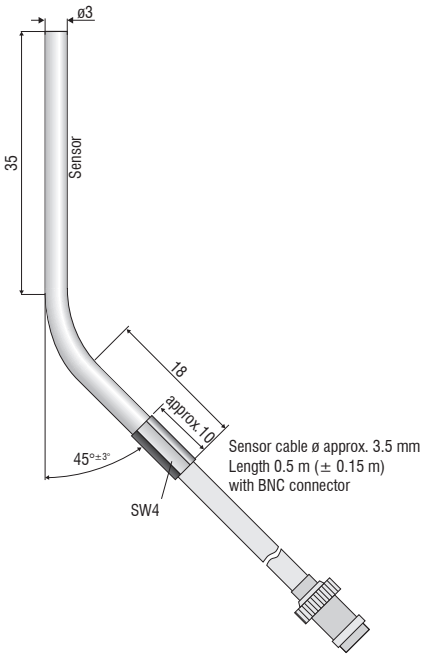
MICRO-EPSILON

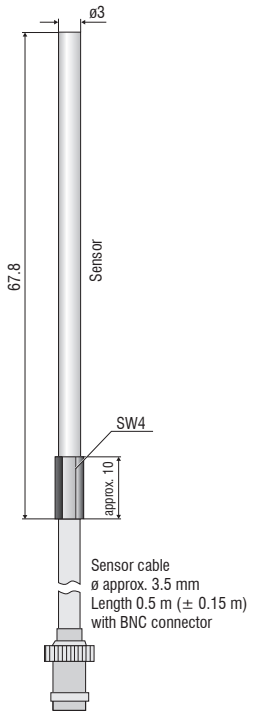
More Precision

eddyNCDT // Inductive sensors based on eddy currents

Sensors
turboSPEED DZ140

Measurement direction





Model		DS 05(03)	DS 05(04)
Sensor type		shielded	shielded
Connection[1)]		integrated cable, axial, length 0.5 m	integrated cable, axial, length 0.5 m
Mounting		Clamping/adapter	Clamping/adapter
Temperature range	Storage	-40 ... +200 °C	-40 ... +200 °C
	Operation	-40 ... +200 °C	-40 ... +200 °C
Feature		curved housing	-

[1)] Length tolerance ± 0.15 m

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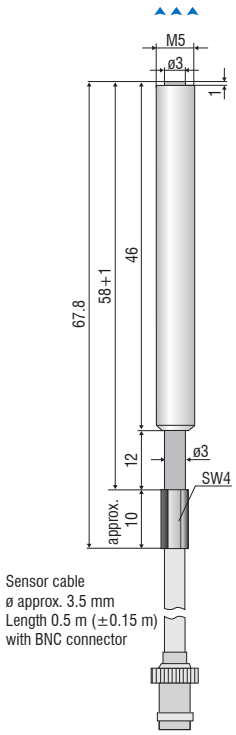
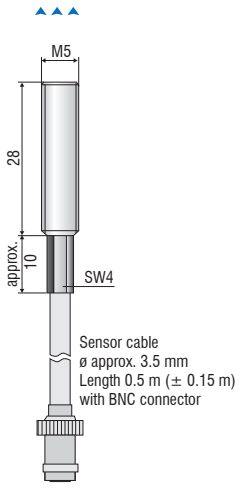
Measurement direction



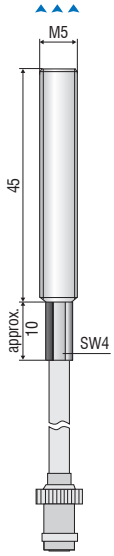


Model		DS 05(07)	DS 05(14)
Sensor type		shielded	shielded
Connection[1)]		integrated cable, axial, length 0.5 m	integrated cable, axial, length 0.5 m
Mounting		Screw connection (M5)	Screw connection (M5)
Temperature range	Storage	-40 ... +200 °C	-40 ... +200 °C
	Operation	-40 ... +200 °C	-40 ... +200 °C
Feature		-	Length of housing 42.5 mm

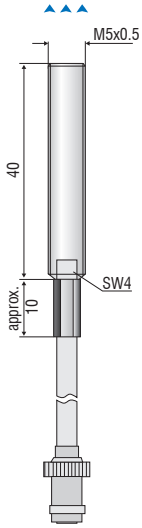
[1)] Length tolerance ± 0.15 m

Sensors
turboSPEED DZ140

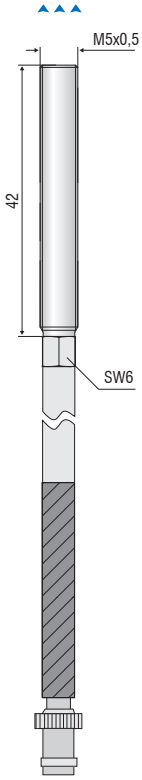
Measurement direction



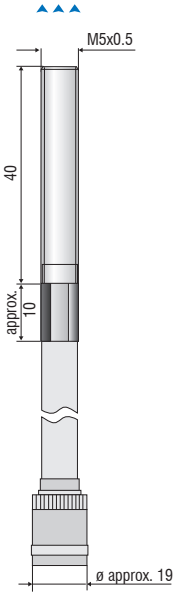
Sensor cable
ø approx. 3.5 mm
Length 0.5 m (± 0.15 m)
with BNC connector



Sensor cable
ø approx. 3.5mm
Length 0.75m (± 0.15 m)
with BNC connector



Sensor cable
ø approx. 6.0
Stainless steel IP 40
Length 0.8m (± 0.15 m)
with BNC connector



Sensor cable
ø approx. 4.5 mm
Length 0.8 m (± 0.15 m)
with triax BNC connector

Model		DS 05(15)	DS 1	DS 1(04)	DS 1/T
Sensor type		shielded	shielded	shielded	shielded
Connection[1)]		integrated cable, axial, length 0.5 m	integrated cable, axial, length 0.75 m	integrated cable, axial, length 0.8 m	integrated cable, axial, length 0.8 m
Mounting		Screw connection (M5)	Screw connection (M5)	Screw connection (M5)	Screw connection (M5)
Temperature range	Storage	-40 ... +200 °C	-40 ... +235 °C	-40 ... +235 °C	-40 ... +235 °C
	Operation	-40 ... +200 °C	-40 ... +235 °C	-40 ... +235 °C	-40 ... +235 °C (short-term +285 °C)
Feature		-	-	Protective hose (stainless steel)	-

[1)] Length tolerance ± 0.15 m

Cables
turboSPEED DZ140

Connection cables for DZ140 portfolio sensors

Miniature coaxial cable for DS05(x) and DS1 models
Diameter: approx. 3.5 mm
Sheath: thermal protection fabric hose (polyolefin shrink hose)
Temperature range: -50 °C to +200 °C (static)
Minimum bending radius: static approx. 18 mm / dynamic approx. 35 mm
Connection: BNC socket coaxial

Miniature coaxial cable for DS1(04) models
Diameter: approx. 6 mm
Sheath: metallic protective hose (stainless steel)
Temperature range: -50 °C to +200 °C (static)
Minimum bending radius: static approx. 30 mm / dynamic approx. 60 mm
Connection: BNC socket coaxial
Protection class: IP40

Triaxial cable for the DS1/T models
Diameter: approx. 3.5 mm
Sheath: thermal protection fabric hose (polyolefin shrink hose)
Temperature range: -50 °C to +200 °C
Minimum bending radius: static approx. 18 mm / dynamic approx. 35 mm
Connection: BNC socket triaxial

Spindle Growth System
eddyNCDT SGS4701

- Miniature sensor design
- M12 controller – integrable in spindle or mountable with flange
- Versions for ferromagnetic and non-ferromagnetic targets
- Integrated temperature measurement

Measuring the thermal extension of spindles

The SGS4701 displacement measuring system (Spindle Growth System) is developed specifically for high speed milling machine applications. Due to high machining speeds and the heat generated, the linear thermal expansion of the spindle in precision machine tools needs to be compensated for in order to keep the tool in a defined position at all times. The SGS sensor measures the thermal and centrifugal force expansion of the spindle. These measurement values are fed into the CNC machine tool as correctional values, compensating for any positioning errors.

The SGS4701 uses the eddy current measuring principle, providing a non-contact, wear-free measurement Furthermore, the measurement procedure is resistant to disturbances such as heat, dust and oil.

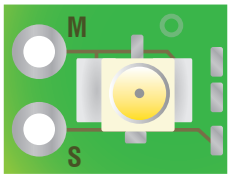
System design

The SGS 4701 consists of a sensor, a sensor cable and a controller, factory calibrated for ferromagnetic and non-ferromagnetic measuring objects. The miniature sensor design enables direct installation in the spindle, where measurements are typically performed on the spindle's labyrinth ring. In addition to measuring linear expansion, the temperature at the sensor is detected and output. The compact controller can be installed on the spindle housing using a flange or directly in the spindle.

The sensor cable must not be shortened as functionality loss may arise. Removing the connector is only permitted behind the plug-sided crimp when using the solder connections.

Customer-specific adjustment

For individual installation situations and measuring objects, sensor and controller can be adjusted in the factory which allows for the best possible measurement accuracy to be achieved.

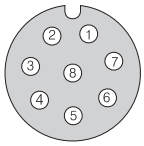


S = Signal = Inner conductor
M = Ground = Shield = Outer conductor

Pin assignment for power supply and signal

Pin	Assignment	Color (cable: PC4701-x)
1	GND	White
2	Supply 12 … 32 VDC	Brown
3	Displacement signal	Green
4	Temperature signal	Yellow
5	NC	Gray
6	assigned internally	Pink
7	assigned internally	Blue
8	NC	Red

8-pole M12x1 housing connector
View on pin side



Model		SGS4701
Measuring range		500 µm (optionally 250 µm [1])
Start of measuring range		100 µm (optionally 50 µm [1])
Measuring rate	Analog output	64 kSa/s (16 bit)
Resolution [2] [3]		0.5 µm
Frequency response (-3dB)		2000 Hz
Linearity		< ±2 µm
Temperature stability [3]	Sensor	< 150 ppm FSO/K
	Controller	< 500 ppm FSO/K
Temperature compensation	Sensor	+10 … +80 °C
	Controller	+10 … +70 °C
Min. target size (flat)		6 mm (optionally 3.5 mm [1])
Target material [4]		Steel, aluminum
Supply voltage		12 … 32 VDC
Power consumption		0.6 W
Analog output	Displacement	0.5 … 9.5 V (100 … 600 µm, optionally 50 … 300 µm [1])
	Temperature	0.5 … 9.5 V (0 … +90 °C)
Connection		Sensor: integrated cable [5], standard length 1 m (0.4 ... 1.5 m on request), min. bending radius 12 mm Supply/signal: 8-pole M12 connector (cable see accessories)
Temperature range	Sensor	0 … +90 °C
	Controller	+10 … +70 °C
Shock (DIN EN 60068-2-27)		50 g / 6 ms in each direction, 1000 shocks each
Vibration (DIN EN 60068-2-6)		20 g / 10 ... 3000 Hz
Protection class (DIN EN 60529)		IP67 (plugged) [6]
Weight [7]		approx. 85 g

FSO = Full Scale Output

[1] For OEM modifications: sensor with a measuring range of 250 µm and an offset of 50 µm possible

[2] Static, at mid of measuring range

[3] Values are referenced to the mid of the measuring range within the compensated temperature range

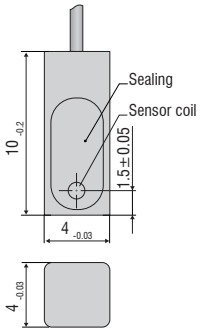
[4] Steel: St37 steel DIN1.0037, aluminum: AlMg

[5] Detailed cable specifications can be found in the operating instructions

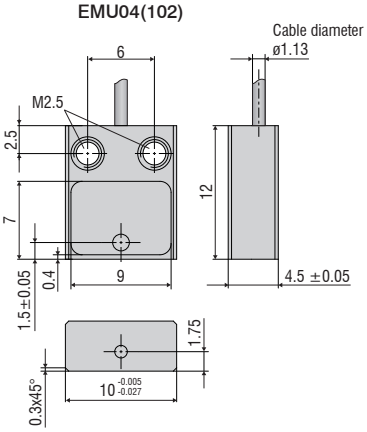
[6] Protection class does not apply for the controller sleeve!

[7] Total weight for controller, cable and sensor

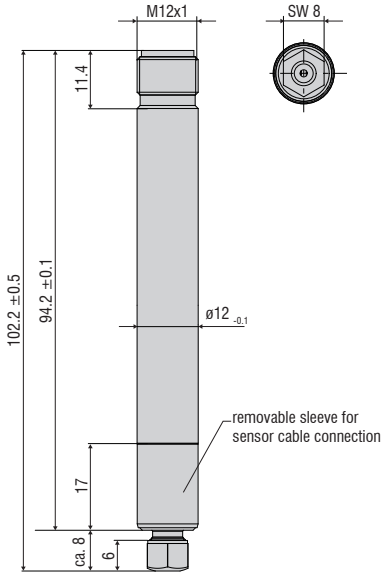
EMU04(121)



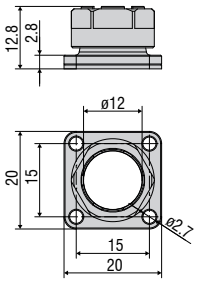
EMU04(102)



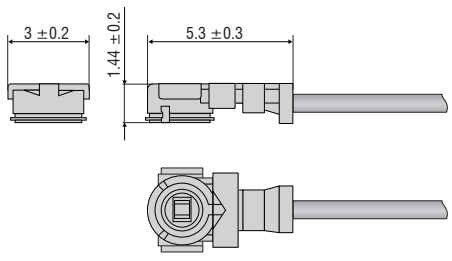
Controller



Clamping flange (optional)



Connector (max. 20 mating cycles possible)



Dimensions in mm, not to scale.

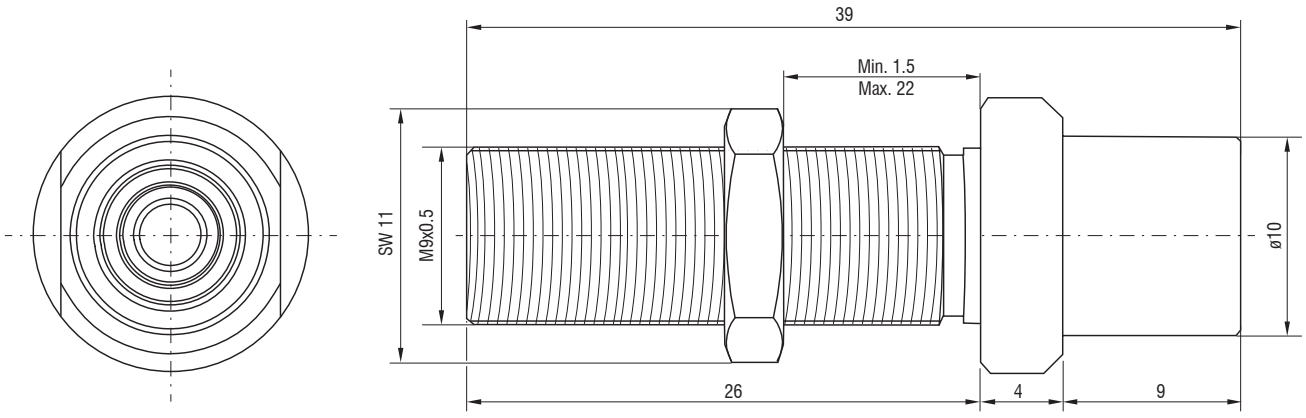
Plug system for vacuum applications
Vacuum feedthrough eddy/fB0/fB0/triax

The eddyNCDT series delivers high-precision measurement results even in airless rooms. The eddy/fB0/fB0/triax vacuum feedthrough also enables eddyNCDT products to be used in vacuum applications.

- Application in vacuums
- Application as a wall duct
- Pluggable version
- Compatible with all common eddyNCDT products

Vacuum feedthrough eddy/fB0/fB0/triax	
Housing material	CuZn39Pb3
O-ring material	FPM (Viton®)
Max. leakage rate (IEC standard 60068-2-17)	$<10^{-8}$ mbar*l/s
Operating temperature [1]	from -20 °C to 150 °C
Mating cycles (IEC 60512-5-9a)	10,000
Vibration (MIL-STD-202 Method 204 Condition B)	10 to 2,000 Hz, 1.5 mm or 15 g, 12 pass cycles per axis, 20 minutes per 10-2000-10 Hz pass cycle, no discontinuity >1 µs
Insulation resistance	10^{10} Ω

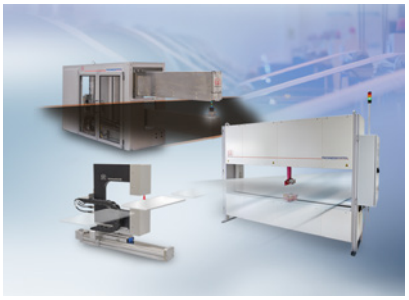
[1] Min. connection temperature: 0 °C



Sensors and Systems from Micro-Epsilon

Sensors and systems for displacement, distance and position

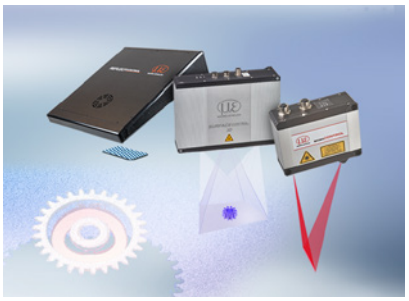
Sensors and measurement devices for non-contact temperature measurement



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

MICRO-EPSILON

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