SENSORS & SYSTEMS

Authority in displacement measurement

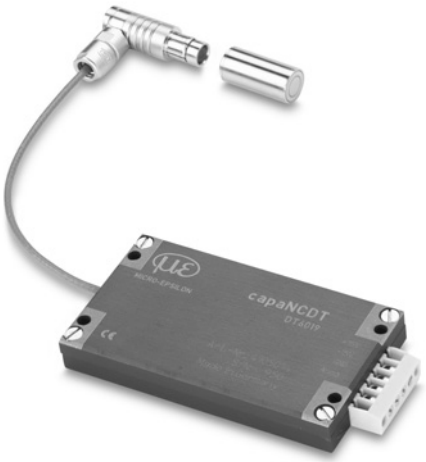
MICRO-EPSILON

CAPACITIVE PRINCIPLE

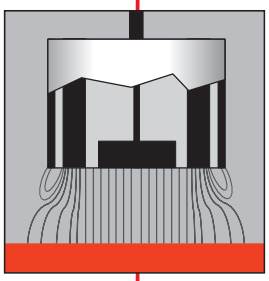
capaNCDT

World's smallest capacitive controller

capaNCDT 6019



Non-contact capacitive displacement measurement



- Low power consumption
- Any conductive target
- Extreme stability

Compact sensor system
capaNCDT 6019

Measuring principle

The operating principle of non-contact capacitive displacement measurement used by the capaNCDT system (capacitive Non-Contact Displacement Transducer) is based on the ideal parallel plate capacitor. The two plate electrodes are formed by the sensor and the target opposite. If an AC current with constant amplitude flows through the sensor capacitor, the amplitude of the AC voltage on the sensor is proportional to the distance between the capacitor electrodes; an adjustable compensating voltage is simultaneously generated in the amplifier electronics. After demodulation of both AC voltages the difference is amplified and output as an analog signal.

Electrical conductors as targets

The linear characteristic of the measurement signal is achieved without extra electronic linearization when measuring against targets made of electrically-conductive materials (metals). Changes in the conductivity do not affect sensitivity or linearity.

Linearization and calibration

capaNCDT 6019 system is factory-calibrated for metallic targets (output 0-10 Volt). In critical sensor mounting conditions, the rated range of the output characteristic can be adjusted and optimized, through the use of the zero and gain potentiometers.

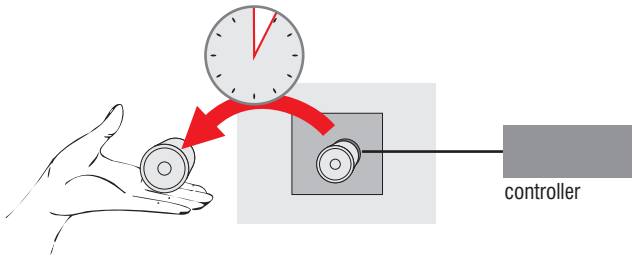
Tri-Electrode technology with active guarding

Due to the unique design of the MICRO-EPISLON Tri-Electrode sensor probes in conjunction with the active guarding technology the capaNCDT 6019 system enables extreme signal stability and immunity.

For machine integration

The non-contact capacitive displacement measuring system capaNCDT 6019 is developed for machine and facility integration. The compact design, the special performed technical data and the low cost prices make the system ideally suited for OEM applications. The capacitive principle allows to measure against any conductive target - furthermore, it ensures very stable and very accurate measuring results. Typical applications can be found in positioning, wear measurements, gap measurements, displacement, roundness and other.

Instant sensor swap within 5 seconds!
Replace any capaNCDT controller and any capaNCDT sensor within seconds without recalibration !

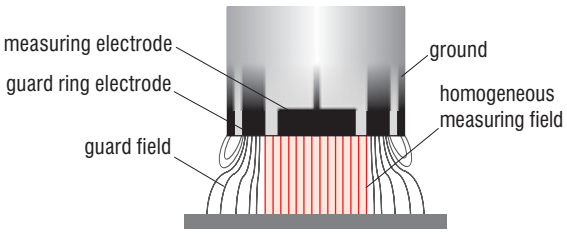


Instant sensor swap without recalibration

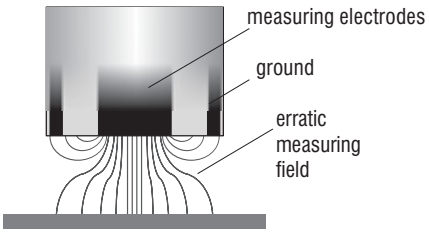
The unique MICRO-EPSILON capacitive technology allows changing any capaNCDT sensor in seconds! Replacing sensors with different measuring ranges and any capaNCDT controller without recalibration. A sensor swap with capaNCDT needs no more than 5 seconds, while other capacitive systems are not designed for replacing components without the need of individual calibration and linearization.

Active guarding for stable measuring results

MICRO-EPSILON capaNCDT sensor



Common capacitive sensor



capaNCDT 6019: single channel system (SMD-model with integral sensor connecting cable)							
Model	**S601-0.2**	**S600-0.5**	**S600-1**	**CS2**	**CS3**	**CS5**	**CS10**
Measuring range	0.2 mm	0.5 mm	1 mm	2 mm	3 mm	5 mm	10 mm
Resolution (static)	≤ 0.01% FSO						
Linearity	≤ 1% FSO						
Frequency response	500 Hz (-3dB)						
Active measuring area (diameter)	2.3 mm	3.9 mm	5.5 mm	7.9 mm	9.8 mm	12.6 mm	17.8 mm
Guard ring width	1 mm	1.4 mm	1.5 mm	4 mm	8.1 mm	11.8 mm	18.1 mm
Sensor connecting cable	120mm, triax angle connector						
Storage temperature	-10°C to 70°C						
Operation temperature	10 °C to 50 °C						
Air humidity	5% to 95% r.H., non-condensing						
Min. load resistance	2 kOhm						
Output	0 to 10V (within measuring range)						
Power supply	± 15V DC						
Max. permissible power supply voltage	± 18V DC						
Min. required power supply voltage	± 12V DC						
Current consumption (±15V)	max. -7 mA / +10 mA (end of measuring range)						
Voltage output	short circuit proof						
Temperature stability	≤ 0.05% FSO / °C (+10°C to +50°C)						
Weigth — Sensors	2 g	4 g	8 g	48 g	65 g	95 g	180 g
Weigth — Controller	60g						
Measuring target	any conductive target						

FSO = Full scale output

Technical specifications are valid for electrical conductors (metal) as reference material at 20 °C (68 °F) ambient temperature and for the standard length (0,12 m) of the sensor cable.

The high linearity is in the measuring principle

The capaNCDT system evaluates the reactance Xc of the capacitor which changes strictly in proportion to the distance:

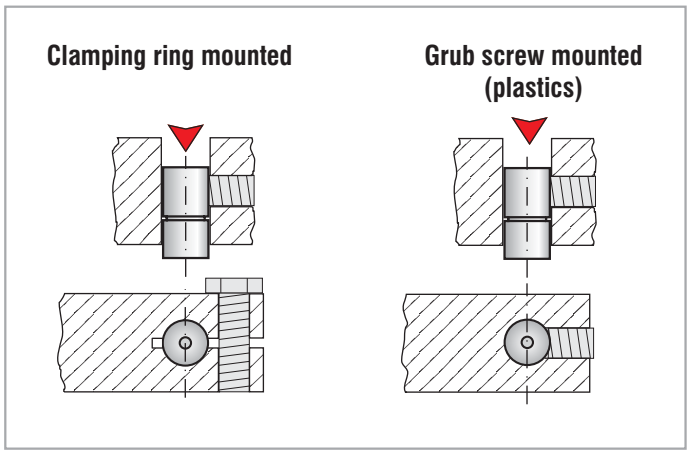
$$Xc = \frac{1}{j\,\omega\,C} \quad \text{capacitance } C = \varepsilon_r \cdot \varepsilon_0 \cdot \frac{\text{area}}{\text{distance}}$$

$$Xc = \text{constant} \cdot \text{distance}$$

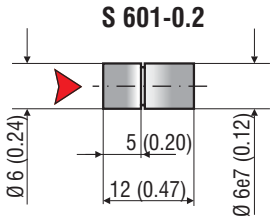
This theoretical relationship is put into practice by constructing the sensors as guard ring capacitors.

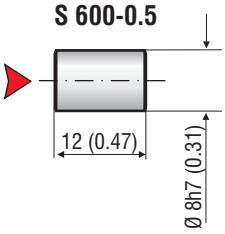
Sensor installation

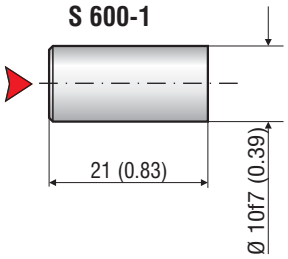
All sensors can be installed free-standing or flush and are secured by clamping or with a chuck.



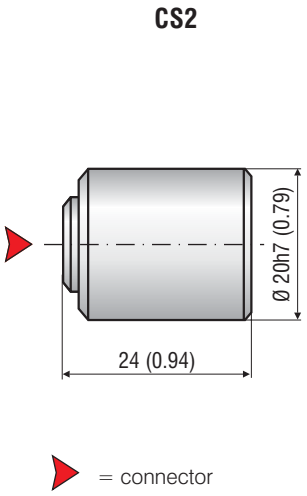
capaNCDT 6019 Sensors and Controller - dimensions in mm (rounded inch), not to scale

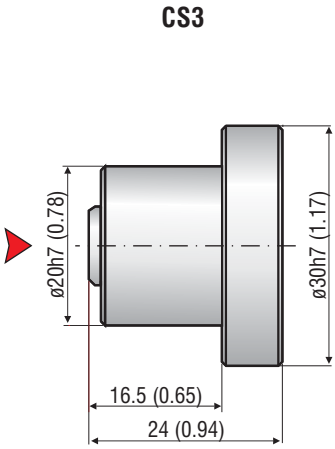


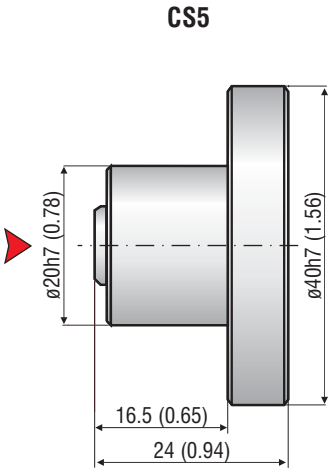


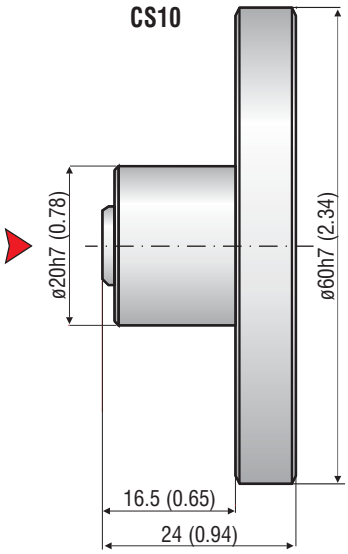


Dimension	Fit tolerance (µm)
7 h7	0 -15
7 f7	- 13 -28
8 h7	0 -15
20 h7	0 -21
6 f7	- 10 -22
6 e7	- 20 -32
10 f7	- 13 -28

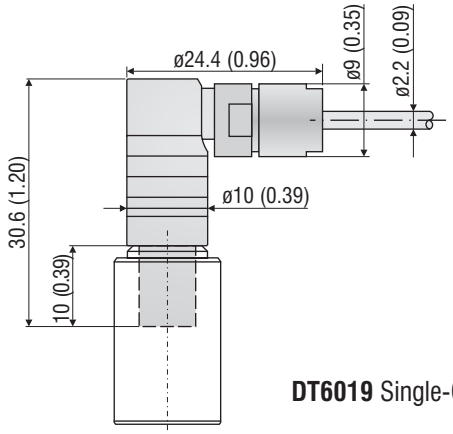




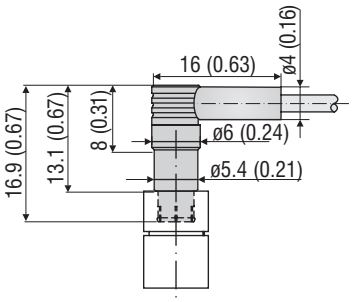




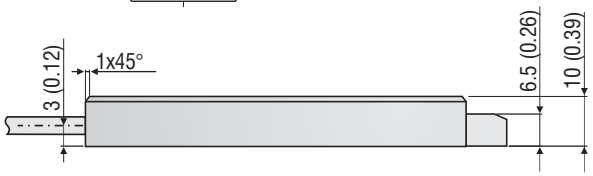
DT6019-B with angle connector for sensors S 600-1 - CS10

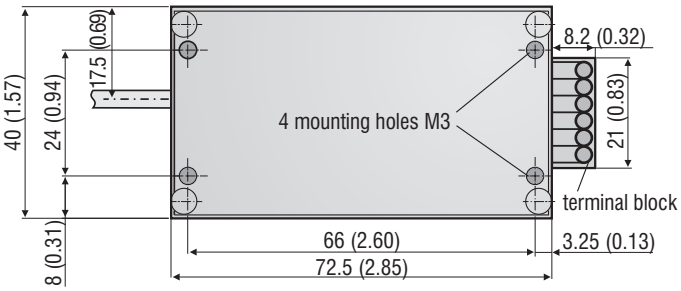


DT6019-C with angle connector for sensors S 601-0.2 and 600-0.5



DT6019 Single-Channel-Controller





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