



EUROPEAN UNION RECOGNISED ORGANISATION (EU RO) MUTUAL RECOGNITION TYPE APPROVAL CERTIFICATE

Certificate No:
MRA000003Y

In accordance with Article 10.1 of EU Regulation 391/2009

This Certificate is issued to

Danfoss A/S
Nordborg, Syddanmark, Denmark

for

Temperature Gauges/Sensors/Transmitters

with type designation(s)

MBT 5111, MBT 5113, MBT 5114, MBT 5116

The product is found to comply with

EU RO Mutual Recognition Technical Requirements for Temperature Gauges and Transmitters

Intended service

High temperature transmitters/sensors for use in control, alarm, monitoring and instrumentation systems subject to classification.

See product description on page 2 for further details.

Temperature [°C]: -50°C to +70°C

Vibration: 2-25Hz / ±1.6mm – 25-40Hz / ±4g – 40-2000Hz / ±10g (600/800°C)

EMC: All locations including bridge and open deck

IP Code: IP66 (according to IEC 60529)

This is to certify:

that the Product referred to herein has been inspected for the Manufacturer, pursuant to the relevant requirements of the European Union Recognised Organisation Mutual Recognition procedure, required by Article 10.1 of EU Regulation 391/2009, and has been found in accordance with those requirements.

This Certificate is valid until **2028-02-27**.

Issued at **Høvik** on **2023-02-28**

for **DNV**

DNV local station: **Denmark CMC**

Approval Engineer: **Martin Skårerverket**

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Frederik Tore Elter
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

The high temperature sensors are intended for use in control, monitoring, and instrumentation systems for marine use. It belongs to a series of exhaust gas temperature sensors used for measuring and regulating exhaust gas from diesel engines, turbines and compressors (MBT 5111, MBT 5113, and MBT 5116), for performance optimization and environmental impact control of large 2 stroke engines (MBT 5114).

Model Nr.	Temperature range	Transmitter	Electrical connections	Measuring element
MBT 5111	-50°C to +800°C	No	Wire end	Thermocouple
MBT 5113	-50°C to +800°C	Yes	B-Head	Thermocouple
MBT 5114	-50°C to +600°C	No	Deutsch DT04	PT Element
MBT 5116	-50°C to +600°C	No	B-Head, Slim-line(PG), Deutsch DT04	PT Element

Manufactured by

Danfoss A/S
 Nordborgvej 81,
 6430 Nordborg, Denmark

Application/Limitation

High temperature transmitters/sensors for use in control, alarm, monitoring and instrumentation systems subject to classification.

Ex-certification is not covered by this certificate. Application in hazardous area to be approved in each case according to the Rules and Ex-Certification/ Special Condition for Safe Use listed in valid Ex-certificate issued by a notified/recognized Certification Body.

Type Approval documentation

Name	Number	Rev./Date
Datasheet MBT 5111	AI237986443594en-001001	2021-02
Datasheet MBT 5113/5116	AI215386431660en-000701	2021-03
Datasheet MBT 5114	AI204186431831en-000302	2022-03
Environmental Marine test of High Temperature Sensor MBT 5111 (Danfoss Report No. TR087U0059-00)	117-34687-4	- / 2021-07-15
Environmental Marine test of High Temperature Sensor MBT 5113 (Danfoss Report No. TR084Z0141-00)	117-34687-5	- / 2021-07-15
Environmental Marine test of High Temperature Sensor MBT 5114 (Danfoss Report No. TR087U0060-00)	117-34687-6	- / 2021-07-15
Environmental Marine test of High Temperature Sensor MBT 5116 (Danfoss Report No. TR084Z0142-00)	117-34687-7	- / 2021-07-15
EMC Marine test of high temperature sensors (Danfoss Report No. TR087U0058-00)	117-34687-2	2 / 2021-07-15
EU RO MR TA PQA Scheme periodical assessment checklist	-	2022-03-01

Marking of product

The products to be marked with:

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

Other Conditions

The temperature transmitters have been verified for compliance with EU Mutual Recognition Technical Requirements for Temperature Gauges and Transmitters version 0.3, dated 2023-01-01, including the Technical Requirements for Sensors version 0.5, dated 2023-02-01.

Environmental test parameters	DNV location classes
Temperature: -50°C to +70°C	D
Vibration: 2-25Hz / ±1.6mm – 25-40Hz / ±4g – 40-2000Hz / ±10g (600/800°C)	B
Humidity: 95%RH @ 55°C	B
EMC: All locations including bridge and open deck	B
Enclosure: IP66 (according to IEC 60529)	C

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 annually and at renewal of this certificate.

END OF CERTIFICATE

Generic Statement for EU RO MR Type Approval Certificate

When a product is presented with this EU RO MR Type Approval Certificate for given application, its acceptability with regards to the limitations stated in the certificate conditions defined in 1b, 1c and 1d of the applied Technical Requirement will be evaluated by the EU RO in charge of classing the ship or being in charge of the unit/system certification.

In accordance with Article 10 of Regulation (EC) No 391/2009 of the European Parliament and of the Council of 23 April 2009 "on common rules and standards for ship inspection and survey organizations", the following organizations, recognized by the EU on this date, have agreed on the technical and procedural conditions under which they will mutually recognize this certificate:

- American Bureau of Shipping (ABS);
- Bureau Veritas (BV);
- China Classification Society (CCS);
- Croatian Register of Shipping (CRS);
- DNV;
- Indian Register of Shipping (IRS);
- Korean Register (KR);
- Lloyd's Register Group Ltd. (LR);
- Nippon Kaiji Kyokai General Incorporated Foundation (ClassNK);
- Polish Register of Shipping (PRS);
- RINA Services S.p.A. (RINA).

The scheme for the mutual recognition of class certificates for materials, equipment and components laid down by Article 10(1) of Regulation (EC) No 391/2009 is only enforceable within the Union in respect of ships flying the flag of a Member State. As far as foreign vessels are concerned, the acceptance of relevant certificates remains at the discretion of relevant non-EU flag States in the exercise of their exclusive jurisdiction, notably under the United Nations Convention on the Law of the Sea (UNCLOS). (In accordance with COMMISSION IMPLEMENTING REGULATION (EU) No 1355/2014 amending Regulation (EC) No 391/2009 - recital (25)).