MICRO-EPSILON

More Precision

eddyNCDT // Inductive sensors based on eddy currents

| | Speed range from 200 to 400,000 rpm |
| Miniature sensor ø3 mm |
| Measuring aluminum and titanium |
| Large distances up to 2.2 mm |
| Highest immunity to interference |
| Sensor operating temperature up to 285 °C |

Measuring principle

A coil integrated in the sensor housing is energized by a high-frequency alternating current. The emerging electromagnetic field changes when approaching a turbo charger blade. This is how every blade generates a pulse. The controller identifies the rotational speed (analog 0 - 5 V) by considering the number of blades.

Robust miniature controller

As the entire controller is in a sealed miniature housing and designed for ambient temperatures up to 115 °C, the controller is easy to integrate into the engine compartment. The turboSPEED DZ140 offers excellent interference resistance for increased EMC requirements as well as in test cells and road tests.

Engine compartment application

The DZ140 eddy current measuring system is resistant to oil and dirt. This is a key advantage especially compared to optical speed measuring systems, as this immunity helps to achieve high precision measurements on a continuous basis.

Ease of use

A tri-color 'status' LED on the controller indicates when the sensor has reached the ideal distance from the turbocharger blades. This simple feature enables greatly reduced installation time. As the sensor is connected with the controller via a special BNC connector, it is therefore downward compatible with all previous sensor models. An industrial push-pull connector guarantees a reliable connection between the controller and the power supply as well as the analog outputs.
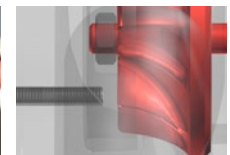
Measuring aluminum and titanium blades

The DZ140 measures both aluminum and titanium blades. The sensors can be mounted at a relatively large distance from the blade. The maximum distance of 2.2 mm enables reliable operation.

Extremely compact design

Axial installation

Large measuring distances both on aluminum and titanium

Radial installation

Model	DZ140
Resolution	10 bits
Speed range (measuring range)	200 … 400,000 rpm
Linearity	< ±0.2 % FSO
Target material	aluminum or titanium
Supply voltage	9 ... 30 VDC (short-term up to 36 VDC)
Max. current consumption	50 mA
Digital output	TTL level (1 pulse / blade with variable pulse duration or 1 pulse / rotation with 100 μs pulse duration)
Analog output	0 … 5 V [1)
Connection	Sensor: triaxial connector; Supply/signal: 10-pole connector, raw signal: coaxial connector (cable see accessories)
Mounting	Screw connection with 4 through-holes
Temperature range	Storage	-40 ... +125 °C
	Operation	-40 ... +125 °C
Protection class (DIN EN 60529)	IP65 (plugged)
Weight	approx. 85 g
Number of blades	adjustable via rotary switch accessible from outside for 1 to 16 blades

FSO = Full Scale Output (speed range)
[1) Rotational speed adjustable via mode rotary switch
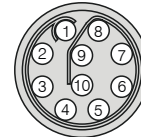
Controller DZ140
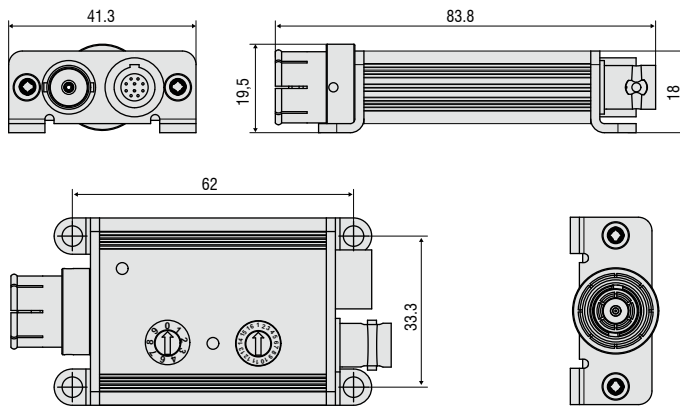
Dimensions in mm, not to scale.

Pin assignment for power supply and signal

Pin	Assignment	Color (cable: PC140-x)
1	Analog output for rotational speed 0 … +5 V	Blue
2	reserved, not connected	Yellow
3	TTL pulses, digital	Green
4	reserved, not connected	-
5	GND	Black
6	reserved, not connected	-
7	Supply -	White
8	Supply voltage +9 … 30 VDC	Brown
9	Not assigned	-
10	Not assigned	-

**10-pin cable connector
View on solder side**

Measurement direction

ø3

Sensor

35

18

approx. 10

45°±3°

SW4

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

ø3

Sensor

67.8

SW4

approx. 10

Sensor cable
ø approx. 3.5 mm
Length 0.5 m (± 0.15 m)
with BNC connector
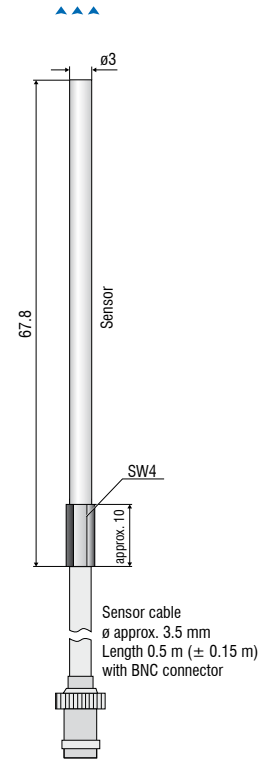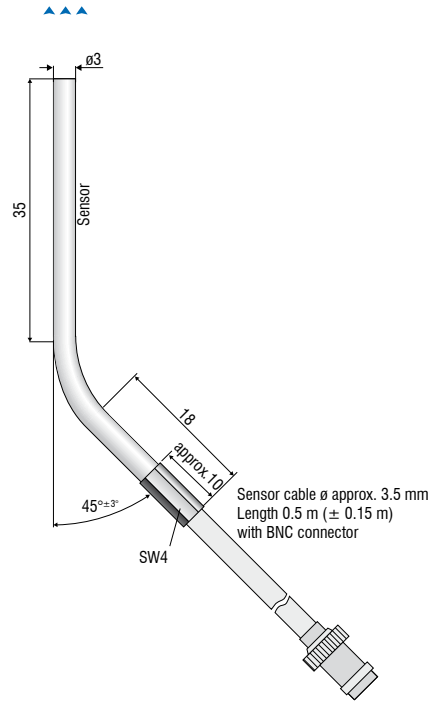
Model	DS 05(03)	DS 05(04)
Sensor type	shielded	shielded
Connection[1]	integrated cable, axial, length 0.5 m	integrated cable, axial, length 0.5 m
Mounting	Clamping/adapter	Clamping/adapter
Temperature range Storage	-40 ... +200 °C	-40 ... +200 °C
Operation	-40 ... +200 °C	-40 ... +200 °C
Special feature	curved housing	-

[1] Length tolerance ± 0.15 m

▲ ▲ ▲
Measurement direction

Dimensional drawings

DS 05(07): M5, ø3, 1, 46, 58+1, 67.8, 12, ø3, SW4, approx. 10

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

DS 05(14): M5, 28, approx. 10, SW4

Sensor cable
ø approx. 3.5 mm
Length 0.5 m (± 0.15 m)
with BNC connector
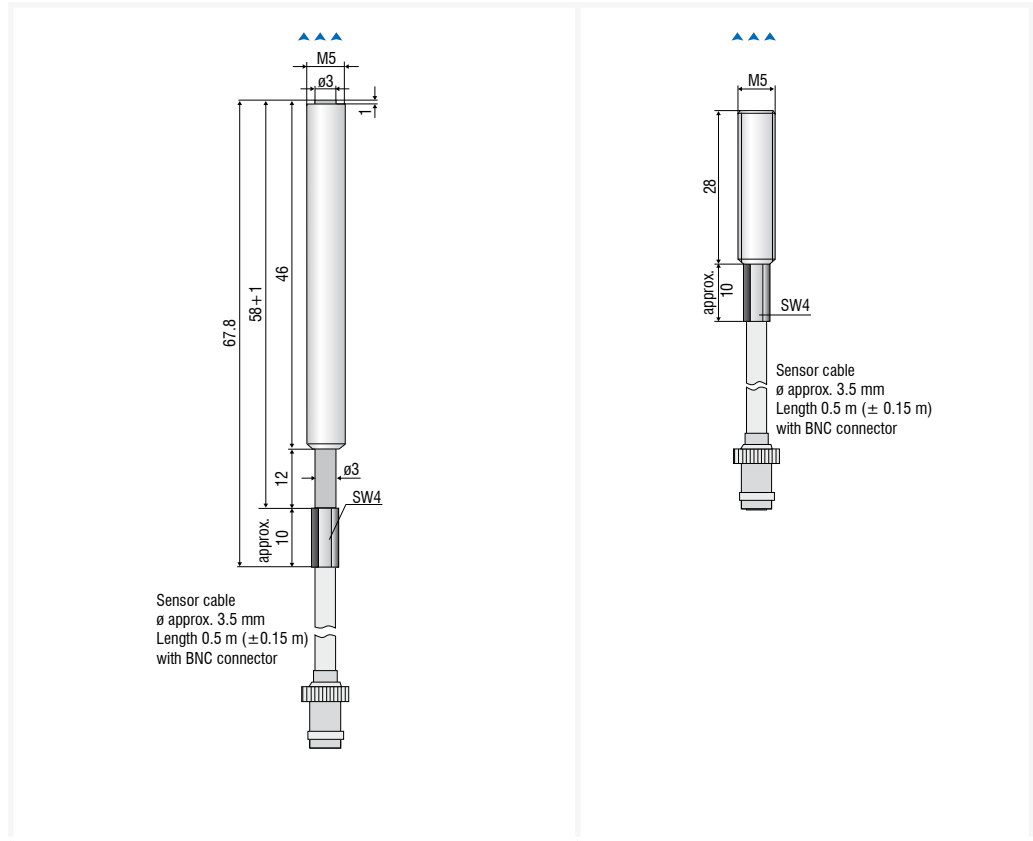
Model	DS 05(07)	DS 05(14)
Sensor type	shielded	shielded
Connection[1]	integrated cable, axial, length 0.5 m	integrated cable, axial, length 0.5 m
Mounting	Cable gland (M5)	Cable gland (M5)
Temperature range — Storage	-40 ... +200 °C	-40 ... +200 °C
Temperature range — Operation	-40 ... +200 °C	-40 ... +200 °C
Special feature	-	Length of housing 42.5 mm

[1] Length tolerance ± 0.15 m

Measurement direction

M5

45

approx. 10

SW4

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

M5x0.5

40

approx. 10

SW4

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

M5x0,5

42

SW6

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

M5x0.5

40

approx. 10

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

ø approx. 19
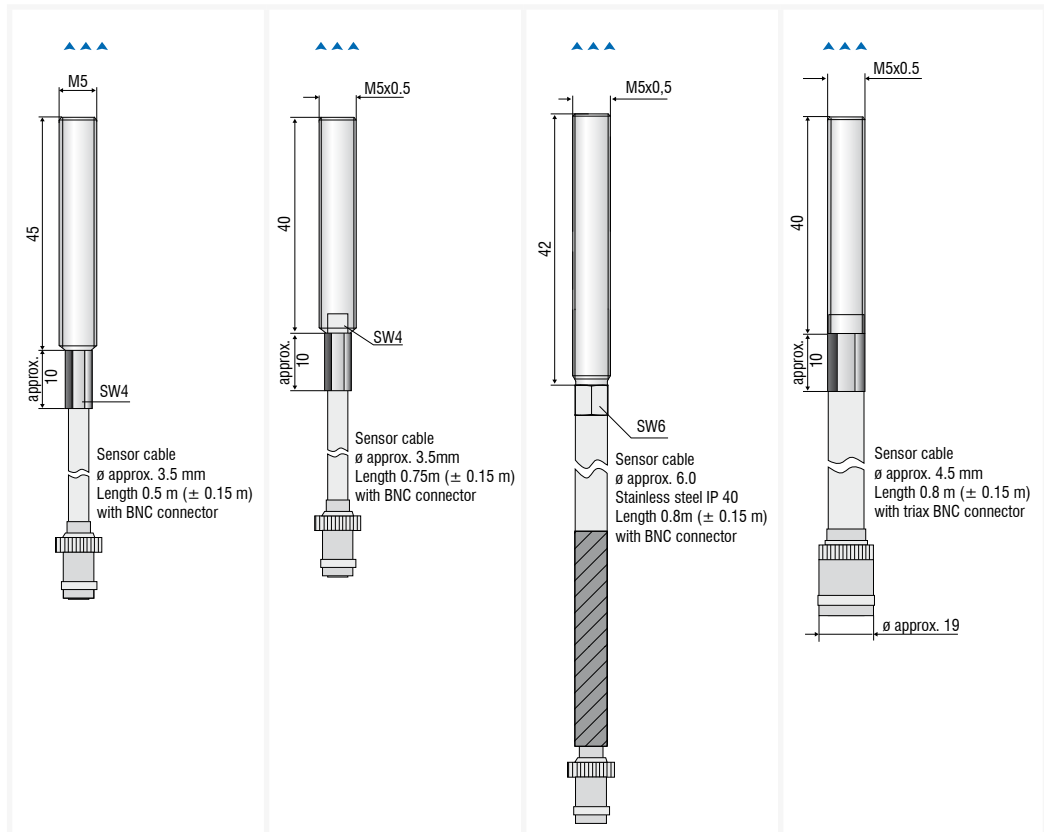
Model	DS 05(15)	DS 1	DS 1(04)	DS 1/T
Sensor type	shielded	shielded	shielded	shielded
Connection[1]	integrated cable, axial, length 0.5 m	integrated cable, axial, length 0.75 m	integrated cable, axial, length 0.8 m	integrated cable, axial, length 0.8 m
Mounting	Cable gland (M5)	Cable gland (M5)	Cable gland (M5)	Cable gland (M5)
Temperature range — Storage	-40 ... +200 °C	-40 ... +235 °C	-40 ... +235 °C	-40 ... +235 °C
Temperature range — Operation	-40 ... +200 °C	-40 ... +235 °C	-40 ... +235 °C	-40 ... +235 °C (short-term +285 °C)
Special feature	-	-	protective hose (stainless steel)	-

[1] Length tolerance ±0.15 m

Connection cables for DZ140 portfolio sensors

Miniature coaxial cable for DS05(x) and DS1 models

Diameter: approx. 3.5 mm

Sheathing: 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

Sheathing: 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: IP 40

Triaxial cable for the DS1/T models

Diameter: approx. 3.5 mm

Sheathing: 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

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

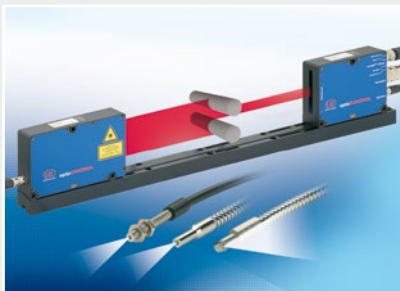# Sensors and Systems from Micro-Epsilon

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