



Certificate no.:
TAA00003RR

TYPE APPROVAL CERTIFICATE

This is to certify:
that the Monitoring System

with type designation(s)
OpTS Mechanical shaft power meter, (OPTS Receiver), (OPTS collar)

issued to
MTE Instruments Inc.
Rimouski, QC, Canada

is found to comply with
DNV rules for classification – Ships, offshore units, and high speed and light craft

Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Location classes

Type	Temperature	Humidity	Vibration	EMC	Enclosure
OpTS Mechanical shaft power meter	B	A	B	A	B (IP65)
(OPTS Receiver)	B	A	B	A	B (IP65)
(OPTS collar)	B	A	B	A	B (IP65)

Issued at **Hamburg** on **2025-12-01**

This Certificate is valid until **2030-11-09**.

for **DNV**

DNV local unit: **Montreal**

Approval Engineer: **Johannes Kindermann**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

The OpTS combines a strain gage based OpTS Collar with a gyro rpm sensor to provide an all-in-one power measurement system.

The OpTS is a strain gage transmitter. It is made to measure torque on rotating shafts using a 350 ohms torque pattern strain gage.

The OpTS measure revolution speed, using a high-speed gyro.

OpTS Sensor Link Specifications:

Description	Data
Autonomy	2 years on 10x 3.6AH, 3.6V batteries
Electrical Consumption	<1mA @ 3.6V
Batteries	3.6V LiSoCl2 (lowest self-discharge)
Strain Gage Type	350 ohms, Full Bridge, torque pattern, welded or bonded
Strain Gage Range Max.	±3900 µstrain @ Gage Factor = 2
Strain Gage Resolution	0.00047 µstrain @ Gage Factor = 2
ADC Resolution	24 bits
Torque Accuracy	± 0.1%
RPM Accuracy	± 1%
Maximum RPM	3000 rpm
Degree of Protection	IP 65

OpTS Receiver Specifications:

Description	Data
Input Voltage	9-36 VDC
Current Consumption	40 mA max
Electrical Isolation	500V
Storage Temperature	-35°C to 85°C
Operating Temperature	-35°C to 70°C
Humidity	10% to 90% non-condensing
Vibration	5 – 50 Hz @ 20 mm/s +/- 1.0g max
Degree of Protection	IP 65
Wireless Communication	2.4 GHz Wireless connection to one OpTS Collar

OPTS RECEIVER WIRED COMMUNICATION

The OpTS Receiver module communication protocol is Modbus RTU over RS-485. Up to 32 modules can be connected on the same Modbus line.

Application/Limitation

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV rules for classification of ships Pt.4 Ch.9 Control and monitoring systems. Equipment to be installed according to instructions given in the Installation & Service Manual

Type Approval documentation

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given

Ensuring traceability between manufacturer's product type marking and the type approval certificate Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

Manufactured by:

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