DNV·GL

Certificate No:
TAA00001ES

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Network and Communication Components

with type designation(s)
MACH 4002 / HS80xx Family Modular Industrial ETHERNET Backbone Switch System

Issued to
Hirschmann Automation and Control GmbH
Neckartenzlingen, 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.

Temperature	**A**
Humidity	**B**
Vibration	**A**
EMC	**A/B***
Enclosure	**Required protection according to DNV GL Rules**

*** B when DC powered.**

Issued at **Hamburg** on **2017-10-18**

This Certificate is valid until **2022-10-17**.
DNV GL local station: **Augsburg**

Approval Engineer: **Marco Rinkel**

for **DNV GL**
Digitally Signed By: Papanuskas, Joannis

Signing Date: 18.10.2017

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.

Product description

Modular Industrial ETHERNET Backbone Gigabit ETHERNET Switch System in a 19" chassis.
The MACH 4002 / HS802x / HS804x support Gigabit-ETHERNET with 1000 Mbit/s.

MACH4002-48+4G-L2P
Optional designation: HS8002 Modular Gigabit Switch
- Switch Chassis 48/4G incl. slide-in fan unit without power supply, with Layer2 Professional software

MACH4002-48+4G-L3E
Optional designation: HS8006 Modular Gigabit Switch
- Switch Chassis 48/4G incl. slide-in fan unit without power supply, with Layer2 Enhanced software

MACH4002-48+4G-L3P
Optional designation: HS8008 Modular Gigabit Switch
- Switch Chassis 48/4G incl. slide-in fan unit without power supply, with Layer2 Enhanced software

MACH4002-48G+3X-L2P
- max. 48 ports / 1000 Mbit upgradable, 3 x 10 Gbit XFP ports preinstalled, Layer 2 Professional

MACH4002-48G+3X-L3E
- max. 48 ports / 1000 Mbit upgradable, 3 x 10 Gbit XFP ports preinstalled, Layer 3 Enhanced

MACH4002-48G+3X-L3P
- max. 48 ports / 1000 Mbit upgradable, 3 x 10 Gbit XFP ports preinstalled, Layer 3 Professional

MACH4002-48G-L2P
- max. 48 ports / 1000 Mbit upgradable, Layer 2 Professional

MACH4002-48G-L3E
Optional designation: HS8046 Modular Gigabit Switch
- max. 48 ports / 1000 Mbit upgradable, Layer 3 Enhanced

MACH4002-48G-L3P
Optional designation: HS8048 Modular Gigabit Switch
- max. 48 ports / 1000 Mbit upgradable, Layer 3 Professional

MACH4002-24G+3X-L2P
- max. 24 ports / 1000 Mbit upgradable, 3 x 10 Gbit XFP ports preinstalled, Layer 2 Professional

MACH4002-24G+3X-L3E
- max. 24 ports / 1000 Mbit upgradable, 3 x 10 Gbit XFP ports preinstalled, Layer 3 Enhanced

MACH4002-24G+3X-L3P
- max. 24 ports / 1000 Mbit upgradable, 3 x 10 Gbit XFP ports preinstalled, Layer 3 Professional

MACH4002-24G-L2P
- max. 24 ports / 1000 Mbit upgradable, Layer 2 Professional

MACH4002-24G-L3E
Optional designation: HS8026 Modular Gigabit Switch
- max. 24 ports / 1000 Mbit upgradable, Layer 3 Enhanced

MACH4002-24G-L3P
Optional designation: HS8028 Modular Gigabit Switch
- max. 24 ports / 1000 Mbit upgradable, Layer 3 Professional

Software release: 07.x
Software release: 08.x
Software release: 09.x

M4-POWER	Power unit chassis (for 3 slide-in units)
M4-AIR	Slide-in fan unit for switch chassis
M4 AIR-T	Plug-in fan module to the switch chassis with air stream regulation
M4-S-AC/DC 300W	Power supply plug-in unit AC (300 W) for switch chassis
M4-S-24VDC 300W	Power supply plug-in unit 24VDC, single-current, for switch chassis 2 connections coupled via diodes, one DC/DC converter
M4-S-48VDC 300W	Slide-in 48VDC power unit, single-current, for switch chassis 2 connections coupled via diodes, one DC/DC converter
M4-P-AC/DC 300W	Slide-in AC power unit (300 W) for power unit chassis
M4-P-24VDC 300W	Slide-in 24VDC power unit, single-current, for power unit chassis 2 connections coupled via diodes, one DC/DC converter
M4-P-48VDC 300W	Slide-in 48VDC power unit, single-current, for power unit chassis 2 connections coupled via diodes, one DC/DC converter

Media modules

M4-8TP-RJ45	Plug-in module 8 TP RJ45 (10/100, 10/100/1000)
M4-FAST 8-SFP	Plug-in module 8 SFP (100 HDX/FDX)
M4-GIGA 8-SFP	Plug-in Ethernet SFP port module 1000MHz to the switch chassis
M4-FAST 8TP-RJ45-PoE	Plug-in Ethernet TP port module to the switch chassis with PoE (Power over Ethernet)
M-XFP-SR/LC	XFP Fiberoptic 10Gigabit-Ethernet Transceiver, Multi Mode Fiber
M-XFP-LR/LC	XFP Fiberoptic 10Gigabit-Ethernet Transceiver, Single Mode Fiber

Firmware version:
L2P: Software release 07.x, Software release 08.x, Software release 09.x
L3E: Software release 07.x, Software release 08.x, Software release 09.x
L3P: Software release 07.x, Software release 08.x, Software release 09.x

Application/Limitation

Equipment not for installation within a distance of 5 m from magnetic compass.

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV GL, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV GL Rules for Ships Pt.4 Ch.9 Control and Monitoring Systems.

Product certificate
If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. 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.

Type Approval documentation

Reports and proofs according to
"Reports_overlook MACH4000.xls" on GL_CD0612xx;
"GL_Reports_overlook_MACH4002_48G_Draft_RK.xls" on GL_CD_071107;
Description of the modification Software release 08.x to 09.x (02.07.2015)

Tests carried out

Applicable tests according to Class Guidelines DNVGL-CG-0339, November 2016.

Marking of product

The products to be marked with:

- Model name
- Manufacturer name
- 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 typeapproved 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