



# More Precision

**induSENSOR** // Linear inductive displacement sensors





- Proven LVDT technology
- Measuring ranges  $\pm 1 \dots \pm 25 \text{ mm}$
- Extremely accurate also under difficult ambient conditions
- Long-term stability
- Wear-free measurement

LVDT 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 measuring range and an excitation amplitude of 2.5 to 5 V eff. Matched sensor electronics are available in this respect.

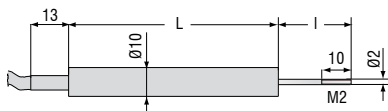
With appropriate setting possibilities for the excitation frequency and amplitude, the sensors can also be operated with alternative electronics.

#### Article designation

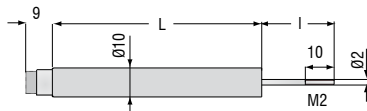
|  |    |                    |                         |                       |     |   |
|--|----|--------------------|-------------------------|-----------------------|-----|---|
| DT   | A- | 10-                | D-                      | 3-                    | CA- | W |
| Options (on request):  |    |                    |                         |                       |     |   |
| W Welded sensor housing (water proof up to 5 bar)  |    |                    |                         |                       |     |   |
| P Pressure-resistant sensors housing with tightness test (up to 100 bar)   |    |                    |                         |                       |     |   |
| F Pressure-resistant mounting flange O-ring seal   |    |                    |                         |                       |     |   |
| H High-temperature sensor models up to 200 °C with integral Teflon cable (only for sensor models with -CA/-CR connections) |    |                    |                         |                       |     |   |
| Axial connections  |    |                    | Radial connections      |                       |     |   |
| CA integral cable (3 m)  |    |                    | CR integral cable (3 m) |                       |     |   |
| SA plug-in connection  |    |                    | SR plug-in connection   |                       |     |   |
| Linearity: 5 ( $\pm 0.5 \%$ )  |    | 3 ( $\pm 0.3 \%$ ) |                         | 1.5 ( $\pm 0.15 \%$ ) |     |   |
| Function: displacement sensor  |    |                    |                         |                       |     |   |
| Measuring range in mm  |    |                    |                         |                       |     |   |
| Excitation AC  |    |                    |                         |                       |     |   |
| Principle: Differential Transformer (LVDT)   |    |                    |                         |                       |     |   |

| Model                               | DTA-1D-                                      |    | DTA-3D-   |    | DTA-5D-   |    | DTA-10D-                                     |    | DTA-15D-   |    |       |    | DTA-25D-  |    |            |    |  |  |
|-------------------------------------|--|----|-----------|----|-----------|----|--|----|------------|----|-------|----|-----------|----|------------|----|--|--|
| Connection                          | CA   | SA | CA        | SA | CA        | SA | CA   | SA | CA         | CR | SA    | SR | CA        | CR | SA         | SR |  |  |
| Measuring range                     | ± 1 mm                                       |    | ± 3 mm    |    | ± 5 mm    |    | ± 10 mm                                      |    | ± 15 mm    |    |       |    | ± 25 mm   |    |            |    |  |  |
| Linearity                           | Standard ± 0.5 %                             |    | -         |    | -         |    | -  |    | -          |    |       |    | 300 μm    |    |            |    |  |  |
|                                     | Standard ± 0.3 %                             |    | 6 μm      |    | 18 μm     |    | 30 μm  |    | 60 μm      |    | 90 μm |    |           |    | on request |    |  |  |
|                                     | Option ± 0.15 %                              |    | 3 μm      |    | 9 μm      |    | 15 μm  |    | on request |    |       |    | -         |    |            |    |  |  |
| 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 ... +80 °C <sup>1)</sup>                 |    |            |    |       |    |           |    |            |    |  |  |
| Storage temperature                 |  |    |           |    |           |    | -40 ... +80 °C                               |    |            |    |       |    |           |    |            |    |  |  |
| Temperature stability <sup>3)</sup> | Zero   |    |           |    |           |    | 70 ppm/°C                                    |    |            |    |       |    |           |    |            |    |  |  |
|                                     | Max. temp. error                             |    |           |    |           |    | 150 ppm/°C                                   |    |            |    |       |    |           |    |            |    |  |  |
| Sensor housing                      | stainless steel including magnetic shielding |    |           |    |           |    |  |    |            |    |       |    |           |    |            |    |  |  |
| Minimum cable bending radius        |  |    |           |    |           |    | 20 mm  |    |            |    |       |    |           |    |            |    |  |  |
| Outer diameter (cable)              |  |    |           |    |           |    | ~4.6 mm                                      |    |            |    |       |    |           |    |            |    |  |  |
| Protection class                    |  |    |           |    |           |    | IP 67 <sup>2)</sup>                          |    |            |    |       |    |           |    |            |    |  |  |
| Shock                               |  |    |           |    |           |    | 40 g, 1000 shocks / axis                     |    |            |    |       |    |           |    |            |    |  |  |
|                                     |  |    |           |    |           |    | 100 g, 3 shocks / direction                  |    |            |    |       |    |           |    |            |    |  |  |
| Vibration                           |  |    |           |    |           |    | 10 ... 58 Hz ± 1.5 mm / 58 ... 500 Hz ± 20 g |    |            |    |       |    |           |    |            |    |  |  |
| Suitable controller                 |  |    |           |    |           |    | MSC7401 (pages 10 - 11)                      |    |            |    |       |    |           |    |            |    |  |  |

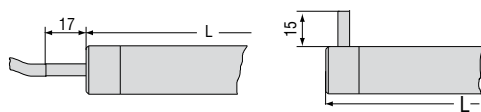
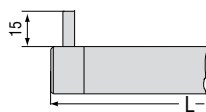
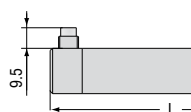
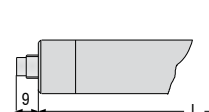
FSO = Full Scale Output

<sup>1)</sup> Higher temperatures on request<sup>2)</sup> Higher pressures on request<sup>3)</sup> Determined according to box method (-40 ... +80 °C)**Sensor types with measuring range up to ± 10mm** (inner diameter 2.7 mm; plunger diameter 2 mm)

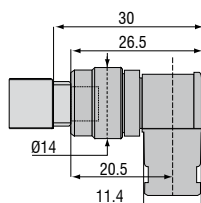
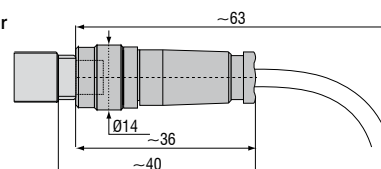
Type-CA with integral cable



Type-SA with axial plug connection

**Sensor types with measuring range ± 15mm and ± 25mm** (inner diameter 4.8 mm; plunger diameter 4 mm)Type - CA  
with integral cableType - CR  
with integral cable (radial)Type - SR  
with radial plug connectionType - SA  
with axial plug connection

| Basic model                    | DTA-1D- |       | DTA-3D- |       | DTA-5D- |       | DTA-10D- |       | DTA-15D- |    |    |    | DTA-25D- |    |    |    |
|--------------------------------|---------|-------|---------|-------|---------|-------|----------|-------|----------|----|----|----|----------|----|----|----|
| Connection                     | CA      | SA    | CA      | SA    | CA      | SA    | CA       | SA    | CA       | CR | SA | SR | CA       | CR | SA | SR |
| Housing length L               | 40 mm   | 40 mm | 57 mm   | 57 mm | 73 mm   | 73 mm | 87 mm    | 87 mm | 106.5 mm |    |    |    | 143.5 mm |    |    |    |
| Plunger length l <sup>1)</sup> | 19 mm   |       | 29 mm   |       | 30 mm   |       | 35 mm    |       | 51 mm    |    |    |    | 62 mm    |    |    |    |
| Housing diameter               | 10 mm   |       |         |       |         |       | 20 mm    |       |          |    |    |    |          |    |    |    |

<sup>1)</sup> Plunger in zero position (±10% of measuring range ±1 mm)**Female connector 90°**  
dimensions apply  
for all models**Female connector**  
dimensions apply  
for all models

**General accessories**

|         |        |   |
|---------|--------|---|
| 2960031 | MC25D  | Digital micrometer calibration fixture  |
| 2420062 | PS2020 | Power supply on DIN rail,<br>input 100 - 240 VAC, output 24 VDC / 2.5 A   |
| 2984026 |        | Function and linearity inspection certificate incl. protocol<br>with listed measurement data of the linearity inspection<br>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 |
|---------|-----------|--------------------------|

**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**

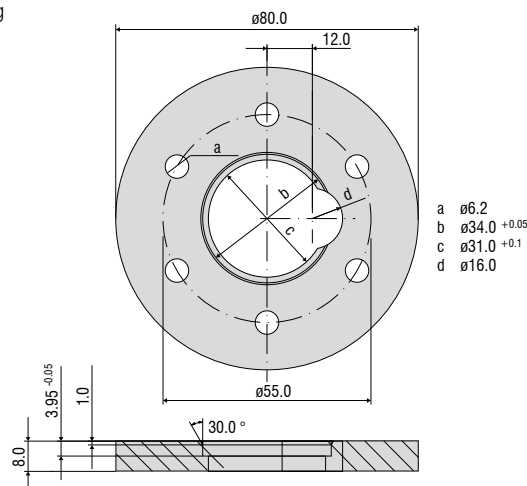
|         |  |   |
|---------|--|---|
| 2985001 |  | Function and linearity inspection for EDS series incl. pressure inspection<br>and documentation without recalibration |
|---------|--|---|

**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<br>for voltage output 1 - 5 V |
| 0157050 | C703/90-5 | VIP/LVP/EDS 7-pin connection cable for S series, 5 m<br>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 |
|---------|--|-------------------|



Linearity inspection certificate

**Accessories for LVDT series**

**Sensor cables**

|         |           |  |
|---------|-----------|--|
| 2902004 | C701-3    | Sensor cable, 3 m, with cable connector and tin-plated free ends     |
| 2902013 | C701-6    | Sensor cable, 6 m, with cable connector and tin-plated free ends     |
| 2902009 | C701/90-3 | Sensor cable, 3 m, with 90° cable connector and tin-plated free ends |
| 2213034 | IF7001    | Single-channel USB/RS485 converter for MSC7xxx                       |

**Service**

|         |  |
|---------|--|
| 2981010 | Connector installation and calibration |
|---------|--|

**Connection cables**

|          |           |   |
|----------|-----------|---|
| 2901087  | PC710-6/4 | Supply/output cable, 6 m, open ends     |
| 29011154 | PC5/5-IWT | Supply/output cable, 5 m, open ends/M12 |

**Spare plungers**

|         |         |               |
|---------|---------|---------------|
| 0800001 | DTA-1D  | Spare plunger |
| 0800002 | DTA-3D  | Spare plunger |
| 0800003 | DTA-5D  | Spare plunger |
| 0800004 | DTA-10D | Spare plunger |
| 0800005 | DTA-15D | Spare plunger |
| 0800006 | DTA-25D | Spare plunger |

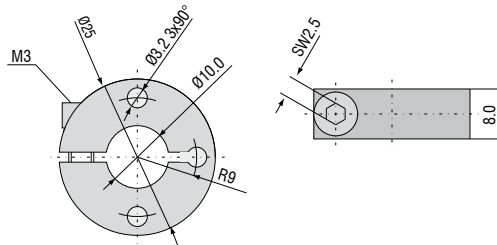
**Flanges**

|            |         |  |
|------------|---------|--|
| 0483090.01 | DTA-F10 | Mounting flange, slotted for DTA-1D, DTA-3D, DTA-5D, DTA-10D |
| 0483083.02 | DTA-F20 | Mounting flange, slotted for DTA-15D, DTA-25D                |

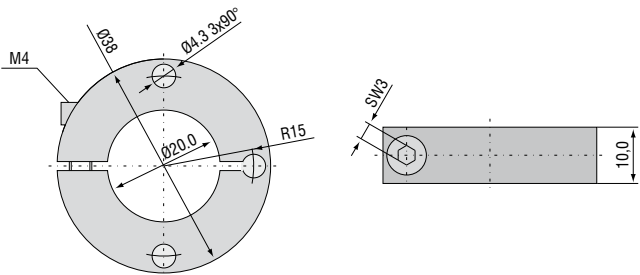
**Probe tips**

|         |                     |
|---------|---------------------|
| 0459002 | Type 2              |
| 0459001 | Type 2 (hard metal) |
| 0459003 | Type 11             |
| 0459004 | Type 13             |

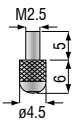
**Flange DTA-F10**



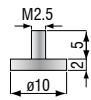
**Flange DTA-F20**



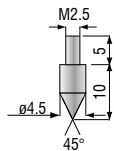
**Standard probe tip: type 2**



**Option: type 11**



**Option: type 13**



## 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 inline spectrometer



Measurement and inspection systems