



# More Precision

**eddyNCDT** // Eddy current sensors for displacement and position





- Maximum speed range from 200 to 400,000 RPM
- Miniature sensor design from  $\varnothing 3\text{mm}$
- Measurement on aluminium and titanium
- Distance to target up to 2.2mm
- No modification of the compressor wheel
- For test cell and on-vehicle measurements
- Highest EMV immunity and stability
- Operating temperature up to 285°C

#### Measuring principle

A coil is integrated in a sensor housing and energised by a high-frequency alternating current. The electromagnetic field from the coil generates eddy currents in the turbocharger blade, while every blade generates a pulse. The controller identifies the speed (analogue 0–5V) by considering the number of blades.

#### Robust miniature controller

As the entire electronics 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. turboSPEED DZ140 offers excellent EMV immunity in test cells and road tests.

#### Reliable speed and temperature measurement

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

#### Ease of use

A tri-colour '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 electronics 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 electronics and the power supply as well as the analogue outputs.

#### Measurement of aluminium and titanium blades

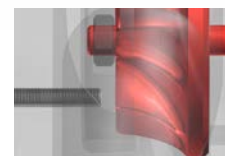
The DZ140 measures both aluminium and titanium blades. The sensors can be mounted at a relatively large distance from the blade. The maximum distance of 2.2mm enables reliable operation.



Extremely compact design



Large measuring distances both at aluminium and titanium



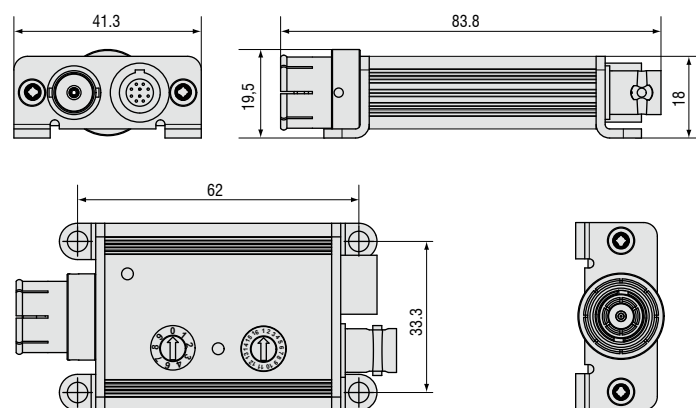
axial installation

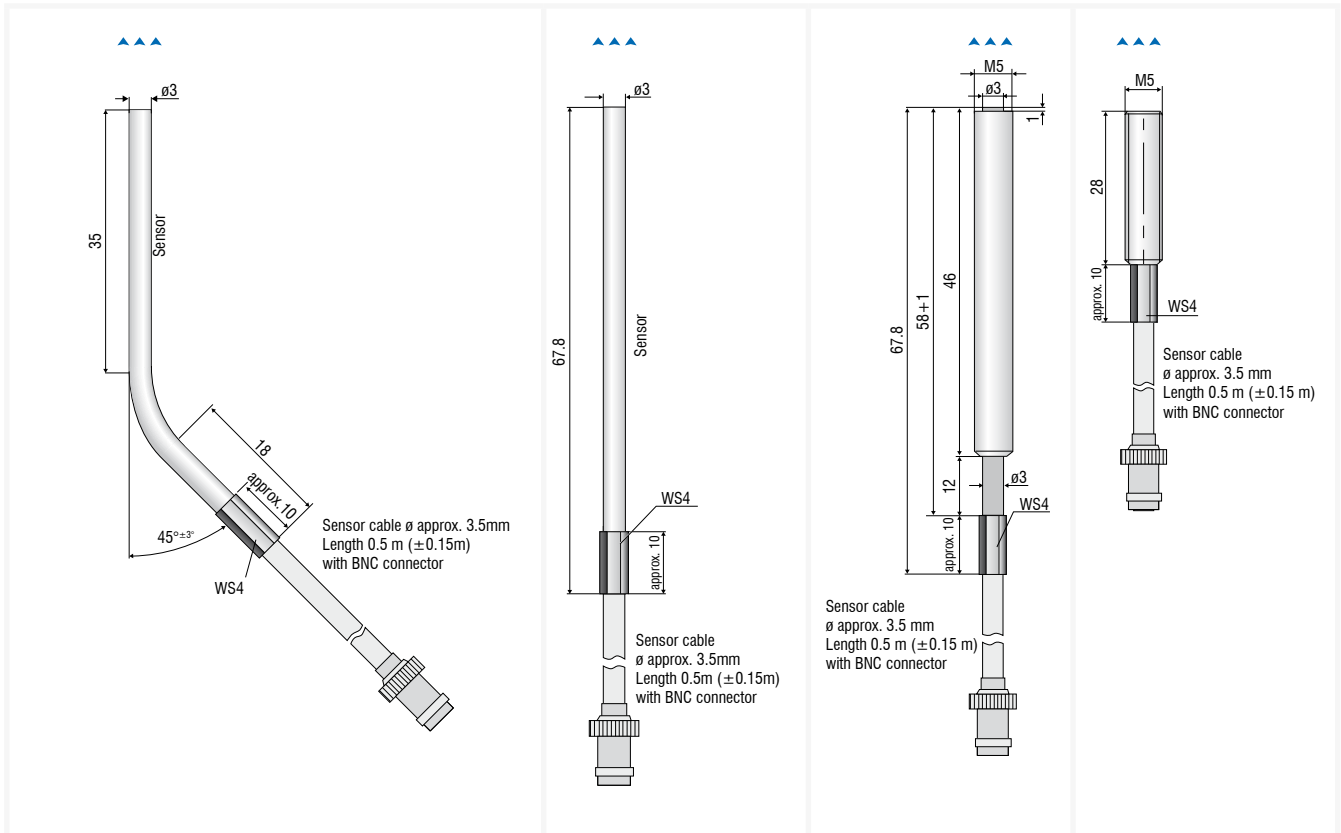


radial installation

Model		DZ140 (Controller)								
Sensors		DS 05(03)	DS 05(04)	DS 05(07)	DS 05(14)	DS 05(15)	DS 1	DS 1(04)	DS 1/T	
Measuring principle		eddy current principle								
Target (blade material)		aluminium or titanium								
Maximum speed range (measuring range)		200 ... 400,000RPM								
Operating temperature	controller	-20 ... +115°C								
	sensor	-40 ... +235°C (short-term +285°C)								
Distance sensor to blade (wall thickness 0.35mm)	aluminium	radial 0.6mm / axial 1.1mm					radial 1.3mm / axial 1.6mm			
	titan	radial 0.6mm / axial 1.0mm					radial 1.2mm / axial 1.6mm			
		adjustment with three-state LED								
Integral sensor cable		0.5m ±0.15m					0.75m ±0.15m		0.8m ±0.15m	
Number of blades		rotary switch (accessible from the outside) for 1 up to 16 blades								
Output (digital)		1 pulse / blade (TTL-level, variable pulse duration) or 1 pulse / revolution (TTL-level, pulse duration 100µs)								
Output (analogue)		0 ... 5V (200 ... 200,000RPM) 0 ... 5V (200 ... 400,000RPM) adjustable, from the outside accessible via mode rotary switch								
	linearity	±0.2% FSO								
	resolution	0.1% FSO								
		test pulse generation to control the measurement chain; load resistance >5kOhm, load capacitance max. 1nF								
RAW output (via BNC connector)		for easy sensor mounting via oscilloscope								
Power supply		9V ... 30VDC / max. 50mA (short-term up to 36VDC)								
Cable		PC140-3 supply and output cable 3m								
		PC140-6 supply and output cable 6m								
Weight		controller DZ140: appr. 85g								
Protection class		controller DZ140: IP 65								

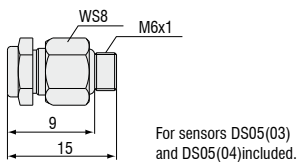
FSO = Full Scale Output

**Controller DZ140**

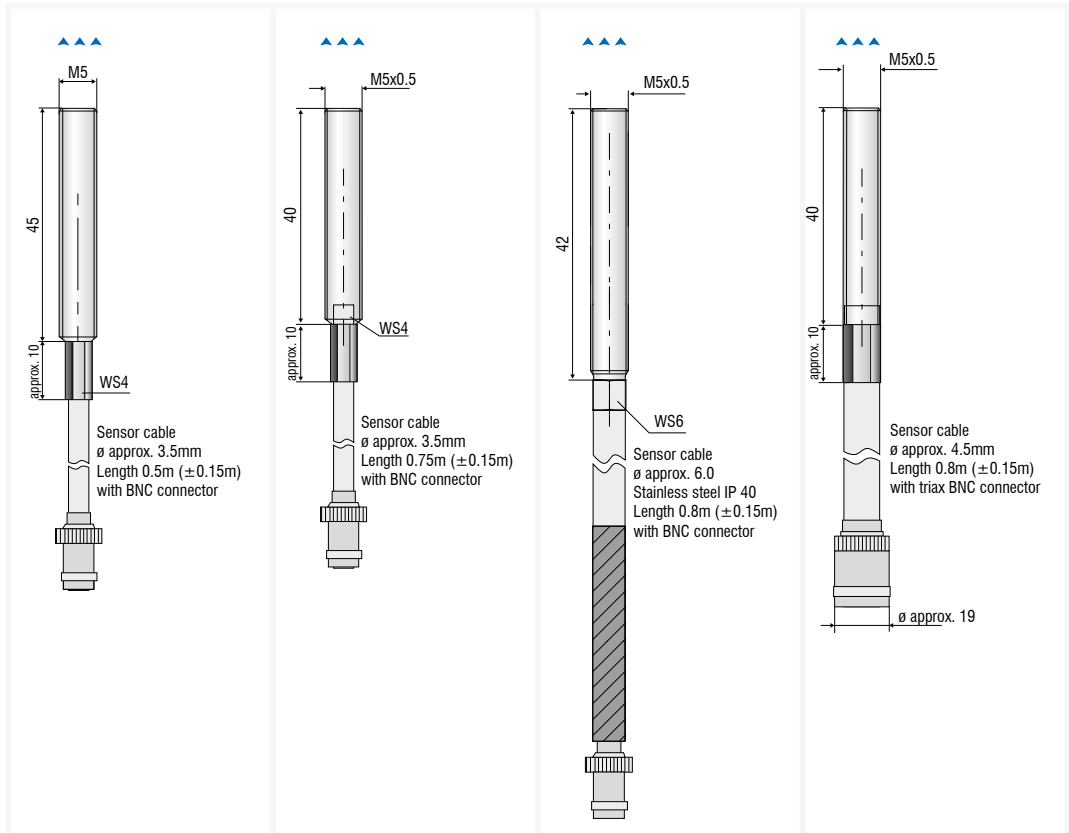


Sensor type	DS 05(03)	DS 05(04)	DS 05(07)	DS 05(14)
Measuring range	0.5mm	0.5mm	0.5mm	0.5mm
Thread length	-	-	45mm	28mm
Thread	-	-	M5 x 0.8	M5 x 0.8
Integrated cable/ length	0.5m	0.5m	0.5m	0.5m
Special feature	curved housing	-	-	length of housing 42.5 mm

Mounting adapter MA135



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Measurement direction



Sensor type	DS 05(15)	DS 1	DS 1(04)	DS 1/T
Measuring range	0.5 mm	1mm	1 mm	1mm
Thread length	45mm	40mm	40mm	40mm
Thread	M5 x 0.8	M5 x 0.5	M5 x 0.5	M5 x 0.5
Integrated cable/ length	0.5m	0.75m	0.8m	0.8m
Special feature	-	-	stainless steel protection hose	-

## High performance sensors made by Micro-Epsilon



Sensors and systems for displacement and position



Sensors and measurement devices for non-contact temperature measurement



2D/3D profile sensors (laser scanner)



Optical micrometers, fibre optic sensors and fibre optics



Colour recognition sensors, LED analyzers and colour online spectrometer



Measurement and inspection systems