DNV·GL

Certificate No:
TAA000014S

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Peripheral Equipment

with type designation(s)
RS20/30, RS22/32, RS40, MS20/30, MICE

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.

Location class:

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

Issued at **Hamburg** on **2017-08-07**
This Certificate is valid until **2021-05-05**.
DNV GL local station: **Augsburg**

for **DNV GL**

Approval Engineer: **Klaus-Peter Schröder**

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.

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Product description

The device name corresponds to the product code. The product code is made up of characteristics with defined positions. The characteristic values stand for specific product properties.

RS20/30: Rail Switch

The switch modules are plugged onto the standard DIN rail.
The RS20 support ETHERNET with 10 MBit/s and 100 MBit/s.
The RS30 support ETHERNET with 10 MBit/s, 100 MBit/s and 1000 MBit/s.

Item	Characteristic	Characteristic value	Description
1…2	Product	RS	Rail Switch
3…4	Product Type	20 30	Rail switch without gigabit ports Rail switch with gigabit ports
5	Hypen	-	
6…7	Number of 10/100 Mbit ports	04 08 09 16 17 24 25	4 * 10/100 Mbit Ethernet 8 * 10/100 Mbit Ethernet 9 * 10/100 Mbit Ethernet 16 * 10/100 Mbit Ethernet 17 * 10/100 Mbit Ethernet 24 * 10/100 Mbit Ethernet 25 * 10/100 Mbit Ethernet
8…9	Number of 1000 Mbit ports	00 02	0 * 1000 Mbit Ethernet 2 * 1000 Mbit Ethernet (without 4 port devices)
10…11	Port 1 (ring port)	T1 M2 M4 MM NN S2 S4 VV UU L2 G2 LL GG O6 OO	Twisted pair TX, RJ45 Multimode FX, DSC, 100 Mbit Multimode FX, ST, 100 Mbit 2 * Multimode DSC, 100 Mbit 2 * Multimode ST, 100Mbit Singlemode FX, DSC, 100 Mbit Singlemode FX, ST, 100 Mbit 2 * Singlemode DSC, 100 Mbit 2 * Singlemode ST, 100 Mbit Singlemode longhaul, FX, DSC, 100 Mbit Singlemode longhaul, FX, DSC, 200km, 100 Mbit 2 * Singlemode longhaul DSC, 100 Mbit 2 * Singelmode longhaul DSC, 200km, 100 Mbit SFP Slot, 1000 Mbit 2 * SFP Slot Gigabit Ethernet, 1000 Mbit
12…13	Uplink port(s)	T1 M2 M4 S2 S4 L2 G2 O6 ZZ	Twisted pair TX, RJ45 Multimode FX, DSC, 100 Mbit Multimode FX, ST, 100 Mbit Singlemode FX, DSC, 100 Mbit Singlemode FX, ST, 100 Mbit Singlemode longhaul, FX, DSC, 100 Mbit Singlemode longhaul, FX, DSC, 200km, 100 Mbit SFP Slot, 1000 Mbit 2 * SFP Slot Fast Ethernet, 100 Mbit
14	Temperature range	S T E	0°C …+60°C -40°C [1]) … +70°C -40°C [1]) … +70°C, conformal coating of PCB's
15	Voltage range	D	2 voltage inputs for redundant power supply Rated voltage 24… 48 VDC

			Voltage range incl. maximum tolerances: 9,6 …60V DC
16	Specifications	X	Any letter, depending on approvals and/or declarations
17	Software variant, optionally be followed by additional digits	E P U B	Enhanced Professional Unmanaged Basic

Relevant notes for this certificate:
[1]) type approval test performed down to - 25°C only.

RS22/32
The switch modules are plugged onto the standard DIN rail or mounted on a wall.
The RS22 support ETHERNET with 10 MBit/s and 100 MBit/s.
The RS32 support ETHERNET with 10 MBit/s, 100 MBit/s and 1000 MBit/s.

Item	Characteristic	Characteristic value	Description
1…2	Product	RS	Rail Switch
3…4	Product Type	22 32	Rail switch without gigabit ports with PoE Rail switch with gigabit ports with PoE
5	Hypen	-	
6…7	Number of 10/100 Mbit ports	08 09 16 17 24 25	8 * 10/100 Mbit Ethernet 9 * 10/100 Mbit Ethernet 16 * 10/100 Mbit Ethernet 17 * 10/100 Mbit Ethernet 24 * 10/100 Mbit Ethernet 25 * 10/100 Mbit Ethernet
8…9	Number of 1000 Mbit ports	00 02	0 * 1000 Mbit Ethernet 2 * 1000 Mbit Ethernet
10…11	Port 1	T1 M2 M4 MM NN S2 S4 VV UU L2 G2 LL GG O6 OO	Twisted pair TX, RJ45 Multimode FX, DSC, 100 Mbit Multimode FX, ST, 100 Mbit 2 * Multimode DSC, 100 Mbit 2 * Multimode ST, 100Mbit Singlemode FX, DSC, 100 Mbit Singlemode FX, ST, 100 Mbit 2 * Singlemode DSC, 100 Mbit 2 * Singlemode ST, 100 Mbit Singlemode longhaul, FX, DSC, 100 Mbit Singlemode longhaul, FX, DSC, 200km, 100 Mbit 2 * Singlemode longhaul DSC, 100 Mbit 2 * Singelmode longhaul DSC, 200km, 100 Mbit SFP Slot, 1000 Mbit 2 * SFP Slot Gigabit Ethernet, 1000 Mbit
12…13	Uplink port(s)	T1 M2 M4 S2 S4 L2 G2 O6	Twisted pair TX, RJ45 Multimode FX, DSC, 100 Mbit Multimode FX, ST, 100 Mbit Singlemode FX, DSC, 100 Mbit Singlemode FX, ST, 100 Mbit Singlemode longhaul, FX, DSC, 100 Mbit Singlemode longhaul, FX, DSC, 200km, 100 Mbit SFP Slot, 1000 Mbit

		ZZ	2 * SFP Slot Fast Ethernet, 100 Mbit
14	Temperature range	S T E	0°C …+60°C -40°C … +60°C -40°C … +60°C, conformal coating of PCB's
15	Voltage range	P	2 voltage inputs for redundant power supply Rated voltage 48 V DC Voltage range incl. maximum tolerances: 47 … 52V DC Remark: Product variants with power supply value P: For connection to a distributed power supply system a discrete isolated power converter is required, which satisfies the permitted voltage to tolerances at his output.
16	Approvals	X	Any letter, depending on approvals and/or declarations
17	Software variant, optionally be followed by additional digits	E P	Enhanced Professional

RS40
The compact switches are plugged onto the standard DIN rail.
The RS40 support Gigabit-ETHERNET with 1000 MBit/s.

Item	Characteristic	Characteristic value	Description
1…2	Product	RS	Modular Switch
3…4	Product Type	40	
5	Hypen	-	
6…7	Number of Fast-Ethernet ports	00	None
8…9	Number of Gigabit-Ethernet ports	09	9 * 1000 Mbit Ethernet
10..11	1st and 2nd uplink port / connector type	CC	Combo Port Gigabit ETHERNET (SFP or TX 1000 MBit)
12…13	3rd and 4th uplink port / connector type	CC	Combo Port Gigabit ETHERNET (SFP or TX 1000 MBit)
14	Temperature range	S T E	0°C …+60°C -40°C … +70°C -40°C … +70°C, conformal coating of PCB's
15	Voltage range	D	2 voltage inputs for redundant power supply Rated voltage 24 … 48 VDC Voltage range incl. maximum tolerances: 9,6 …60V DC
16	Specifications	X	Any letter, depending on approvals and/or declarations
17	Software variant, optionally be followed by additional digits	E P	Enhanced Professional

MS20, MS30, MB20, MM4-2TX/SFP: Switches, Backplane Expansion Modules, Media Module
The modular switches are plugged onto the standard DIN rail.
Backplane Expansion Modules mountable to any MICE family modular switch.
Media modules are mounted on a backplane.
The MS20 support Fast-ETHERNET with 100 MBit/s.
The MS30 support Gigabit-ETHERNET with 1000 MBit/s.

Modular Switches

Item	Characteristic	Characteristic value	Description
1…2	Product	MS	Modular Switch
3…4	Product Type	20 30	Modular Switch, Fast-Ethernet uplink Modular Switch, Gigabit-Ethernet uplink
5	Hypen	-	
6…7	Number of mountable Fast-Ethernet ports	08 16 24	8 * 100 Mbit Ethernet 16 * 100 Mbit Ethernet 24 * 100 Mbit Ethernet
8…9	Number of Gigabit-Ethernet ports	00 02	None 2 * 1000 Mbit Ethernet
10	Temperature range	S T E	0°C …+60°C -40°C … +70°C -40°C … +70°C, conformal coating of PCB's
11	Voltage range	A C E	2 voltage inputs for redundant power supply Rated voltage 24V DC Voltage range incl. maximum tolerances: 18 … 32V DC 2 voltage inputs for redundant power supply Rated voltage 24 … 48V DC Voltage range incl. maximum tolerances: 18 …60V DC 2 voltage inputs for redundant power supply Rated voltage 24… 48V DC Voltage range incl. maximum tolerances: 18 …60V DC (6-pin)
12	Specifications	X	Any letter, depending on approvals and/or declarations
13	Software variant, optionally be followed by additional digits	E P	Enhanced Professional

Backplane Expansion Modules

Item	Characteristic	Characteristic value	Description
1…2	Product	MB	Backplane Expansion Modules
3…4	Product Type	20	for Fast Ethernet (note: the name may also be "MB-" only)
5	Hypen	-	
6	Number of mountable Media Modules	2	2 Modules
7	Temperature range	S T E	0°C …+60°C -40°C … +70°C -40°C … +70°C, conformal coating of PCB's
8	Specifications	B H	With ATEX 100a Zone 2 Without ATEX

Media Module

MM4-2TX/SFP	2 x TP interfaces and 2 x socket for SFP

MICE

MICE (Modular Industrial Communication Equipment) is a modular network component.
MICE allows to construct switched ETHERNET networks that conform to the IEEE 802. and 802.3u standard using copper wires or optical fibers in a bus or ring topology.
The switches are mounted by snapping them onto a standard DIN rail.

The components are Switch Basic Modules, Media Modules, Expansion Modules.

Basic modules of the MICE switches

MB-2T	backplane, extension accessory to MS Type Switches, 2 slots for Media Modules

Media Modules, twisted-pair ports

MM2-4TX1	4 ports, 100BASE-T(X), RJ45 *)
MM3-4TX5	4 ports, 100BASE-T(X), M12

Media Modules, F/O ports

MM2-4FXM3	4 ports, 100BASE-FX, multimode, MTRJ connections *)
MM2-2FXM2	2 ports, 100BASE-FX, multimode, DSC connections *)
MM2-2FXS2	2 ports, 100BASE-FX, singlemode, DSC connections *)
MM2-2FXP4	2 ports POF Polymere Optical Fiber / ST (100 Mbit) *)
MM3-4FXM2	4 ports, 100BASE-FX, multimode, DSC connections
MM3-4FXM4	4 ports, 100BASE-FX, multimode, BFOC connections
MM3-4FXS2	4 ports, 100BASE-FX, singlemode, DSC connections
MM3-4FXP4	4 Ports POF Polymere Optical Fiber / ST (100 Mbit)
MM3-4FLM4	4 ports, 10BASE-FL, multimode, ST connections
MM2-2FLM4	2 ports, 10 Base-FL, multimode, ST connections

Media Modules, twisted-pair and F/O ports

MM2-2FXM3/2TX1	2 x 100BASE-FX, multimode, MTRJ connections, 2 x 10/100BASE-T(X), RJ45 *)
MM3-1FXM2/3TX1	1 x 100BASE-FX, multimode, DSC connection, 3 x 10/100BASE-T(X), RJ45
MM3-2FXM2/2TX1	2 x 100BASE-FX, multimode, DSC connections, 2 x 10/100BASE-T(X), RJ45 *)
MM3-2FXM4/2TX1	2 x 100BASE-FX, multimode, BFOC connections, 2 x 10/100BASE-T(X), RJ45
MM3-1FXS2/3TX1	1 x 100BASE-FX, singlemode, DSC connection, 3 x 10/100BASE-T(X), RJ45 *)
MM3-2FXS2/2TX1	2 x 100BASE-FX, singlemode, DSC connections, 2 x 10/100BASE-T(X), RJ45 *)
MM3-1FXL2/3TX1	1 x 100BASE-FX, singlemode, DSC connections, Long Haul, 3 x 10/100BASE-T(X), RJ45
MM3-1FXS2/1FXM2/2TX1	1 x 100BASE-FX, 1 x multimode / SC (100 Mbit), 2 x 100BASE-T(X), RJ45

*) - also with suffix "EEC"

Item	Characteristic	Characteristic value	Description
1…2	Product	MM	
3	Product Type	2 3	Fast Ethernet 10/100 Mbit Gigabit Ethernet 1000Mbit
4	Technology	0 2	Standard Power over Ethernet (PoE)
5	Hypen	-	
6…7	Port 1		
8…9	Port 2		
10…11	Port 3		
12…13	Port 4	T1 T5 M2 M3 M4 S2 S4 F4 L2 G2 O6	Twisted pair / RJ45 Twisted pair / M12 Multimode / SC (only 100 Mbit) Multimode / MTRJ (only 100 Mbit) Multimode / ST (only 100 Mbit) Singlemode / SC (only 100 Mbit) Singlemode / ST (only 100 Mbit) Multimode / ST (only 10 Mbit) Singlemode LH / SC (only 100 Mbit) Singlemode LH / SC (only 100 Mbit) SFP slot / SFP (1000 Mbit)

		O7 P4 Z6 99	SFP slot + RJ45 (1000 Mbit) POF Polymere Optical Fiber / ST (only 100 Mbit) SFP slot /SFP (100 Mbit) Port not mounted (except for Position 6, 7 Port 1)
14	Temperature range	S T E	0°C …+60°C -40°C … +60°C -40°C … +60°C, conformal coating of PCB's
15	Specifications	X	Any letter, depending on approvals and/or declarations
16	OEM-Type	H X	Standard Customer specific (X – any suffixes)

Application/Limitation

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 RU SHIP Pt.4 Ch.9 Sec. 1.

RS20/RS30 Location class EMC: A (Power supply 48V DC)
B (Power supply 24V DC)

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

Test results from the "Compass safe distance":

Type designations	Compass; standard	Compass; steering/standby steering/ emergency
RS20/RS30	45cm	30cm
MS20/MS30/MS4128	70cm	45cm

Type Approval documentation

Tests carried out

Applicable tests according to Class Guideline DNVGL-CG-0339, Edition November 2015.
"Compass safe distance" was measured according to EN60945 (2002) section 11.2.

Marking of product

The products to be marked with:
- device 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 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