

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Remote Control System Diesel Engine

with type designation(s)

KRONOS 20, PHLOX II, ARIADNE, E-LES 80, IA 02-76, IA-M12, Ignition rails Z00-21-028-00/Z00-21-029 -00 with Ignition coil Z00-17-001-01, Ignition lead Z00-19-041-00, KS-1-K

Issued to

Heinzmann GmbH & Co. KG
Schönau/Schwarzwald, Germany

is found to comply with

GL Rules for Classification and Construction VI - Additional Rules and Guidelines Part 7 - Guidelines for the Performance of Type Approvals Chapter 2 - Test Requirements for Electrical/Electronic Equipment and Systems

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Location classes ¹⁾

	Temperature	Humidity	Vibration	EMC
KRONOS 20	B	B	B	A
E-LES 80 SMC-Marine	B	B	B	A
PHLOX II	B	B	B	A
Ignition rails	B	B	B	A
Ignition lead	B	B	B	A
Ariadne	A	B	B	A
Helenos II	B	B	B	A
KS-1-K	B	B	B	N/A
IA 02-76	D	B	B	N/A
IA-M12	D	B	B	N/A
MBS 33M	D	B	B	N/A
MBT 5260	D	B	B	N/A

¹⁾ IP protection according to the Rules shall be provided upon installation on board

This Certificate is valid until **2019-11-30**.

Issued at **Høvik** on **2017-12-01**

for **DNV GL**

DNV GL local station: **Augsburg**

Approval Engineer: **Didier Girardin**

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Joannis Papanuskas
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: **262.1-020296-2**
 Certificate No: **TAA000003R**
 Revision No: **1**

Product description

Heinzmann Gas Engine Management System integrates the control of air fuel ratio (AFR), engine speed, knocking and ignition.

HW Type	HW	SW	HW description
KRONOS 20 P/N: 620-00-118-01	h	008216	Air Fuel Ratio (AFR) Controller
E-LES 80 SMC-MARINE P/N: 472-00-030-00 P/N: 472-80-031-05 P/N: 472-19-001-03 or P/N: 472-19-001-00	0 0 0 a	00.02.03	Gas positioner (472-00-030-00) electronically controlled by KRONOS 20 controller and including: Stepper motor controller SMC (472-80-031-05) Stepper motor (472-19-001-03 or 472-19-001-00)
PHLOX II System P/N: 680-00-010-01 P/N: Z00-17-001-01 P/N: Z00-21-028-00 P/N: Z00-21-029-00 P/N: Z00-19-041-00	g 0 0 0 0	00.80.28	Ignition systems including control unit PHLOX (680-00-010-01), ignition coils (Z00-17-001-01), part of ignition rails (Z00-21-028-00 and Z00-21-029-00) and ignition leads (Z00-19-041-00).
ARIADNE P/N: 620-00-137-20	b	00.80.17	Knock control system
KS-1-K P/N: 010-80-095-00	0	N/A	Knock Sensor
IA 02-76 P/N: 600-00-006-01	b	N/A	Inductive speed sensor
IA-M12-100/160 P/N: 600-00-111-00	b	N/A	Inductive speed sensor
HELENOS II System P/N: 624-00-072-00 P/N: 514-00-009-00	0 q	0083.36	Digital speed governor system (Cert.: DNVA13969 / GL 94 946-10 HH) including throttle valve actuator StG 2080.21-SV (514-00-009-00).
MBS 33M P/N: 010-80-101-00	0	N/A	Pressure transmitter (GL Cert. No. 65 326-93 HH)
MBT 5260 P/N: 010-80-100-00	0	N/A	Temperature sensor (DNV Cert. No. A-14115)

Legacy GL Environmental Category¹⁾

KRONOS 20	D, EMC2
E-LES 80 SMC-Marine	DT, EMC2
PHLOX II control unit	D, EMC2
Ignition rails Z00-21-028-00 /29-00	DT, EMC2
Ignition lead Z00-19-041-00	DT, EMC2
ARIADNE	C, EMC2
Sensor KS-1- 010-80-095-00	DT
Pick-up IA 02-76	DT
Pick-up IA-M12	DT

¹⁾ (IP) Required protection according to the Rules shall be provided upon installation on board

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Application/Limitation

- Actual configuration is applicable for MAN E3262LE222 gas engines installed in ESD-protected machinery spaces, as Prime mover of multi-engine Gen-Set installation
- Ignition coils Z00-17-001-01 part of ignition rails Z00-21-028-00 /29-00 to be additionally isolated with fire proof insulation.
- Connectors of knock sensors 010-80-095-00 to be additionally isolated with fire proof insulation.
- Ex-certification is not covered by this certificate. Application in hazardous area to be approved in each case according to the Rules and Ex-Certification/ Special Condition for Safe Use listed in valid Ex-Certificate issued by a notified/recognized Certification Body.
- IP class shall be in accordance with installed area on board.

Approval conditions

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

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

- Reference to this Type Approval Certificate
- Reference to engine Type Approval Certificate
- System block diagram (showing integrated configuration of systems, sensors and signal connections)
- Power supply arrangement (may be part of the System block diagram)
- List of controlled and monitored points (alarms & safety functions) incl. type, range and threshold
- Traceability matrix of monitored failure alarm messages from respective integrated systems
- Software versions for respective delivery
- Test program for certification

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 of applicable rule requirements 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

See ANNEX

Product certificate

Each delivery of the application system is to be certified. The certification test is to be performed at the manufacturer of the application system, preferably at the engine/system application maker integrating the type approved hardware, based on approved test specification and before the system is shipped to the yard.

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

Tests carried out

According applicable GL test requirements for Electrical / Electronic Equipment and Systems [VI-7-2]
Compliant to applicable hardware tests according to Class Guideline DNVGL-CG-0339, Nov 2016

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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

Periodical assessment is to be performed at least every second year and at renewal of this certificate.

END OF CERTIFICATE

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ANNEX

Hidden

Type Approval documentation

- E&C Test Report No. 15PBI040055-02 dated 27.01.2015
- E&C Test Report No. 15PBU040068-01 dated 28.01.2015
- Kronos 20 Reference is made to GL Cert. 75 810-09 HH
- CSA Group Test report No. C38989-00-01ME Rev. 3.0 dated 18.05.2015
- CSA Group Test report No. E39288-00-02WA Rev. 6.0 dated 15.06.2015
- TÜV SÜD Test Report No 486871-23934-5 (Ed. 11) dated 27.08.2013
- TÜV SÜD Test Report No 486871-23934-2 (Ed. 1) dated 24.07.2013
- BUREAU VERITAS Test Report No. ECL-EMC-TR-15-098-V02.00 dated 24.04.2015
- BUREAU VERITAS Test Report No. ECL-ENV-TR-15-046-V01.00 dated 03.07.2015
- BUREAU VERITAS Test Report No ECL-ENV-TR-15-048-V01.00 dated 03.07.2015
- BUREAU VERITAS Test Report No ECL-ENV-TR-15-047-V01.00 dated 06.07.2015
- BUREAU VERITAS Test Report No ECL-EMC-TR-15-099-V02.00 dated 24.04.2015
- BUREAU VERITAS Test Report No ECL-ENV-TR-15-045-V01.00 dated 26.06.2015
- TÜV SÜD Test Report No 486871-23934-6 (Ed. 1) dated 03.09.2013
- TÜV SÜD Test Report No 486871-23934-7 (Ed. 1) dated 24.07.2013
- TÜV SÜD Test Report No. 486871-19426-01 (Ed.1) dated 11.04.2013
- Phoenix TESTLAB Test Report No. S152278E1 dated 28 May 2015
- AFR 15 001-e / 09-15 Info on Marine Genset Control System

Periodical Assessment Report DNV GL Kobe, dated 2017-10-23.