ENGINEERING
TOMORROW

Sensing Solutions | Wind Power

The **performance** of your wind turbine relies on the **quality** of its small **components**

One

stop shop - reducing your supply base and boosting your bottom line

sensors.danfoss.com

Efficient operation of wind turbines

The general trend towards larger wind turbines at remote sites, often offshore, places new demands on the turbine equipment and sets new standards for maintenance during the turbine life cycle. Controlling the pressure and temperature in the different systems in the nacelle requires excellent EMC performance, reliable and accurate measurements at all times.

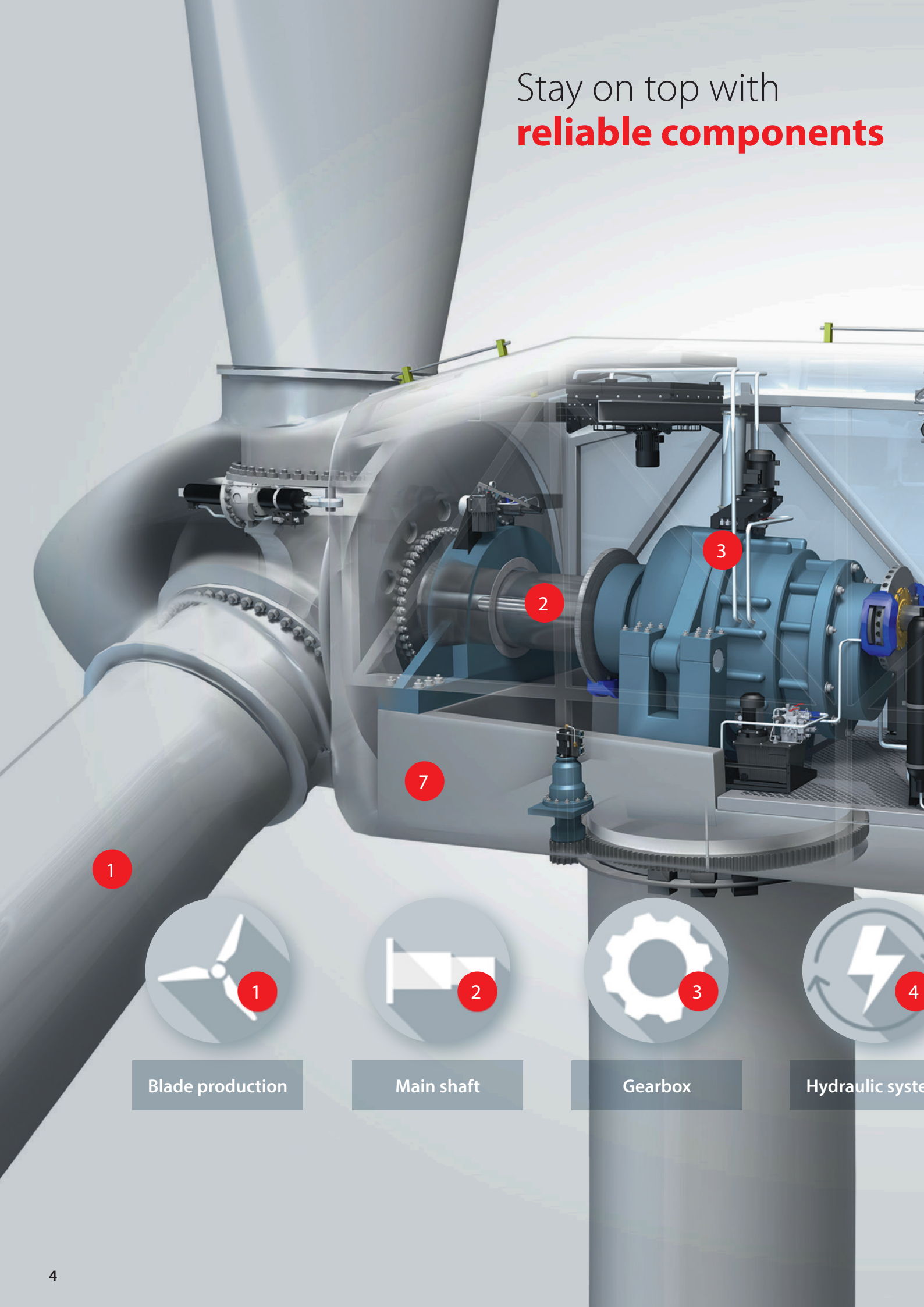
In order to ensure long and maintenance-free service life it is imperative to choose nacelle components that are designed particularly for use in heavy-duty hydraulic applications and protected by acid-resistant stainless steel (AISI 316) casings to avoid corrosion in offshore environments.

Vital applications

At first glance, pressure and temperature sensors and switches may seem small and inconsequential when compared to the impressive structures of the wind turbines. Nevertheless, failure of even the smallest sensor is likely to bring the turbine to a halt, resulting in costly downtime, expensive maintenance and lost revenue. It is therefore important to be extremely careful in selecting the right components for the vital applications of the wind turbines; components that fulfil the requirements to extreme accuracy during daily operation and durability over time and often in harsh environments.

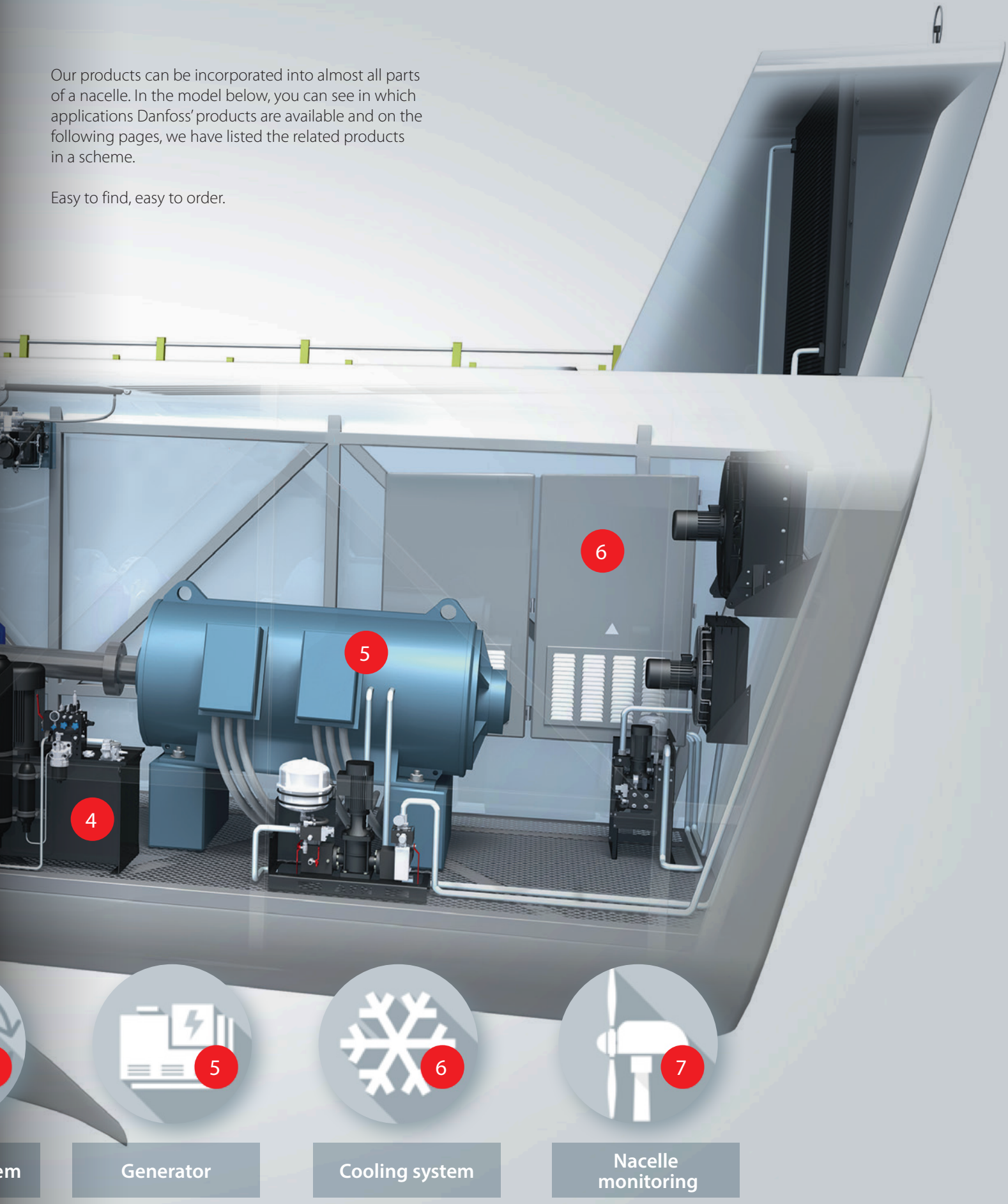
- Hydraulic system, controlling the pitch and yaw.
- Cooling system, ensuring an optimum operating conditioning.
- Gearbox, ensuring the right speed of the generator according to the current wind speed.
- Main shaft, monitoring the temperature of the bearings.
- Blade manufacturing, monitoring pressure and temperature in the production process.

Stay on top with **reliable components**



Our products can be incorporated into almost all parts of a nacelle. In the model below, you can see in which applications Danfoss' products are available and on the following pages, we have listed the related products in a scheme.

Easy to find, easy to order.



Drawing credit: Hydratech Industries.

Choosing the right components is key to your success

Controlling the pressure with **Danfoss pressure transmitters** offering reliable and accurate measurement at all times.

- **MBS 1600**
  0 –6 bar to 0 – 600 bar, 4 – 20 mA, IP67, Accuracy: +/-0.5%FS, Pulse snubber, Hex 22, ex 22, required pressure connections available, Electrical connections: DIN PG9 form A and M12 plug
- **MBS 3000**
  0 – 1 bar to 0 – 600 bar, 4 – 20 mA, Voltage, IP67, Accuracy: ± 0.5% FS, Pulse snubber, Hex 22, Wide range of pressure connections, Electrical connections: M12 plug.
- **MBS 8200**
  Measuring range 6 to 600 bar, 4 – 20 mA, IP67, ± 0.5% FS, Pulse snubber, Hex 27, Wide range of pressure connections, Electrical connections: DIN and M12 plug.

Reliable performance at the top with **Danfoss temperature sensors** safeguarding your bearings

- **MBT 3310 (Top mounted bearing temperature sensor)**
  Available in both Pt 100 and Pt 1000, -50 to 200 °C, Spring loaded measuring insert, Output signal in Ohm, IP65 enclosure, Electrical connections: M12 plug.
- **MBT 5310 (Bearing temperature sensor)**
  Available in both Pt 100 and Pt 1000, -50 to 200 °C, Spring loaded measuring insert, Output signal in Ohm, IP65 enclosure, Electrical connections: DIN and M12 plug.
- **MBT 5250 (General purpose sensor)**
  Available in both Pt 100 and Pt 1000, -50 to 200 °C, Changeable measuring insert, Output signal in Ohm, IP65 enclosure, Electrical connections: DIN and M12 plug.
- **MBT 3270 (Compact sensor)**
  Available in both Pt 100 and Pt 1000, -50 to 150 °C, Fixed measuring insert, Output signal in Ohm, IP65 enclosure, Electrical connections: M12 plug.

One of the world's most extensive ranges - **Danfoss pressure & temperature switches** accurate, robust and built for life

- **MBC 5100 (Pressure switch in block design)**
  0.2 to 400 bar measuring range, SPDT contact system, 0.5 amp electrical rating, Ag contact material, Fixed differential, IP65 enclosure.
- **KPS (Pressure switch)**
  0 to 60 bar measuring range, SPDT contact material, 6 amp electrical rating, Au contact material, Adjustable differential, IP 67 enclosure
- **KPS (Temperature switch)**
  -10 to 200 °C measuring range, SPDT contact system, 6 amp electrical, Au contact material, Adjustable differential, IP66 enclosure

Highly effective and durable, **Danfoss Fluid Controls** are known to reliably open and close in even the toughest environment

- **EV220B (Solenoid valve)**
  Available in both NC and NO version, G1/4 to G2", Size DN 6 to 50, 0.7 to 40 Kv-value m^3/h, 0.1 to 16 bar differential pressure, Up to 140 °C media temperature, Brass and stainless steel valve body, Sealing material available with both EPDM/FKM/NBR, Available with sealed cllp-on coil.
- **EV250B (Solenoid valve)**
  Available in both NC and NO version, G 3/8 - G1", Size DN 10 to 22, 2.5 to 7 Kv-value m^3/h, 0 to 10 bar differential pressure, Up to 140 °C media temperature, DZR Brass valve body, Sealing material available with both EPDM/FKM, Available with sealed cllp-on coil.

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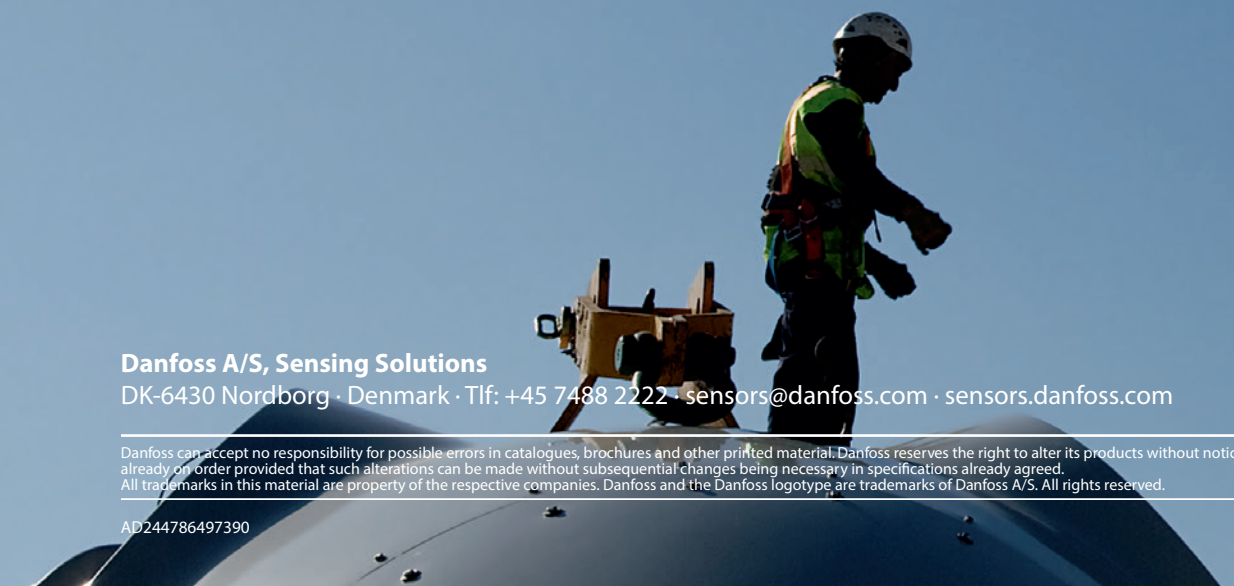
Controlling the Wings of Power

Components for Monitoring Pressure and Temperature of Wind Turbines

For more than 70 years Danfoss has manufactured components for monitoring and controlling pressure and temperature. Regardless of application, Danfoss aims to provide our customers with the best available solutions. Danfoss components are designed for high performance, and we make no short-cuts when it comes to:

- Robust design
- High operational reliability
- High stability under long-term loads
- Long lifetime

This is achieved through use of the latest technologies. Danfoss products and solutions are results of close co-operation with customers in the wind power industry.



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