

**TYPE APPROVAL CERTIFICATE****This is to certify:****That the Signaling Device**with type designation(s)  
**PAM-199-P**

Issued to

**W.E.St. Elektronik GmbH**  
**Niederkrüchten, Germany**

is found to comply with

**DNV GL rules for classification – Ships, offshore units, and high speed and light craft****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Location classes:****Temperature B****Humidity B****Vibration A****EMC B****Enclosure Required protection according to the Rules shall be provided upon installation on board.**Issued at **Hamburg** on **2020-05-12**for **DNV GL**This Certificate is valid until **2025-05-11**.DNV GL local station: **Essen**Approval Engineer: **Heinz Scheffler****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.

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.



## Product description

The PAM-199-P is a Power amplifier for proportional directional, pressure or throttle valves with analog command signal input.

### Technical Data:

Power supply: 12V / 30 VDC (incl. Ripple)

- Power consumption max.: 60W
- External protection: 3 A medium time lag
- Inputs: digital, analogue (-10V to +10V or 4mA to 20mA)
- Outputs: digital, nominal PWM output current (0 to 2600 mA- broken wire monitored and short circuit proofed, PWM frequency (61 to 2604 Hz adjustable in steps)

### General function:

- Command 195: Functionality for directional valves with two solenoids and analogue input signals
- Command 196: Functionality for two pressure/throttle valves with analogue input signals
- Command 197: Functionality for directional, pressure and throttle valves with pre-programmed values, selectable by digital inputs.

## 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 Pt.4 Ch.9 Control and Monitoring Systems.

## Type Approval documentation

Test Report:051-20, dated 2020-04-21

Documents: Project\_File\_PAM-199-P\_GL\_2019; Technical Documentation PAM-199-P dated 04-12-2019

## Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, December 2019.

## Marking of product

The products to be marked with:

- Model name
- Manufacturer 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



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- 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