

**EUROPEAN UNION RECOGNISED
ORGANISATION (EU RO) MUTUAL
RECOGNITION TYPE APPROVAL
CERTIFICATE**

Certificate No:
MRA000001R
Revision No:
1

In accordance with Article 10.1 of EU Regulation 391/2009

This Certificate is issued to
PSM Instrumentation Ltd
Haywards Heath, West Sussex, United Kingdom

for
Pressure Gauges/Transmitters

with type designation(s)
APT 500 series analogue pressure and level transmitters

The product is found to comply with
EU RO Mutual Recognition Technical Requirements for Pressure Gauges – Transmitters

Intended service
Pressure transmitters for use in control, alarm, monitoring and instrumentation systems subject to classification, including ballast, cargo, and service tank gauging.

Temperature [°C]: -35°C and 90°C
Vibration: ±1 mm / 0.7 g
EMC: All locations including bridge and open deck
IP Code: APT 500D/1000D: IP65, APT 500S/1000S: IP68 (50 m)

This is to certify:

that the Product referred to herein has been inspected for the Manufacturer, pursuant to the relevant requirements of the European Union Recognised Organisation Mutual Recognition procedure, required by Article 10.1 of EU Regulation 391/2009, and has been found in accordance with those requirements.

This Certificate is valid until **2023-02-27**.

Issued at **Høvik** on **2019-06-20**

DNV GL local station: **Southampton**

for **DNV GL**

Approval Engineer: **Ståle Sneen**

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Trond Sjøvåg
Head of Section

When a product is presented with this EU RO MR Type Approval Certificate for given application, its acceptability with regards to the limitations stated in the certificate conditions defined in 1b, 1c and 1d of the applied Technical Requirement will be evaluated by the EU RO in charge of classing the ship or being in charge of the unit/system certification.
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.



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Product description

APT 500 series analogue pressure transmitter and APT 1000 series dual mode 4-20 mA and RS485 Modbus intelligent transmitter for pressure and level gauging applications.

Fully submersible construction may be mounted internal or external to tank:

- APT 500S/1000S – submersible with cable – IP68 suitable for continuous immersion
- APT 500D/1000D – with DIN plug 43650 – IP65 suitable for mounting external to tank

Technical specifications:

| | |
|-----------------------------------|---|
| Materials Sensor Body | 316L, Titanium, or Hastelloy C276 |
| Materials Diaphragm | 316L, Titanium, or Tantalum |
| Standard Measurement Ranges (Bar) | -1.0, -0.35, -0.2, 0.2 0.35. 1.0, 2.5, 4.0, 6.0, 10, 16, 25, 40, 60 |
| Measurement Type | Vented Gauge or Absolute |
| Overload | 2 x Nominal Range |
| Span accuracy | ±0.1% within compensated range |
| Zero accuracy | ±0.1% within compensated range |
| Total error band APT 500 | ±0.2% of Nominal Range |
| Total error band APT 1000 | ±0.1% of Nominal Range |
| Thermal compensation | No thermal effect within range 0°C to 70°C |
| Long term stability | Error not exceeding ±0.1% per annum |
| Max / Min process temperature | -35°C to 85°C Continuous |
| IECEX certification | Refer to manufacturer for valid certification |
| ATEX | Refer to manufacturer for valid certification |
| Signal Output APT 500 | 4-20 mA / 2 wire loop powered |
| Signal Output APT 1000 | 4-20 mA / 2 wire loop powered & RS485 Modbus RTU |
| Power Supply | 10-30 Vdc |
| Maximum load | Supply dependant. $(V_s - 10) / 0.02 = \text{Load in Ohms}$ |
| Firmware version APT 500 | 1.0 |
| Firmware version APT 1000 | 1.0 |

Manufactured by

PSM Instrumentation Ltd,
Unit 3, Burrell Road, Haywards Heath,
West Sussex, RH16 1TW, United Kingdom

Application/Limitation

The pressure transmitter shall be powered by the 4-20 mA loop by an instrument power supply.

Type Approval documentation

| Name | Number | Rev. / Date |
|---|---------------|-----------------|
| Documentation for APT 500/common: | | |
| APT 500 Data sheet | DAT54 | B |
| APT 500 Installation operation & maintenance instruction manual | Man 085 | A / 2018-02-09 |
| APT Outline drawing | P19000-APT-GA | A / 2017-06-31 |
| APT Exploded drawing | P19001-APT-GA | A / 2017-06-31 |
| APT 500 Series block diagram | P19025-APT-DT | A / 2017-08-20 |
| Cable drawing | 700054734 | 00 / 2014-01-04 |
| TPS 120 (FR) material specification | MI_R120_04 | 2013-09-12 |
| TPS 130 material specification | MI_R_04 | 2013-09-12 |
| Test report overview | AP02801 | - |
| Witnessed testing (visual inspection, performance, power supply variation) | AP02802 | 2017-10-12 |
| Test report (200% static pressure and performance) | AP02805 | 2017-10-09 |

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| Name | Number | Rev. / Date |
|--|-----------------|--------------------|
| Test report (IPX8 50 m for 24 hours) | N70157429A | 2017-10-09 |
| Test report (climatic) | TL17081 | 1 / 2017-07-31 |
| Test report (environmental) | TL17118 | 1 / 2017-10-19 |
| EMC Test report | 17J462 CR | 1 / 2018-01-29 |
| Additional documentation for APT 1000: | | |
| APT 1000 Data sheet | DAT57 | A / 2019-02-04 |
| APT 1000 Installation operation & maintenance instruction manual | Man 087 | A / 2019-05 |
| APT 1000 Submersible Transmitter G1/2" Male Process Connection | S-001473-APT-DD | A / 2019-05-03 |
| APT 1000 Flange Transmitter | S-001474-APT-DD | A / 2019-05-03 |
| Witnessed testing (visual inspection, performance, 150% static pressure, power supply variation, power supply failure) | AP02850 | 2019-05-17 |
| EMC Test report | 1099 CR | 1 / 2019-04-08 |
| EU RO MR TA PQA Scheme periodical assessment checklist | - | 2019-05-20 |

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings

Other conditions

The pressure transmitters have been verified for compliance with EU Mutual Recognition Technical Requirements for Pressure gauges – transmitters version 0.0, dated 2016-07-01.

| | |
|--|-------------------------|
| Environmental test parameters | DNV GL location classes |
| Temperature: -35°C ~ +90°C | D |
| Vibration: ±1.0 mm / 0.7 g | A |
| Humidity: 95%RH @ 55°C, damp heat cyclic | B |
| EMC: All locations including bridge and open deck | B |
| Enclosure: IP65 – when delivered with DIN plug 43650 | B |
| IP68 (50 m, 24 hours) – when delivered with cable (IP-ratings according to IEC 60529) | D |

The technical requirements do not specify any special design requirements for the cable. The vented gauge transmitters are delivered with an integrated special cable (Habia Cable R 2019 STR 2x2 + Vent Tube) that has been reviewed and found to comply with DNV GL rules for classification of ships Pt.4 Ch.8 Sec.9.

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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 will be performed annually and at renewal of the certificate.

END OF CERTIFICATE