MICRO-EPSILON

More Precision

eddyNCDT // Inductive sensors based on eddy currents

Wide range of applications with more than 400 sensor models

High temperature stability

High resolution & linearity

Frequency response 20 kHz (-3dB)

Sensors for ferromagnetic and non-ferromagnetic targets

Analog output (U/I) Digital output

Intuitive configuration via web interface
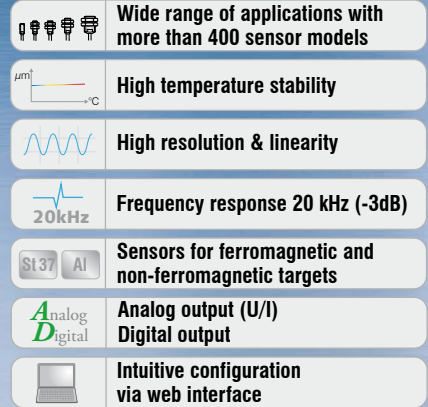
High performance for the industry

The eddyNCDT 3060 is a powerful, inductive sensor system based on eddy currents for fast, high precision displacement measurements. The system comprises a compact controller, a sensor and an integrated cable and is factory-calibrated either for ferromagnetic or non-ferromagnetic materials.

Integration into plant and machinery

As sensor and controller are temperature-compensated, a high measurement accuracy can be achieved even in fluctuating temperatures. The sensors are designed for ambient temperatures up to a maximum of +200 °C and an ambient pressure up to 20 bar. The compact controller design as well as the sensor robustness make the measuring system ideal for integration into plant and machinery.

New benchmark in controller technology

The industrial-grade M12 Ethernet interface offers a modern fieldbus connection. Configurable analog outputs enable to output the measured values as voltage or current. For operating several systems, a new frequency separation is provided, which enables to operate several sensors next to one another without requiring any synchronization.

Features	Controller type	
	DT3060	DT3061
Active temperature compensation for sensor and controller	✔	✔
Frequency separation (LF & HF)	✔	✔
Ethernet interface	✔	✔
Intuitive web interface	✔	✔
Multipoint calibration regardless of the distance (up to 3-point calibration)	✔	✔
Scalable measuring range via analog output (teach function)	✔	✔
Scalable analog output	✔	✔
Switching and temperature outputs	-	✔
5-point calibration	-	✔
Storage of multiple characteristic curves	-	✔

When connecting a PC via the Ethernet interface, a modern web interface can be accessed without any further installation and enables the parameterization of sensor and controller. The DT3061 controller provides enhanced features such as 5-point calibration, setting of switching and temperature outputs, as well as storage of multiple characteristic curves.

Model		DT3060	DT3061
Resolution [1]	static (20 Hz)	0.002 % FSO	
	dynamic (20 kHz)	0.01 % FSO	
Frequency response (-3dB)		selectable (20 kHz, 5 kHz, 20 Hz)	
Measuring rate		50 kSa/s	
Linearity [2]		< ±0.2 % FSO	< ±0.1 % FSO
Temperature stability		< 0.015 % FSO / K	
Temperature compensation		+10 … +50 °C	
Synchronization		with LF & HF variants (please consider the notes for frequency separation, p. 46)	
Target material [3]		Steel, aluminum	
No. of characteristic curves		1	max. 4
Supply voltage		12 … 32 VDC	
Power consumption		2.5 W	
Digital interface		Ethernet	
Analog output		0 … 10 V; 4 … 20 mA (short circuit proof)	
Connection		Sensor: pluggable cable via triaxial socket; supply/signal: 8-pole M12 connector; Ethernet: 5-pole M12 connector (cable see accessories)	
Mounting		through bores	
Temperature range	Storage	-10 … +70 °C	
	Operation	0 … +50 °C	
Shock (DIN EN 60068-2-27)		15 g / 6 ms in 3 axes, 2 directions and 1000 shocks each	
Vibration (DIN EN 60068-2-6)		5 g / 10 ... 500 Hz in 3 axes, 2 directions and 10 cycles each	
Protection class (DIN EN 60529)		IP67 (plugged)	
Material		die-cast aluminum	
Weight		approx. 230 g	

FSO = Full Scale Output
[1] RMS noise relates to mid of measuring range
[2] Value with 3-/5-point linearization
[3] Steel: St37 steel DIN1.0037 / AlCuMgPb3.1645 / AlMg3
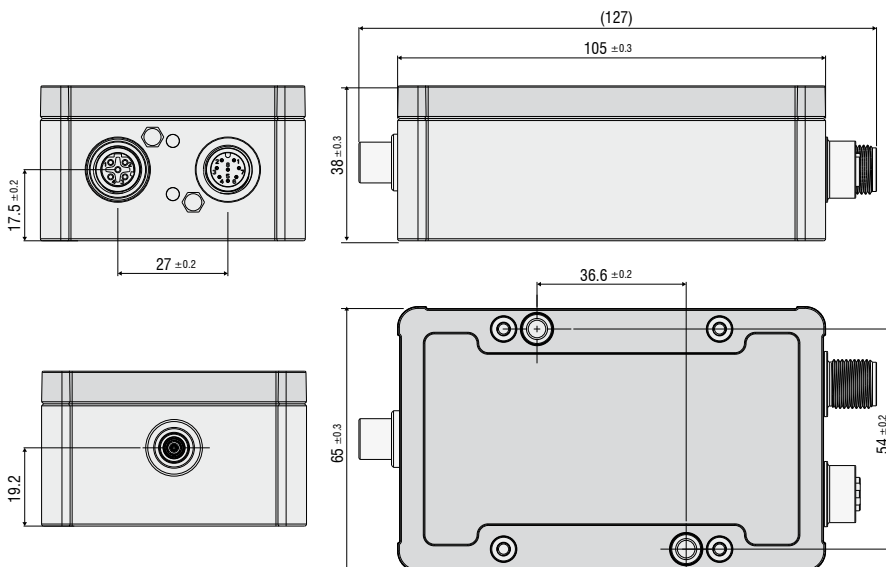

Pin assignment IN/OUT/24V IN

Pin	Assignment	Color (cable: PCx/8-M12)
1	Analog output $U_{Displacement}$	White
2	Supply +24 V	Brown
3	Limit value 1 / $U_{Temp\,Sensor}$	Green
4	Limit value 2 / $U_{Temp\,Controller}$	Yellow
5	GND Temperature, Limit value	Gray
6	GND analog output	Pink
7	GND supply	Blue
8	Analog output $I_{Displacement}$	Red

**8-pole M12x1 housing connector
View on pin side**
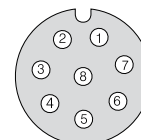
Dimensions in mm, not to scale.

▲ ▲ ▲
Measurement direction
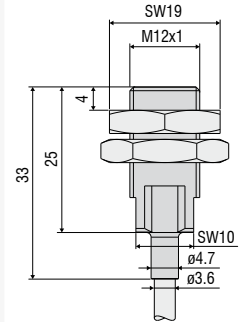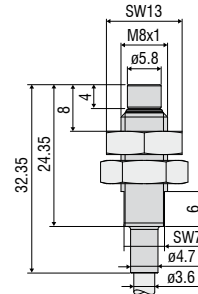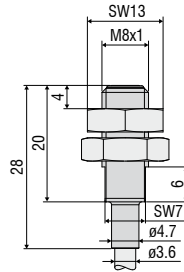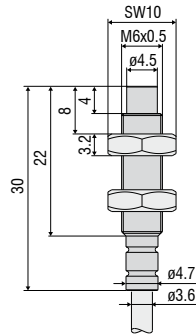
Model	ES-U1	ES-S1	ES-U2	ES-S2
Measuring range	1 mm	1 mm	2 mm	2 mm
Start of measuring range	0.1 mm	0.1 mm	0.2 mm	0.2 mm
Resolution [1] [2] [3]	0.02 μm	0.02 μm	0.04 μm	0.04 μm
Linearity [1] [4]	< ±1μm	< ±1μm	< ±2 μm	< ±2 μm
Temperature stability [1] [2]	< 0.15 μm / K	< 0.15 μm / K	< 0.3 μm / K	< 0.3 μm / K
Temperature compensation	+10 … +180 °C	+10 … +180 °C	+10 … +180 °C	+10 … +180 °C
Sensor type	unshielded	shielded	unshielded	shielded
Min. target size (flat)	Ø 18 mm	Ø 12 mm	Ø 24 mm	Ø 18 mm
Connection	integrated cable, axial, standard length 3 m; 1 m, 6 m, 9 m optional [5]			
Mounting	Cable gland (M6)	Cable gland (M8)	Cable gland (M8)	Cable gland (M12)
Temperature range Storage	-50 … +180 °C	-50 … +200 °C	-50 … +200 °C	-50 … +200 °C
Temperature range Operation	-20 … +180 °C	-20 … +200 °C	-20 … +200 °C	-20 … +200 °C
Pressure resistance	20 bar (front); 5 bar (rear)			
Shock (DIN EN 60068-2-27)	15 g / 6 ms in 3 axes, 2 directions and 1000 shocks each			
Vibration (DIN EN 60068-2-6)	15 g / 49.85 … 2000 Hz in 3 axes ±3 mm / 10 … 49.85 Hz in 3 axes			
Protection class (DIN-EN 60529)	IP68 (plugged)			
Material	stainless steel and plastic			
Weight [6]	approx. 2.4 g	approx. 2.4 g	approx. 4.7 g	approx. 11 g

[1] Valid for operation with DT306x controller, referred to nominal measuring range
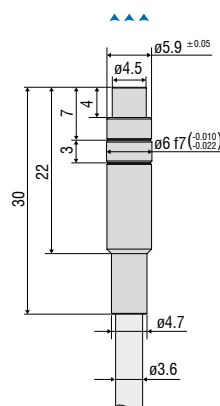[2] Relates to mid of measuring range
[3] RMS value of the signal noise, static (20 Hz)
[4] Only with DT3061 controller and 5-point linearization
[5] Length tolerance cable: nominal value +30 %
[6] Weight only sensor without nuts without cable

**Additional design:**   ES-U1-T

ES-Ux-T design:
Sensors without thread
The ES-Ux-T design are sensors without thread.
These offer additional advantages for installation and temperature stability.
▪ Thanks to clamp mounting, the cable is not subjected to torsional stress, which prevents damage.
▪ The sensor has a defined clamping point, which minimizes thermal expansion in the measuring direction and achieves high temperature stability.

Measurement direction ▲▲▲
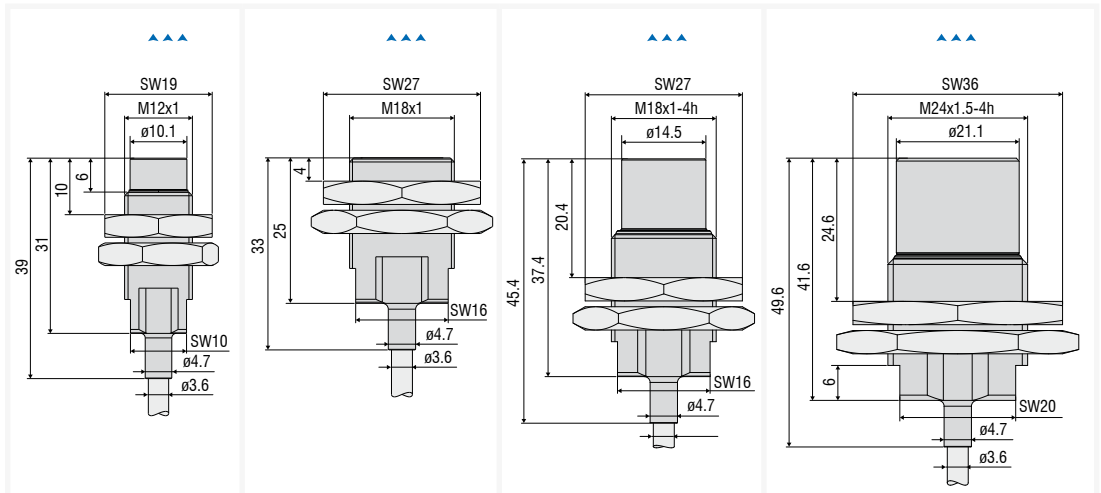
Modell	ES-U3	ES-S4	ES-U6	ES-U8
Measuring range	3 mm	4 mm	6 mm	8 mm
Start of measuring range	0.3 mm	0.4 mm	0.6 mm	0.8 mm
Resolution [1] [2] [3]	0.06 μm	0.08 μm	0.12 μm	0.16 μm
Linearity [1] [4]	< ±3 μm	< ±4 μm	< ±6 μm	< ±8 μm
Temperature stability [1] [2]	< 0.45 μm / K	< 0.6 μm / K	< 0.9 μm / K	< 1.2 μm / K
Temperature compensation	+10 … +180 ℃	+10 … +180 ℃	+10 … +180 ℃	+10 … +180 ℃
Sensor type	unshielded	shielded	unshielded	unshielded
Min. target size (flat)	Ø 36 mm	Ø 27 mm	Ø 54 mm	Ø 72 mm
Connection	integrated cable, axial, standard length 3 m; 1 m, 6 m, 9 m optional [5]			
Mounting	Cable gland (M12)	Cable gland (M18)	Cable gland (M18)	Cable gland (M24)
Temperature range — Storage	-50 … +200 ℃	-50 … +200 ℃	-50 … +200 ℃	-50 … +200 ℃
Temperature range — Operation	-20 … +200 ℃	-20 … +200 ℃	-20 … +200 ℃	-20 … +200 ℃
Pressure resistance	20 bar (front); 5 bar (rear)			
Shock (DIN EN 60068-2-27)	15 g / 6 ms in 3 axes, 2 directions and 1000 shocks each			
Vibration (DIN EN 60068-2-6)	15 g / 49.85 … 2000 Hz in 3 axes ±3 mm / 10 … 49.85 Hz in 3 axes			
Protection class (DIN-EN 60529)	IP68 (plugged)			
Material	stainless steel and plastic			
Weight [6]	approx. 12 g	approx. 30 g	approx. 33 g	approx. 62 g

[1] Valid for operation with DT306x controller, referred to nominal measuring range
[2] Relates to mid of measuring range
[3] RMS value of the signal noise, static (20 Hz)
[4] Only with DT3061 controller and 5-point linearization
[5] Length tolerance cable: nominal value +30 %
[6] Weight only sensor without nuts without cable

Additional design: ES-U3-T
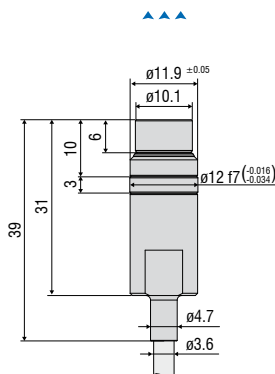
Connection of sensors with integrated cable:

standard cable length: 3 m

Triax connector — Coaxial cable — Sensor
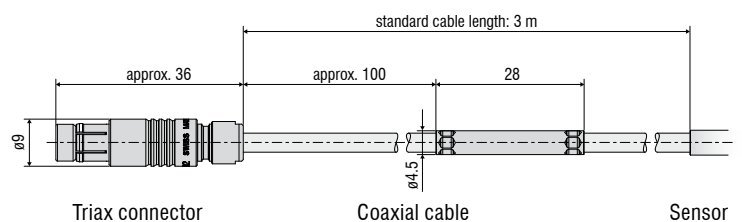
Connection cable for DT3060 portfolio sensors

Sensors with integrated cable: cable type ES-xx-C-CAx

❶

Coaxial cable with Viton sheathing
Cable diameter: Ø 3.6 mm
Minimum bending radius: static approx. 18 mm / dynamic approx. 36 mm
Temperature resistance: up to 200 °C (3000 hrs.)
Available length: 1 m / 3 m / 6 m (9 m on request)

Sensors with socket: cable type EC-x/mB0/mB0

❶   ❶

Coaxial cable with Viton sheathing
Cable diameter: Ø 3.6 mm
Minimum bending radius: static approx. 18 mm / dynamic approx. 36 mm
Temperature resistance: up to 200 °C (3000 hrs.)
Available length: 1 m / 3 m / 6 m (9 m on request)

Extension cable: cable type ECE-x/fB0/mB0

❶   ❷   ❶
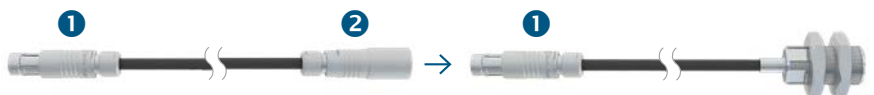
Coaxial cable with Viton sheathing
Cable diameter: Ø 3.6 mm
Minimum bending radius: static approx. 18 mm / dynamic approx. 36 mm
Temperature resistance: up to 200 °C (3000 hrs.)
Available length: 1 m / 3 m / 6 m (9 m on request)

Plug/Socket

1 **Connector Triax 0323118:** Type S 102 A014-120 D4,1
Triaxial connector:
Type: mB0
Connection: push-pull
Temperature resistance: 200 °C (3000 hrs.)

2 **Socket Triax 0323141:** Type KE102 A014-120 D4,1
Triaxial socket:
Type: fB0
Connection: push-pull
Temperature resistance: 200 °C (3000 hrs.)

Article	Description	DT3001	DT3005	DT3060	DT3070	DT3300	DZ140	SGS
PCx/8-M12	**Supply and signal cable** 8-pole with M12 connector Standard length: 3 m Optionally available: 5 m/ 10 m /15 m / 10 m as drag-chain suitable variant			x	x			
PCx/5-M12	**Supply and signal cable** 5-pole with M12 connector Standard length: 5 m Optionally available: 20 m	x	x					
PC4701-x	**Supply and signal cable** 8-pole with M12 connector Standard length: 10 m Optionally available: 15 m / 10 m as drag-chain suitable variant							x
SCD2/4/RJ45	**Ethernet cable** 4-pole with M12 connector on RJ45 connector Standard length: 2 m			x	x			
SCAx/5	**Signal cable, analog** 5-pole with M16x0.75 connector Standard length: 3 m Optionally available: 6 m / 9 m					x		
SCDx/8	**Signal cable for switching inputs and outputs:** 8-pole with M16x0.75 connector Standard length: 0.3 m Optionally available: 1 m					x		
PSCx	**Supply and synchronization cable** 5-pole with M9 connector Standard length: 0.3 m Optionally available: 1 m					x		
ESCx	**Synchronization cable** 5-pole with M9 connector Standard length: 0.3 m Optionally available: 1 m					x		
PC140-x	**Supply and signal cable** 8-pole connector Standard length: 3 m Optionally available: 6 m						x	
PS2020	**Power supply unit** Input 100-240 VAC output 24 VDC / 2.5 A; mounting onto symmetrical standard rail 35 mm x 7.5 mm, DIN 50022	x	x	x	x	x	x	x

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

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