

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Engine Safety, Control and Alarm System**

with type designation(s)

Engine Safety, Control and Monitoring System "ECS-4" for Tier-4 engines series V250M and L250M, Engine Control and Monitoring Unit "ECU", Engine Safety System "SFU", Local Control Station "LCS", Power Supply Unit "PSU"

Issued to

**GE Transportation
ERIE PA, 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:**

Type	Temperature	Humidity	Vibration	EMC	Enclosure
Engine Safety, Control and Monitoring System "ECS-4" for Tier-4 engines series V250M and L250M Engine Control and Monitoring Unit "ECU"	B	B	B	A	B
Engine Safety System "SFU"	B	B	B	A	B
Local Control Station "LCS"	B	B	B	A	B
Power Supply Unit "PSU"	B	B	B	A	B

This Certificate is valid until **2018-06-27**.Issued at **Høvik** on **2016-06-28**for **DNV GL**DNV GL local station: **New York**Approval Engineer: **Krzysztof Aleksander Jankowski**-----
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: **262.1-019310-1**
Certificate No: **TAA00000J3**

Product description

"ECS-4" is cabinet mounted Engine Safety, Control and Monitoring System for General Electric 6, 8, 12 and 16 cylinders, Tier-4 engines series V250M and L250M. System is supporting both, 'V' and Inline engine configurations and forward / reverse rotation engines.

"ECS-4" – Engine Safety, Control and Monitoring System consists:	
Hardware name	Short description
ECU	Engine Control and Monitoring Unit
SFU	Engine Safety System
LCS	Local Control Station with Human Machine Interface "CFD"
ICB	InterConnect Box with two Ethernet Switches "ESW 1" and "ESW 2"
PSU	Power supply distribution unit with dual 18-32V power inputs and isolated outputs with overcurrent protection.

Software versions for 6, 8, 12 and 16 cylinder V250M and L250M engines series	
Hardware name	Software versions
ECU	00.06.XX
SFU	10.XX.YY
CFD	04.YY.XX
XX- minor changes not affecting DNV Rules requirements (bug fix, etc.)	
YY- minor changes not affecting DNV Rules requirements (GE customer additional request, etc.)	

Maintenance of software versions is described in document "Software Conformity Document", doc. no. 84A231868SC, Rev. A

Place of manufacture

GE Transportation
Erie, PA
The United States of America

Marking of product

GE Transportation Systems
Part or panel number

Optional:
Six digit date code
Nine digit MRP number

Application/Limitation

1. The Type Approval covers hardware and software listed under Product description.
2. This Type Approval Certificate is valid only for systems made and delivered by GE Transportation from production centers listed under place of manufacture for GE Transportation System for 6, 8, 12 and 16 cylinder engines V250 and L250 series, provided they hold a valid DNV GL Type Approval Certificate.
3. Add-On Monitoring Unit "AMU" is not covered by this Type Approval Certificate.
4. Oil Mist Detection override shall be disabled for DNV GL classified vessels and MOU's.
5. The system intended only for multiengine propulsion plants, auxiliary and emergency purposes.
6. Sufficient mechanical protection and correct installation of sensors to be verified for each installation during on board survey.
7. Gearbox safety, control and monitoring system is not covered by this Type Approval Certificate.
8. Specifications for routine test and maintenance of sensors according to class rules to be available on board after installation.

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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, etc.)
- Software versions used in specific delivery
- Configuration file used in specific delivery
- System block diagram showing overall system layout
- Power supply arrangement (may be part of block diagram)
- List of control & monitored points (indications, alarms, load reductions, shutdown list)
- Test program for certification

Product certificate.

Each delivery of the application system is **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, preferably at the engine/system application maker integrating control, monitoring and safety system, before the system is shipped to the yard. After the certification the clause for application software control will be put into force.

Clause for application function 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. Certification of Application Functions may be required.

Software update notification

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.

Type Approval documentation

Tests carried out

Applicable tests according to Class Guideline DNVGL-CG-0339, November 2015.
Functional Type Testing performed at GE Transportation premises, Erie, PA, United States of America, 2015-09-21 to 23.

Periodical assessment

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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