

ENGINEERING  
TOMORROW



# Industrial sensors and switches **Global supplier of applied expertise**

**30+**  
**countries**

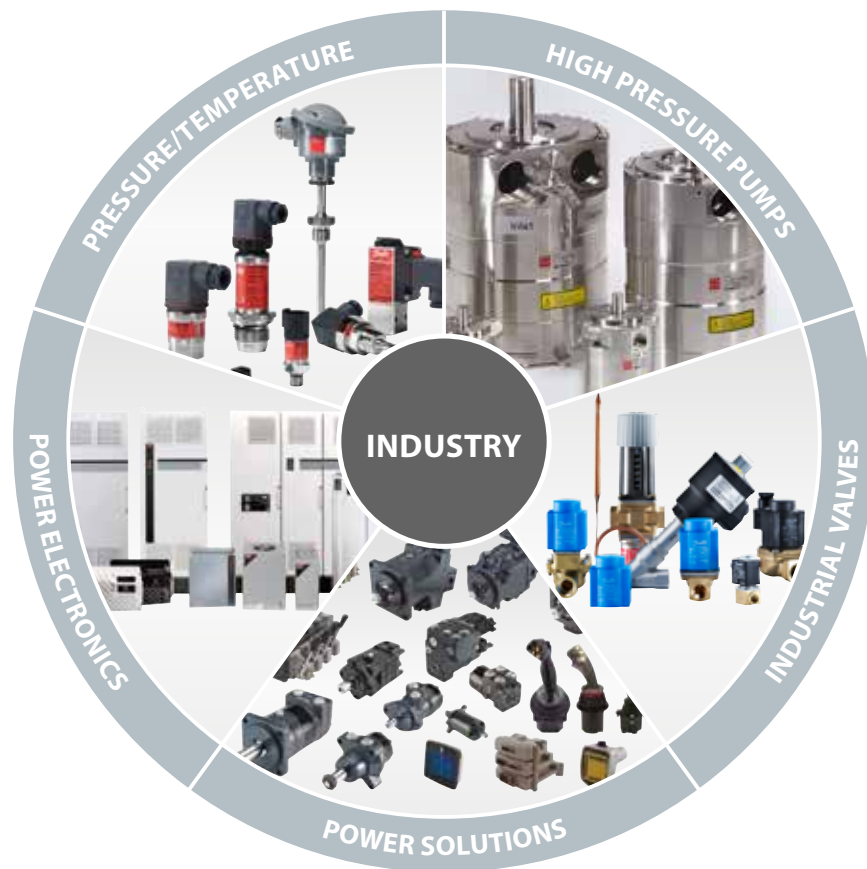
with dedicated field  
experts, all focused on  
your needs and with a  
desire to build strong  
partnerships.

# 80 years of engineering

## Across industries and borders

Since 1933, Danfoss has been delivering increased comfort and modern convenience through climate and energy solutions. Every day, people and industries throughout the world rely on our technologies.

Our core technologies are cooling and heating both domestic and commercial buildings, preserving and transporting food, controlling electric motors, automating industrial processes, controlling hydraulics, supporting the production of renewable energy, and countless other



MARINE



MOBILE HYDRAULICS



POWER PLANTS



WIND TURBINES

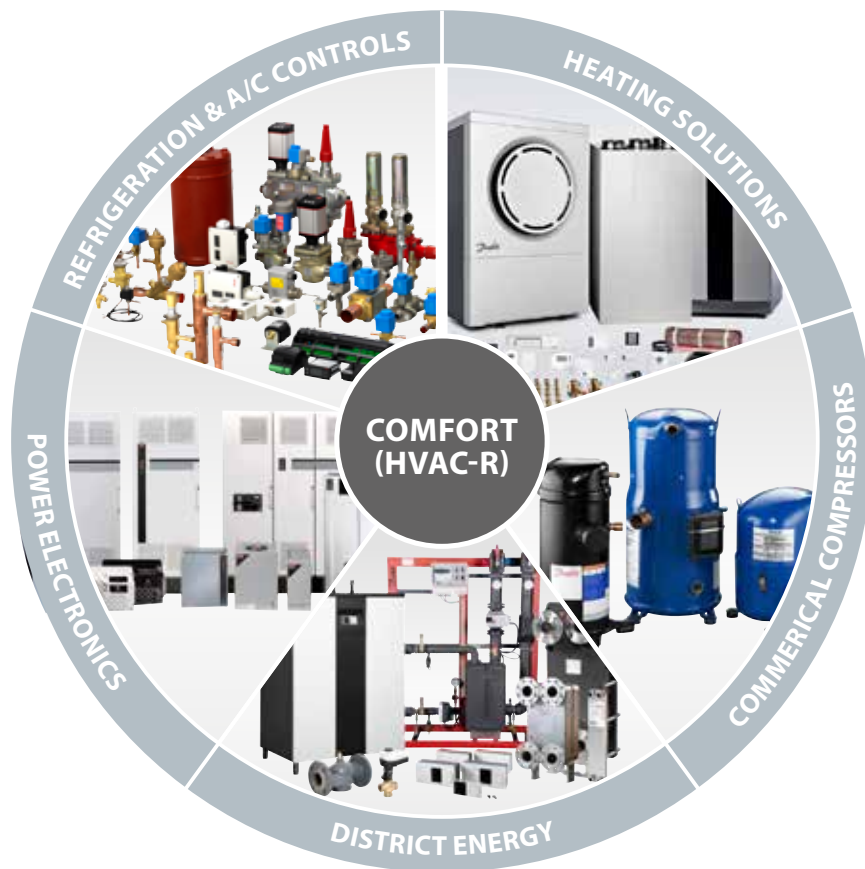


applications. In short - our expertise is applied everywhere.

Over the years we have built and maintained our reputation for reliability, excellence and innovation, while consciously acting as responsible global corporation. Today, Danfoss is a

worldwide market leader with strong local operations and in close collaboration with our customers.

Engineering Tomorrow - together.



SOLAR ENERGY



REFRIGERATION



AIR CONDITIONING



RESIDENTIAL COMFORT

# Danfoss pressure and temperature control

## Global sales and production



### Danfoss IA Manufacturing and Engineering Facilities:

- Nordborg, Denmark
- Newcastle, United Kingdom
- Wuqing, China
- Grodzisk Mazowiecki, Poland

### You can find us all over the world:

- Industrial Automation Manufacturing and Engineering Facilities
- Sales Companies



### **Local production, global quality**

No matter where in the world our products are manufactured they must comply with our strict quality demands.

The Danfoss quality concept is an integrated part of the entire organization. Our quality management is based on ISO 9001:2008 and is being developed to become compliant with the TS16949

quality standard for suppliers to the automotive industry. A zero-defect mindset is an integral part of our quality culture and is based on six sigma principles and tools.

Danfoss is registered as conforming to the requirements of ISO 9001, ISO 14001 and RoHS.

Our in-house Technology Centres (in Nordborg, Denmark and Tianjin, China) guarantee the best quality throughout the value chain. We routinely perform market quality tests to verify that product requirements have been met when our products have been exposed to external impacts for some time.

# We make your challenges our business

## Through applied expertise

Expertise is valuable. Applied expertise makes a difference. This is the belief that we act on every day. And this is exactly what makes Danfoss a unique business partner. Applied expertise is what enables us to make your challenges our business both literally and figuratively. Recognizing the fact that applied expertise also means being in the right place at the right time, we support this belief through our presence in more than 30 countries spread across the globe.

### Expertise in a context

For us, applied expertise simply means putting our expertise, which we have gained over many decades, to good, practical use. We do this through insight and collaboration with trusted partners worldwide.

We are very well aware that the products we supply are not worth much unless we understand and acknowledge the context in which they are meant to be used. This understanding and insight enables us to collaborate with the right partners in order to deliver the right solutions in the place at the right time.

When you choose Danfoss as your supplier you gain a dedicated partner who truly understands and recognizes the challenges in your specific application. Decades of experience allow us to provide you with advanced solutions that will meet your every requirement in terms of reliability,

operational safety, life cycle costs, and overall performance.

### Partnering up to reduce emissions and fuel consumption

Danfoss Industrial Automation is recognized as a global supplier of applied expertise to a variety of industries and for a variety of purposes.

In this context our pressure and temperature controls are a vital part of the state-of-the-art solutions developed by manufacturers within various industries in order to get their machinery (on sea or on shore) to comply with environmental legislation related to emissions and safety.

For instance, our sensors are helping a leading UK construction equipment manufacturer meet the latest emissions regulations. The company began using Danfoss sensors in its stability systems in 2006. And recently in close cooperation, we designed and tested a series of sensors specifically for the manufacturer's emission systems – precisely the level of service that the construction equipment manufacturer was looking for in a supplier.

The Danfoss sensors are now set to play a key role in reducing emissions in backhoe loaders, earthmovers, telescopic handlers, and other off-highway equipment around the globe.

### Reducing total cost of ownership at sea

Our pressure transmitters and temperature sensors are playing a significant role for manufacturers of marine diesel or gas combustion engines in order to be ready for the world's demands of tomorrow.

Thanks to close cooperation with leading engine manufacturers, our pressure and temperature controls are suitable for the different eco-friendly engine solutions.

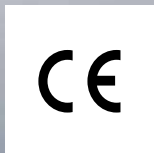
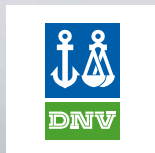
On board many of today's container ships, bulk carriers, oil tankers and cruise ships, Danfoss sensors monitor pressure and temperature in a variety of engine applications. This enables ships to lower their emissions as well as fuel and other operational costs. This has a huge impact on the shipping company and its stakeholders.

### Booster pump manufacturers choose Danfoss pressure transmitters

Many supply and water treatment applications throughout the world are controlled by a variable-speed booster pumps together with a frequency converter to adjust the pump speed to the water demand. But, like most water applications, liquid hammer, pressure peaks, and electromagnetic interference (EMI) can impede performance and damage system components.

Development work with a leading pump

### Certificates



manufacturer has resulted in a series of dedicated pressure transmitters based on an innovative piezo-resistive silicon sensor together with an excellent pulse-snubber.

These sensors are reliable and accurate - they work flawlessly in applications where rapid changes in flow velocity occur. Therefore, global pump manufacturers turn to Danfoss when excellent performance of their equipment is a must.

#### **Maximum uptime for wind turbines**

Located on top of towers that can extend 80 to 110 meters into the sky, wind turbines are subjected to powerful operating forces.

This need for safe, stable operation of the various wind turbine applications means that we need to help manufacturers secure trouble-free operation in order to keep maintenance and repair costs down.

We have decades of experience with wind farms around the world, backed by teams of dedicated engineers. Thousands of wind turbines are

controlled by Danfoss pressure and temperature controls.

#### **High performance and lower costs in harsh conditions**

Danfoss pressure and temperature controls have recently gained popularity in a new process within the oil and gas field in North America.

New drilling technologies have created a gas boom in shale rich areas. Extracting the gas trapped in shale deposits is done by a high-pressure process known as hydraulic fracturing – or fracking – by pumping water and chemicals into the rock under high pressure.

Our global field experts are all focussed on understanding customer needs. The

proven reliability and performance of the Danfoss controls within the oil and gas industry have been the key factors behind the choice of Danfoss controls for monitoring pressure and temperature on pump intake, lube oil, and filter pressure on the fracking trucks.





# Danfoss Industrial Automation

## our fields of applied expertise

Serving a broad, global market within diverse and demanding industries, Industrial Automation is your one-stop partner for industrial control components. Through Danfoss Industrial Automation you gain access to the entire Danfoss pool of technology, with a dedicated focus on pressure and temperature sensors and switches for monitoring and control in a wide range of industries.



### HYDRAULICS

In a world depending on infrastructure, mobile hydraulic equipment is important. Whether used in construction, agriculture or for material handling, mobile hydraulic equipment offers efficiency, economy, safety and environmental advantages.

Examples of how Danfoss Industrial Automation expertise is applied are:

- Measuring oil reservoir temperature
- Monitoring function pressure
- Weight sensing on wheel loaders



### WIND TURBINES

As the demand for sustainable energy increases, there is a growing need for highly efficient, robust and reliable wind turbines. The proven reliability of our products helps secure the optimal up-time of the turbines throughout their life.

Danfoss Industrial Automation provides sensors, transmitters, and switches for almost all applications in the nacelles of wind turbines, such as:

- The disc brake system
- The cooling systems
- The gear box
- The hydraulic unit and pitch cylinders



### WATER PUMPS

The global need for clean water is enormous and on the rise, calling for a dedicated common effort to control the water cycle.

Danfoss is well prepared to contribute to such endeavours. To us, the pump is the key to controlling the water cycle - from intake to effluent. Consequently, we have developed a range of sensors and switches for pumps, tailored for the most common applications in the water industry.



*“Through Danfoss Industrial Automation you gain access to the entire Danfoss pool of technology.”*



### **MARINE**

From the handling of sewage water to the treatment of exhaust gas, a modern ship contains most of the applications found on shore, all in a limited space.

Danfoss Industrial Automation is a global leader in supplying temperature and pressure controls to equipment placed in and around the engine room: two and four stroke diesel and gas engines, propulsion systems, fuel treatment, and oil separators - where the requirements are high.

Danfoss Industrial Automation has all the marine approvals needed to serve the industry. Danfoss' 10 international marine approvals are your guarantee that quality is built into your application.



### **AIR COMPRESSORS**

From very small units for medical use to very large industrial compressors operating in the kilowatt power band, the air compressor industry covers a huge range of equipment. Equally varied are the fundamental compressor technologies used.

Danfoss Industrial Automation supports everything from small, self-contained units operated at the site of use to large, centralized units mounted on trucks.



### **INDUSTRIAL ENGINES**

Our products are used in a variety of industrial engines such as trucks, generator sets and smaller power stations. Our product range offers high flexibility. The input from the sensor allows the control system to adjust fuel injection pressure and other parameters on the engines. Furthermore, we supply sensors for a number of measuring points, such as those which measure oil pressure and cooling water temperature.

# Applied expertise in detail

## A product range of reliability

### Pressure transmitters

#### Unique specifications and a long life

Danfoss pressure transmitters are available with analogue or digital electronic solutions and offer unique specifications in terms of accuracy.

Using two sensing technologies, Danfoss is able to cover the versatile application requirements with highly competitive solutions. Both technologies are designed to operate in severe environments.

The transmitter design offers long-life stability through sturdy and shock-proof packaging.



### Industrial switches

#### High accuracy, repeatability and stability

Pressure and temperature controls have either fixed or adjustable differential settings, excellent readability, and high accuracy of range setting.

All contacts are “snap-action” types, maintaining the contact force until the moment contact is broken. Outstanding vibration stability in switches ensures flawless operation even in heavy-duty applications.

Danfoss’ bellows are manufactured without any welding points, which makes them stress free, completely tight, and guarantees a long life.



## Temperature sensors

### Precise and flawless signal

Depending on the equipment, different element technologies can be applied, and if required the temperature sensor can be delivered with a transmitter to get an analogue output signal.

Special care has been put into the design of the sensor in relation to the reaction time. 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.

The casing design and sensor material secure unique wearing qualities and a flawless signal.



## Examples of innovative developments

### Pressure and temperature sensors dedicated to a specific industry

**MBS 1800** Cylinder Pressure Transmitter and the **MBT 5114** Exhaust Gas Temperature Sensor are both the result of innovative developments in cooperation with the leading marine engine manufacturers.

**MBS 1900** Pressure Transmitter is dedicated to water pumps and air compressor applications. The performance and space envelope of the MBS 1900 are tailored to the industry.

**MEP** Electronic Pressure Switch has proven its quality in the harsh environment found in mobile hydraulic applications.





## 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 in 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 product. 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.

### **Danfoss, Industrial Automation**

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