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

Certificate No:
MRA000004X

In accordance with Article 10.1 of EU Regulation 391/2009

This Certificate is issued to

ILSUNG MEASUREMENT CO., LTD.

Busan, **Korea, Republic of**

for
Flow Switches

with type designation(s)
Servo Oil Flow Sensor, P.C.O Flow Sensor

The product is found to comply with
EU RO Mutual Recognition Technical Requirements for Flow Switches

Intended service
Flow switches for control, monitoring, alarm, and safety functions subject to classification.

Type:	Temperature [°C]:	Vibration:	EMC:	IP Code:
Servo Oil Flow Sensor	5°C ~ 70°C	±1.6 mm / 4.0 g	General power distribution zone	IP67
P.C.O Flow Sensor	5°C ~ 70°C	±1.6 mm / 4.0 g	General power distribution zone	IP67

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 **2030-01-26**.

Issued at **Høvik** on **2025-01-27**

DNV local unit: **Busan, CMC Korea**

for **DNV**

Approval Engineer: **Nikolai Arntzen**

Frederik Tore Elter
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

Operating principle:
Two temperature elements are positioned in the oil flow path. Generally, the distance between these two elements remains constant. One element is in direct contact with the oil, while the other is exposed to materials that are not in contact with the oil, serving as a temperature reference. When oil flows, the contact element measures a higher temperature because the heat transfer between the oil and the element increases. The flow or non-flow of the oil is monitored by measuring the temperature difference, which correlates with the oil flow rate.

P.C.O flow sensor:
Flow monitoring of piston cooling oil

Media:	Gases, Oil, Water
Operating:	24[Vdc]±15%
Max current rating:	100[mA]
Current consumption:	<80[mA]
Working temperature:	0~85[°C]
Ingress Protection:	IP67
Control output:	PNP Open Collector Output Model
Connection:	M12 Connector
Process Connection:	PF1/2 or Others
Yard Supply Option:	Surge Clamp <1000A, External Type, ZNR/ERZ-V14D270

Servo Oil flow sensor:
Flow monitoring of servo oil

Media:	Gases, Oil, Water
Operating:	24[Vdc]±15%
Max current rating:	80[mA]
Current consumption:	50[mA]
Calibration:	Switch Point = 13 L / min. * *In 29 mm Inner Diameter Pipe and System Oil as Liquid
Working temperature:	0~85[°C]
Ingress Protection:	IP67
Control output:	PNP Open Collector Output Model
Connection:	M12 Connector
Process Connection:	1/4“ NPT or Others
Yard Supply Option:	Surge Clamp <1000A, External Type, ZNR/ERZ-V14D270

Manufactured by

Ilsung Measurement Co., Ltd.
65-1, Jwadong-ro, Haeundae-gu,
Busan, Korea

Application/Limitation

The Type Approval covers all hardware listed under Product description.
The flow switches are intended for use in control, monitoring, alarm and safety systems subject to classification.

Technical installation and maintenance manual to be provided for each delivery.

Limitation according valid and amended EU RO MR Group technical requirements to be observed.

Type Approval documentation

Marking of product

The products to be marked with:
- manufacturer name
- model name
- serial number
- power supply ratings
- IP ratings
- operating temperature

Other Conditions

The flow switches have been verified for compliance with EU Mutual Recognition Technical Requirements for Flow Switches version 0.2 dated 2024-07-01.

Applicable tests according to IACS Unified Requirements E10 rev. 10 have been verified.

Environmental test parameters		DNV location classes
Temperature:	5°C and 70°C	B
Vibration:	±1.6 mm / 4.0 g	B
Humidity:	95%RH @ 55°C, damp heat cyclic	B
EMC:	General power distribution zone	A
Enclosure:	IP67 (IP-ratings according to IEC 60529)	B

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

Generic Statement for EU RO MR Type Approval Certificate

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.

In accordance with Article 10 of Regulation (EC) No 391/2009 of the European Parliament and of the Council of 23 April 2009 "on common rules and standards for ship inspection and survey organizations", the following organizations, recognized by the EU on this date, have agreed on the technical and procedural conditions under which they will mutually recognize this certificate:

- American Bureau of Shipping (ABS);
- Bureau Veritas (BV);
- China Classification Society (CCS);
- Croatian Register of Shipping (CRS);
- DNV;
- Indian Register of Shipping (IRS);
- Korean Register (KR);
- Lloyd's Register Group Ltd. (LR);
- Nippon Kaiji Kyokai General Incorporated Foundation (ClassNK);
- Polish Register of Shipping (PRS);
- RINA Services S.p.A. (RINA);

The scheme for the mutual recognition of class certificates for materials, equipment and components laid down by Article 10(1) of Regulation (EC) No 391/2009 is only enforceable within the Union in respect of ships flying the flag of a Member State. As far as foreign vessels are concerned, the acceptance of relevant certificates remains at the discretion of relevant non-EU flag States in the exercise of their exclusive jurisdiction, notably under the United Nations Convention on the Law of the Sea (UNCLOS). (In accordance with COMMISSION IMPLEMENTING REGULATION (EU) No 1355/2014 amending Regulation (EC) No 391/2009 - recital (25)).