Certificate No:
TAA000038C

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Temperature Transmitter

with type designation(s)
Cylinder Liner Temperature Sensors CLTS

Issued to
Dr. E. Horn GmbH & Co. KG
Gärtringen, Baden-Württemberg, Germany

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.

Temperature	**D**
Humidity	**B**
Vibration	**B**
EMC	**A**
Enclosure	**B: sensor (IP54); interface box (IP67)**

Issued at **Hamburg** on **2022-12-22**
This Certificate is valid until **2027-12-19**.
DNV local unit: **Augsburg**

Approval Engineer: **Jens Dietrich**

for **DNV**

Joannis Papanuskas
Head of Section

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 300,000 USD.

Product description

Cylinder Liner Temperature Sensors (CLTS)
Temperature monitoring for continuous monitoring of 2-stroke engine cylinder liners, large gear units or bearing monitoring.

Sensor element TGL00942-x-y:
Element type: NiCr-NiAl
Maximum temperature sensor tip: 800°C
Accuracy of temperature measurement: ±2.5°C or 0.0075 · t (t = measuring value)
x: Length of sensor probe: 50….180mm
y: Cable length: up to 12m.

Sensor interface box: GHG02731-x:
Power supply: 18…32VDC;
Connections: 2 x M12 cable glands for sensors; M16 cable gland for peripheric cable connection.
Outputs:
x=A: configurable current output: 4…20mA, load max. 1.200Ω
x=I : I²C interface for use with HORN-Bearing Monitoring System BMS3

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.

Product certificate
If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After certification the clause for software control will be put into force.

Tests carried out

Applicable tests according to DNV CG-0339, edition August 2021.

Marking of product

Type label: Manufacturer, part number, customer part number, serial number.

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.

END OF CERTIFICATE