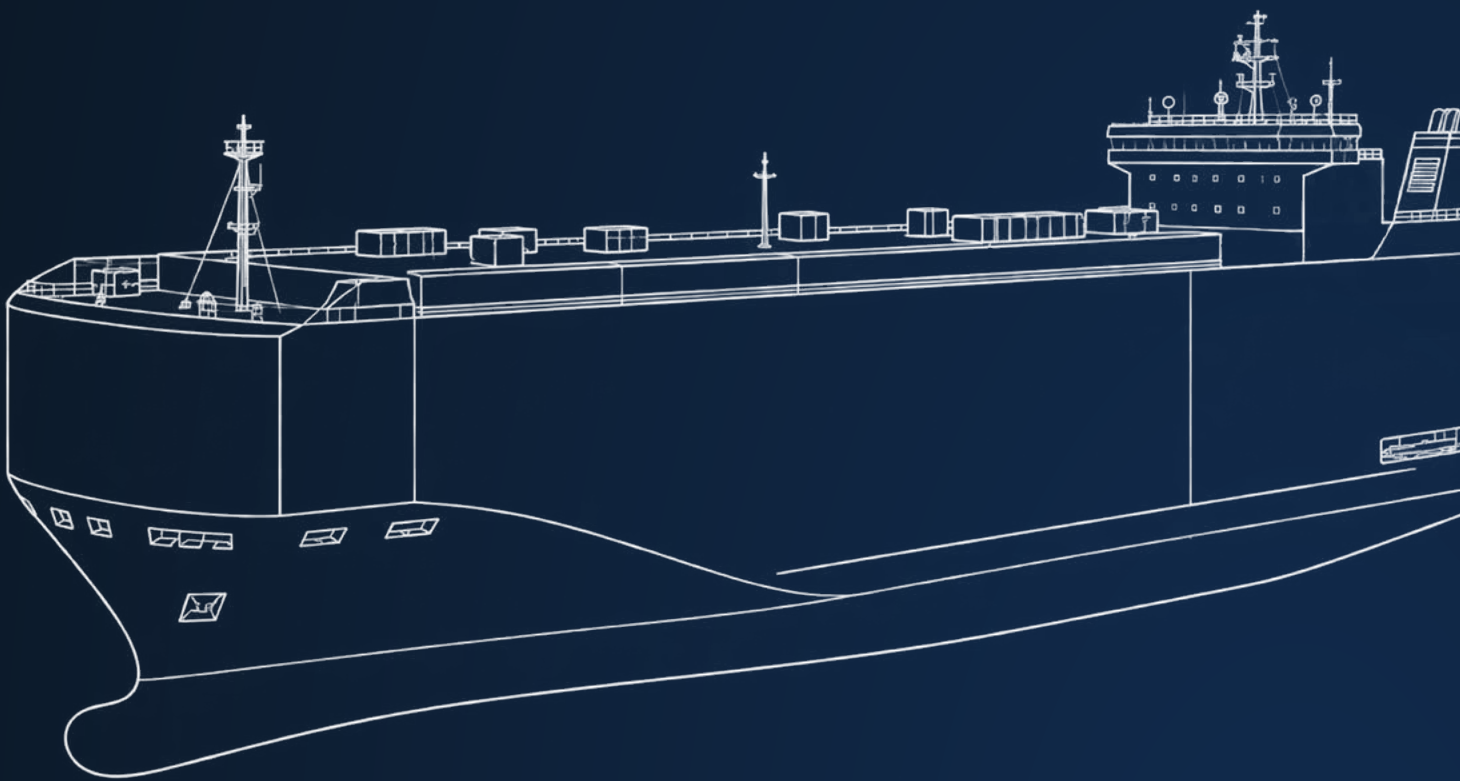


Shaft Power & Propeller Thrust.

T-Sense® & TT-Sense® torque and thrust measurement systems

Measure propulsion performance where it happens.

T-Sense® and TT-Sense® provide continuous insight into the mechanical performance of rotating shafts. Developed for demanding marine and industrial operating conditions, the systems combine optical shaft measurement with practical onboard monitoring and system integration.



One measurement principle, two system levels

Every shaft line and installation is different. Shaft diameter, shaft material, available straight length, shaft speed, installed power, installation location and signal requirements all influence the correct system selection.

The T-Sense® and TT-Sense® product family provides continuous shaft performance measurement at the point where mechanical power is transmitted. T-Sense® measures torque, shaft speed and shaft power, while TT-Sense® adds propeller thrust measurement for deeper analysis of propulsion efficiency, hull resistance and propeller performance.

Product lines

System	Main role
T-Sense®	Optical torque measurement for torque, shaft speed and shaft power
TT-Sense®	Optical thrust and torque measurement for thrust, torque, shaft speed and shaft power

From shaft power to propulsion insight

Measurement	What it shows	Supports
Torque and shaft speed	The mechanical power transmitted through the shaft	Shaft power monitoring, engine load monitoring, overload protection, power and fuel-efficiency analysis, operational optimisation, torsional-vibration analysis and long-term performance trending
Thrust with torque and speed	How effectively transmitted shaft power is converted into propulsion	Propeller-efficiency insight, hull-resistance trending, cleaning decision support, trim optimisation, Energy Saving Device evaluation, propulsion KPI monitoring and validation after modifications

From measurement to integration

Depending on the selected configuration, measured values can be made available for local display, ship automation, data acquisition or performance monitoring. Integration options include RS485 / Modbus, optional 4 to 20 mA outputs, Ethernet, PEM4, SPU-3 and the IVY® Propulsion Performance Management Solution.

Optical shaft measurement technology

T-Sense® and TT-Sense® are mounted around the rotating shaft and use optical measurement technology. The basic measuring principle does not require slip rings, strain gauges or shaft modifications.

How optical torque measurement works

Under load, a rotating shaft twists by a very small amount. The system measures this optical displacement and converts it into torque. Shaft speed is measured at the same location, and shaft power is calculated from torque and speed.



How thrust measurement is added

TT-Sense® uses the same torque measurement principle and adds axial displacement measurement. This makes it possible to measure propeller thrust together with torque, shaft speed and shaft power on the same shaft line.

What the systems measure

System	Primary measurement	Output values
T-Sense®	Torque	Torque, shaft speed and shaft power
TT-Sense®	Thrust and torque	Propeller thrust, torque, shaft speed and shaft power

Key characteristics

 Continuous shaft performance data at the location where mechanical power is transmitted.

 Optical measurement technology mounted around the rotating shaft.

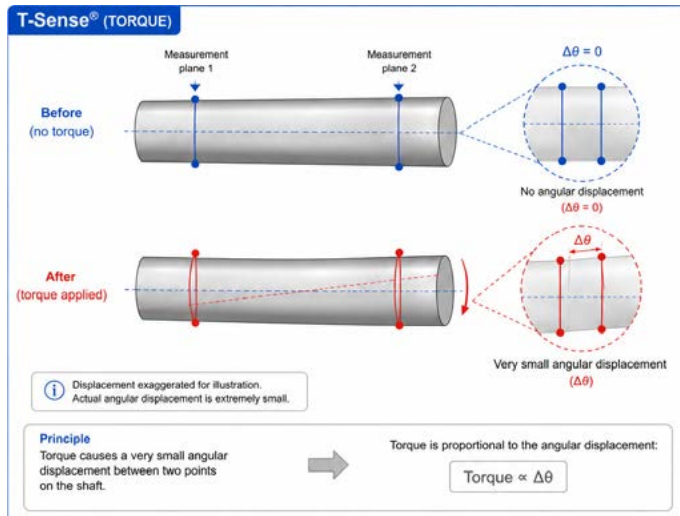
 No slip rings, strain gauges or shaft modifications required for the basic measuring principle.

 Torque, shaft speed and shaft power from one measurement location; propeller thrust added with TT-Sense®.

 Designed for demanding marine and industrial rotating-shaft applications.

The result is practical performance data from the shaft line itself, available for onboard monitoring, operational optimisation and long-term performance analysis.

Optical shaft performance measurement



T-Sense® — From measurement to performance insight

T-Sense® continuously measures torque, shaft speed and shaft power directly on the rotating shaft. Its optical measuring principle detects minute shaft twist without slip rings, strain gauges or shaft modifications.

Key characteristics

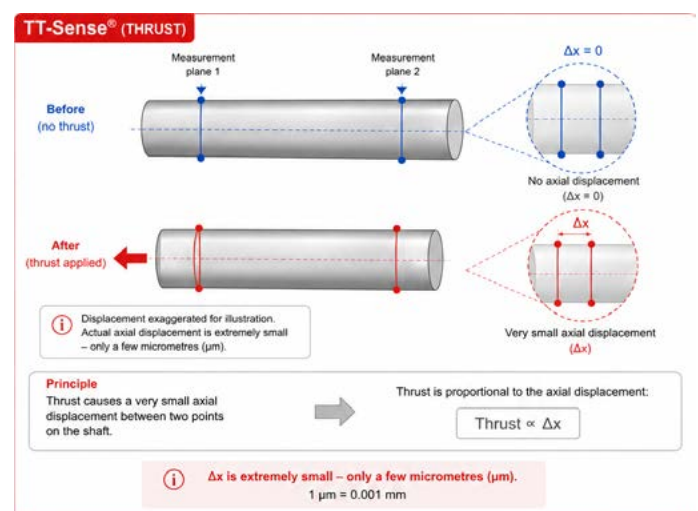
- Continuous shaft performance data
- Non-contact optical measurement
- Simple integration

TT-Sense® — Adding thrust to shaft performance

TT-Sense® builds on the T-Sense® measuring principle by adding propeller thrust. This provides a more complete view of how shaft power is converted into propulsion.

Key characteristics

- Torque and thrust in one system
- Axial and torsional measurement
- Deeper propulsion insight



Heavy Duty and integration

HD (Heavy Duty) for demanding applications

For particularly demanding applications involving high shaft speeds and/or vibration, we recommend the HD (Heavy Duty) version. Its reinforced construction has proven itself in dredging, high-speed and marine applications.



Output and integration options

Depending on the selected configuration, measured values can be made available for local display, ship automation, data acquisition or performance monitoring.

Output / processing	Typical use
RS485 / Modbus	Digital communication with automation or data-acquisition systems
Optional 4 to 20 mA outputs	Analogue transmission of selected measured values
Ethernet	Network connection for compatible monitoring configurations
PEM4 display	Local presentation of measured shaft values
SPU-3 Signal Processing Unit	Signal processing and system interface
IVY® Propulsion Performance Management Solution	Long-term propulsion-performance monitoring and analysis

T-Sense®

Optical torque measurement system

T-Sense® is designed for continuous torque and power measurement on rotating shafts. The system measures the small displacement caused by shaft strain under torque.



Typical applications

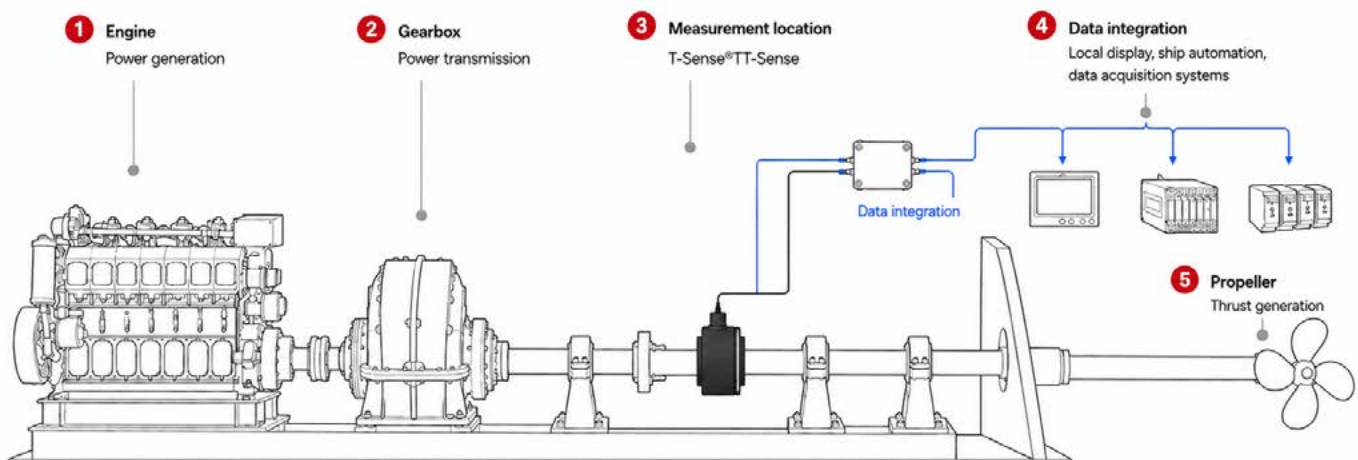
-  Propulsion power measurement
-  Overload protection
-  Engine load monitoring
-  Industrial drive-shaft monitoring
-  Power-consumption management
-  Fuel-efficiency optimisation

Measured values

Torque · shaft speed · shaft power

Key benefits

-  Direct insight into transmitted shaft power
-  Continuous monitoring for operational optimisation
-  Suitable for onboard display and system integration



- | | | | | |
|---|---|--|--|--|
| 1 Engine
The engine generates power to propel the vessel. | 2 Gearbox
The gearbox adapts speed and torque to the propulsion requirements. | 3 Measurement location
T-Sense® or TT-Sense® measures torque (and thrust with TT-Sense®) directly on the rotating shaft. | 4 Data integration
Measured values are integrated into local display, ship automation or data acquisition systems. | 5 Propeller
The propeller converts mechanical power into thrust. |
|---|---|--|--|--|

TT-Sense®

Optical thrust and torque measurement system

TT-Sense® uses the same optical measurement principle and adds axial thrust measurement. The system measures both torque-related and thrust-related displacement on the shaft.



Typical applications

-  Propulsion-efficiency monitoring
-  Trim optimisation
-  Hull-resistance trending
-  Propeller-performance analysis
-  Energy Saving Device evaluation
-  Long-term monitoring
-  Hull and propeller evaluation

Measured values

Propeller thrust · torque · shaft speed · shaft power

Key benefits

-  Combined thrust and power data from one shaft line
-  Deeper insight into propulsion efficiency and hull resistance
-  Supports performance validation after cleaning or modifications

Measure. Connect. Perform.
Turning data into confident decisions.

Get in touch With our experts.

Have a question or want to learn more about VAF? Our team is ready to help. Get in touch using the contact details below.

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The VAF logo consists of the letters "VAF" in white, bold, sans-serif font, centered within a solid red square.

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