

# TYPE APPROVAL CERTIFICATE

**This is to certify:****That the Signaling Device**

with type designation(s)

**Electronic indicators with stepping motor drive system for indication of Thrust; Pitch; Rudder Angle; RPM; Power Factor; Pressure and Temperature**

Issued to

**Dr. E. Horn GmbH & Co. KG**  
**Schönaich Baden-Württemberg, Germany**

is found to comply with

**DNV GL rules for classification – Ships****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Temperature B****Humidity B****Vibration A****EMC A****Enclosure Required protection according to the Rules shall be provided upon installation on board.**Issued at **Hamburg** on **2017-09-27**This Certificate is valid until **2022-09-26**.for **DNV GL**DNV GL local station: **Augsburg**Approval Engineer: **Andrea Grün**

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**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.



## Product description

System for indication of Thrust; Pitch; Rudder Angle; RPM; Power Factor; Pressure; Temperature and other Values

Electronic indicators with stepping motor drive system for indication of Thrust; Pitch; Rudder Angle; RPM; Power Factor; Pressure and Temperature

Type:

EAD 181x143, EAD 96x96 ... and EAD 144x144...

EAD 72x72 to 192 x 192 and 3phase EAD360

CPU : 80C505 CA 12/16 MHz; CY8C27443; T89C51CC01

Rated Voltage : 24 V DC

Input : CAN, 0...10 V; 0... +/-10 V; 0/4...20 mA; 4-12-20 mA,  
cosinus / sinus poti

Software CAN:

- EADCAN V2.26 (80C505) and 2.54(T89C51CC01)
- EADCANGRD.101
- EADCANMULTI.101
- EADCANMULTI-J1939.100
- EADcom.....110
- EADcomNOCANS.102
- Software 0...10V and 0/4...20mA : EAD20MA V2.32 (80C505)
- Software 0...10V and 0/4...20MA : EADLC\_2P V1.00 (CY8C27443)
- Software 0 ...+/- 10V and 4-12-20MA : EAD20MA V2.32 (80C505)
- Software 0 ...+/- 10V : EADLC\_3PST V1.00 (CY8C27443)
- Software 4-12-20MA : EADLC\_3PBR V1.00 (CY8C27443)
- Software cosinus / sinus Poti EAD pot 2.12
- Software 0 ...+/- 10V : EADLC\_3PST V1.01 (CY8C27443)
- Software 4-12-20MA : EADLC\_3PBR V1.01 (CY8C27443)

Type designation : EAD 72x72 ... x - yy uuu v w z

Type Key : Type EAD  
Size : 72x72; 96x96; 144x144; 181x143, 192x192; 100; 150; 188; 230 and 360  
Scale type sl-W : scale change; 1 for IP56 front; without a mark IP 69K/IP68  
Model S x : 2 for pitch; 3 for thrust indication; 4 for rudder angle; 5 for RPM  
/ Power factor  
6 for multi funktion 1x7 segment; 7 for multi funktion 2x7 segments  
Model yy : Special type scale; customised model for scale and degree of protection  
Scale model uuu : for example 0 ... 100%  
Input signal v : A for 4-20 mA; B for 0...10 V DC; C for 0 ... +/- 10 V DC; D for 0 ... 6 V DC  
E for CAN; F for Poti; G for CAN, 2x4-20 mA  
Output signal w : 0 for "no signal"; A for 4-20 mA; B for CAN  
Scale colour z : A for black/Yellow; B for black/white; C for black/green-red

## 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 Rules for Ships/Offshore Standards Pt.4 Ch.9 Control and Monitoring Systems.

## Clause for application software control

All changes in software are to be recorded if the system is in use on board. The records of all changes are to be forwarded to DNV GL for evaluation and approval. Major changes in the software are to be approved before being installed in the computer.

## Type Approval documentation

Test reports:

- EAD \_ LOTR-DNVGL\_TAA00001EG\_20170925\_Rev01 dated 25-09-2017

Technical Documentation:

- EAD \_ LOTD-DNVGL\_TAA00001EG\_20170925\_Rev01 dated 25-09-2017

## Tests carried out

Applicable tests according to Class Guideline DNVGL-CG-0339, November 2016.

## Marking of product

The products to be marked with:

- manufacturer name
- model 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 after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE