



## Marine Applications

Industry leading knowledge keeps you in control

## Partnership based on accountability

As a global enterprise that is highly competitive in the marine and engine sectors, Danfoss brings together a wealth of talent and

a strong commitment to providing our customers with a competitive advantage through industrial control solutions that make a difference to the bottom line.

### For marine equipment manufacturers

We understand that as a supplier, we need to go beyond delivering quality components; we work together with OEM customers to create a dependable logistics system, and we're highly adaptable, too. In short, we share the same objective as you: to deliver the best quality to your customers!

We aim to measurably improve the performance and reliability of your monitoring and control systems. And with a proven track record throughout the world, we have the experience to prove it.

### Expert knowledge of marine applications

There is more to marine equipment than metal and lube oil. These are critical applications with essential elements. If they go down, so do your profits. We design our pressure and temperature controls to maximize uptime and mean time to repair. They provide safe, efficient operations to ensure that your equipment – and your profits – stays up. We have 60-plus years of experience, and leverage this knowledge to positively impact your operations.

### For ship owners

We understand the critical need for uptime and robust performance as well as keeping equipment repair and maintenance at a minimum, which is why our valves, sensors, transmitters and switches are designed for accuracy, reliability and long life.

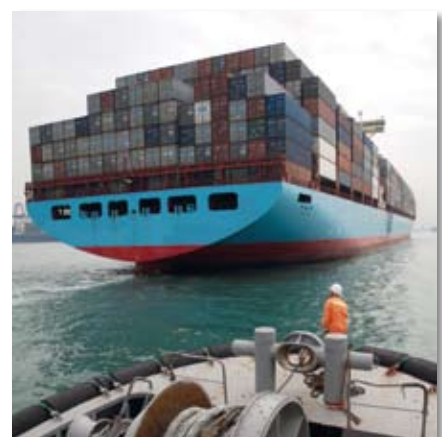
### Quality pays

What could possibly be more critical than not finding the right controls solution for your applications? Maintaining and repairing them if the quality is not good enough. In fact, your lifecycle

### For ship builders

We understand the need to comply with ever-tougher government regulations, which is why our products are accredited and certified in accordance with the world's most stringent standards.

*We've got you covered  
every knot of the way*



*We know how to keep  
technology flowing.*



costs can easily outpace the cost of buying controls in the first place if they don't meet the highest quality standards. When you have a partner with our experience on board, you can feel confident knowing that our controls have passed stringent certification processes. In fact, they are so robust and reliable, they can help you lower costs and make them more predictable.

**Service aimed to meet real-world challenges**

Sometimes, all you need is a marine controls specialist to help with product selection and configuration. Other times you need more optimised system solutions. Danfoss approaches each case proactively to ensure maximum uptime and performance.

Our marine controls offering is one of the world's best, as proven in compressors, gear boxes, engine and propulsion systems, engines and countless other applications around the globe. Our people have the experience to provide control solutions and service which lower your expenses.



*Danfoss approaches each case  
proactively to ensure maximum  
uptime and performance.*



## Global solutions dedicated to your business

Every business is different, but they all share a common goal. Our marine specialists are dedicated to increasing the performance of your applications.

Our specialists bring their experience to projects ranging from general boiler to propulsion systems.

### **With Danfoss at the helm, we can improve your operations**

Let's start with the heart of your operation. There's a good chance that your equipment could be running more effectively and efficiently.

Let us come in and make it happen. As a manufacturer of high quality industrial controls, we can size things up and make recommendations quickly. And deliver valuable solutions that can lower maintenance costs and extend equipment life – for an initial cost that's lower than what you might expect.

And we bring it around the globe, servicing accounts from ship owners and builders to engine manufacturers.

In critical applications like gear boxes, compressors, or propulsion systems, Danfoss has developed designs for clutch pressure monitoring and alarm, lube-oil pressure monitoring, control and alarm, exhaust-gas pressure and temperature monitoring, and fluid controls monitoring.

The list of solutions goes on. And the earlier we get in, the more we can do for you. Because, at Danfoss we are committed to you.

*Every business is different, but they all share a common goal.*







*Danfoss products are well known for being robust, reliable and user-friendly, and our solutions for marine applications are no exception.*

#### Application overview:

##### Marine applications

	Pressure	Temperature	Fluid controls	Monitoring	Control	Alarm
Boilers						
Pumping systems						
Separators						
Starting air compressors						
Generators						
Winches						
Water treatment						

##### Propulsion systems

	Pressure	Temperature	Fluid controls	Monitoring	Control	Alarm
Start air						
Scavenge/charge air						
Lube oil						
Water cooling						
Fuel oil						
Exhaust gas						
Servo oil						
Gears						
Propeller systems						

## The technology keeps on flowing

Danfoss products are well known for being robust, reliable and user-friendly, and our solutions for marine applications are no exception. When you have a partner like Danfoss, you can be confident knowing our controls have passed stringent certification processes.









### Pressure transmitters

Type	Compact Cartridge MBS	Standard Cartridge MBS	Block Design MBS	Box Design EMP
				
Measuring range	0-1 bar to 0-600 bar	0-1 bar to 0-600 bar	0-1 bar to 0-600 bar	-1 to 1.5 bar to 0-400 bar
Electrical connection	Various plugs/cables	Various plugs/cables	DIN plug	Terminals
Pressure connection	Diff. types	Diff. types	Diff. types	Diff. types
Pressure references	Absolute/gauge	Absolute/gauge	Absolute/gauge	Gauge
Output signal	4-20 mA, ratio metric, voltage	4-20 mA	4-20 mA	4-20 mA
Accuracy (typical)	±0.3%/0.5% FS	±0.3% FS	±0.1% FS	±0.3%/0.5% FS
Zero point and span adjustment				
Enclosure	IP 65/67	IP 65/67	IP 65	IP 67
Marine approvals				
Available with pulse-snubber				
Can be used together with:				
MBV 5000 test valve				
MBV 2000 isolating valve				
MBV 3000 test valve				
MBD 1000 display	 (DIN 43650 plug vers.)	 (DIN 43650 plug vers.)		

### Temperature sensors & transmitters

Type	Exhaust Gas Sensor MBT 5111	Sensor MBT 5113	Sensor MBT 5116 Slim-line	Sensor MBT 5116 B-head	Sensor MBT 5250	Sensor MBT 5252	Sensor & transmitter MBT 5560	Transmitter MBT 9110
								
Pt 100								(0)
Pt 1000								(0)
Thermocouple								(0)
Measuring insert	Straight or angle	Changeable	Changeable	Changeable	Changeable	Changeable		Changeable
Media temperature	-40° to 800°C	-50 to 800 °C	-50 to 600 °C	-50 to 600 °C	-50 to 200 °C	-50 to 400 °C	-50 to 200 °C	
Enclosure	IP 65	IP 65	IP 65	IP 65	IP 65	IP 65	IP 65	
Material protection tube	St. Steel	St. Steel	St. Steel	St. Steel	St. Steel	St. Steel	St. Steel	
Reaction time $t_{0,5}$ in water	2 sec	30 sec	30 sec	30 sec	9 sec	12 sec	10 sec	
Output signal	mV	mV/4-20 mA	Ohm	Ohm/4-20 mA	Ohm	Ohm/4-20 mA	4-20 mA	4-20 mA
EEx ia IIC T4/T6 approval								
Marine approvals								
Option: MBT 9110 built in								
MBD 1000 display								

## Temperature and pressure switches

Type	Temperature switch RT	Temperature switch KPS	Temperature switch CAS	Temperature switch MBC	Pressure switch RT	Pressure switch KPS	Pressure switch CAS	Pressure switch MBC
								
<b>Measuring range</b>	-50 – 300 °C	-10 – 200 °C	-20 – 150 °C	-10 – 200 °C	-1 – 30 bar	0 – 60 bar	0 – 60 bar	0,2 – 400 bar
<b>Contact system</b>	SPDT	SPDT	SPDT	SPDT	SPDT	SPDT	SPDT	SPDT
<b>Electrical rating</b>	4 amp	6 amp	0,1 amp	0,5 amp	4 amp	6 amp	0,1 amp	3 amp
<b>Electrical rating AC-3</b>	Screw terminals	Screw terminals	Screw terminals	DIN plug	Screw terminals	Screw terminals	Screw terminals	DIN plug
<b>Contact material</b>	Ag/Au	Au	Ag	Ag	Ag/Au	Au	Ag	Ag
<b>Diferential</b>	Adjustable	Adjustable	Fixed	Fixed	Adjustable	Adjustable	Fixed	Fixed
<b>Enclosure</b>	IP 66/54	IP 67	IP 67	IP 65	IP 66/54	IP 67	IP 67	IP 65
<b>Design</b>	Box industrial	Box heavy duty	Box heavy duty	Block compact	Box industrial	Box heavy duty	Box heavy duty	Block compact
<b>Marine approvals</b>								
<b>Also available as differential vers.</b>								
<b>Can be used together with MBV 5000 test valve</b>								

## Solenoid valves

Type	Solenoid valve EV210B	Solenoid valve EV220B	Solenoid valve EV224B	Solenoid valve EV250B
				
Connection ISO 228/1	G1/8 – G3/8	G1/2 – G2	G1/2 – G3/4	G3/8 – G1
Function	NC/NO	NC/NO	NC/NO	NC/NO
Orifice size mm	1.5-4.5	15-50	15-20	10-22
K <sub>v</sub> -value m <sup>3</sup> /h	0.08-0.55	4-40	Up to 8	2,5-7
Permissible diff. pressure bar	0-30	0.3-16	0.3-40	0-16
Media temperature max.	120 °C	140 °C	60 °C	140 °C
Valve body	Brass / St. Steel	Brass / St. Steel	Brass	DZR Brass
Internal parts	St. Steel	St. Steel	St. Steel	St. Steel
Seal material	EPDM / FKM	EPDM / FKM / NBR	NBR	EPDM / FKM
Marine approvals				

### Customer care

Every customer is unique, faced with unique challenges and a unique list of needs. So at Danfoss we give every customer our complete attention and interest so we can use our experience to find the right products. Service is an important part of Danfoss' quality.





## With Danfoss, your safety, performance and satisfaction are assured

Danfoss provides a long lifetime of safe, accurate and reliable performance for marine and engine applications. Our line of state-of-the-art components for monitoring and controls systems includes:

- Pressure and temperature switches
- Pressure transmitters
- Temperature sensors and transmitters
- Solenoid valves
- Externally operated valves
- Thermostatically operated valves
- Electro-mechanical contactors
- Electronic contactors and motor controllers

To learn more about our marine and engine solutions, contact any one of our sales and service centers in over 100 countries around the world. Visit our website at [www.danfoss.com/marine](http://www.danfoss.com/marine).



Danfoss also provides solutions for drives, hydraulics, refrigeration and air conditioning applications and more.



*Danfoss keep up with the global marine industry and are ready to meet it wherever and whenever the need arises.*