EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Certificate No:
MEDB00007V3

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED), issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV AS under the authority of the Government of Norway.

This is to certify:

That the Electronic chart display and information system (ECDIS)

with type designation(s)
MNS-100E Series

Issued to
MRC Inc.
Busan, Korea, Republic of

is found to comply with the requirements in the following Regulations/Standards:
Regulation **(EU) 2022/1157,**
item No. MED/4.30. SOLAS 74 as amended, Regulations V/18, V/19, V27 & X/3, IMO Res. A.694(17), IMO Res. MSC.36(63), IMO Res. MSC.97(73), IMO Res. MSC.191(79), IMO Res. MSC.232(82), IMO Res. MSC.302(87), IMO MSC.1/Circ.1503 Rev.1

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

This Certificate is valid until **2024-01-01**.

Issued at **Høvik** on **2022-11-07**

DNV local station:
AK Admin Support

Approval Engineer:
Tommi Juhani Rifaat

Notified Body
No.: **0575**

for **DNV AS**

Sverre Olav Bergli
Head of Notified Body

A U.S. Coast Guard approval number will be assigned to the equipment when the production module has been completed and will appear on the production module certificate (module D, E or F), as allowed by the "Agreement between the United States of America and the EEA EFTA states on the mutual recognition of Certificates of Conformity for Marine Equipment" signed 17 October 2005, and amended by Decision No 1/2019 dated February 22nd, 2019.

The mark of conformity may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production-surveillance module (D, E or F) of Annex B of the MED is fully complied with and controlled by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representative in accordance with Directive 2014/90/EU.
This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV AS of any changes to the approved equipment. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.
Should the specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") 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

The MNS-100E consist of the following components:

Unit	Type	Location
Processor Unit	HTC03-i5-AC-yzzzzzz or HTC03-i7-AC-yzzzzzz	Protected
Display Unit	HD27T22 MMD-MA4-FAGA	Protected
Keyboard & Trackball	NSI KSML106-MC1 Series	Protected
Network Hub	Cisco C9200L-48P-4G-E *or* HP Aruba Instant 1030 series HPE JL868A	Protected
Mini DP to DP Cable	NVIDIA PNY mini Display Port Male to Display Port Female Adapter 91008582V3	Protected
Power Cable	Hatteland TP52/TC01-1.8M	Protected
Sensor Adapter	Hatteland HT 00262 OPT-A1 (USB to 4x RS422/485)	Protected

Software version: 1.0.x where x is higher than 0
Operating system: Windows 10 Pro 64bit

Application/Limitation

- A dual installation of the designated ECDIS is found to comply with the SOLAS requirements for ECDIS with Back-up arrangements.
- ECDIS shall be installed, verified and tested on board according to MNS-100E Series Technical Manual.

Type Examination documentation

DNV No	Ref.No	Rev	Description
5	MRA000003D		Certificate: DNV, Hatteland Computers
6	MRA0000016	3	Certificate: DNV, Hatteland Monitors
36	MRA000002D	2	Certificate: DNV, Hatteland Panel Computers MRA
38	MRC-2021Lab1018001		Doc: MRC, IEC 60945 Corrosion declaration for Switch Hubs
20			Manual: MRC, MNS-100E Series Operating Manual
18			Manual: MRC, MNS-100E Series Technical Manual
23	30429	0	Report: Applica, Hatteland 61162-series Test report
37	DANAK-19/17020	-	Report: Delta, KSML 106 Keyboards and E38 Trackball unit IEC 60945 test report
31	DREKETC2208-0086		Report: DT&C, Cisco 9200L Series ECM Test report IACS E10 additional testing
30	DREKETC2208-0085		Report: DT&C, Cisco 9200L Series ECM Test report IEC 60945
32	DRCKRELC2204-0225		Report: DT&C, Cisco 9200L Series Temp and Vibration Test report IEC 60945
34	DREKETC2205-0058		Report: DT&C, HP 1930 Series ECM Test report IACS E10 additional testing
33	DREKETC2205-0057		Report: DT&C, HP 1930 Series ECM Test report IEC 60945
35	DRCKRELC2204-0226		Report: DT&C, HP 1930 Series Temp and Vibration Test report IEC 60945
10	DOC206156-1	02	Report: Hatteland IEC 62288 Flicker Test Report HD 27T22 MMD
11	DOC206417-1	0	Report: Hatteland, ECDIS & Radar Conformance Test Report HD 27T22
40	ICRT-TR-I220661-0A	1	Report: Kolas, IP 2x test report Network Switches
42	MNS-TSE-221025	1.0.0	Report: MRC, ECDIS IEC 60945 11.1 Acoustic Noise Test Report
16	MNS-TSE-002	1.0.3	Report: MRC, ECDIS IEC 61162-1 Edition 5.0 Type Approval Test Report
13	MNS-TSE-003	1.0.3	Report: MRC, ECDIS IEC 61162-2 Edition 1.0 Type Approval Test Report
15	MNS-TSE-005	1.0.2	Report: MRC, ECDIS IEC 61162-450 Edition 2.0 Type Approval Test Report
21	MNS-TSE-001	1.0.4	Report: MRC, ECDIS IEC 61174 Edition 4.0 Type Approval Test Report
19	MNS-TSE-004	1.0.5	Report: MRC, ECDIS IEC 62288 Edition 2.0 Type Approval Test Report

DNV No	Ref.No	Rev	Description
17	MNS-TSE-006	1.0.2	Report: MRC, ECDIS IEC 62923-1 Edition 1.0 Type Approval Test Report
14	MNS-TSE-007	1.0.1	Report: MRC, ECDIS IEC 62923-2 Edition 1.0 Type Approval Test Report
41	-	1	Report: MRC, ECDIS S-64 Type Approval Test Report

Tests carried out

- Performance testing, IEC 61174 (2015)
- Environmental testing, IEC 60945 (2002) incl. IEC 60945 Corr.1:2008
- Serial interface testing, IEC 61162-1 (2016)
- LAN interface testing, IEC 61162-450 (2018)
- Presentation testing, IEC 62288 (2014)
- Bridge Alert Management testing, IEC 62923-1 (2018) and IEC 62923-2 (2018)

Marking of product

The type designation and name and contact address of the manufacturer shall be affixed visibly, legibly and indelibly to the product. In addition the product shall be marked with serial number, safe distance to magnetic compass, power consumption and/or supply voltage.