DNV·GL

Certificate No:
MEDB00005BN

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

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 GL AS under the authority of the Government of Norway.

This is to certify:

That the Integrated navigation system (INS)

with type designation(s)
RAVEN INS

Issued to
Norwegian Electric Systems AS
Godvik, Norway

is found to comply with the requirements in the following Regulations/Standards:
Regulation **(EU) 2020/1170,**
item No. MED/4.59. SOLAS 74 as amended, Regulations V/15, V/18, V/19 & 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.252(83), IMO Res. MSC.302(87)

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

This Certificate is valid until **2025-09-30**.
Issued at **Høvik** on **2020-10-01**

DNV GL local station:
Høvik Electrical Systems

Approval Engineer:
Frederik Tore Elter

Notified Body
No.: **0575**

for **DNV GL AS**

Roald Vårheim
Head of Notified Body

NORWEGIAN ACCREDITATION PROD 019

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 GL 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 This certificate remains valid unless suspended, withdrawn, recalled or cancelled.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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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.

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Product description

The RAVEN Integrated Navigation System (INS) consists of Multifunction displays (MFDs) incorporating the below INS-functions and integrated via duplicated Ethernet.

INS Functions:

- Collision Avoidance (RADAR)
- Route Monitoring (ECDIS)
- Route Planning (ECDIS)
- Navigation Control data (CID)
- Alert Management (CAM)
- Status and Data Display

Options;
- Heading Control System (HCS)
- Track Control System (TCS)
- Auxiliary Operator Information Displays
- Planning Station

List of HW

MFD

Type	**Type designation**	**NES Part number**	**Note/description/limitation**	**Installation Location**
Computer	NES-COMPUTER-300	129-0010	*All applications*	Protected
with				
Monitor	HD24T22MMD or,	115-0352	*ProNav Part No: HD24T22* ***PND****-MA4-FAGA - CAT 2 and 3 RADAR only*	Protected
	HD26T22MMD or,	-	*ProNav Part No: HD26T22* ***PND****-MA4-FAGA*	
	HD27T22MMD or,	115-0353	*ProNav Part No: HD27T22* ***PND****-MA4-FAGA*	
	HD32T22MVD	115-0224	*ProNav Part No: HD32T22* ***PND****-MA4-AAGA*	
	HD55T22MVD	115-0222	*ProNav Part No: HD55T22* ***PND****-MA4-COTA*	
or				
Panel PC	HD24T22MMC or,	115-0351	*CAT 2 and 3 RADAR only*	Protected
	HD27T22MMC	115-0220		
Computer with Monitor and Panel PC with;				
Input Device	RKTE85 Keyboard or,	126-0347	*To be installed with each MFD*	Protected
	KSM103 Keyboard or,	126-0346		
	E38 Trackball Erg. or,	115-0223		
	TSX50 Trackball Flush	115-0223		
	Heading Unit	129-0011		
	Function Selection	129-0023		

INS System Components

Type	Type designation	NES Part number	Note/description/limitation	Installation Location
Central Possessing Computer	NES-COMPUTER-300	129-0010	*All applications*	Protected
	NES-COMPUTER-400	129-0016	*HCS Controller only (PoE)*	
Network Switch	MT-NetGear	129-0012	*PoE*	Protected
	Veinland 24PMagicS.	129-0025		
I/O and Interface	CMH-2370 (NQA-2443 w. NQE-1143)	129-0002 126-0108		Protected
	WAGO750 series	129-0024		
	MT-IOB2	129-0015		
	I/O Sensor Concentrator PoE	129-0013		

RADAR

Type	Type designation	NES Part number	Note/description/limitation	Installation Location
RADAR Interface	ScanStreamer MKII	126-0114	*To be installed with radar antennas*	Protected
RADAR Antennas	NQE-3167 PS/Term.	129-0014	*RADAR: Power Control unit*	Protected
	NKE-2103-6	126-0116	*RADAR: X-Band, standard 6 ft 10KW*	Exposed
	NKE-1125-9	126-0106	*RADAR: X-Band, standard 9 ft 25KW*	
	NKE-1130-12	126-0107	*RADAR: S-Band, Magnetron 12 ft 30 KW*	
	NKE-2632-8	126-0345	*RADAR: S-Band, SolidState 8ft 250W*	
	NKE-1632-12	126-0117	*RADAR: S-Band, SolidState 12 ft 250W*	
with options;	NJU-84	126-0348	*RADAR: Performance Monitor S-band*	
	NJU-85	126-0349	*RADAR: Performance Monitor X-band*	
	CFQ-6912+x	126-0294 126-0119	*RADAR: Scanner cable 10,20,30,40,50m*	
	2695110056	126-0115	*RADAR: Scanner cable 14 Core*	

Planning Station and Auxiliary display - optional configurations

Type	Type designation	NES Part number	Note/description/limitation	Installation Location
Computer	NES-COMPUTER-300	129-0010		Protected
with				
Monitor	HD24T22MMD or,	115-0352	*ProNav Part No: HD24T22 **PND**-MA4-FAGA - CAT 2 and 3 RADAR only*	Protected
	HD26T22MMD or,	-	*ProNav Part No: HD26T22 **PND**-MA4-FAGA*	
	HD27T22MMD or,	115-0353	*ProNav Part No: HD27T22 **PND**-MA4-FAGA*	
	HD32T22MVD	115-0224	*ProNav Part No: HD32T22 **PND**-MA4-AAGA*	
	HD55T22MVD	115-0222	*ProNav Part No: HD55T22 **PND**-MA4-COTA*	
	MFD 13'' Display	126-0202	*Auxiliary operator information displays only*	
or,				

Panel PC	HD24T22MMC or,	115-0351	*CAT 2 and 3 RADAR only*	
	HD27T22MMC	115-0220		
	HD13T30MMC	115-0225	*Auxiliary operator information displays only*	
Computer with Monitor and Panel PC with;				
Input Device	RKTE85 Keyboard or,	126-0347	*To be installed with each MFD*	Protected
	KSM103 Keyboard or,	126-0346		
	E38 Trackball Erg. or,	115-0223		
	TSX50 Trackball Flush	115-0223		

Note: System configuration, selected and number of components to be in accordance with installation manual for RAVEN INS and vessel carriage requirements.

Software

- INS SW: 1.0.x
- Operating System: Ubuntu 18.x LTS
- ScanStreamer MKII: Version 1.09.x
- RADAR Antennas: Version 1.x
- ECDIS: Preslib 4.0 with SDK 2.2.X

Application/Limitation

- The minimum configuration of RAVEN INS for SOLAS consists of 3 MFDs with 2 radar antennas.
- The maximum configuration 3 radar antennas connected to primary LAN A and B switches.
- The RAVERN INS shall be connected with dual sensors for position, heading and speed, according to vessel carriage requirements. Sensors shall hold a valid type approval certificate.
- The RAVEN INS shall be connected to an alarm transfer system for transfer of back-up navigator alarms, according to vessel carriage requirements.
- The MFDs shall be connected to the VDR for transfer of ECDIS and RADAR images in compliance with IEC61996-1, according to carriage requirements.
- For vessels where BAM-compliance in accordance with MSC.302(87) is required the INS CAM-HMI should be arranged as the functional HMI for the Bridge Alert Management.
- The RAVEN INS shall be installed and commissioned onboard according to manufacturer's installation instructions for INS.
- The RAVEN INS may present Chart RADAR and ECDIS Radar Overlay in accordance with applicable standards.
- For CAT1 Radar applications, the Raven INS must be delivered with monitors of size 26 inch or larger. For CAT2 and CAT3 Radar applications, the Raven INS must be delivered with monitors of size 24 inch or larger.
- HCS and TCS are tested and may be installed as integrated part of the RAVEN INS.
- The RAVEN INS may support presentation of WEB-HMI MKD on MFD's in line with ODES design guidelines, installation and presentation in accordance with WEB-HMI MKD provider specifications and requirements for installation and FAT testing.
- The RAVEN INS MFD may be configured as, and installed with optional Planning Station
- The RAVEN INS MFD may be installed with optional Auxiliary display presenting:
    - BAM alert view as an additional extension of installed INS CAM-HMI
    - Navigation Control - CID
    - Status Data - CCRS
    - HCS/TCS - UID
    - Simplified non-SOLAS radar and chart presentation

- The certificate is also valid for the INS equipment with the type designation *ProNav Premium Bridge.*

Job Id: **344.1-009312-1**
Certificate No: **MEDB00005BN**

Tests carried out

- Performance INS — IEC 61924-2 (2012)
  Including, as part of INS:
  - Heading Control HCS — ISO 11674 (2019)
  - Track Control System (TCS) — IEC 62065 (2014)
  - RADAR (inc. Chart Radar) — IEC 62388 (2013)
  - ECDIS (inc. Radar overlay) — IEC 61174 (2015)

- Environmental — IEC 60945 (2002) incl. IEC 60945 Corr. 1:2008,
- Serial Interface — IEC 61162-1 (2016)
- Serial high-speed — IEC 61162-2 (1998)
- LAN — IEC 61162-450 (2018)
- Presentation — IEC 62288 (2014)
- Bridge alert management (BAM) — IEC 62923-1 (2018), IEC 62923-2 (2018)

Type Examination documentation

DNV GL No	Document No	Rev	Title
228	NES-P201829-083-014	Rev.:1	Report: ISO11674 NES RAVEN INS TYA HCS test report (FOR REVIEW)
227	NES-P201829-129-083-15	Rev.:1	Report: IEC62065 NES RAVEN INS – Test report TCS (FOR REVIEW)
226	NES-P201829-129-083-01	Rev.:1	Report: IEC61924-2 NES RAVEN INS TYA Report
225	NES-129-010-01	Rev.: 1.0	Manual: NES RAVEN INS Installation Manual HW, Raven INS
223	NES-129-050-05	Rev.: 01	Manual: NES RAVEN INS System Manual
222	NES-129-064-01	Sept15	Manual: NES RAVEN INS FMEA
221	NES-129-050-002	ver0.98	Manual: RAVEN INS: Operator Manual
219	NES-129-050-06	Sept15	Manual: RAVEN INS Quick reference guide
218	NES-129-050-01	INS 0.9	Manual: RAVEN INS Familiarization Manual
217	NES-P201829-129-083-02	Rev:.1	Report: IEC60945 IEC62288 IEC62388 NES - RAVEN INS TYA Overview report external test reports
216	NES-P201829-129-083-014	Rev.:1	Report: IEC62923-1/-2 NES RAVEN INS BAM CAM Cover
215	NES-P201829-129-083-003	Rev.:1	Report: IEC62288 -RAVEN INS TYA IEC62288 Presentation and display test report
214	21009	Rev.: 0	Report: Applica IEC60945 HD 26T22 MMD-MA1-FAGP Technical Report 2017-21009 Maritime Rev 0
213	DOC205969-1	R01	Report: Hatteland IEC62288 flicker test report HD26T22
210	DOC102352-4	R02	Report: Hatteland Conformance test report HD 26T22 MMD-MA1-FAGA-ES_HTC02-DVI-D
207	MT_DEV-5457	0.7	Report: IEC61162-1/-2 MT-IOB2, MT-NMEA-CONVERTER, MTPoE-IOB
203	NES-P201829-129-083-08	Rev.:1	Report: IEC62388: RAVEN INS Type approval - Overview
200	DOC205967-1		Report: HD 24T22 IEC62288 flicker test report HD 24T22

DNV GL No	Document No	Rev	Title
199	DOC102352-2		Report: HD 24T22 Conformance test report HD 24T22
198	YN0709007-1		Report: NKE-2103 Chemitox test report: IEC 60945 clause 9 EMC
197	DOC206417-1	01	Report: HD 27T22 Conformance test report HD 27T22
196	DOC206156-1	02	Report: HD 27T22 IEC62288 flicker test report HD 27T22
194	YN0801001-1		Report: NKE-1129 Chemitox test report: IEC60945 Clause 9 & 10 EMC
193	TAA00002K2		Certificate: Wago I/O 750
192	TA0000249		Certificate: DC power supply, Phoenix Quint
191	MRA0000006	Rev. 1	Certificate: Hatteland Display HD13T21
182	PDF203166-1		Report: IEC 60945 -HD VED SX2-G1 + HD 32T22 MVD-MA1-AOGP Technical Report 2017-21172 Maritime Rev.0
181	PDF202139-1		Report: IEC 60945 - HD 32T22 MVD-MA1-AAGP Technical Report 2017-20931 Maritime Rev 1
178	DOC206291-1	R01	Report: IEC62288 Hatteland: Conformance test report HD43T22 MVD
177	DOC206291-1	R01	Report: IEC62288 Hatteland: Minimum brightness test of TDC
175	MRA000002D		Certificate: Hatteland Computers and Programmable Logic Controllers Series E MMC Standard, Series E MMC Compact
168	NES-P201829-129-083-11	Rev.:1	Report: NES RAVEN INS IEC62388 RADAR TYA Part 3: Aids for collision avoidance
163	NES-P201829-083-04		Report: IEC61162-1 RAVEN INS TYA Report Interfaces
161	NES-P201829-083-04		Report: IEC61162-1 RAVEN INS Type Approval report IEC61162-1 Digital interfaces: Single talker, multiple listeners
153	NES-P201829-129-083-05		Report: RAVEN INS Test report IEC61162-450 Interfaces: Ethernet (LWE) ed. 1 and ed2.
146	NES-P201829-129-083-07		Report: RAVEN INS TYA Report IEC61174 ECDIS IHO S-64 appendix
145	NES-P201829-129-083-06		Report: RAVEN INS TYA Report IEC61174 ECDIS GLO sign rev1
144	NES-P201829-129-083-11		Report: RAVEN INS IEC62388 RADAR Part2 CCRP Own ship rev1
143	NES-P201829-129-083-13		Report: RAVEN INS 62388 RADAR report part 5 GLO sign
142	NES-P201829-129-083-09		Report: RAVEN INS IEC62388 RADAR TYA Report Part 1 GLO SIGNED
141	NES-P201829-129-083-12		Report: RAVEN INS Type approval report IEC62388 RADAR Part 4 Chart radar March 2020 GLO SIGN rev1
140	TL18136	2019-06-25	Report: IEC60945 EMC, MS Testing, Cursor Controls Silicone Rubber Keyboard with Ergonomic Trackball
137	TAA00001BV	Rev-0	Certificate: TAA00001BV - Ethernet Switch
134	119-29851-1	Rev-1	Report: FORCE - IEC60945: Test for marine type approval of RKTE85 - NSI bvba
124	DANAK-1918561 / 117-22712		Report: Delta, IEC60945, NSI Keyboards; KFT104S0001-G-MC1, E38-76A31Dm E38-79A19F-M012, TBE38F0-001-MC1, E38-76A11D
123	20113167200		Report: Telefication, IEC60945 - NSI Laser Trackball TSY50YZ-XXXX-MCW

DNV GL No	Document No	Rev	Title
121	DANAK 1914318 / T208006-7	Rev A	Report: Delta, IEC60945, Backlighted keyboard NSI bvba KSM103B0001-WED-MC1
120	20133319200	rev1.0	Report: Telefication, IEC60945, Backlight keyboard NSI KSMX106Ybbbb-Z(ED)-MC1
119	QinetiQ/14/01527	1.3	Report: QINETIQ IEC62388 NKE-1632: Unwanted emission measurements
118	QinetiQ/14/01531	1.1	Report: QINETIQ IEC62388 NKE-2632-H: Unwanted emission measurements
117	QinetiQ/14/01532	1.2	Report: QINETIQ IEC62388 NKE-2632: Unwanted emission measurements
116	QinetiQ/14/00249	1.1	Report: QINETIQ IEC62388 NKE-2632-H: Unwanted emission measurements
115	RGC R7006		Report: QINETIQ IEC62388 NKE-2103: wind tunnel test
114	RGC R7003		Report: QINETIQ IEC62388 NKE-1125: wind tunnel test
113	YN0801004-1		Report: NKE-1130 Chemitox test report: IEC60945 Clause 10 EMC
112	YN0712002-1		Report: NKE-1130 Chemitox test report: IEC60945 Clause 9 EMC
111	YN0708005-12		Report: NKE-2103 Chemitox test report: IEC60945 Clause 10 EMC
110	YN0709007-11		Report: NKE-2103 Chemitox test report: IEC60945 Clause 10 EMC
109	YN0708005-1		Report: Chemitox test report: IEC60945 Clause 9 EMC
105	QINETIQ/EMEA/TS/CR0803478/2	February 2008	Report: QINETIQ, Frequency Analysis JRC(S)200 (X)200 (X)201
104	75923142 Report 01	Issue 3	Report: TUV IEC60945, NKE-1130 and AUX EQUIPMENT
98	75923142 Report 05	Issue 3	Report: TUV IEC60945, IEC62388: SSD SCANNERS NKE-2632 NKE-1632
96	QinetiQ/MS/EES/TSTR0800603/1		Report: QINETIQ IEC62388; NJU-84/-85 /NQE-3141 Performance compliance testing on JRC JMA 5300, 7100 & 9100 Series Radars
93	DOC206168-1	R02	Report: HD 55T22 HD 55T22 MVD ECDIS Compliance Statement
92	DOC205984-1		Report: HD 55T22 Conformance test report HD 55T22 MVD-AA1-TOGP_HTC02-DP
91	DOC205971-1		Report: HD 55T22 IEC62288 flicker test report HD55T22
88	DOC205992-1		Report: HD 32T22 Conformance test report HD 32T22 MVD-MA1-AOGP_HTC02-DP
87	DOC205970-1		Report: HD 32T22 IEC62288 flicker test report HD32T22
84	DOC206372-1	R01	Report: HD 27T22 Conformance test report HD 27T22 MMC-M82-4GM110-ES
83	DOC206371-1	R01	Report: HD 27T22 IEC62288 flicker test report HD 27T22 MM
81	DOC206364-1	R01	Report: HD24T22 IEC62288 flicker test report HD 24T22 MMC
79	DOC206335-1	R02	Report: HD24T22 Conformance test report HD 24T22 MMC-M82-4GP186-ES
78	DOC205958-1	rev 5	Report: HD24T22 Minimum brightness test of GDCX
76	DOC207334-1	R02	Report: 08T30 and 13T30 Minimum brightness test of buttons and status indicators
75	DOC207094-1	R02	Report: IEC62288 Ed. 2.0 Display Test HD 13T30 MMC
74	DOC207092-1	R02	Report: IEC62288 flicker test report HD 13T30 MMC

DNV GL No	Document No	Rev	Title
73	75923142		Report: NKE-2632/-1632 : TUV testing IEC60945 & IEC62388
72	Z071C-13420		Report: TUV Scanner NKE-2632/1632- TUV IEC60945(EMC)test report
71	75924011		Report: Scanner NKE-2632/NKE-1129 : TUV IEC62388 test report
70	75901288 rep.03	1	Report: TUV IEC60945 test report - RADAR scanner NKE-1130
69	75901288 rep.02	1	Report: TUV IEC60945 test report - RADAR scanner NKE-1125
68	75901288 rep.01	1	Report: TUV IEC60945 test report - RADAR (Env.)
50	141011F		Report: TesLab, IEC 60945 - NETGEAR GS728TP
49	133040F-G		Report: TesLab, IEC 60945 - MT-PoE-IO-BOARD ASSY Module
48	147124F		Report: TesLab, IEC 60945 - MT-IOB-MK2
47	17A284F		Report: TesLab, IEC 60945 - MT-400 computer
46	17A283F		Report: TesLab, IEC 60945 - MT-300 computer
45	147126F		Report: TesLab, IEC 60945 - MT-4BUTTON-PANEL
42	TL18008	ISSUE 2	Report: MS Testing, IEC 60945, DSPNOR - ScanStreamer MK II
29	TAA000000B	Rev. 3	Certificate: DNV GL, IEC 60945 - Marine technologies - BridgeMate Hardware Platform
28	BABT-MED000060	Issue 06	Certificate: TüV, MED-B - JMR-9200 Series Radar Systems
26	MRA0000016	2	Certificate: DNV GL, IEC 60945 - Hatteland Displays - Monitors and Terminals - Series X G2 Marine Displays
25	MRA0000014	Rev. 1	Certificate: DNV GL, IEC 60945 - Hatteland Displays - Series X G2 Marine Multi Computer

Marking of product

The type designation and name and contact address of the manufacturer shall be affixed visibly, legibly and indelibly to at least one part of the product. In addition the various 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.