

Article | Exhaust gas temperature sensors

Tackle the exhaust gas challenge of tomorrow with Danfoss Sensing Solutions

As demands for today's vessels continue to increase, reliable and accurate exhaust gas temperature measurement is key to maximizing engine performance while minimizing emissions. For ship owners around the world, this balancing act only becomes more pressing on the way to meeting the 2030 objectives for CO₂ reduction. In marine engine applications, no one solution fits all, so these challenges call for choosing a partner you can trust to deliver on all your demands for exhaust gas treatment solutions.





New challenges on the horizon



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Richard Lang Jørgensen,

Product Manager at Danfoss Sensing Solutions

As a highly violent application that involves extreme heat and vibration — but is required to run and remain precise for a very long time — exhaust gas treatment is a challenge in itself. Today, it comes down to striking the right balance between getting maximum yield out of the engine and reducing harmful emissions. This demands an optimized combustion process, which is only possible if you know the exhaust gas temperature. Also, accurate temperature measurement and control is of course critical to avoid engine breakdowns.


In a field with a very limited number of players, Danfoss Sensing Solutions has supplied exhaust gas temperature sensors since 2006. It offers a full portfolio covering temperatures up to 850 °C — optimized for marine engine applications and supporting auxiliary systems.

“Exhaust gas is a balancing act that requires a solid foundation of precise temperature measurement and control. That is what our sensors deliver,” says Richard Lang Jørgensen, Product Manager at Danfoss Sensing Solutions.

Exhaust gas temperature, pressure, and vibration have only increased over the years as engines are pushed to the edge of performance in ever tougher conditions. In addition, MARPOL emission legislation means that ship owners must meet new requirements for reduction of CO₂ emissions and greenhouse gasses by 2030. Consequently, they must choose whether to change to alternative fuel types, including Methanol, Hydrogen, and Ammonia, or to opt for an exhaust gas cleaning system to improve engine efficiency.

Two key factors are availability and cost — which will depend on, e.g., where the vessel is going and the cost development of alternative fuels in the future. Also, with an increased focus on ESG calculations, etc., boasting a green profile could tip the scale in cases where two vessels are similar in cost.

Whatever its customers choose, Danfoss Sensing Solutions can meet their needs — having raised the bar on quality, customization, and capacity.



Future-proof sensors of the highest quality

For its exhaust gas temperature sensors program, Danfoss Sensing Solutions uses some of the very best materials available, which means they are all characterized by a very high corrosion resistance and robustness against shock and vibration. For customers, this translates into not just very high reliability but also significant savings in terms of minimizing downtime, extending service intervals and product lifetime, and reducing operating costs.

Moreover, the entire portfolio offers more marine certifications than any other company on the market — covering all regions and mainstream classifications for the industry. “This area is very important to our customers — and therefore also to us. Our wide range of certifications serves as a value-adding proof stamp,” explains Thomas Schaukal, Sales Director of Marine Sales.

Finally, all exhaust gas temperature sensors from Danfoss Sensing Solutions are fully compatible and comply with any type of fuel applied — making them a future-proof choice.



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Thomas Schaukal,
Sales Director of Marine Sales

No such thing as **one size fits all**

Every single marine engine has its own set of requirements for exhaust gas temperature sensors, e.g., for the insertion length or electrical connection. In other words, whenever a new engine is developed, it too comes with individual requirements specified by the customer. As a result, customization is a given, and Danfoss Sensing Solutions is highly experienced in tailor-made offerings.

In addition to custom-made sensors critical to match each engine's unique requirements, it can provide individual marine type approvals if requested. Customers also have the option of fast-tracking prototypes to reduce costly testing time. Here, a highly dynamic cooperation enables Danfoss Sensing Solutions to get modified samples to the customer faster.



Meeting capacity needs of tomorrow

As the new MARPOL legislation also applies to vessels already in operation, the demand for retrofit solutions is expected to increase between now and 2030. This places pressure on suppliers to be able to match that spike.

Thanks to its investments in recent years, Danfoss Sensing Solutions has doubled its production capacity after relocating production facilities from Denmark to China in February of 2023.

Quality standards, approval procedures, and testing are exactly the same, and the entire team of Chinese production operators was fully trained in Denmark before relocating to ensure the right level of competencies and a smooth transfer. Plus, relocating involved upgrading equipment and tweaking any steps that could be improved in one way or another. "With this boost in capacity, we're fully equipped to also meet all our customers' needs in the future," says Richard Lang Jørgensen.



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Co-creating the future

Expectations are sky-high — from customers and internally — for Danfoss Sensing Solutions to keep developing and improving its portfolio to match new engine types, designs, and conditions. Here, close customer collaboration is essential especially for field testing prototypes, because you can't reproduce an exhaust gas system in the engine.

This is also a classic Danfoss approach to product development that is unlikely to change. "On any commercial vessel today, you will find Danfoss products. Together with our customers, we work hard to ensure it stays that way," underlines Thomas Schaukal.



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