eurofins

(1) # EU-Type Examination Certificate

(2) Equipment or protective system intended for use in potentially explosive atmospheres - **Directive 2014/34/EU**

(3) Certificate number: **SEV 18 ATEX 0209 X**

(4) Product: Thermocouples and Resistance Thermometers
Types: Thermocouples type 90.1***.****
Resistance Thermometers type 90.2***.****

(5) Manufacturer: JUMO Mess- und Regeltechnik AG

(6) Address: Laubisrütistrasse 70, 8712 Stäfa, SWITZERLAND

(7) The equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) Eurofins, notified body No. 1258, in accordance with article 17 of Directive 2014/34/EU of the European parliament and of the council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential basic reports 05-IK-0253.01, 05-IK-0253.03 extensions 1 and 2 and 18-Ex-0097.X04 extension 3.

(9) Compliance with the essential health and safety requirements has been assured by compliance with:

EN 60079-0:18 **EN 60079-31:14** **EN 60079-7:15**

Except in respect of those requirements listed at item 18 of the schedule.

(10) If the sign «X» is placed after the certificate number, it indicates that the product is subjected to special conditions for safe use specified in the schedule to this certificate.

(11) This EU type examination certificate relates only to design and construction of the specified product. Further requirements of this directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

See page 6 (20)

Eurofins Electrosuisse Product Testing AG
Notified Body ATEX
Jürg Rellstab
Product Certification

(13) # Appendix

(14) **EU-Type Examination Certificate no. SEV 18 ATEX 0209 X**

(15) **Description of product**

RTD temperature probes from JUMO are used as operating equipment for temperature measurement in liquid or gaseous media, as well as, for dusts, with the protection types increased safety „e".

The thermometers consist of a protection fitting with various process connection options, a terminal head or a connecting cable, and an interchangeable measuring insert (depending on the type). All fittings in contact with the process media undergo a leakage test. The Pt100 temperature sensors mounted in the fittings are according to EN 60751, in tolerance classes AA, A or B in 2-, 3-, or 4-wire circuit (see Section 8).
It is also possible to use these sensors with a higher reference value (Pt500; Pt1000; Pt2000; Pt 5000). NTC sensors, such as KTY, or other PTC sensors can also be used. Versions with two or three measurement circuits are possible. A transmitter can be build outside the explosive area, for measurement transmission with a standard signal.

Ratings:	Umax. = 30V, Imax. = 100 mA, Pmax. is given into instructions
Classification of installation and use:	stationary
Ingress protection:	IP65
Rated ambient temperature range:	Tamb min. ... Tamb max. The minimal ambient temperature is provided in the Special Conditions for safe use. The maximum ambient temperature is to be determined with the ignition temperature of the specific medium, (gas or dust) for which it is intended, and with the device heating Tamb = Temperature class - device heating

(16) **Report number** Basic reports 05-IK-0253.01, 05-IK-0253.03 extensions 1 and 2 and 18-Ex-0097.X04 extension 3.

(17) **Specific conditions of use**

1. Devices are to be adapted to the minimal ambient conditions. On one hand protection fittings are adapted to the medium temperature, on the other hand, terminal heads or connecting cables are chosen regarding the ambient temperature.

- Cables ambient temperatures are:

Material	Temp.range [°C]	also for dust	remarks
PVC	-5...+80	X	Standard
PVC	-5...+105	X	High temperature PVC
PUR	-5...+80	X	
PUR	-5...+105	X	
Silicone	-50...+180	X	
PTFE	-190...+260	X	Sealed with silicone and/or glued
Glas fibre	-20...+350		
Radox	-40...+120	X	Halogen-free
Polyolefin (Betaflam)	-40...+120	X	Halogen-free
PEEK	-60...+260	X	Sealed with silicone and/or glued
FPM	-50...+180	X	Chemical resistant
FEP	-70...+200	X	Sealed with silicone and/or glued
PFA	-190...+260	X	Sealed with silicone and/or glued
PI (Kapton)	-190...+260	X	Sealed with silicone and/or glued

- Ambient temperatures of connection heads:

TN	form	Tamb (°C)	remark	drawing nb. (Ex)
00626681	BUZ	-20...+100	SIL, yellow	*90.9715.905885.M.--*
00387717	BUZH	-20...+100	non	*90.9715.Ex9956.Z.--*

- The Resistance Temperature Detectors (RTD) ambient temperature is:

  - -70....+260 °C: for a standard measuring insert with platinum chip sensors in heat-conductive paste
  - -200...+600 °C: constructed with a mineral insulated measuring insert.

- For Thermocouples, the ambient temperature takes into account:

  - Mineral insulated thermocouple
  - Thermocouple wire

  The maximum ambient temperature is provided into the thermocouple specifications according to standards EN 60584.

2. The Thermocouples and the RTD with protection fittings are to be adapted to the maximum ambient condition.

For Gas:

- If the maximal power and the temperature class are specified, then the maximum ambient temperature can be calculated.

Tamb max. = temperature class – safety margin – (Pmax. x Thermowell constant)

Tamb max. (°C)	=	maximum ambient temperature
Temperature class (°C)	=	According to EN/IEC 60079-0 T1 = 450 °C, T2 = 300 °C, T3 = 200 °C T4 = 135 °C, T5 = 100 °C, T6 = 85 °C
Safety margin (K)	=	10 K for T1 to T2 and 5 K for T3 to T6.
Pmax. (W)	=	Maximum supply power from an external source
Thermowell constant (K/W)	=	In German "Schutzrohrkonstante SK" (marking plate)

Example for Gas:
A probe is to be used in temperature class T4
The Thermowell constant, SK, is 80 K/W.
The maximum power in the circuit, Pmax., is 500 mW.

Tamb max. = (135 °C – 5 K) – (0.5 W x 80 K/W) = +90 °C

- If the ambient temperature is given and the temperature class are given, then the maximum power supplied can be calculated.

Pmax. = (temperature class - safety margin - Tamb max.) / Thermowell constant

Example for Gas:
A probe is to be used in temperature class T4
The Thermowell constant, SK, is 220 K/W.
Tamb max. = +120 °C

The maximum power = (135 °C – 5 K – 120 °C) / 220 K/W = 45 mW

For Dust:

The device maximum surface temperature, Tsurface max, is the ambient maximum temperature added to the device heating multiplied by the dust constant 2.8.

Tsurface max. = Tamb max. + (Pmax. x Thermowell constant x Dust constant)

Tamb max. (°C)	=	maximum ambient temperature
Pmax. (W)	=	Maximum supply power from an external source
Thermowell constant (K/W)	=	In German "Schutzrohrkonstante SK" (marking plate)
Dust Constant (-)	=	2.8, the factor takes into account the isolation in the worst case condition, resulting from the dust layer

Example for Dust:
Tamb max. is +40 °C.
The Thermowell constant, SK, is 80 K/W.
The maximum power in the circuit, Pmax., is 70 mW.
Tsurface max. = +40 °C + (0.07 W x 80 K/W x 2.8) = 56 °C

The temperature class = T surface max. = T56 °C

3. The maximum current, maximum voltage and maximum power supply provided by the instructions below are to be respected and not exceeded as followed:

	Umax. [V]	Imax. [mA]	Pmax. [mW]
For Gas in the specified device temperature range	30	100	750
For Dust for Temperature sensors with a maximum total temperature of T80 °C			100

4. For Resistance Temperature Detectors (RTD), if there is no Thermowell constant available, following Thermowell constants are to be used for 2-wire, 3-wire or 4-wire circuit:

Protection tube diameter		Thermowell constants
minimum	maximum	
[mm]	[mm]	[K/W]
3	3.3	220
> 3.3	4	180
> 4	5	110
> 5		80

Those values are valid for sensing elements greater or equal than an equivalent surface of 2 x 3 mm.

5. For Thermocouples, the Thermowell constants are provided below, for mineral-insulated thermocouples with a diameter ≥ 1 mm, isolated or non-isolated (element welded with thermowell), and for thermocouples in a ceramic thermowell with a wire diameter ≥ 0.35 mm.

Insertion Length (EL)	Thermowell constant
[mm]	[K/W]
≥ 25 ... 50	120
> 50 ... 330	70
> 330	20

6. Thermocouples and RTD must be adequately earthed.

(18) **Essential health and safety requirements**

In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

Clause **Subject**
None

(19) **Drawings and Documents**

See test report "Manufacturer's Documents"

(20) **The marking of the product shall include the following:**

II 2 G Ex eb IIC T6...T1 Gb
II 2 D Ex tb IIIC T80 °C Db
II 1/2 D Ex ta/tb IIIC T80 °C Da/Db