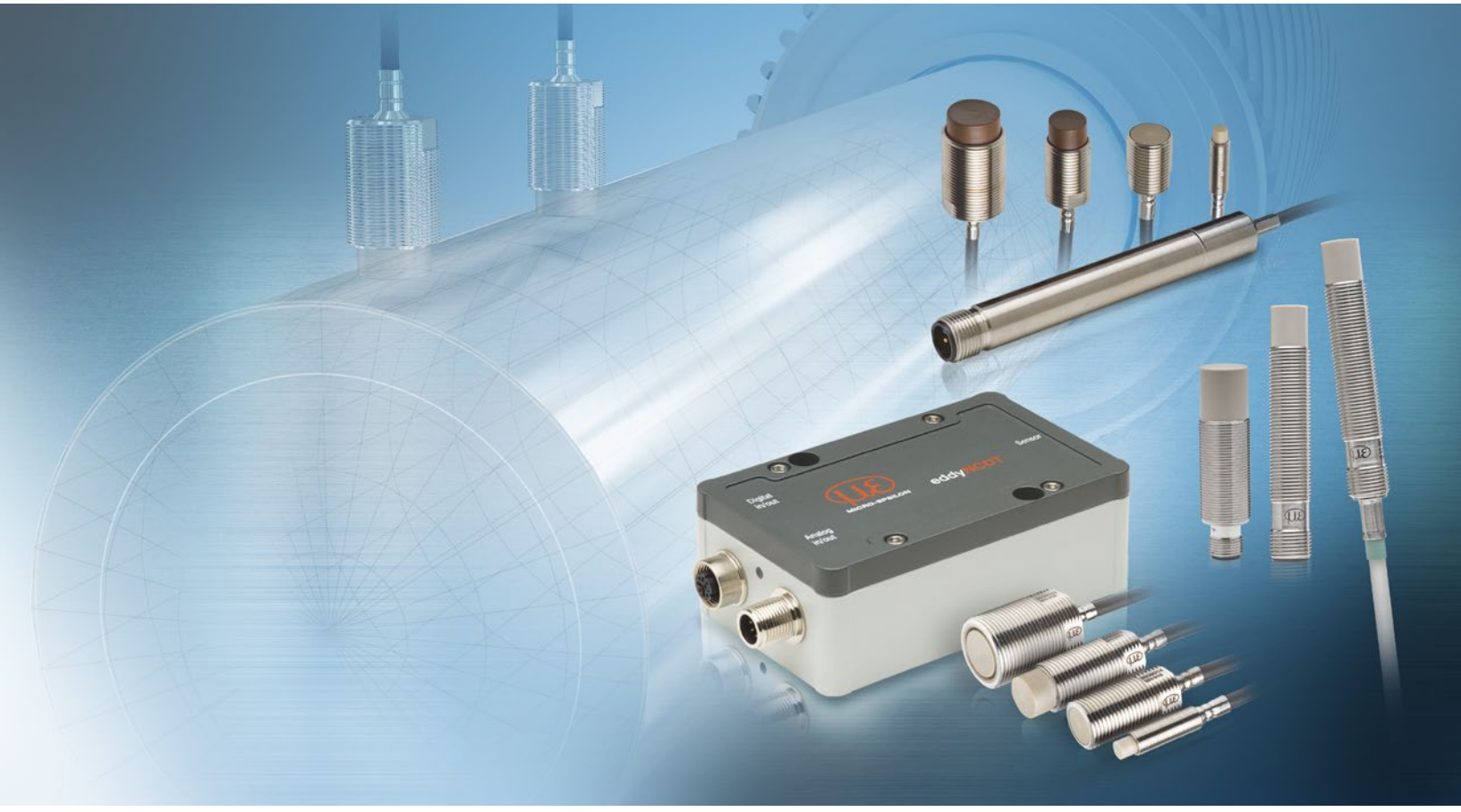
MICRO-EPSILON

More Precision

eddyNCDT // Inductive sensors based on eddy currents



Turbocharger speed measurement
turboSPEED DZ140

- 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.

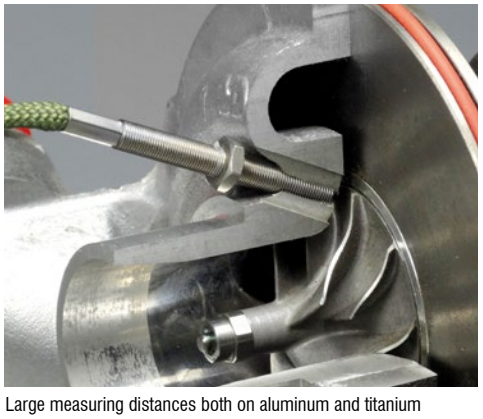
Ease of use

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.

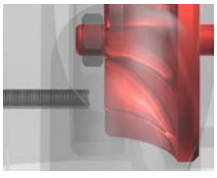
Measuring aluminum and titanium blades

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



Large measuring distances both on aluminum and titanium



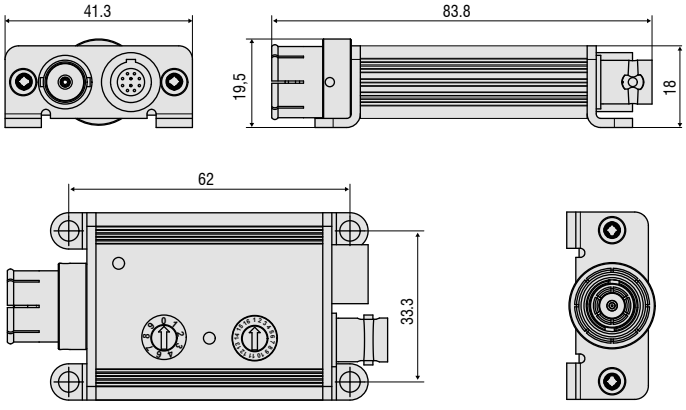
Axial installation

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

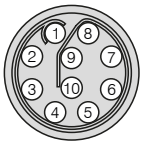


Dimensions in mm, not to scale.

Pin assignment for power supply and signal

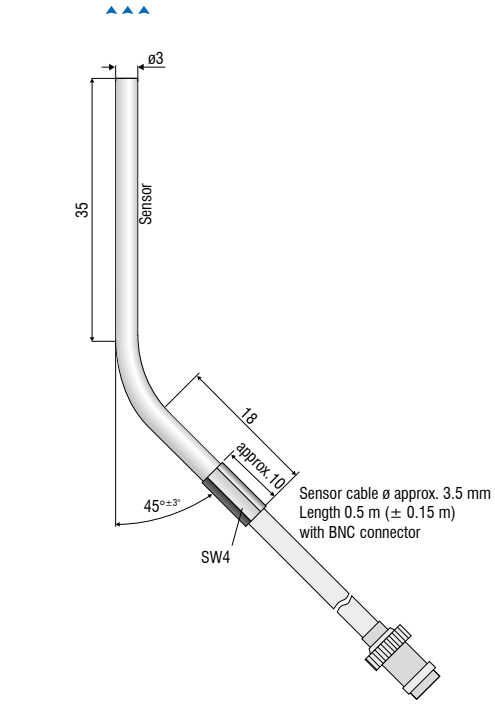
Pin	Assignment	Color (cable: PC140-x)
1	Analog output for rotational speed 0 … +5 V	Blue
2	reserved, not connected	Yellow
3	TTL pulses, digital	Green
4	reserved, not connected	-
5	GND	Black
6	reserved, not connected	-
7	Supply -	White
8	Supply voltage +9 … 30 VDC	Brown
9	Not assigned	-
10	Not assigned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

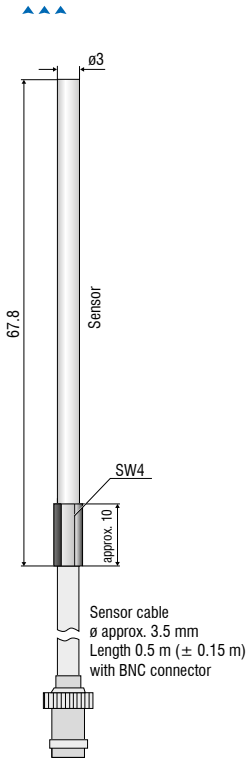
10-pin cable connector
View on solder side



Sensors
turboSPEED DZ140

Measurement direction

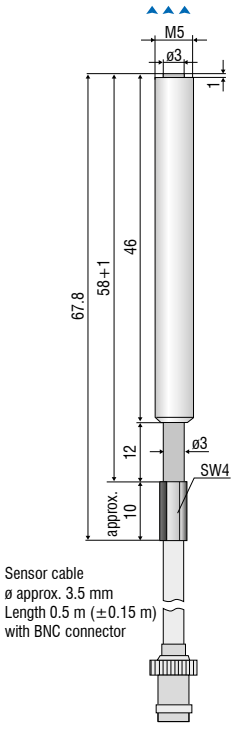


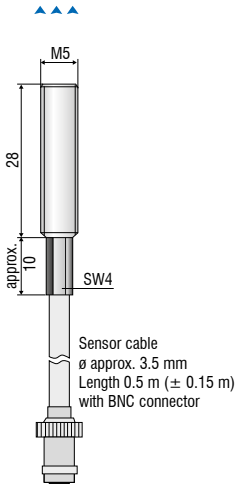


Model		DS 05(03)	DS 05(04)
Sensor type		shielded	shielded
Connection[1)]		integrated cable, axial, length 0.5 m	integrated cable, axial, length 0.5 m
Mounting		Clamping/adapter	Clamping/adapter
Temperature range	Storage	-40 ... +200 °C	-40 ... +200 °C
	Operation	-40 ... +200 °C	-40 ... +200 °C
Special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

[1)] Length tolerance ±0.15 m

▲▲▲
Measurement direction



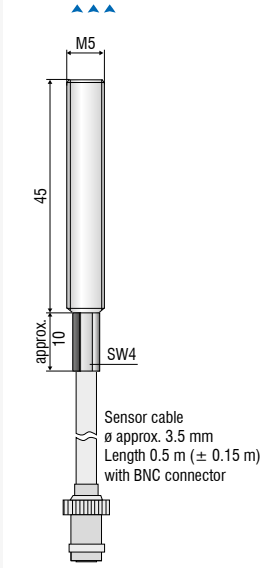


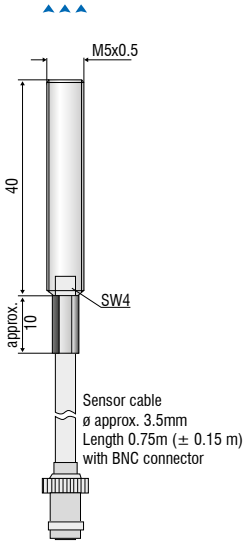
Model		DS 05(07)	DS 05(14)
Sensor type		shielded	shielded
Connection[1)]		integrated cable, axial, length 0.5 m	integrated cable, axial, length 0.5 m
Mounting		Cable gland (M5)	Cable gland (M5)
Temperature range	Storage	-40 ... +200 °C	-40 ... +200 °C
	Operation	-40 ... +200 °C	-40 ... +200 °C
Special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

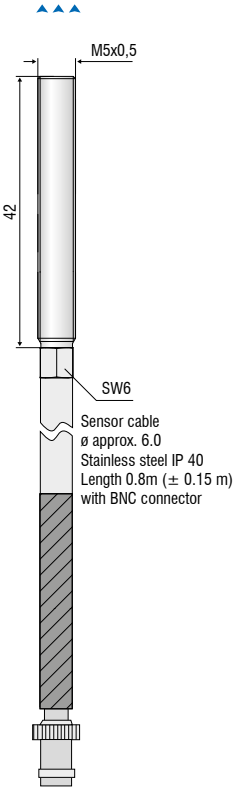
[1)] Length tolerance ±0.15 m

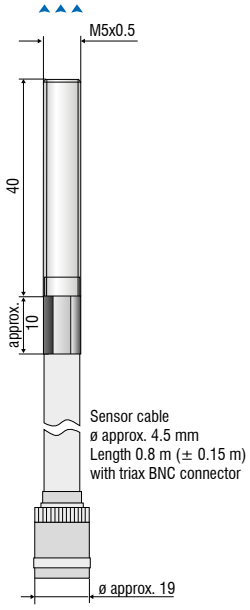
Sensors
turboSPEED DZ140

Measurement direction









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
	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

Cables
turboSPEED DZ140

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

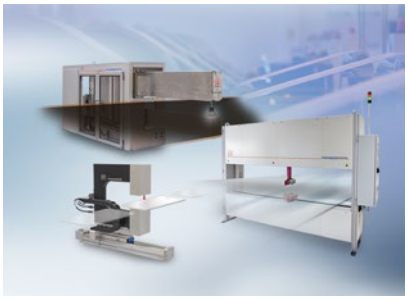
Accessories
eddyNCDT

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: 10 m / 20 m / 40 m / 80 m as drag-chain suitable variant	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

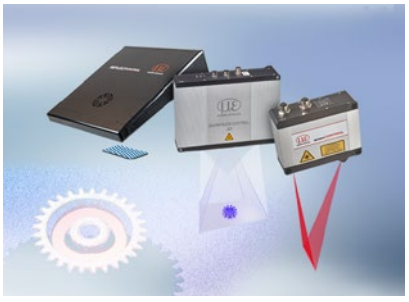
Sensors and measurement devices for non-contact temperature measurement



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

Modifications reserved / Y9766509-F022055GKE

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