

ADVANTAGE

PRINCIPLES

eddyNCDT



Highest resolution

High repeatability

Ideal for OEM

non-contact eddy-current
displacement and
position measurement

OEM-Sensor-System
eddyNCDT 3700

eddyNCDT 3700

Eddy-Current displacement sensors

The measurement principle

Non-contact displacement sensors, series NCDT 3700 are based on the eddy current principle and are used for measurements against electrically conductive, non-ferromagnetic materials. A high frequency alternating current is fed through a coil embedded in a sensor housing. The electromagnetic field from the coil induces eddy currents in the conductive target. As a consequence, the alternating current resistance of the coil changes. This change of impedance produces an electrical signal proportional to the distance of the target to the sensor.

Highest resolution

Measurement results down to 0.09 nanometers (0.0000000009 m) have been established with eddyNCDT displacement sensors in the series 3700. The system has been specifically developed and rated for applications with high and ultra-high requirements of resolution.

Designed for OEMs

eddyNCDT 3700 is intended for use in production systems for machine monitoring as a customized system for OEM applications, particularly when extreme resolution is demanded. Due to the high repeatability the system can be further optimized by computed linearization.

Positioning and closed-loop control tasks are solved with the highest precision.

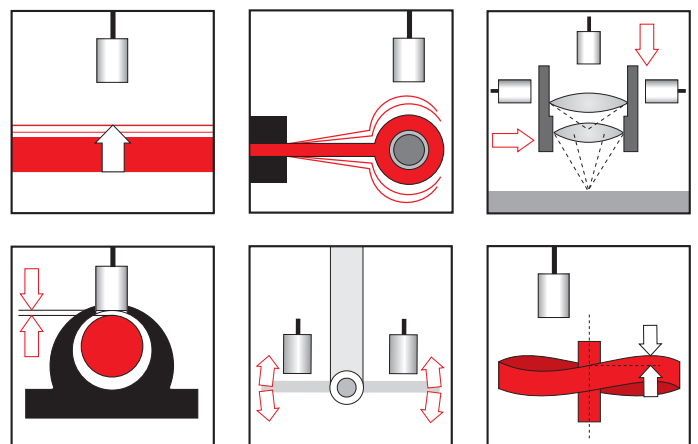
ADVANTAGES

- extremely high resolution
- miniaturized design
- low current consumption
- versatile OEM system
- stable eddy current technique



TYPICAL APPLICATIONS:

- **Wafer:** Positioning in semiconductor manufacture
- **Photolithography:** Positioning of the exposure unit
- **VLT telescope:** Mirror positioning
- **Microscopy:** Positioning of the optical system
- **Target tracking:** Positioning of the optical system
- **Air-gap monitoring** in magnetic bearings
- **Spindle movement** in machine tools
- **Alignment** of stepper systems



	Model	single-channel system			dual-channel system			differential system			
		DT3701-U1-A-C3	DT3701-U3-A-C3	DT3701-U6-A-C3	DT3702-U1-A-C3	DT3702-U3-A-C3	DT3702-U6-A-C3	DT3703-U1-A-C3	DT3703-U3-A-C3	DT3703-U6-A-C3	
Measuring range ¹⁾	mm	1	3	6	1	3	6	0.5	1.5	3	
	inch	0.04	0.12	0.24	0.04	0.12	0.24	0.02	0.06	0.12	
Reference distance / SMR	mm	0.1	0.3	1.0	0.1	0.3	1.0	0.1	0.4	1.0	
	inch	0.004	0.012	0.04	0.004	0.012	0.04	0.004	0.016	0.04	
Sensor model ²⁾		U1	U3	U6	U1	U3	U6	U1	U3	U6	
Measurement target	non ferromagnetic metal (reference: aluminum)										
Measuring principle	non-contact eddy-current principle										
Linearity	±6 % FSO						±5 % FSO				
Repeatability	< 0.001 % FSO						< 0.0005 % FSO				
Resolution (static) output of external lowpass filter fg=10 Hz)	nm	< 0.000033 % FSO						< 0.000018 % FSO			
		0.2	0.77	2.0	0.2	0.77	2.0	0.09	0.22	0.45	
Resolution (dynamic) output of external lowpass filter fg=1 kHz)	nm	< 0.00016 % FSO						< 0.00008 % FSO			
		1.3	3.9	9.8	1.3	3.9	9.8	0.4	1.0	2.1	
Frequency response (-3 dB)	10 kHz										
Temperature range	controller: 10...60 °C (50...140 °F) / sensor/cable: -50...150 °C (-58...302 °F)										
Temperature stability (midrange)	% FSO / °C	sensors 0...100 °C (32...212 °F)									
		0.05	0.06	0.19	0.05	0.06	0.19	0.025	0.015	0.06	
		0.03	0.03	0.34	0.03	0.03	0.34	0.014	0.008	0.03	
Sensor cable length	3 m ± 0.45 m (10 ft ± 1.5 ft)										
Signal output ³⁾	0 ...10 VDC										
Adjustment	zero / gain										
Power supply	12.5...30 V / 30 mA			12.5...30 V / 50 mA			12.5...30 V / 30 mA				
Electromagnetic compatibility	acc. EN 50081-2 / EN 61000-6-2										
Vibration controller	EN 60068-2-64 (noise)										
Shock controller	EN 60068-2-29 (permanent shock)										

All data apply for aluminium at 20 °C.

FSO = Full Scale Output SMR = Start Measuring Range

1) Smaller / larger measuring range for OEM applications on request.

2) Matched sensor designs for OEM applications on request (more than 500 different sensor models available).

3) -2.5 ... 0 V / -2.5 ... 2.5 V / -2.5 ... 5 V / -2.5 ... 10 V / 0 ... 2.5 V / 0 ... 5 V / 4 ... 20 mA for OEM on request

eddyNCDT3701:

Single-channel system:
one sensor; one output signal

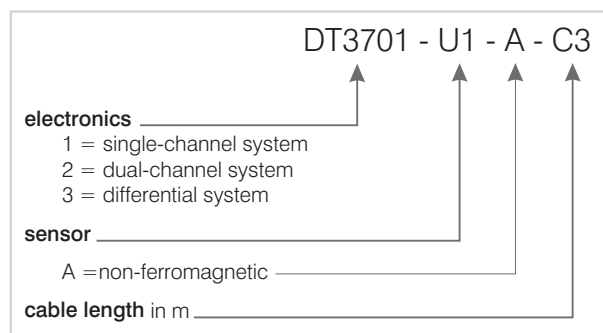
eddyNCDT3702:

Dual-channel system:
two sensors; two separate,
independent output signals

eddyNCDT3703:

Differential system:
two sensors; differential output

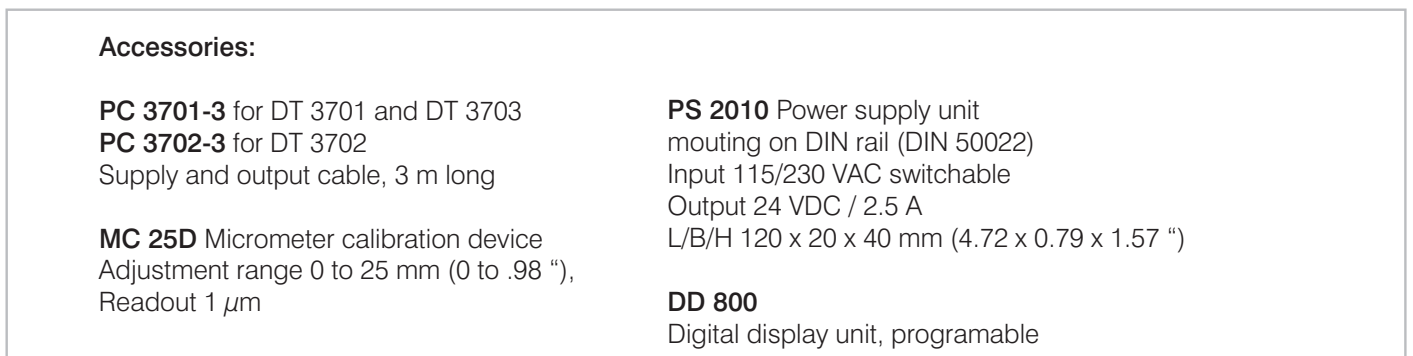
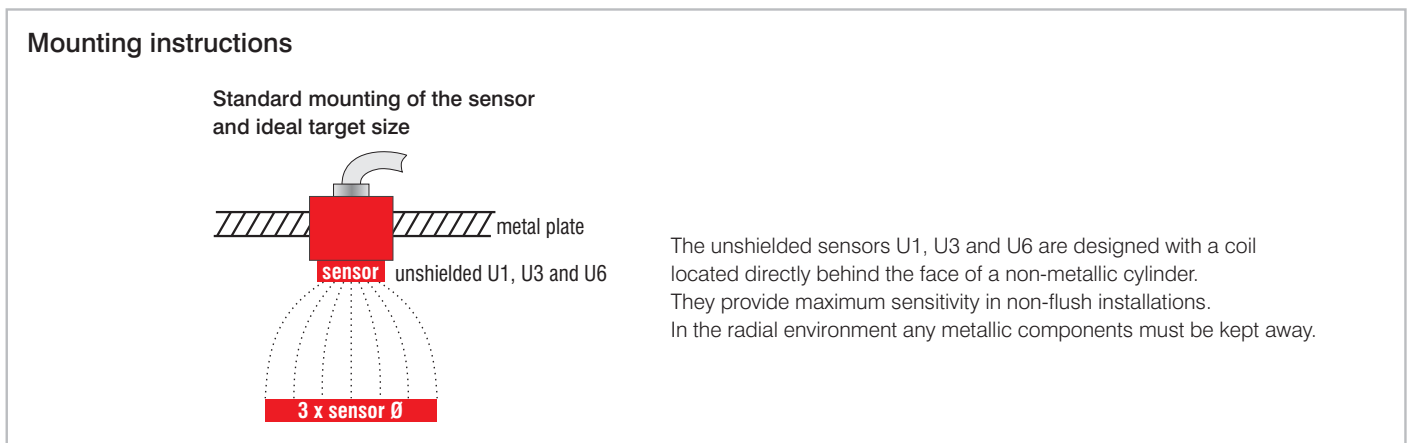
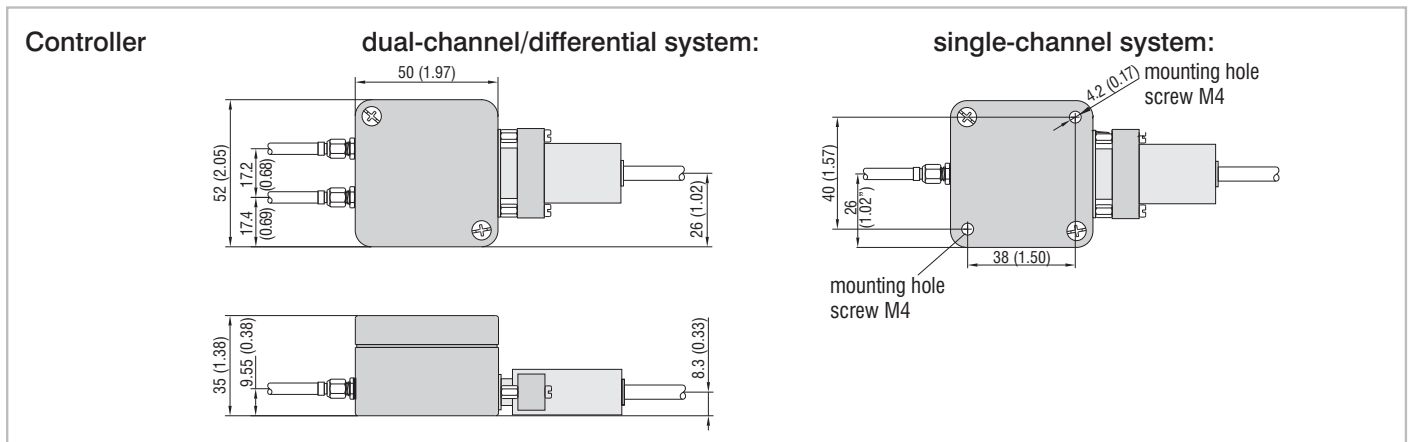
Sensor identification



For fastest order processing we need the exact sensor identification.

Dimensions and mounting

Dimensions in mm (inch), not to scale - all inches are rounded



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