DNV·GL

Certificate No:
TAA00000CU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Position Transmitter

with type designation(s)
Angle Calculation Module ACM-20

Issued to
Parker Hannifin Manufacturing Finland Oy
Forssa, Finland

is found to comply with
DNV GL rules for classification – Ships and offshore units

Application :

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

Location classes:

Temperature	**B**
Humidity	**B**
Vibration	**B**
EMC	**A**
Enclosure	**Required protection according to the Rules shall be provided upon installation on board**

This Certificate is valid until **2020-03-04**.

Issued at **Høvik** on **2016-04-14**

for **DNV GL**

DNV GL local station: **Helsinki**

Approval Engineer: **Ståle Sneen**

Odd Magne Nesvåg
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.

Job Id: **262.1-009093-3**
Certificate No: **TAA00000CU**

Product description

The ACM-20 module will serve as an angle calculation module in two-stroke engines applications. It reads four pick-ups (three for crank angle and one for TDC) and sends crank position via SSI bus.
ACM-20 is designed for 24V DC power supply.
The System consists of three modules: two redundant and one spare.

Technical data:
Main Processor Motorola MPC5534, 56 MHz, 64 kByte RAM
-1x Isolated CAN communication channels 125 to 500 kbit/s
-4x Digital inputs (PNP/NPN) for pick-up input
-4x Digital Outputs (100 mA with current measurement) for pick-up power
-1x Digital Output (isolated, 150 mA)
-1x SSI-Communication for crank angle

Place of manufacture

Benchmark Electronics
Parcul Industrial Ghimbav
Strada 103C Km 2+115
Hala 3 – 507075 Brasov
Romania

Application/Limitation

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV GL, 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 GL 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 the certification the clause for application software control will be put into force.

Clause for application software control
All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV GL for evaluation and approval. Major changes in the software are to be approved before being installed in the computer.

Type Approval documentation

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2015.

Marking of product

Mfr. Part no.: As listed under product description
Wärtsilä part no.
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 at least every second year and at renewal of this certificate.

END OF CERTIFICATE