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ENGINEERING
TOMORROW

Danfoss

Off-highway equipment manufacturers:
save energy and **maintenance costs**,
reduce emissions and **enhance safety**

40

years of expertise

in applying hydraulics
in mobile and
off-highway solutions



Hydraulic solutions you, your customers and their operators can count on

Danfoss Industrial Automation

Take a look inside practically any off-highway equipment and you'll find components from Danfoss Industrial Automation playing a key role in saving fuel costs, reducing emissions and improving man-machine safety. But take another look around you, and you'll find Danfoss hard at work in many more places.

In fact, OEMs around the world count on us not only to enhance performance, but also to deliver best-in-class quality and product life cycle costs. As a global leader in electronic controls and hydraulic components, Danfoss is committed to both our customers and theirs, as well as the millions of people around the globe who depend on us every day to make modern living possible.

Danfoss Power Solutions

Mobile equipment manufacturers also rely on another Danfoss company,

Danfoss Power Solutions, to power, propel, control and steer their off-highway machines efficiently, safely and reliably. Learn more at www.powersolutions.danfoss.com about a wide range of hydraulic and electronic components that includes:

- Hydrostatic transmissions
- Mobile electronics
- Orbital motors
- Steering components
- PVG spool valves

Applied expertise drives innovative solutions

Decades of close cooperation with OEMs have given Danfoss Industrial Automation unique expertise in how pressure and temperature sensors and switches enable improved performance and safety in all kinds of mobile equipment. We apply our expertise in controls for hydraulic systems and mobile equipment to innovate the solutions our partners are looking for,

often in direct collaboration with their engineers, in many industries:

- **Construction**
- **Agriculture**
- **Mining**
- **Material handling and lifting**
- **Forestry**

Pressure, temperature and fluid controls that make a difference

We design the components that optimize temperature and pressure where they matter most to your mobile equipment's performance. And we let you fine-tune the processes that deliver the best returns so your off-highway machines run smarter, faster and more efficiently.



Quality you can rely on

Our zero-defect policy is your guarantee. Danfoss Industrial Automation uses the same production processes and quality assurance standards worldwide. All procedures are certified in accordance with ISO/TS 16949:2009, so no matter where we manufacture the products, we

follow the same stringent guidelines for what to do and how to do it.

The Danfoss culture of quality depends on best-in-class systems, tools and certifications. Above all, it depends on people who care.

PRESSURE TRANSMITTERS

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TEMPERATURE SENSORS

Read more on page 9



PRESSURE AND TEMPERATURE SWITCHES

Read more on page 10



SOLENOID VALVES

Read more on page 11



Advantages that add up over the lifetime of your equipment



LONGER EQUIPMENT LIFETIME

Smarter hydraulic control extends the life of your hardworking mobile equipment.

One important example of this is Electronic Load Sensing (ELS). When you mount our MBS 1250 pressure transmitter on the control that detects work port pressure, it sends information to an electronic controller to instantly adjust system pressure. Your system pressure and engine output are thus fine-tuned to deliver exactly according to actual demand. ELS extends the life of hydraulic components and reduces downtime and maintenance costs as it saves you fuel and emissions.



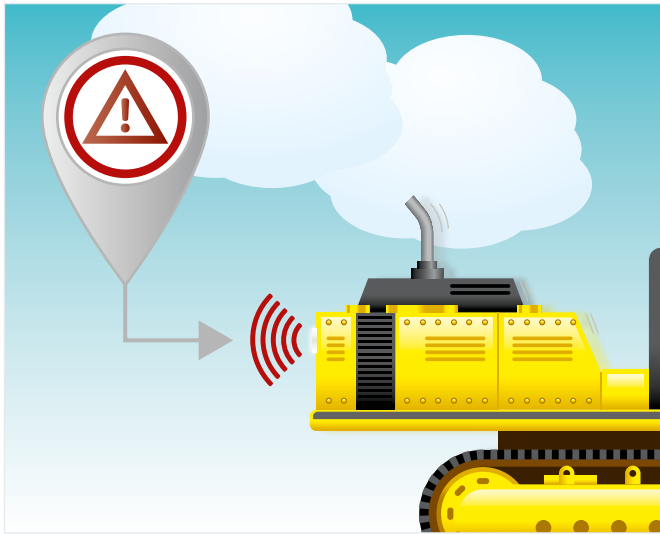
BETTER OPERATOR COMFORT

Improving comfort for your operators increases their safety and performance. It also makes them much less tired at the end of their day.

One of the ways we help OEMs do this is by making Continuously Variable Transmissions (CVT) work even better. Smart CVTs use Danfoss pressure sensors to engage the clutch and control line pressure in order to keep transmission pressure balanced and prevent power loss.

Adding our MBS 1250 pressure transmitter to clutch engagement and line control makes the CVT run smoother. This does more than improve engine performance and reduce fuel consumption: it also reduces operator exposure to vibration.





IMPROVED SAFETY

As everyone who moves heavy equipment around knows, backup alarms that activate when vehicles are reversing are critical for personal safety, especially when rear visibility is limited.

Mobile machinery such as excavators traditionally measure pressure to sense when both levers are pulled back to put the vehicle in reverse. They then activate an electromechanical switch to trigger the audible backup alarm.

By mounting a Danfoss MEP 2250 electronic pressure switch on the hydraulic circuit instead, the backup alarm system's reliability is dramatically improved. Unlike electromechanical switches that can wear out or fail, our electronic pressure switch contains no moving parts. With no risk of a faulty switch, the risk of the vital backup alarm not working is radically reduced.

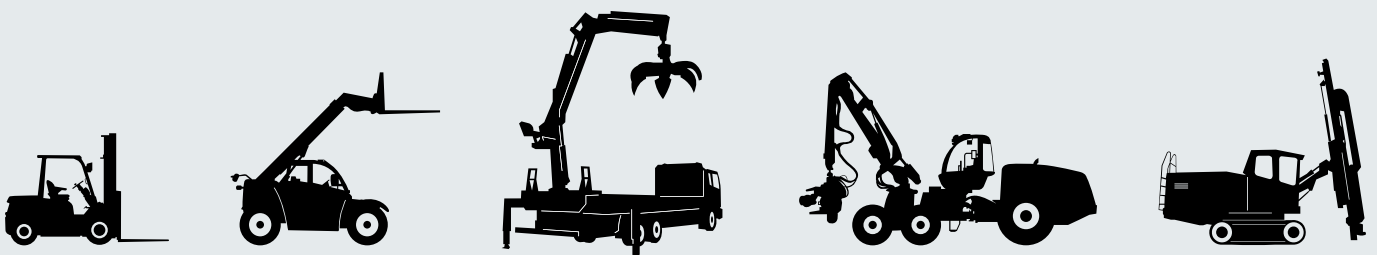


REDUCED DOWNTIME AND MAINTENANCE COSTS

Mobile machinery operators depend on hydraulic oil filter indicators to let them know when oil filters are clogged and need to be changed.

Many manufacturers of off-highway equipment still use mechanical indicators on the filter or an electromechanical switch connected to an indicator in the cabin to keep operators informed of filter status. However, both of these methods are susceptible to mechanical failure that could compromise the hydraulic system and components.

To prevent such critical failure, more and more mobile equipment manufacturers are installing Danfoss MBS pressure transmitters directly on their filter housing. This gives operators constant, real-time information on filter status to reduce downtime and maintenance costs.



Intelligent automation wherever performance matters

Hydraulic power

- ELS pressure
- Hydraulic pump pressure
- Oil filter pressure
- Oil temperature
- Hydraulic reservoir temperature
- Auto-idle pressure
- Compression pressure

Transmission and steering

- CVT pressure
- CVT temperature
- Transmission pump pressure
- Transmission pump temperature

Engines

- Air intake pressure
- Coolant pressure
- Crank case pressure
- Exhaust gas recycling temperature
- Exhaust manifold pressure
- Fuel pressure
- Lube oil pressure
- Lube oil temperature
- Turbocharger pressure

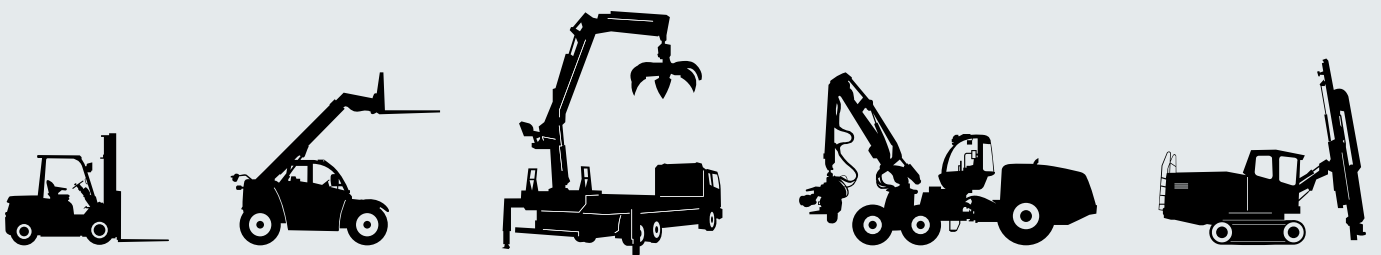
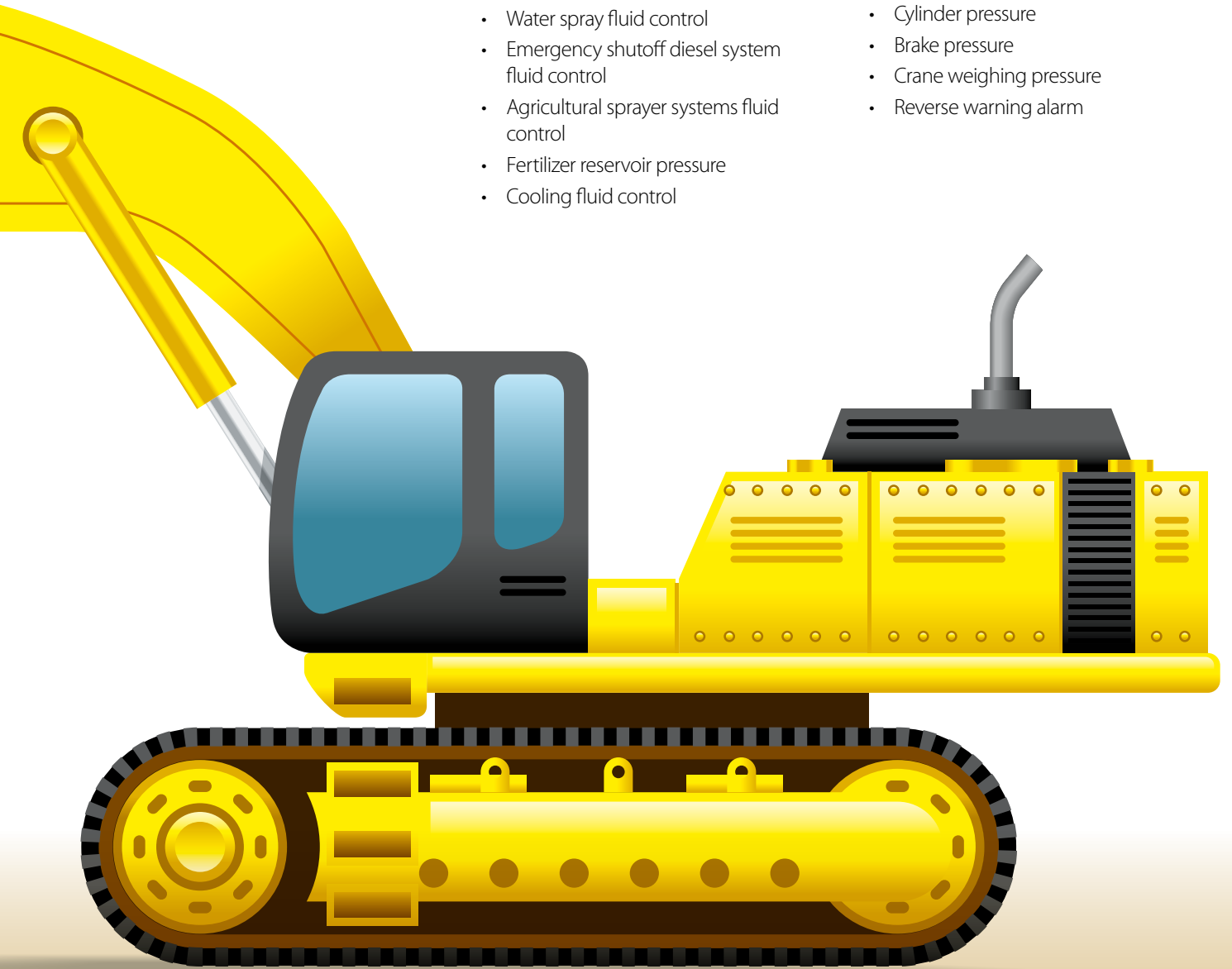


Auxiliary systems

- Lubrication system pressure
- Water spray fluid control
- Emergency shutoff diesel system fluid control
- Agricultural sprayer systems fluid control
- Fertilizer reservoir pressure
- Cooling fluid control

Safety, weighing and monitoring systems

- Cylinder pressure
- Brake pressure
- Crane weighing pressure
- Reverse warning alarm



Pressure transmitters



High-pressure transmitters

- From 0 – 1 bar to 0 – 2200 bar
- 4 – 20mA, absolute voltage, ratiometric output
- Versions with pulse snubber available
- Up to 125°C
- Wetted parts made of stainless steel
- Wide range of electrical and pressure connections

Compact pressure transmitters

- From 0 – 1 bar to 0 – 600 bar
- 4 – 20 mA, absolute voltage output
- Versions with pulse snubber available
- Versions up to 85°C and 125°C
- Wetted parts made of stainless steel
- Wide range of electrical and pressure connections

Electronic pressure switches

- 0 – 7 bar to 0 – 600 bar
- Dual output: switch output and analog output
- Single output: switch output up to 125°C
- Wetted parts made of stainless steel
- Wide range of electrical and pressure connections
- No leakages due to fully welded design
- Versions with pulse snubber available

The Danfoss range of pressure transmitters



MBS 1200 Series
MBS 1300 Series



MBS 3000 Series
MBS 3200 Series



MEP 2200 Series
MEP 2600 Series

Temperature sensors



Compact temperature sensors

- Temperature range -50 – 300°C
- Various sensor elements: RTD, NTC, PTC
- Fixed measuring insert
- Brass or stainless steel
- Low response time

Standard temperature sensors

- Temperature range -50 – 200°C
- Pt 100 or Pt 1000 sensing element
- Interchangeable measuring insert
- Gold-plated connectors
- A wide selection of process and electrical connections

Temperature sensors with integrated transmitter

- Temperature range -50 – 200°C
- Pt 1000 sensing element
- Fixed measuring insert
- Output signals 4 – 20mA or ratiometric
- A wide selection of process and electrical connections

The Danfoss range of temperature sensors



MBT 3270 Series



MBT 3560 Series



MBT 5250 Series

Pressure and temperature switches



Block pressure switches

- 0.2 – 1 bar to 40 – 400 bar
- Temperature -40 – 85°C (diaphragm version -10 – 85°C)
- Contact load AC 3: 2A, 250V, AC 15: 0.5A, 250V
- Plug EN 175301-803-A
- Wide range of pressure connections
- Versions with pulse snubber available
- Can be used with MBV test valves

Electronic pressure switches

- 0 – 7 bar to 0 – 600 bar
- Dual output: switch output and analog output
- Single output: switch output
- Up to 125°C
- Wide range of pressure and electrical connections
- No leakages due to fully welded design
- Versions with pulse snubber available

The Danfoss range of switches



MBC 5000 Series



MEP 2200 Series
MEP 2600 Series

Solenoid valves



Directed-operated 2/2-way valves

- Differential pressure 0 – 30 bar
- Media temperature -30 – 120°C
- Thread connection G 1/8 – G 1/4
- DN 1.2 – 3.5
- Viscosity up to 20 cSt

Servo-operated 2/2-way valves

- Differential pressure 1 – 30 bar/
0.3 – 16 bar
- Media temperature -30 – 100°C/
-30 – 140°C
- Thread connection G 1/4 – G 1/G 1/2 – G 2
- DN 6 – 22/15 – 50
- Viscosity up to 50cSt/50cSt

Thermostatically operated valves

- Differential pressure 0 – 10 bar
- Media temperature -25 – 130°C
- Thread connection G 3/8 – G 1
- Self-acting – no power needed

The Danfoss range of solenoid valves



EV210A Series



EV220B Series



AVTA Series



Here **today**. Here **tomorrow**.

Danfoss is a leading global player in 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.

We produce more than 250,000 items at 70 factories in 25 countries – every day. 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 A/S, Industrial Automation

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