Certificate No:
TAA0000393

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Cylinder Monitoring System

with type designation(s)
E²PRECON-B10

Issued to
AVAT Automation GmbH
Tübingen, Baden-Württemberg, Germany

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.

Location classes:

Temperature	**D**
Humidity	**B**
Vibration	**B**
EMC	**A**
Enclosure	**B (IP65)**

Issued at **Hamburg** on **2023-03-09**
This Certificate is valid until **2028-03-08**.
DNV local unit: **Augsburg**

Approval Engineer: **Holger Jansen**

for **DNV**

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 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

E²PRECON-B10
Measurement of cylinder pressure signals, calculation of combustion characteristics

Sensors:	up to 10 x cylinder pressure, 4..20 mA
	up to 2 x speed/timing signals (active or passive)
Interfaces:	CAN SAE-J1939 or CANopen, USB-C or Ethernet for service tool
Power supply:	24Vdc, 24 W

Software version: xxP13y (xx - Customer designation, y – minor changes)

Application/Limitation

The following documentation of the actual application is to be submitted for approval in each case:
- Reference to this Type Approval Certificate
- System block diagram
- Power supply arrangement (may be part of the System block diagram)
- Test program for certification - Software version used in the specific delivery

The Type Approval covers hardware listed under Product Description and software design principles. Suitability of the detecting characteristics for the individual engine type needs aligned with the respective engine maker.

When the software is revised (affecting all future deliveries) DNV is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have to be renewed to identify the new software version.

Product certificate
Each delivery of the application system is to be certified according to Pt.4, Ch.9, Sec.1. The certification test is to be performed at the manufacturer of the application system, preferably at the engine maker performing the integration test as referenced in Pt.4, Ch.3, Sec.1. After the certification the clause for application software control will be put into force.

Type Approval documentation

Tests carried out

Applicable tests according to DNV Class Guideline CG0339, August 2021.
System test performed at AVAT Automation GmbH, Tübingen, Germany, dated 2022-08-09.

Marking of product

The products to be marked with:
- Manufacturer AVAT Automation GmbH
- Serial number
- Part No.

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