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

Certificate No:
MRA000004V

In accordance with Article 10.1 of EU Regulation 391/2009

This Certificate is issued to

Shanghai KSR-Kuebler Automation Insturment Co., Ltd.

SHANGHAI, **China**

for
Level Switches

with type designation(s)
TLS-S-series tuning fork level switch

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

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

Temperature [°C]:	**-25°C to 70°C**
Vibration:	**± 1.0 mm/0.7 g**
EMC:	**For equipment installed in the general power distribution zone**
IP Code:	**IP66/68 (10 minutes @ 20 MPa)**

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 **2029-10-31**.

Issued at **Høvik** on **2024-11-13**

DNV local unit: **Shanghai**

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

The tuning fork level switch is composed of tuning fork, vibration driving device, detection line and junction box. It is a universal liquid level switch, intended used for overflow protection in containers and pipelines, dry operation protection and pump operation protection.

The circuit module is designed in protection type Ex 'ia' for use in explosive gas atmospheres. The process connection of the level switch is thread and flange, through the process connection, the level switch is connected to tank and pipeline.

Type code: TLS- $X^1X^2X^3$-X^4-X^5/X^6-LX^7

X^1 A: Aluminum terminal box
AV: Stainless steel terminal box
AD: Aluminum flameproof terminal box

X^2 - Process connection:
NPT: mounting thread
R: mounting thread
G: mounting thread
BSP: mounting thread
MR: hygienic connection
FC: hygienic connection
F: flange

X^3 - Material of connector and tuning fork:
V: stainless steel
VE: stainless steel electropolished
HC: hastelloy
VED: stainless steel sprayed PFA
VEC: stainless steel sprayed ECTFE

X^4 - Size of process connection

X^5 - Electrical function:
JT: DPDT
TR: PNP
NR: NAMUR
TW: two-wire

X^6 - Temperature design:
None: standard
HT: High temperature

X^7 - Insertion depth:
Specific length(≤1000mm)

Item	Specification information		Explanation
1	Operating pressure (MPa)		0~10
2	Operating temperature (°C)		-100~250
3	Ambient temperature (°C)		-40~60
4	S.G. (kg/m3)		≥500
5	Material	Main part material	SS316L, Hastelloy, SS316L+PFA/ECTFE
		Terminal box material	Aluminum ADC12, SS316L
6	Length of tuning fork (mm)		30~150
7	Measuring range (mm)		37~1000
8	Output signal		Relay DPDT, PNP/NPN, Two- wire, NAMUR
9	Supply voltage		24V DC, 8.2V DC
10	Environment		Hazardous
11	Ex marking		II 1/2 G Ex ia IIC T6…T2 Ga/Gb II 1/2 G Ex db IIC T6…T3 Ga/Gb
12	Hazardous area classification		Zone1, Zone2, Zone0 (only sensor)
13	Flammability gas classification		IIC
14	Classification of IPXX		IP66/68
15	Ex certification standard		EN 60079-0, EN 60079-1, EN 60079-26, EN 60079-11

Manufactured by

Shanghai KSR-Kuebler Automation Instrument Co., LTD
2 Lane 699 Yuyang Road Shanghai,
P.R.China

Application/Limitation

The Type Approval covers all hardware listed under Product description. The level switches are intended for use in control, monitoring, alarm and safety systems subject to classification.
Technical installation and operation manual to be provided for each delivery.
Limitation according valid and amended EU RO MR Group technical requirements to be observed.

Ex-certification is not covered by this certificate and the following paragraph, which is for information only, is based on information received from the manufacturer, but not verified by DNV.

Information on Ex-Certification received from manufacturer – Not verified by DNV		
Equipment	Certified	Certificate No.
Tuning fork level switch / Type(s): TLS series	Ex db IIC T6…T3 Ga/Gb Ta: -40°C to +60°C	IECEx TUR 23.0061X
Tuning fork level switch TLS series	Ex ia IIC T6…T2 Ga (Stainless Steel enclosure) Ex ia IIC T6…T2 Ga/Gb (Aluminium connections enclosure)	IECEx TUR 23.0057X

Type Approval documentation

Marking of product

The products to be marked with:

- Manufacturer name
- TLS-S series & Type code described in product description
- Unique serial number
- Supply Voltage

Other conditions

The units have been verified for compliance with EU Mutual Recognition Technical Requirements for Level 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:	-25°C and 70°C	D
Humidity:	95%RH @ 55°C	B
Vibration:	±1.0 mm / 0.7 g	A
EMC:	All locations except bridge and deck zone	A
Enclosure:	IP66/68 (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 annually and at renewal of this 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)).