



Certificate no.:
TAA00003E1

TYPE APPROVAL CERTIFICATE

This is to certify:

that the **Personal Computer**

with type designation(s)
NEURO-01-01-05-05-01-00-01

issued to

DeepSea Technologies
Athens, Greece

is found to comply with

DNV rules for classification – Ships

Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Temperature	B
Humidity	A
Vibration	A
EMC	B
Enclosure	A

Issued at **Høvik** on **2024-04-24**

This Certificate is valid until **2029-04-23**.

for **DNV**

DNV local unit: **Piraeus**

Approval Engineer: **Roger Lauritsen**

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.

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 NEURO-AA-BB-CC-DD-EE-FF-GG-HH model description consist of following

Variable	Description	Type	Enumeration
AA	Power Supply	Numeric	01 (24VDC, 15W*)
BB	Case specification	Numeric	01 (IP20, TAKACHI model EXHFE 19-6-18SS)
CC	PCB layout	Numeric	05 (PCB layout version 5)
DD	PCB scematics	Numeric	05 (PCB schematics version 5)
EE	Compute module specification	Numeric	01 (Rasberry Pi CM4)
FF	Network components	Numeric	01 (Gigabit Ethernet, RJ45)
GG	Internal extensions type	Numeric	00 (No extensions)
HH	Input/output connections	Numeric	01 (6 serial ports, 2 USB and 1 HDMI)

Compass safe distance: Standard compass: 24 cm
Steering compass: 18 cm

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, 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 rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Product certificate

If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After certification the clause for software control will be put into force.

Software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Type Approval documentation

DNV No	Doc Ref.	Rev.	Description
6	10070	06.12.2023	Report: NTUA HV Lab, EMC tests
7	LAB1682SCD		Report: EMC HELLAS, Compass safe distance
8	504706	00	Report: HEEQAC, Environmental tests
9		9.0	Report: DeepSea, Neuro Hardware Test Procedure and Report of Hardware

Tests carried out

Applicable tests according to DNV-CG-0339, August 2021.

Applicable tests according to IACS Unified Requirements E10, Rev.8.

Applicable serial interface tests according to IEC 61162-1 (2016)

Compass safe distance' were measured according to sections 11.1 and 11.2 of IEC 60945, (2002).

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings
- compass safe distance

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.