-cost LDR sensors are also particularly suitable for large-scale installation under restricted spatial conditions and in industrial environments with a high measuring rate.

Model	LDR-10-		LDR-25-		LDR-50-	
Connection	SA	CA	SA	CA	SA	CA
Measuring range	10 mm		25 mm		50 mm	
Measuring principle	LDR - sensor					
Linearity	typ. $\pm 0.30\%$ FSO		typ. $\pm 0.35\%$ FSO		typ. $\pm 0.5\%$ FSO	
	$\pm 0.030$ mm		$\pm 0.088$ mm		$\pm 0.35$ mm	
	max. $\pm 0.50\%$ FSO				max. $\pm 0.70\%$ FSO	
Excitation frequency	16 kHz		12 kHz		8 kHz	
Excitation amplitude	1 $V_{\text{eff}}$		1 $V_{\text{eff}}$		2.6 $V_{\text{eff}}$	
Sensitivity	51 mV/Vmm		21 mV/Vmm		5.5 mV/Vmm	
Temperature range	SA	Storage: $-40 \dots +80$ °C / Operation: $-15 \dots +80$ °C				
	CA	Storage: $-40 \dots +160$ °C / Operation: $-40 \dots +160$ °C				
Temperature stability <sup>1)</sup>	Zero	30 ppm / °C			40 ppm / °C	
	Max. temp. error	100 ppm / °C			150 ppm / °C	
Housing (material)	ferromagnetic stainless steel					
Weight sensor (without plunger)	9 g	24 g	14 g	28 g	23 g	37 g
Weight (plunger)	1.5 g		2.2 g		3.5 g	
Minimum bending radius (sensor cable fixed/moved)	8 / 15 mm	10 / 30mm	8 / 15 mm	10 / 30mm	8 / 15 mm	10 / 30mm
Outer diameter (sensor cable)	3.1 mm	1.8 mm	3.1 mm	1.8 mm	3.1 mm	1.8 mm
Protection class	IP67					
Shock	40 g, 3000 shocks / axis					
	100 g radial, 300 g axial					
Vibration	5 ... 44 Hz $\pm 2.5$ mm / 44 ... 500 Hz $\pm 20$ g					
Electrical connection	SA	3-pin plug-in connection (accessory cable, article 0157047/047, 3 or 5 m)				
	CA	integral axial cable (shielded), 2 m				
Suitable controller	MSC7401 (pages 10 - 11)					

FSO = Full Scale Output SA = connector axial CA = cable axial

<sup>1)</sup> Determined according to box method ( $-40 \dots +160$  °C)

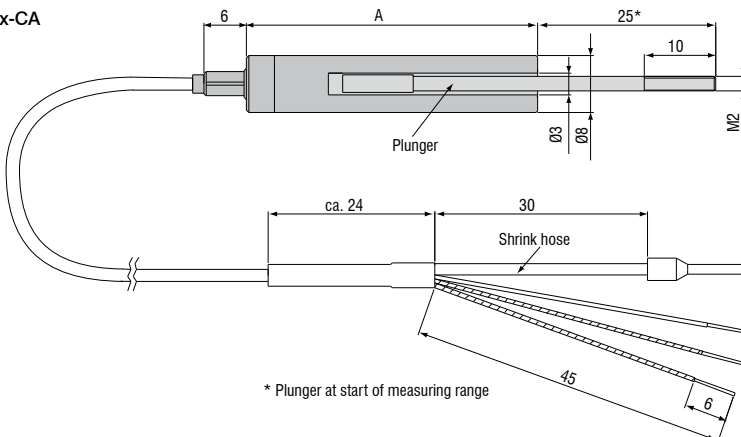
#### LDR-x-SA



\* Plunger at start 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 start of measuring range

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



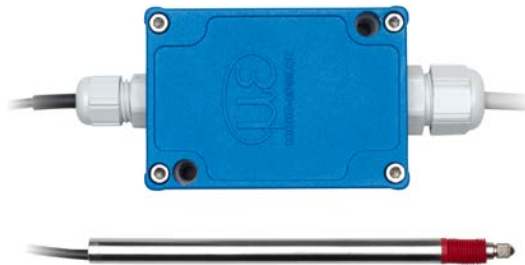
- Compact and robust aluminum housing (IP67)
- High resolution and linearity
- Universal application - compatible with LVDT and half-bridge sensors
- Ideal for high-volume applications in machine building and automation
- User-friendly set up and configuration via buttons or software

The new MSC7401 controller is designed to be operated with LVDT and LDR measuring gauges and displacement sensors. Due to its robust aluminum housing protected to IP67, this single-channel controller is predestined for industrial measurement tasks.

A large variety of compatible, inductive displacement sensors and gauges from Micro-Epsilon combined with an optimized price/performance ratio opens up numerous fields of applications in automation technology and machine building. The controller is easily set up using buttons or software.

#### Exemplary configuration

MSC7401 with DTA-5G8-3-CA gauge:



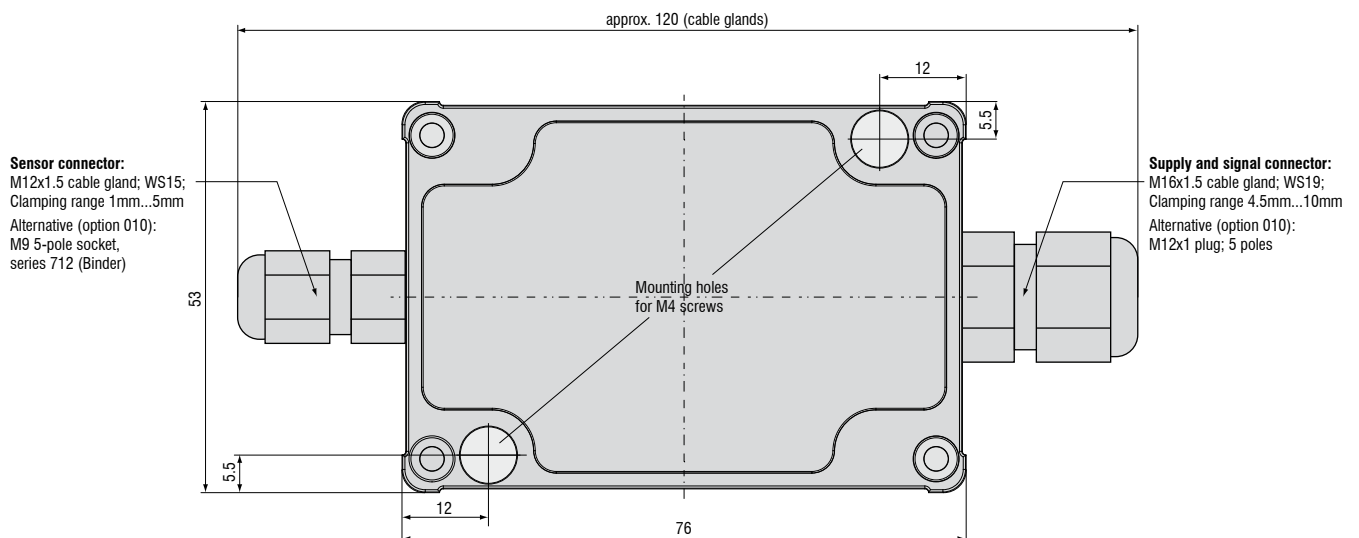
Technical Data	Channel with DTA-5G8-3-CA
Measuring range	$\pm 5 \text{ mm}$
Linearity	$30 \mu\text{m}$
Resolution	$\sim 1.2 \mu\text{m}$
Output	analog

Model		MSC7401 Miniature sensor controller
Power supply		5 V <sup>1)</sup> ... 14 V ... 30 V
Protection		reverse polarity protection, overvoltage protection
Sensor principle		full-bridge sensor/LVDT (DTA series) and half-bridge sensor (LDR series)
Input impedance (sensor)		> 100 kOhm
Gain		adjustable via buttons or software
Zero		
Output signal (adjustable)		(0)2 ... 10 VDC / 0.5 ... 4.5 V / 0 ... 5 V (Ra > 1 kOhm) or (0)4 ... 20 mA (load < 500 Ohm)
Resolution <sup>2)</sup>	DTA series	13 bits (0.012 % FSO) at 50 Hz 12 bits (0.024 % FSO) at 300 Hz
	LDR series	12 bits (0.024 % FSO) at 50 Hz 11 bits (0.048 % FSO) at 300 Hz
Linearity		0.02 % FSO
Frequency response (only adjustable via software)		300 Hz (-3dB)
Storage		-40 ... +85 °C
Operation		-40 ... +85 °C
Temperature stability	DTA series	± 100 ppm FSO/K
	LDR series	± 125 ppm FSO/K
Protection class		IP67
Weight		approx. 200 g
Housing material		aluminum die casting
Connection	Cable gland	screw terminal; AWG 16 to AWG 24; with ferrule up to AWG 28
	Connector	power supply: M12x1 plug (5 poles); sensor: M9 socket; 5 poles (Binder)
EMC		DIN EN 61326-1; DIN EN 61326-2-3
Vibration		DIN EN60068-2-6
Shock		DIN EN 60068-2-27 (40g, 6ms, 1000 per axis)
		DIN EN 60068-2-27 (100g, 6ms, 3 per axis)

FSO = Full Scale Output

<sup>1)</sup> Restricted with load and signal span

<sup>2)</sup> Noise: AC RMS measurement via RC low-pass filter of the 1st order with  $f_c = 5$  kHz



**General accessories**

2960031	MC25D	Digital micrometer calibration fixture
2420062	PS2020	Power supply on DIN rail, input 100 - 240 VAC, output 24 VDC / 2.5 A
2984026		Function and linearity inspection certificate incl. protocol with listed measurement data of the linearity inspection and documentation
2213034		IF7001 single-channel USB/RS485 converter

**Accessories for LDR series****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

**Supply cable**

2901087	PC710-6/4	Supply/output cable, 6 m
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**Spare plungers**

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

**Service**

Connector installation and adjustment

**Accessories for EDS series****Service**

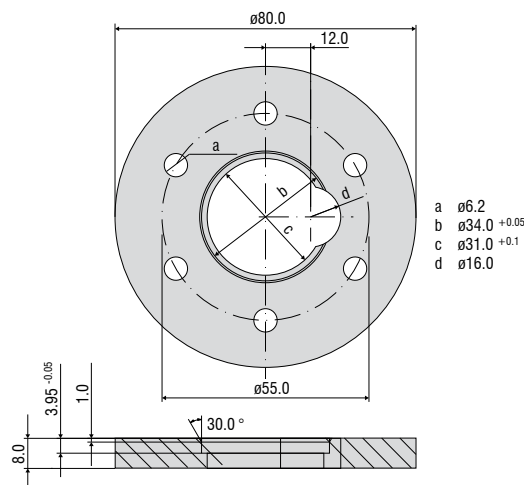
2985001		Function and linearity inspection for EDS series incl. pressure inspection and documentation without recalibration
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**Connection cables**

0157043	C703-5	VIP/LVP/EDS 7-pin connection cable for S series, 5 m
2902084	C703-5/U	VIP/LVP/EDS 7-pin connection cable for S series, 5 m for voltage output 1 - 5 V
0157050	C703/90-5	VIP/LVP/EDS 7-pin connection cable for S series, 5 m with 90° cable connector
2901143	C705-5	VIP-/LVP-/EDS 5-pin connection cable for F series, 5 m
2901160	C705-15	VIP-/LVP-/EDS 5-pin connection cable for F series, 15 m

**Installation ring**

0483326		EDS mounting ring
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## High performance sensors made by Micro-Epsilon



Sensors and systems for displacement and position



Sensors and measurement devices for non-contact temperature measurement



2D/3D profile sensors (laser scanner)



Optical micrometers, fiber optic sensors and fiber optics



Color recognition sensors, LED analyzers and color online spectrometer



Measurement and inspection systems