

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Steering Gear Control System**with type designation(s)
NAVIGUIDE 4000

Issued to

**Northrop Grumman Sperry Marine B.V. - German Branch
Hamburg, Germany**

is found to comply with

DNV GL 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 GL.****Location classes:****Temperature B****Humidity B****Vibration A****EMC B****Enclosure Required protection according to the Rules to be provided upon installation on board**This Certificate is valid until **2020-06-03**.Issued at **Hamburg** on **2018-06-04**DNV GL local station: **Hamburg**for **DNV GL**Approval Engineer: **Jörg Rebel**

Arne Schaarmann
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: **262.1-023172-2**
Certificate No: **TAA00000X6**
Revision No: **1**

Product description

The NAVIGUIDE 4000 Manual Steering System based on the NAVINET 4000 Steering Control Network may consist of the following equipment:

<i>Description</i>	<i>Type</i>
Steering Mode Selector / NFU Tiller with Override contacts	4954AA
Steering Mode Selector / NFU Tiller	4954
SyncroHelm FU Hand Wheel	4944DA
SyncroHelm FU Mini Wheel with 3 buttons and Software 020238-0000-000 Rev.: x	4956AA
FU Mini Wheel / Display Unit with 3 buttons and Software 020238-0000-000 Rev.: x	4956
Multi-Function Unit with 3 buttons with following functions: Wheel Control Unit, FU, Device Interface / Display Unit and Software 020238-0000-000 Rev.: x	4955AA
Multi-Function Unit with 6 buttons and with following functions: Steering Mode Selector, Steering Position Selector, Dual Rudder Sync Selector, Steering Alarm Module and Software 020238-0000-000 Rev.: x	4955
Steering Control Unit Hardware Rev.: Ax; Software 020801-0000-000 Rev.: x	4961
Override Unit	4987
Steering insert	4944
FU tiller	4970
NFU tiller	4930
Control selector switch	4516, 4518, 4876
FU amplifier	4747, 60197
Feed-back unit incl. lever drive	4968 (Temperature: A; Vibration: B)
Emergency NFU control switch	4870
Power supply unit	60208, 60281, 60290, 60272, 47891
Relays	43118, 47276, 46154, 46104
Relay box	4971
Diodes	46673
Automatic rudder limiter	4823
Program Fieldbus Controller Ethernet with Software 020809-0000-000 Rev.: V1.xx	750-881
- Program Fieldbus Controller Ethernet	750-352
- Power Supply Filter 24VDC	750-626
- Field Supply Filter 24VDC	750-624
- Power Supply Module 24VDC	750-602
- Power Supply Module 24VDC	750-612
- Power Supply Module 24VDC, fuse	750-610

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<i>Description</i>	<i>Type</i>
- 2 DO, 125 VAC	750-514
- 8 DI, 24 VDC, 3 ms	750-430
- 8 DO, 24VDC, 0,5 A	750-530
- 8 DO, 24VDC, 0,5 A	750-536
- 4 AO, +- 10VDC, 12 Bit	750-557
- 4 AI, +- 10VDC, s.e.	750-457
- Interface serial, RS485	750-653
- End Module	750-600
- Solid State Relay	PLC-OSP

Approval conditions

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

- Reference to this Type Approval Certificate
- System block diagram
- Power supply arrangement (may be part of the System block diagram)
- Test program for certification

The Type Approval covers hardware and software listed under Product description. No further application software is necessary for delivery of an application system.

The software numbers and versions are listed in document PN300.02 containing the respective latest versions. The document status from 2018-03-12 is the basis for this Type Approval Certificate.

When the type approved software is revised (affecting all future deliveries) DNV GL is to be informed by forwarding updated document PN300.02. 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 software control will be put into force.

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

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, Edition November 2016 and IEC/EN 60945 (2002) including Corrigendum 1 (2008).

Marking of product

- Components are marked with product name and product number as listed in the table above.
- Basic software version is displayed in the system graphical user interface.
- Each project application configuration is documented in a dedicated version log file which is specific for each vessel.

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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 at renewal of this certificate.

END OF CERTIFICATE