

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Control and Monitoring System**with type designation(s)
POSEIDON-P, -E, -H, -EHkon, -EHmix, -EH

Issued to

S-two GmbH & Co. KG
Lage, Germanyis found to comply with
DNV GL rules for classification – Ships**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Temperature****Humidity****Vibration****EMC****Enclosure**Issued at **Hamburg** on **2020-04-24**This Certificate is valid until **2025-04-23**.for **DNV GL**DNV GL local station: **Magdeburg**Approval Engineer: **Dariusz Lesniewski****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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

POSEIDON – P (Pneumatic System - Star-Wired and ShipPowerBus)
POSEIDON – E (Electric System - Star-Wired and ShipPowerBus)
POSEIDON – H (Decentralized Hydraulic System)
POSEIDON – EHkon (Electro-Hydraulic System - Star-Wired)
POSEIDON – EHmix (Electro-Hydraulic System - Star-Wired and ShipPowerBus)
POSEIDON – EH (Electro-Hydraulic System with Smart ShipPowerBus)

Application, system functionalities:

- Valves and pumps remote control, monitoring and datalogging.
- Tank level monitoring and alarming (independent Low/High/High-High alarms)
- Flooding detection and alarm generation.
- Pressure and temperature monitoring (in tanks or pump pressures)
- Anti Heeling System (optional)

System components:

- Single Control Cabinet with marine type PLC (Application software Version 4.x.x)
 - a) Spare PLC CPU mounted in bracket for manual replacement, or
 - b) Double redundant PLC with automatic supervision and switchover
- Multiple Control Cabinets with marine type PLC (Application software Version 4.x.x)
 - a) One pair of control cabinets with Smart ShipPowerBus wired between control cabinets. Both cabinets of one pair with additional ethernet / fiber optic interface (may also have two interfaces for redundancy) to achieve the Ring for the data communication.
 - b) Multiple pair of control cabinets with Smart ShipPowerBus wired between individual pair of control cabinets. All control cabinets are connected to adjacent control cabinet through ethernet / fiber optic interface to achieve the Ring for the data communication for all cabinets.
- Workstations with type approved PC(s) – Independent of Operating System.
VNC Viewer or Web Browser based access to HMI.
- Process Sensors according to application, type approved.
- Alarm Boxes for High and High-High level alarms (optional)
- Data Interface to the Loading Computer (optional)
- Data Interface to Ship Alarm and Monitoring System (optional)
- Data Interface to other systems like BWTS, Compressor, etc. (optional)

Approval conditions

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

- Reference to this Type Approval Certificate
- Functional description
- System block diagram
- Circuit diagrams (including power supply arrangement)
- List of control and monitored points
- Test program for certification

The current software numbers and versions are listed in document "Software Version History" according to the reference document: Software Quality Plan SQP-1_03, issue 1.2.

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.

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 before the system is shipped to the yard. After the certification the clause for application software control will be put into force.

Application software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV GL for evaluation and approval before implemented on board.

Type Approval documentation

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings

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 after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE