



Certificate No. 03-001949/031648

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.2201-1.xx

FOR MAN B&W ME-B / ME-GI / ME-LGI / ME-GA 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: **2027-04-14**

Place and date: Split, 2023-04-14

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. 16 dated 2022.12.14 based on submitted relevant Environmental Test reports.

ECS components update: The Engine Control System are to be assembled by MAN ES designed and specified OEM (Original Electronic Manufacturer) and COTS (Commercial Off The Shelf) components listed in a "selection list" in document: 3093398-0, List of approved electronic components for MAN ES Engine Control Systems.

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

Software update: 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.

Overridable engine power limitation (EPL) for MAN B&W ME electronically controlled engines provides fuel index limitation according to IMO MEPC.335(76) and is implemented in the engine control system MAN B&W ME-ECS from software version 1909-7.xx.

APPLICATION / LIMITATIONS:

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

TYPE APPROVAL DOCUMENTATION:

	<i>Type Approval Test</i>		<i>Documentation</i>
ME-ECS	15-16 th April 2013 Copenhagen	doc. 3099296-9 doc. 3099297-0	General System Information of ME-ECS Type Approval Test report for ME-ECS, SW 1304.
	24-25 th January 2018 Takamatsu	doc. 3099296-9 doc. 3099645-7	General System Information of ME-ECS Type Approval Test report for ME-ECS, SW 1710.
	9-10 th 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	5-6 th May 2015 Copenhagen	doc. 3099295-7 doc. 3099636-2
7 th -8 th 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		15-17 th March 2016 Tamano	doc. 3099567-8 doc. 3099642-1
	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	17-19 th 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.
ME-GA ECS	27 th -28 th February 2023 Ulsan, Korea	doc. 3099926-9 doc. 6275283-2	General System Information of ME-GA Type Approval Test report for ME-GA ECS, SW 2201-1

General System Information for MAN B&W ME-GA ECS, Document No. 6136662-7 Rev.3, and Type approval test of MAN B&W ME-GA ECS v.2201-1, approved by CRS letter 862/TSE/NP/ZS/031648, dated 2023-04-14.

General System Information for MAN B&W ME-ECS, Document No. 3099926-9 Rev.7, and ME-ECS-SW Version overview, Document No. 3091321-2 Rev. 37, approved by CRS letter 75/TSE/NP/ZS/031619, dated 2023-01-10.

Onboard Management Manual (OMM) for EPL should be approved according to IMO MEPC.335(76). OMM rev4.1 is checked and accepted to be used as the template document of MAN ME engine OMM documents.

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.