DNV

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Engine Control and Alarm System

with type designation(s)
AHD 504 A, AHD 514 A, AHD 514 S, AHD 504 NG, AHD 504 OP, AHD 514 OP

Issued to
Böning Automationstechnologie GmbH & Co.KG
Ganderkesee, Niedersachsen, Germany

is found to comply with
  DNV rules for classification – Ships, offshore units, and high speed and light craft

Application :

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

Type	Temperature	Humidity	Vibration	EMC	Enclosure
AHD 504 A	**B**	**B**	**A**	**B**	*)
AHD 514 A	**B**	**B**	**B**	**B**	*)
AHD 514 S	**B**	**B**	**B**	**B**	*)
AHD 504 NG	**B**	**B**	**B**	**B**	*)
AHD 504 OP	**B**	**B**	**A**	**B**	*)
AHD 514 OP	**B**	**B**	**B**	**B**	*)

*) Required protection according to DNV Rules shall be provided upon installation on board

Issued at **Hamburg** on **2023-02-22**

This Certificate is valid until **2025-01-29**.

DNV local unit: **Hamburg – CMC North/East**

Approval Engineer: **Jens Dietrich**

for **DNV**

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Joannis Papanuskas
Head of Section

Product description

AHD 504 A, Alarm System and Start-/Stop Unit:
9 x analog (selection 4–20mA / PT1000 / Bin via Jumper)
2 x analog (selection NiCrNi / 0-32V via Jumper)
3 x binary (Contact/Bedia with wire break monitoring)
6 x binary (control inputs)
1 x engine speed input (Pickup, galvanically isolated)
1 x Transistor 8A, wire break monitored, short-circuit proof (for solenoid or operating solenoid)
4 x relay 3A (32VDC, potential free)
1 x Transistor (32V/25mA)
2 x LED indicator (Power, Fault)
Interfaces: 2 CAN bus, RS232 diagnostic, serial for I/O extensions
Functions: Alarming, start-/stop Control, logging
Firmware-Version: 3.12.xxx
Degree of protection: IP20
Power supply: 24VDC

AHD 514 A, Alarm System and Start-/Stop Unit:
6 analog inputs 4..20mA
6 analog inputs PT100/PT1000
1 RPM input, galvanic isolated
2 add. binary inputs
6 binary inputs for control
2 voltage input for fuse trip and charging alternator
2 voltage input for speed-up/down
8 binary relay outputs 6A
2 binary transistor outputs (with wire break monitoring)
1 voltage output 1..5V/1..10V
2 status-LEDs
Interfaces: 2 CAN bus, RS232 diagnostic, serial for I/O extensions
Functions: Alarming, start-/stop Control, logging.
Firmware-Version: 4.2.xxx
Degree of protection: IP20
Power supply: 24VDC

AHD 514 S, Safety System
2 emergency stop inputs, direct acting, with wire break monitoring
5 binary inputs for automatic shut down with wire break monitoring
5 binary inputs for control (reset, override...)
1 RPM input, galvanic isolated
4 binary relay outputs, 6A
2 transistor outputs 8A, with wire break monitoring
1 transistor output 8A, short-circuit-proof with wire break monitoring
1 current output 4..20mA
2 status-LEDs
8 alarm-LED for override, emergency stop, overspeed and 5 other safety stop criteria
Interfaces: 1 CAN Bus for communication with AHD 514 A and AHD 514 OP, serial output
Functions: Manual emergency stops and automatic shut-down.
Firmware-Version: 1.19.xxx
Degree of protection: IP20
Power Supply 24VDC

AHD 504 NG, Grid and Generator Capture Unit:
3 x analog (400V AC, 50Hz / 60Hz) voltage and frequency measuring
Interfaces: 1 CAN Bus
Functions: measuring and monitoring of voltage and frequency of the power grid
Firmware-Version: 2.4.1.xx
Degree of protection: IP20
Power Supply 24VDC

AHD 504 OP / AHD 514 OP, Operator Panels:
AHD 504 OP: 4.3" (16:9) colour display with automatic dimmed illumination
AHD 514 OP: 5.7" colour display with automatic dimmed illumination

Interfaces: CAN Bus for communication with AHD 504 A, AHD 504 NG, AHD 514 A and AHD 514 S.
Functions: Indication of most important analog engine parameters on each page,
 engine status indication, alarm pages for acknowledged and unacknowledged alarms,
 membrane keys for engine start/stop, buzzer stop, acknowledgement,
 reset and page selection, buzzer
AHD 504 OP: Firmware-Version: 1.1.xxx
AHD 514 OP: Firmware-Version: 1.31.xxx
Degree of protection: IP20; front side: IP44
Power Supply 24VDC.

Addititional Tests: Low temperature -25°C and -50°C non-operating performed successfully.

Application/Limitation
The system is suitable for auxiliary engines, emergency engines and multi engine propulsion systems.
The Type Approval covers hardware and basic software listed under Product description. The installation instructions in the Operation Manual have to be observed.

The following documentation of the actual application is to be submitted for approval in each case:
- Reference to this Type Approval Certificate
- Specifications for Engine and/or reference to engine Type Approval Certificate
- System block diagram (showing independency between Safety System and Control and Monitoring
  System, including sensors separation)
- Power supply arrangement
- List of controlled and monitored points showing alarms and safety functions
- Software versions for particular delivery
- 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 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 for evaluation and approval. Major changes in the software are to be approved before being installed in the computer.

Tests carried out
Applicable tests according to DNV Class Guideline CG-0339, August 2021.
Performance test, dated 2013-05-16 and 2022-12-21.

Marking of product
Manufacturer, Type designation, serial number.

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 renewal of this certificate.

END OF CERTIFICATE