ENGINEERING
TOMORROW

Cut back on **system costs** Upgrade to the **right technology**

A temperature sensor overview



34%
cost reduction

by switching from a thermocouple to a Danfoss Pt 100 sensor and benefit from problem free installation.

www.danfoss.com

Unsurpassed expertise makes all the difference

When you choose Danfoss as your supplier of temperature sensors, you choose a dedicated partner who truly understands the challenges in your specific application. Years of experience allow us to provide you with advanced solutions that will meet your every requirement in terms of both performance and life cycle cost. Choose from our wide range of standard devices or team up with our worldwide sensor experts to design a customised solution for your equipment.

Transportation

Marine, Mobile Hydraulics and Railways

The increasing global focus on environmental and safety legislation calls for more control and automation. Danfoss accommodate this by optimising product functions and specifications, allowing you to comply with the new demands. Our wide sensor range comprises solutions for:

- Marine equipment (MBT 5250/5252/5116/5113 series)
- Mobile hydraulic equipment (MBT 3270 series)
- Railway equipment (MBT 5310/5252/3270 series)

Machine and equipment

Industrial Hydraulics, AirCompressors, Water Pumps and Industrial Engines

Within machines and equipment the temperature sensor specifications depend on the specific application. Close cooperation with customers has allowed us to develop dedicated sensor solutions for:

- Water pumps and air compressors (MBT 3270/5250 series)
- Industrial engines (MBT 3270/5250/5111 series)
- Industrial hydraulics (MBT 3270 series)

Heating and sanitation

Sterilisers, Autoclaves, Boiler and Boiler Room Equipment

Energy efficiency and safety are frequent challenges in heating and sanitation applications. The answer is highly reliable and accurate measurements, which is achieved by using specialised sensors. Bearing the above equipment in mind we have developed dedicated temperature sensors for:

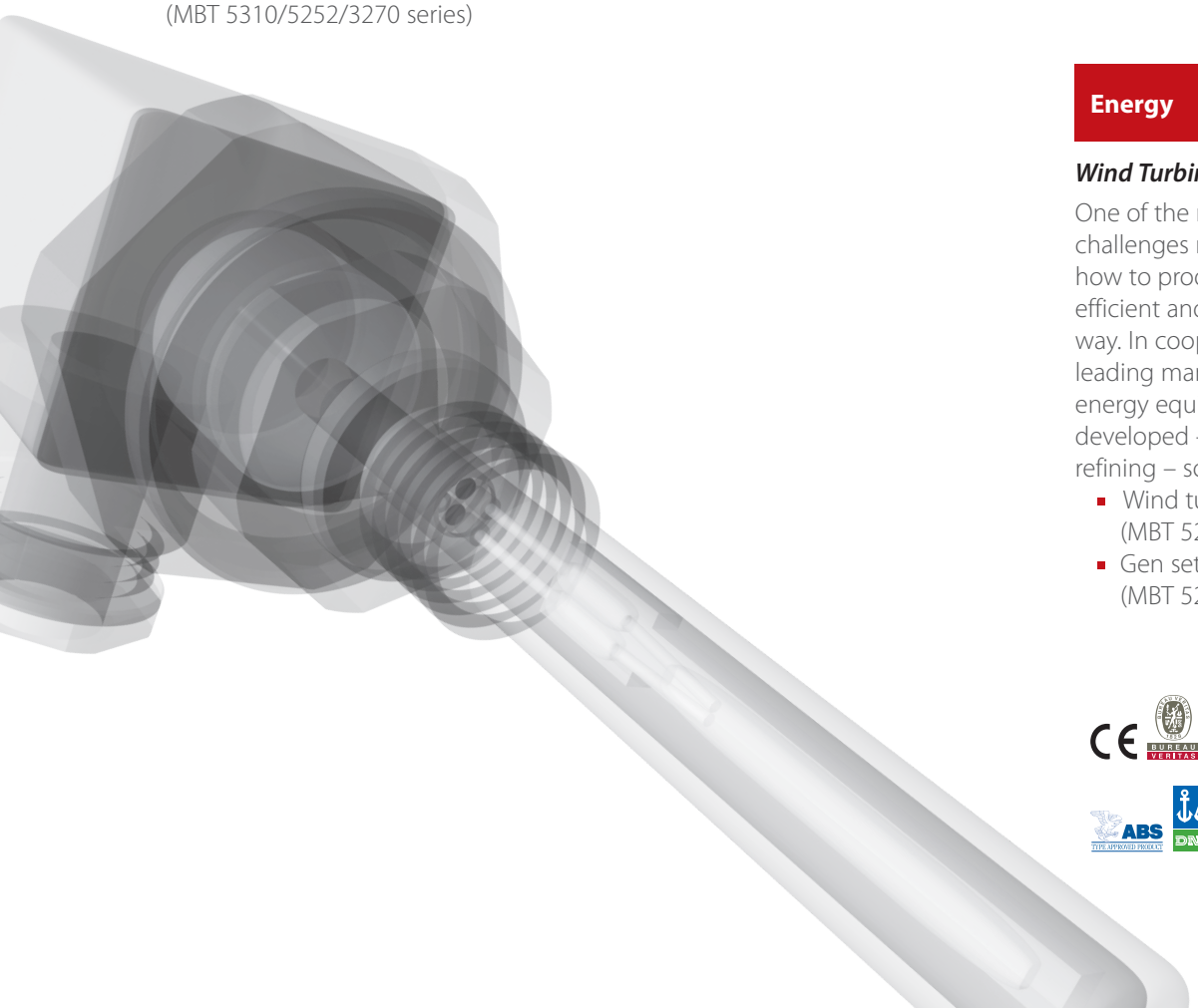
- Sterilisers and autoclaves (MBT 153/5253 series)
- Boiler and boiler room equipment (MBT 5252/5250/5410 series)

Energy

Wind Turbines and Electric Power

One of the most distinct global challenges now and in the future is how to produce energy in a both efficient and environmentally friendly way. In cooperation with some of the leading manufacturers of process and energy equipment, Danfoss has developed – and is continuously refining – solutions for:

- Wind turbines (MBT 5250/5310 series)
- Gen sets (MBT 5250/5252/5116/5111 series)



Temperature sensors that can take the heat

An outstanding temperature sensor performance is characterised by:

- The element
- The ability to react fast and precise
- The packaging

1 Elements

Depending on the equipment different element technologies can be applied:

- RTD (Pt100/Pt1000) – for standardised signals and high accuracy the RTD's are a perfect choice
- Thermistors (NTC/PTC) – the optimum solution for OEM equipment in large volumes
- Thermocouples – a well-known technology for high temperatures and heavy-duty applications

If required the temperature sensor can also be delivered with a transmitter to get an analogue signal:

- 4–20 mA
- Voltage
- Ratio metric

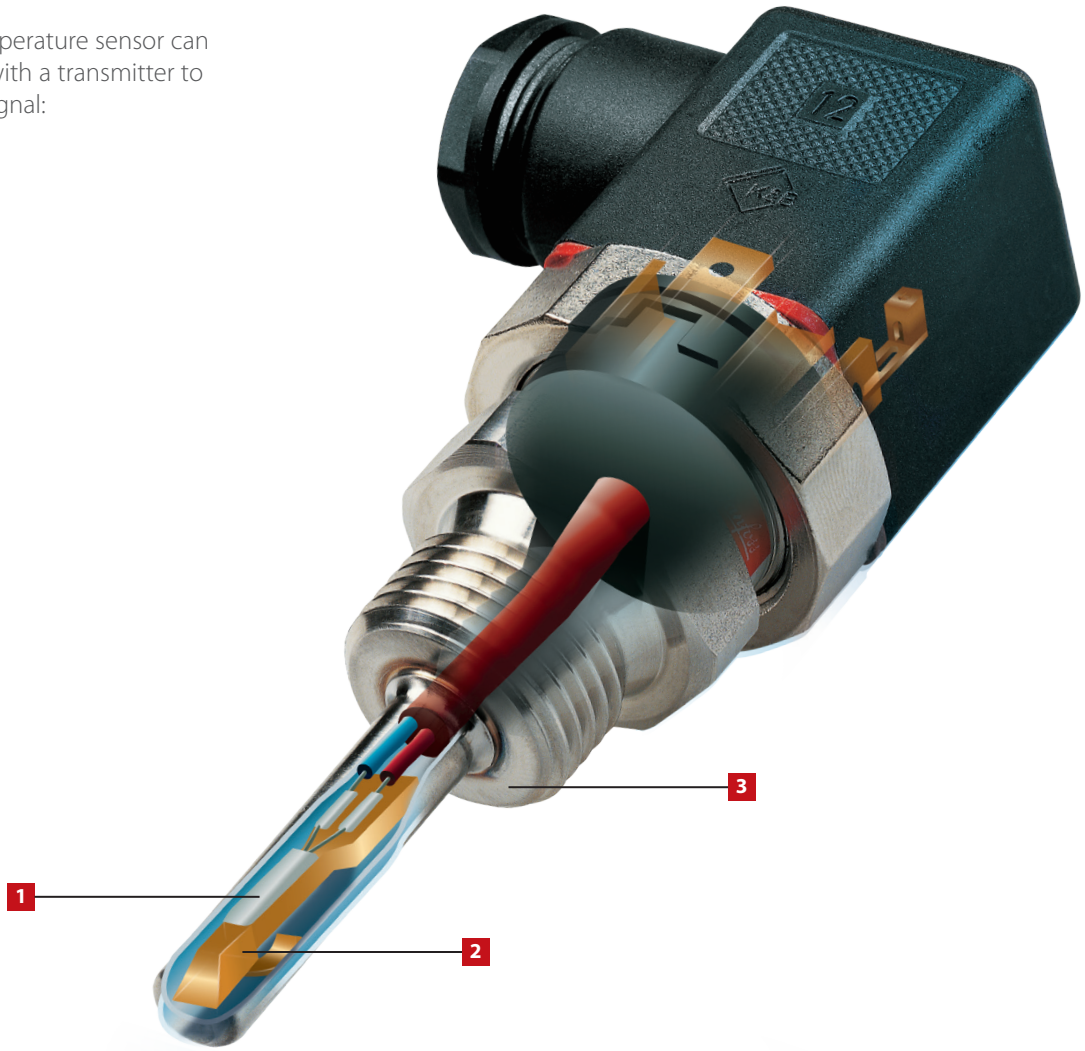
2 The ability to react fast and precise

Special care has been put into the design of the sensor in relation to the reaction time. A specially developed sensor element fixture ensures contact between the element and the housing material in order to secure a fast heat transfer from the media to the sensor element. On top of this the sensor construction ensures minimum radiation of heat, which results in a measurement very close to the actual temperature of the media.

3 Packaging

The sensor design offers long-life stability through:

- High shock and vibration stability
- High enclosure grade (special version up to IP69K)
- Flexible choice of sensor material:
  - Stainless steel (AISI 316)
  - Brass
- Gold plated contacts to secure flawless signal












TYPE	STANDARD		MBT 3260	MBT 3270	MBT 3300	MBT 3560	MBT 153	MBT 5111	MBT 5113	MBT 5114
Segments	Transportation			●		●		●	●	●
	Heating and sanitation		●		●		●			
	Machine and equipment			●		●		●		●
	Energy					●	●	●	●	
Characteristics	Pt 100/Pt 1000		•	•	•		•			•
	NTC/PTC			•			•			
	Thermocouple							•	•	
	Transmitter					mA / V d.c.				
	Transmitter as option				mA				mA	
	Measuring insert		Fixed	Fixed	Changeable	Fixed	Fixed	Fixed	Changeable	Fixed
	Medium temperature	°C	-50 – 120 °C	-50 – 300 °C	-50 – 600 °C	-50 – 200 °C	-50 – 200 °C	-40 – 800 °C	-50 – 800 °C	-50 – 550 °C
		°F	-58 – 248 °F	-58 – 572 °F	-58 – 1112 °F	-58 – 392 °F	-58 – 392 °F	-40 – 1472 °F	-58 – 1472 °F	-58 – 1022 °F
	Enclosure		IP54 (NEMA 13)	IP65 (NEMA 4)	IP65 (NEMA 4)	IP65 / IP67 (NEMA 4/ NEMA 6)	IP67 (NEMA 4)	IP65 (NEMA 4)	IP65 (NEMA 4)	IP54 (NEMA 13)
	Material protection tube		Protection tube Copper Process connection Brass	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.457 (AISI 316 Ti
	Reaction time $t_{0.5}$ in water (sec)		2 s	Stainless steel 1.5 s Brass 1.2 s	Depending on protection tube	10 s	1 s	Straight: 15 s Angle: 2 sec	30 s	2 s
	Marine approvals							•	•	•

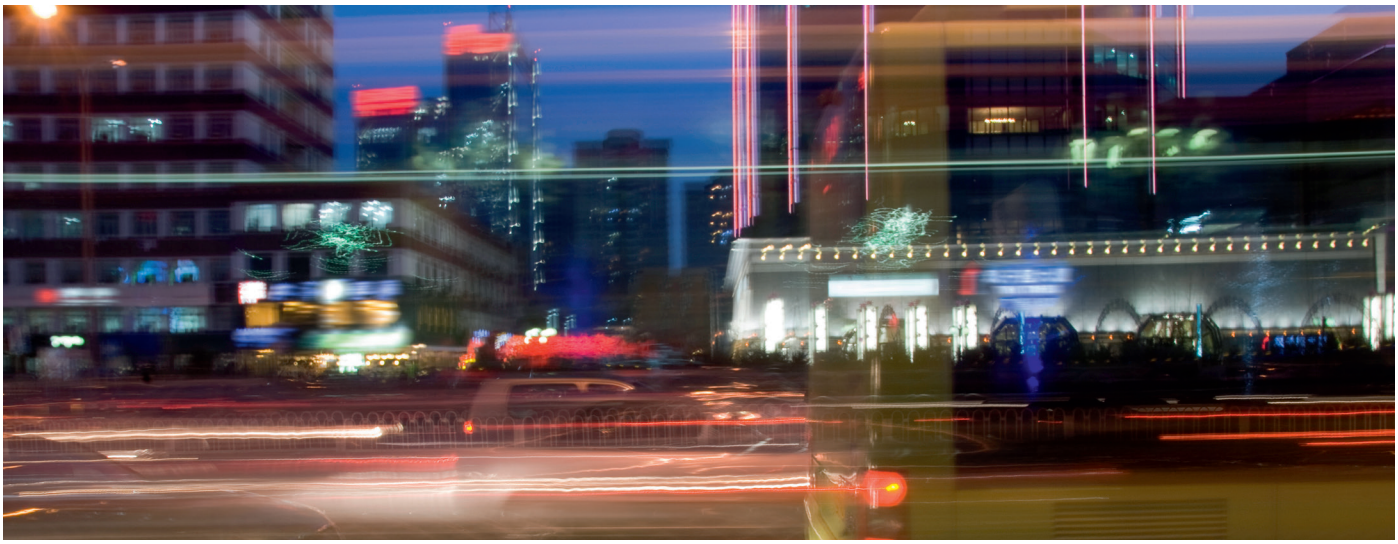
TEMPERATURE SENSORS OVERVIEW



	MBT 5116 Slim-line	MBT 5116 with B-head	MBT 5250	MBT 5252	MBT 5260	MBT 5310	MBT 5410	MBT 5560	MBT 5722	MBT 9110 - separate encl.
	⚓	⚓	⚓	⚓	⚓	⚓	⚓	⚓	⚓	⚓
				🔥			🔥			🔥
	▭	▭	▭	▭	▭					🌡
	▭	▭	▭	▭	▭	✳	✳			
	•	•	•	•	•	•	•		•	(•)
			•	•						
										(•)
								mA / V d.c.		mA
		mA		mA		mA	mA		mA	
	Changeable	Changeable	Changeable	Changeable	Fixed	Fixed	Changeable	Fixed	Fixed	Changeable
	-50 – 600 °C	-50 – 600 °C	-50 – 200 °C	-50 – 400 °C	-50 – 200 °C	-50 – 200 °C	-50 – 100 °C	-50 – 200 °C	-50 – 200 °C	-50 – 800 °C
	-58 – 1112 °F	-58 – 1112 °F	-58 – 392 °F	-40 – 752 °F	-58 – 392 °F	-58 – 392 °F	-58 – 212 °F	-58 – 392 °F	-58 – 392 °F	-58 – 1472 °F
	IP65 (NEMA 4)	IP65 (NEMA 4)	IP65 (NEMA 4)	IP65 (NEMA 4)	IP65 (NEMA 4)	IP65 (NEMA 4)	IP67 (NEMA 6)	IP65 (NEMA 4)	IP67 (NEMA 6)	IP54 (NEMA 13)
	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	W.no. 1.4571 (AISI 316 Ti)	
	30 s	30 s	9 s	12 s	2 s	9 s	12 s	10 s	4 s	Depending on sensor type
	•	•	•	•	•	•	•	•	•	•

ENGINEERING
TOMORROW

Here today. Here tomorrow.



Danfoss is a leading global player within the development and production of mechanical and electronic products and controls. Since *1933*, our extensive know-how has made modern life easier and we continue to break new ground within our core business areas.

Every day, more than *250,000* items are produced at *70* factories in *25* countries. Impressive as these figures are, we are most proud of the way our dedicated employees apply the high-quality components in customer solutions, adding value to the end products. Building strong partnerships is of great importance to us, because it is purely by understanding our customers' needs that we can meet the expectations of tomorrow.

This is also true in Industrial Automation, a Danfoss entity dedicated to focusing on the industrial world of today. Through us, you gain access to the entire Danfoss pool of technologies, with special emphasis on sensors and controls.

We offer safer, more reliable and more efficient solutions in a close cooperation based on firm values.

Learn more at **www.danfoss.us/ia**

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