DNV·GL

Certificate No:
MEDB0000743

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED). This Certificate is issued by DNV GL SE based on the notification of the Federal Maritime and Hydrographic Agency of Germany.

This is to certify:

That the Rudder angle indicator

with type designation(s)
EAD 72x72..., EAD 96x96... and EAD 144x144..., EAD 192x192..., EAD 181x143..., EA 72x72.2, EA 96x96.2 ... and EA 144x144.2...

Issued to
Dr. E. Horn GmbH & Co. KG
Gärtringen, Baden-Württemberg, Germany

is found to comply with the requirements in the following Regulations/Standards:
Regulation **(EU) 2020/1170,**
item No. MED/4.20. SOLAS 74 as amended, Regulations 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.302(87)

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

This Certificate is valid until **2025-12-22**.
Issued at **Hamburg** on **2020-12-23**

DNV GL local station:
Augsburg

Approval Engineer:
Jörg Rebel

Notified Body
No.: **0098**

for **DNV GL SE**

Christine Mydlak-Roeder
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 European Community and the United States of America on Mutual Recognition of Certificates of Conformity for Marine Equipment", signed February 27th, 2004, and amended by Decision No 1/2018 dated February 18th, 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 GL SE 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 This certificate remains valid unless suspended, withdrawn, recalled or cancelled.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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Job Id: **344.1-011089-1**
Certificate No: **MEDB0000743**

Product description

The rudder angle indicator system comprises the receivers EAD or EA with the transmitters EGD50.

The rudder angle indicators type EAD *dimension* with stepping motor drives have following specification:

Dimension [mm]	72x72, 96x96, 144x144, 192x192, 181x143
Protection degree (front side)	IP 68/IP 69K
(back side)	IP 20 (sealed housing) or IP 68/IP 69K (connection box)
Input signal	0 – 10 V DC or ±10 V DC or 0/4 – 20 mA or CANopen
Output signal for CAN-input signal	4 – 20 mA
Rotation range	270° or 360°
Stepping motor	2400 steps per rotation range
Power supply	18 – 36 V DC (approx. 50 mA)
Software version	EADcomCan v1.10

Additional variants:
1. EAD 150… with circular housing (130 mm ∅) and
2. EAD 360… for ceiling mounting with panoramic indication (360° rotation range and 5° graduation)

The rudder angle indicators type EA *dimension* with moving coil mechanism have following specification:

Dimension [mm]	72x72, 96x96, 144x144
Protection degree (housing)	IP 54 (144x144: IP 52)
Input signal	0 – 10 V DC or ±10 V DC or 0/4 – 20 mA
Power supply (Scale illumination)	24 V DC (0 – 36 V DC; 144x144: also 115 V AC or 230 V AC)

The rudder angle transmitters EGD50… are absolute encoders and have following specification:

Variants	EGD50.5X: single encoder; EGD50.7X: double encoder
Protection degree (housing)	IP 67
(shaft inlet)	IP 65
Output signal	4 – 20 mA or CANopen
Rotation range	360°
Power supply	24 V DC (19.2 – 30 V DC)
Power consumption	2 W
Firmware version	EGD50x.300, EGD50xS.300, EGD50xK.300, EGD50xSK.300

Application/Limitation

None

Tests carried out

- Environmental and EMC testing: IEC 60945 (2002) incl. Corrigendum 1 (2008)
- Presentation testing: IEC 62288 (2014)
- Performance testing: ISO 20673 (2007)

Note: The above described indicators do not issue alerts, hence, testing according to IEC 62923-1/-2 is deemed as not being applicable.
They also have no interfaces according to IEC 61162 series, thus, testing according to IEC 61162 series is deemed as not being applicable, as well.

Type Examination documentation

DNV GL No	Document No	Rev.	Description
17	-	3.00 (2015-12-07)	Manual: Single turn rotary encoder CANopen type EGD50.XX - Instruction manual and data sheet
16	DK 002634	3 (2019-01-31)	Manual: Tacho-Indicator Form B rectangular type EA
15	DK 002632	3 (2019-01-31)	Manual: Tacho-Indicator Form B rectangular type EA with changeable scale
14	-	2012-02-09	Manual: EAD software EADcomCan v1.10 - Description of CAN communication
13	DK 002630	6 (2020-08-24)	Manual: Analogue display unit type EAD with stepping motor drive
12	202012/1	2020-12-23	Report: Dr. E. Horn, Performance tests for EAD, EA and EGD acc. to ISO 20673, ISO 22554 and ISO 22555
11			Material declaration: Dr. E. Horn, for EAD, EA and EGD according to IEC60945, 8.12.1
10	817		Certificate: BSH, Compass Safe Distance test for EAD
9	655		Certificate: BSH, Compass Safe Distance test for EA
8	U201998E1		Report: Phoenix, Environmental tests for EAD and EGD according to IEC 60945, 8.2 to 8.4 and 8.7
7	E201998E1	2020-12-15	Report: Phoenix, EMC tests for EAD and EGD acc. to IEC60945, 10.3 and 10.4 and to DNVGL-CG-0339 (2019), Sec.3 [4,5,14.4]
6	E200589E2	2020-05-06	Report: Phoenix, EMC delta tests for EAD and EGD acc. to DNVGL-CG-0339 (2019), Sec. 3 [14.8 and 14.11]
5	U131013E1	2013-05-16	Report: Phoenix, Environmental tests for housing GHG00871 acc. to IEC 60945, 8.8 and 8.12
4	U62421	2006-12-06	Report: Phoenix, Environmental tests for EAD acc. to GL rules 2003, VI - Pt.7 Ch. 2 Sec.3.B [7,9,13,] and to IEC 60529
3	U51365	2005-08-30	Report: Phoenix, Environmental tests for EGD acc. to GL rules 2003, VI - Pt.7 Ch. 2 Sec.3.B [5-7,9,13,14]
2	E51365	2005-08-16	Report: Phoenix, EMC tests for EGD acc. to GL rules 2003, VI - Pt.7 Ch. 2 Sec.3.B [3,4,15-22]
1	E90515	2000-07-28	Report: Phoenix, EMC tests for EAD acc. to GL rules 1997, VI - Pt.7 Ch. 2 Sec.3.B [3,4,15-22]

Marking of product

According to IEC 60945, Sect.4.9:

The product to be marked with following information, where practicable:

- Identification of the manufacturer,
- Equipment type number or model identification under which it was type tested,
- Serial number of the unit,
- Compass safe distance.

Alternatively, the marking may be presented on a display at equipment start-up, and in case of fixed equipment compass safe distance may be given in the equipment manual.

END OF CERTIFICATE