

TYPE APPROVAL CERTIFICATE

This is to certify:

That the General Controller

with type designation(s)
Large Engine Control Module (LECM)

Issued to

Woodward Inc.
Fort Collins, CO, United States

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	D*
Humidity	B
Vibration	B
EMC	A
Enclosure	B

***Tested at -40°C**

This Certificate is valid until **2021-01-31**.

Issued at **Høvik** on **2016-02-01**

DNV GL local station: **Approval CMC – Houston**

Approval Engineer: **Nils Jarem**

for **DNV GL**

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.

Product description

Large Engine Control Module (LECM)

Combinations :

- Aux
- Aux + Main
- Main
- EID
- Main + EID
- Aux + Main + EID

Nominal voltage: 24V DC.

Firmware version used in testing:
MotoHawk: 2015b_beta2.1502

Place of manufacture

Woodward Poland Sp. z o.o.
Ul. Skarbowa 32
32-005 Niepołomice
Polska

Approval conditions

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.

Application/Limitation

Note: In the 0.150-2.0 MHz range, specific high current IO, when used, may cause Radio Frequency (RF) noise to be 1-2 dB over the RF limits for DC power lines: per the General Distribution Zone Conducted Emission RF limits. Under such conditions a dedicated power bus for the engine package should be used. IO affected by this limitation are the High current PWM LSO Discrete Outputs on the Main Module when driving loads similar to: Oxygen Sensor heaters, Auto-transformer type Spark Ignition Coils, or inductive actuator coils which draw more than 1.5 ARMS current. *See user's manual for more Specific & detailed IO limitations.*

Type Approval documentation

Tests carried out

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

Marking of product

The products to be marked with:

- manufacturer name
- model name
- 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