

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Application of: Council Directive 96/98/EC of 20 December 1996 on Marine Equipment as amended by directive (EU) 2015/559, issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Directorate.
This Certificate is issued by DNV GL AS under the authority of the Government of the Kingdom of Norway.

This is to certify:**That the Integrated navigation system (INS)**with type designation(s)
Ocean Explorer INS

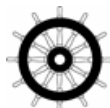
Issued to

Japan Radio Co., Ltd.
Mitaka Tokyo, Japan

is found to comply with the requirements in the following Regulations/Standards:

Annex A.1, item No. A.1/4.59 and Annex B, Module B in the Directive; SOLAS 74 as amended, Regulation V/18, V/19 & X/3, IMO Res. A.694(17), 2000 HSC Code 13 and IMO MSC.191(79), 252(83) & 302(83)**IMO Resolution MSC.302(87) Performance standards for Bridge Alert Management**

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2021-05-29**.Issued at **Høvik** on **2016-05-30**DNV GL local station:
YokohamaApproval Engineer:
Olaf GundersrudNotified Body
No.: **0575**for **DNV GL AS**-----
Vidar Dolonen
Head of Notified Body

Product description

The Ocean Explorer Integrated Navigation System (INS) consists of several Multifunction displays (MFDs) incorporating the below functions and integrated via a dual Ethernet platform:

<i>Function</i>	<i>type</i>
• RADAR	JMR-9200 manufactured by Japan radio Co., Ltd.
• ECDIS	JAN-9201 manufactured by Japan radio Co., Ltd.
• CONNING	JAN-9202 manufactured by Japan radio Co., Ltd.
• CAM	JAN-9202 manufactured by Japan radio Co., Ltd.

For details, see Appendix

Application/Limitation

- The individual functions identified under Product description shall hold valid type approval certificates documenting compliance with applicable international standards in accordance with the Directive.
- The minimum configuration of Ocean Explorer INS for SOLAS compliance comprises 4 MFDs. The maximum configuration tested comprises 9 MFDs. An INS-topology involving additional MFDs may be approved on case-by-case basis.
- IGMP snooping and GMRP for filtering of multicast traffic shall be disabled.
- The Ocean Explorer INS shall be interconnected with dual installations of position, heading and speed sensors holding valid type approval certificates.
- The Ocean Explorer INS shall be connected to an alarm transfer system for transfer of back-up navigator alarms.
- The INS Alert Management (CAM) may handle, distribute and present bridge alerts being additional to the Ocean Explorer and its primary sensors.
- For vessels where BAM-compliance in accordance with MSC.302(83) is required the INS CAM-HMI should be arranged as the functional HMI for the BAM.
- The Ocean Explorer INS ECDIS function may be interfaced to and act as HMI for the JRC MFD/ECDIS Track Control System(s).
- The Ocean Explorer INS shall be installed and commissioned onboard according to manufacturer's installation instructions.

Note: The Ocean Explorer installation may comply with the DNVGL's additional class notations NAUT-nn with qualifier (ICS). The actual INS topology and the workstation arrangement are subject to approval on case-by-case basis.

Type Examination documentation

Tests carried out

- | | |
|----------------------|-----------------------|
| • Performance | – IEC61924-2 (2012) |
| • Environmental | – IEC60945 (2002) |
| • Serial Interface | – IEC61162-1 (2010) |
| • Serial high speed | – IEC61162-2 (1998) |
| • Ethernet interface | – IEC61162-450 (2011) |
| • Presentation | – IEC62288 (2014) |

Marking of product

The designation of Manufacturer and Type shall be fixed in a clearly visible location on the individual equipment. In addition the equipment shall be marked with serial number. Safe distance to magnetic compass and power consumption and/or supply voltage may be stated in the individual installation manuals.

APPENDIX (PAGE 1 OF 2)

Product Description

The Ocean Explorer INS consists of combinations of the following systems and components¹⁾:

Unit	Model Name	Components	Remark
ECDIS	JAN-9201	Keyboard/Trackball Monitor Processing unit	<i>See ECDIS type examination certificate (TEC) for details</i>
RADAR	JMR-9200	Keyboard/Trackball Monitor Processing unit Scanner unit Transceiver unit LAN nodes J4117 & J4122	<i>Dual radar installation See RADAR TEC for details</i>
CID / CAM	JAN-9202	Keyboard/Trackball Monitor Processing unit	<i>See CID TEC for details</i>
Interswitch	NQE-3141-nA		<i>n=4,5,6,7,8</i>
Gyro compass	TG-8000	Dual installation	
Gyro distribution	TK DGC-80		
Ethernet switch	MOXA EDS-G516E-4GSFP-T		<i>The LAN components shall be duplicated</i>
Serial/LAN interface - ALC	JRC CMH-2370		
Serial/LAN interface - SLC	JRC CMH-2370		
Cabling	CAT5 STP		
<i>Software versions</i>	Multi-Function version 02.00.nnn		<i>NDC-1590</i>
	APL version 01.00.nnn		<i>NQE-1143</i>

¹⁾For further details ref. installation manual 7ZPNA4466B 1.3.

Type Examination documentation

DNV No.	Document no.	Title
51	WM-000000450	Test report on IEC61924-2. 8.9.5.2.2 Fault tolerance
50	WM-000000449	Performance test report for JRC "Ocean Explorer INS"
49	WW-000001841	Topology (min): Communication & power diagram of INS system configuration
48	WW-000001840	Topology (max): Communication & power diagram of INS system configuration
46	WW-000001847	FMEA(INS)20160317.xls
45	WM-000000413	INS software version list
44	WW-000001857	JRC_INS_Document_list
42		INS power condition
37		Alert list
35	Table F.2	IEC 61162-1 sentences transmitted by the INS

Job Id: **344.1-004841-1**
Certificate No: **MEDB00000BE**

APPENDIX (PAGE 2 OF 2)

Type Examination documentation cont.

36	2016/03/_23JRC	ALERT ARCHITECTURE DESCRIPTION
34	2016/03/23JRC	INTEGRITY MONITORING ARCHITECTURE DESCRIPTION
33	2016/03/22JRC	INS task station diagnosis description
32	7ZPNA4578	INS Instruction manual: MFD (ECDIS,RADAR,CID,BAM)
31	7ZPNA4466B	Installation manual: MFD (ECDIS,RADAR,CID,BAM)
30	QKW15126	Software Quality Control Outline
29	EDS-G516E-4GSFP	MOXA managed Ethernet switch