

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Governor Control System and Pitch Control System**with type designation(s)
DEGO IV

Issued to

Q-TAGG R&D AB
Västerås, Sweden

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.****Location classes:**

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

Issued at **Høvik** on **2018-03-08**This Certificate is valid until **2020-03-07**.DNV GL local station: **Stockholm**for **DNV GL**Approval Engineer: **Jabber Abbas****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

DEGO IV is a governor system for electronic speed control of diesel engines. The unit is available in the following variants:

QHFQ 120: DEGO IV for fuel rack actuator ASAC 120*

QHFQ 121: DEGO IV for fuel rack actuator ASAC 70, including 80V power amplifier (QHFQ 250)

QHFQ 123: DEGO IV for fuel rack actuator ASAC 200/400, including 180V power amplifier (QHFQ 251)

QHFQ 500: DEGO IV expansion with remote Pitch Control System (PCI). One PCI is provided for each shaft.

*currently covered by Type Approval Certificate TAA00001S1

All DEGO IV variants contain a control board (QHFQ 211) and 2.8-inch touch screen user interface.

Governor functions covered by this certificate:

- Engine speed and fuel control operation
- Overspeed protection
- Torque and smoke limits
- Critical RPM blocking and monitoring
- Load sharing (droop / isochronous operation)
- Load control operation
- Local alarm handling

Controllable Pitch Propeller (CPP) main functions are also covered by this certificate:

- Manual pitch control including combinator with load control, constant RPM mode and constant power mode
- Emergency pitch control
- Alarm handling

The following main components are 3rd party equipment that are type approved separately:

Description	Make	Type	DNV GL TA certificate valid at the date of issue
12' Touch Panel	Hatteland	HD 12T21 MMC	MRA0000007
Ethernet Switches	Westermo Teleindustri AB	Lynx and Lynx DSS	TAA000000R
Panel Push-Button	EAO AG	Series 31	93 806-79 HH

Current software version: **2.1.xx**

Software version is denoted on the format MM.NN.RR where MM is major software version number, NN minor software version number and RR indicates software revisions to correct bugs or minor improvements where approval by DNV GL is not required.

Description of software maintenance and development is found in document "4417 2002 Quality Plan"/2014-10-23. Control system revision changes are documented in Software Change Record files, "1415 2003".

Application / limitation

1. Cables and sensors are not covered by this Type Approval Certificate.
2. The system is suitable for use in propulsion, auxiliary and emergency engine applications.
3. Gas and dual-fuel applications are not covered by this Type Approval Certificate.
4. Additional engine alarm system and independent safety system (including overspeed protection) are required to complement DEGO IV for a complete engine control and monitoring system according to DNV GL Rules Pt.4 Ch.9.
5. The system will keep the last fuel rack position upon power failure.
6. The system supply shall be protected with line fuse.

7. For generator applications DEGO IV shall be arranged with dual power supply, according to instructions provided in "Power Unit QHFQ490 Supply Circuits" (doc no. 2213_4497, rev 2014-09-20).
8. I/O list and associated alarms shall be according to Pt.4 Ch.3 Sec.1 Table 9, 10 and 11 (as applicable) and Ch.9 Sec.2 . Also if E0 class notation apply Pt.6 Ch.2 Sec.2 Table 4, 8 and 12 (as applicable).
9. For vessels with class notations DYNPOS(AUTR) and DYNPOS(AUTRO) a Failure Mode and Effect Analysis (FMEA) of power management functions (load sharing) shall be provided, according to DNV GL Rules Pt.6 Ch.3 Sec.1 Table 5.
10. Independent emergency stop is not provided by the maker when QHFQ500 Pitch Control System (PCI) is a part of the delivery. For vessels with class notations DYNPOS(AUTR) and DYNPOS(AUTRO) the emergency stops circuits must be loop monitored.
11. Propeller speed and pitch position indicators are not provided by the maker when QHFQ500 Pitch Control System (PCI) is a part of the delivery, and are not covered by this type approval certificate.
12. Levers are not provided by the maker when QHFQ500 Pitch Control System (PCI) is a part of the delivery, and are not covered by this type approval certificate.

Approval conditions

The following documentation of the actual application is to be submitted for approval in each case:

- Reference to this Type Approval Certificate
- Information about engine type and intended use (propulsion, auxiliary, emergency)
- System block diagram
- Software version for the specific delivery
- Confirmation that power supply arrangement is according to Application/limitation 6 and 7.
- Confirmation that I/O is arranged according to Application/limitation 8.

For **single engine propulsion plants** or deliveries where additional functions - not covered by this certificate - are implemented, the following supplementary documentation shall be submitted:

- Functional description (highlighting functionality not covered by this certificate)
- List of control and monitored points
- Test program for certification

The Type Approval covers hardware and software listed under Product description.

When the type approved software is revised (affecting all future deliveries) DNV GL is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have to be renewed to identify the new software version.

Product certificate

As long as the units are covered by the Type Approval, a product certificate according to Pt.4 Ch.9 Sec.1 will **not** be required. Correct configuration and set up for each delivery to be tested during commissioning after installation

Deliveries for **single engine propulsion plants** or with additional software functionality (not covered this certificate) are to be certified according to Pt.4 Ch.9 Sec.1. The certification test is to be performed at the manufacturer of the application system or at the responsible integrator of the complete engine control and monitoring system before the system is shipped to the yard or taken into service. 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.

A Certification of Application Functions may be required for the particular vessel.



Job Id: **262.1-017490-3**
Certificate No: **TAA00001S4**

Type Approval documentation

Tests carried out

Applicable tests according to Standard for Certification No. 2.4, April 2006.

Functional tests in Västerås, Sept/Oct/Dec 2014.

Functional test in Västerås, 14th of March 2017.

Marking of product

The products to be marked with:

- manufacturer
- type
- serial number

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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

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE