CROATIAN REGISTER OF SHIPPING

Certificate No. **03-001847**/*031535*

TYPE APPROVAL CERTIFICATE

This is to certify that this product complies with the Rules for the classification of ships, Part 1 - General requirements, Chapter 3 - Type approval of products.

TYPE AND DESCRIPTION OF PRODUCT:

ENGINE CONTROL SYSTEM

MAN B&W ME-ECS v. 1909-5.xx

Features – ME, ME-B, GI & LGI Engines

MANUFACTURER:

MAN Energy Solutions
Teglholmsgade 41
DK-2450 COPENHAGEN SV
DENMARK

THE PRODUCT MEETS FOLLOWING RULES/REGULATIONS:

Croatian Register of Shipping: **Rules for the classification of ships, Part 9. – Machinery, Part 13. – Automation**

IACS UR E10

FURTHER DETAILS OF THE PRODUCT AND CONDITIONS FOR CERTIFICATION ARE GIVEN OVERLEAF.

APPROVAL IS VALID UNTIL: **2025-09-06**

Place and date: Split, 2021-09-06 **Seal**

Marinko Popović, dipl.ing.

NOTE: This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Croatian Register of Shipping of any modification or changes to the product in order to obtain a valid certificate.

DETAILED PRODUCT DESCRIPTION:

ME-ECS is an electronically controlled system for the hydraulic-mechanical fuel injection and exhaust valves actuation for MAN B&W 2-stroke diesel engines. It is consisted of several control units listed in doc. 3093398-0.
The entire list of electronic components for ECS 3093398-0 is reviewed by CRS. New components are added and approved up to including Rev. 12 dated 2020.11.24 based on submitted relevant Environmental Test reports.

Where amendments of components are regarded as minor change, the amendment is informed via a letter of notification to CRS.
-Minor changes is as an example amendment of alternative components to the selection list, to increase liability in the supply chain.
-Where the amendment of components is regarded as major change, this will be included in a Type Approval Test of the ECS.
Major changes are including new functionality to ECS referring to IACS UR E22 table 1, system categories.

APPLICATION / LIMITATIONS:

Engine start, stop and reversing
Control of fuel injection, exhaust and start valve activation
Automatic speed control
Control of cylinder lubrication
Monitoring (for alarm and safety systems)
Gas injection
Gas valve train
Fuel gas system interface
Inert gas purging system interface
Double gas pipe leakage detection & ventilation
Scavenging air pressure control (optional)
Autotuning (optional)

TYPE APPROVAL DOCUMENTATION:

	Type Approval Test	*Documentation*	
ME-ECS	15-16th April 2013 Copenhagen	doc. 3099296-9 doc. 3099297-0	General System Information of ME-ECS Type Approval Test report for ME-ECS, SW 1304.
	24-25th January 2018 Takamatsu	doc. 3099296-9 doc. 3099645-7	General System Information of ME-ECS Type Approval Test report for ME-ECS, SW 1710.
	9-10th October 2019 Tamano	doc. 3099296-9 doc. 3099694-7.2	General System Information of ME-ECS – Rev. 06 Type Approval Test report for ME-ECS, SW 1903-2.
ME-GI ECS	5-6th May 2015 Copenhagen	doc. 3099295-7 doc. 3099636-2	General System Information of ME-GI Type Approval Test report for ME-ECS for ME-GI engines, SW 1502.
	7th-8th June 2021 Dong-gu Ulsan	doc. 3099295-7 doc. 6087449-6.2	General System Information of ME-GI – Rev. 08 Type Approval Test report for ME-ECS for ME-GI engines, SW 1909-5
ME-LGI ECS	15-17th March 2016 Tamano	doc. 3099567-8 doc. 3099642-1	General System Information of ME-LGI Type Approval Test report for ME-ECS for ME-LGI engines, SW 1601.
	30-31 th January 2020 Changwon	doc. 3099567-8 doc. 3099787-1	General System Information of ME-LGI – Rev. 04 Type Approval Test report for ME-ECS for ME-LGI engines, SW 1903-4
ME-B ECS	17-19th July 2013 Korea	doc. 3099313-8 doc. 3099629-1	General System Information of ME-B Type Approval Test report for ME-B ECS, SW 1212.

Programme for the TAT of software MAN B&W ME-ECS v. 1909-5, Document No. 3090685-1 Rev.4.8 and Programme for TAT of software MAN B&W ME-ECS Second Fuel Extension, Document No. 3093265-0 Rev. 2.8, approved by CRS letter 1760/TSE/NP/ZS/031535 dated 2021-08-20.

The procedure for Software release depends on the impact on the safety critical functions:
- Minor updates of Software have no influence on the safety critical functions and their release is performed by submission of Design Update Notes including information about software version and implemented changes.
- Major updates of Software, which alter the safety critical functions, are introduced after performance of a Type Approval Test witnessed and approved by the classification societies.

MARKING OF PRODUCT:

The Manufacturer and Type Designation of the product, serial number, date of manufacture, supply voltage and software version.

CONDITIONS FOR CERTIFICATION:

For each application on board CRS classed vessels complete technical documentation and drawings shall be submitted for examination and approval prior installation on board.
Each engine FAT test must include ME-ECS Integration Test with particular engine.

A separate control system product certificate will not be required provided that:
Control system configuration and set up for each delivery identified and tested at the engine shop test in accordance with “General Guideline for Shop Testing of Electronically Controlled Marine Two-Stroke Diesel Engines with 300bar System” doc. id. 5151619-0, or “General Guideline for Shop Testing of Electronically Controlled Marine Two-Stroke Diesel Engines with Common Rail System” doc. id. 5821516-8 as applicable, and
- Control system software identified and tested at quay and sea trials as specified in “Quay Trials & Sea Trials S/K/L-ME(-C) 300 bar system” doc. id. 5172536-4, as applicable, and
- If extended with second fuel system (GI or LGI): Added inspections and tests related to gas fuel injection found in “Factory Acceptance Test ME-GI” doc. id. 3099569-1

After the certification the clause for application software control will be put into force.