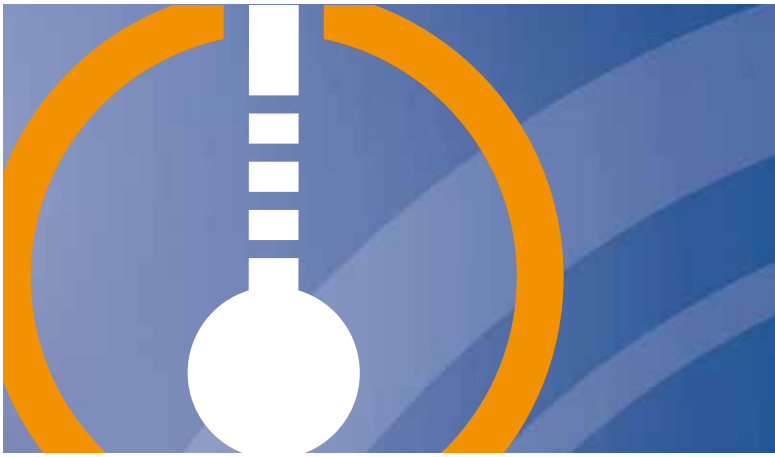
JUMO

More than sensors + automation

Temperature

Innovative solutions for the highest requirements



Contact:
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Dear Reader,

Temperature is one of the most commonly measured physical measurands throughout the world.
During the mid-1960s, the manufacturing of high-quality and accurate temperature probes offering long-term stability began to mature into one of JUMO's core fields of expertise. Ever since this era of development, JUMO has been producing RTD temperature probes and thermocouples of outstanding quality. We are now one of the world's leading manufacturers in this field.
Our customers benefit from our extensive experience in design and our high-quality production expertise.
Because we can draw on both these pools of knowledge, we are able to produce both smaller batches as well as larger quantities in series production with a high degree of automation. We have reached a high level of quality due to our motivated employees, statistical process control, and optimized process flows.
High standards are imposed starting with the design process. This leads to innovative, economical solutions that are right for the market. Another important factor is extensive qualification measures for our products. Especially in series production we conduct these measures together with our customers. We keep our products at the highest standard through continuous new and ongoing development.

Our expertise is further reinforced by our DAkkS laboratory where highly precise measurements are possible. In addition, our own temperature sensor thin film manufacturing strengthens our proficiency even more. We have been manufacturing platinum-chip temperature sensors in complex production processes for 30 years.
Today JUMO temperature sensors are used in many areas of industry and services where they guarantee consistent, high quality in products.
We always focus on the customer in everything we do. Customer satisfaction and long-term collaboration are the driving forces that keep us achieving outstanding performance time and time again.

This brochure provides an overview of our products for measurement technology. Of course, we would also be happy to develop individual solutions that are completely customized to your requirements.

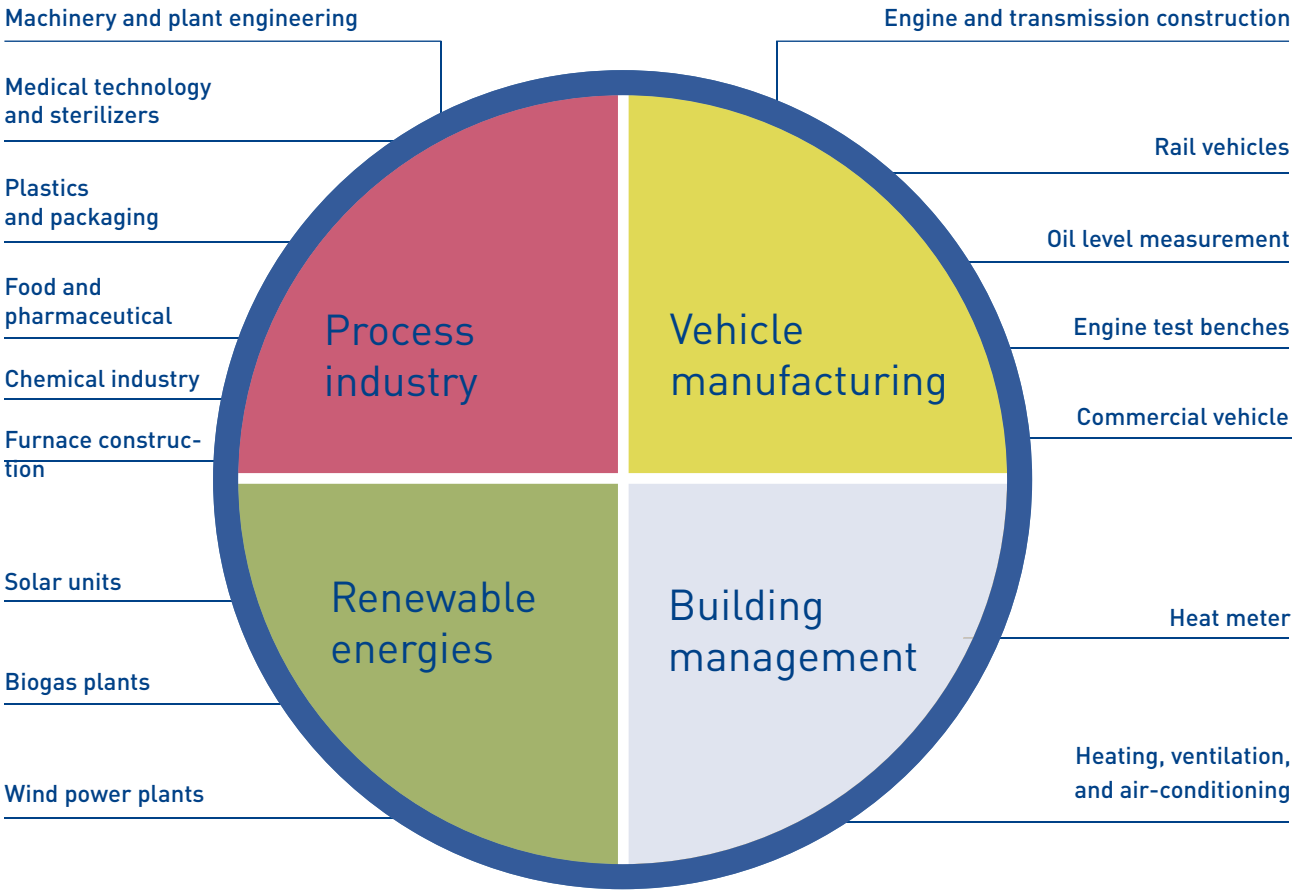
Detailed information about our products can be found under the specified type/product group number at **www.jumo.net**.

Contents

Temperature measurement

Temperature is one of the most important measurands in the industry. Temperatures must be recorded and processed for numerous manufacturing processes.
The application spectrum ranges from measurements in building technology to measuring a temperature of up to 1600 °C in industrial furnace construction and foundry technology. Because so many different application areas are involved, the thermal and mechanical requirements for temperature probes vary widely and have changed over the years. The adjustment to the respective measurement task can occur using different protection fittings and materials as well as terminal head, cable, and connector. As a result, extreme vibrations, atmospheres containing steam and which are under pressure, as well as aggressive media are controllable.

The industries



In addition to products for these industries, our portfolio also includes many other design types for other applications. Just contact us and we will find the right product for you! Thermocouples and RTD temperature probes can be used for SIL applications with manufacturer's declaration.

Approvals

ATEX, EAC Ex, metrological registration, PL, SIL, DIN EN 14597, GL, EHEDG

Thermocouples

Higher temperatures are measured with thermocouples. Different thermocouples can be used depending on the requirements. Available types are L, J, K, N, S, and B. The respective voltage series and limiting deviations are standardized according to DIN EN 60584 and DIN 43710. Compensating cables or thermal cables must be used for the connection. The different lines (sheath and stranded wire) are color coded according to the type. Applications above 800 °C require the use of protection fittings made of heat-resistant steel or ceramic.

If extended transmission paths need to be covered, a transmitter in the terminal head with an output of 4 to 20 mA is generally recommended.

Screw-in thermocouples

	Description	**Screw-in thermocouple with terminal head form B**	**Screw-in thermocouple with terminal head form J**	**Screw-in thermocouple with connecting cable**
	Type / data sheet	901020	901030	901050
Application	**Features**	–		
	Areas of application	Woodworking machines, dryer systems, baking ovens, smelting works, and rolling mills	Solid fuel boiler, plastics industry	Industrial kitchen equipment suppliers, tempering equipment, plastics industry
Technical data	**Connection**	Head		Cable
	Operating temperature	–200 to +800 °C		–200 to +600 °C
	Measuring circuits	1/2		
	Thermocouples	J, L, K		L, K
	Process connection	Thread		
	Protection fitting	Stainless steel		
	Protection type	IP65		–
	Option	Head transmitter	–	Non-insulated construction
	Approvals	Metrological registration		–
	Special features	Replaceable measuring insert, extension tube	Union nut	Cable made of silicone, PTFE, metal braiding
			Complies with specification according to AMS 2750 E and CQI-9	

Screw-in thermocouples

	Description	**Screw-in/push-in thermocouples for devices and plants tested according to DIN EN 14597**	**Screw-in melt thermocouples**
	Type / data sheet	901006	901090
Application	**Features**	For operating media water, oil, and air	–
Application	**Areas of application**	Heating construction, furnace construction, apparatus construction	Plastics industry
Technical data	**Connection**	Head, cable	Cable, connector
Technical data	**Operating temperature**	0 to +1500 °C	–40 to +600 °C
Technical data	**Measuring circuits**	1/2	1
Technical data	**Thermocouples**	L, K, S, B,	J, L, K
Technical data	**Process connection**	Thread, flange, compression fitting	Thread
Technical data	**Protection fitting**	Stainless steel, steel, ceramic	Stainless steel, coating
Technical data	**Protection type**	–	–
Technical data	**Option**	Non-insulated construction	
Technical data	**Approvals**	For DIN EN 14597 tested devices	–
Technical data	**Special features**	–	Cable made of PTFE, metal braiding, probe tip flat/blade-shaped

Push-in thermocouples

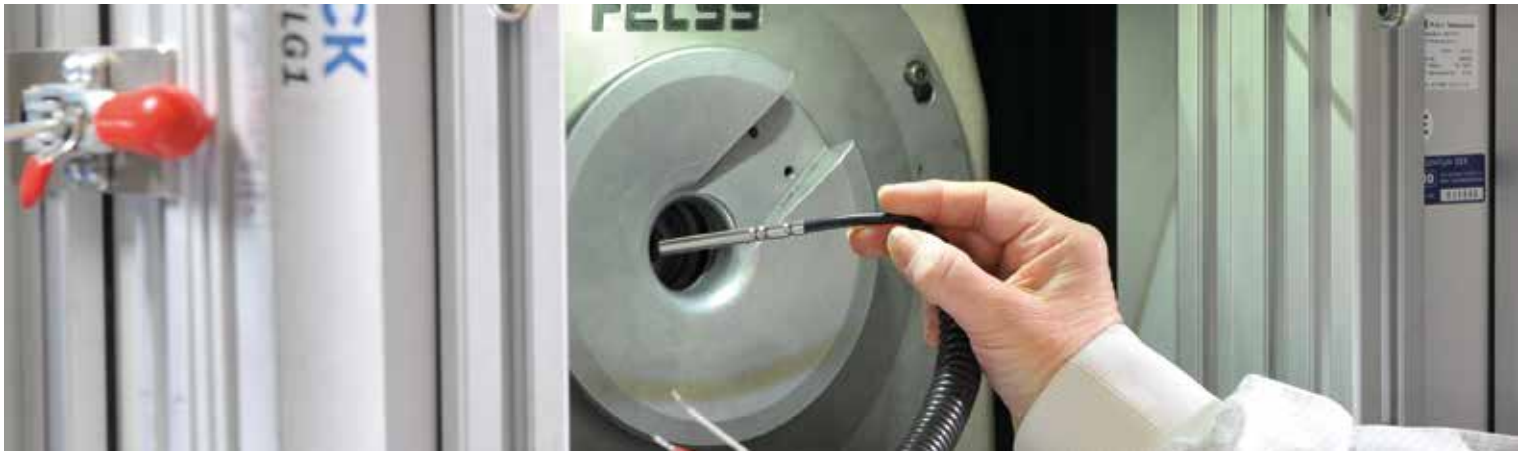
	Description	Push-in thermocouples with form A terminal head	Push-in thermocouples with form B terminal head	Push-in thermocouples with connecting cable	Push-in thermocouples with bayonet connection
	Type / data sheet	901110	901120	901150	901190
Application	Features	–			Adjustable spring pressure ensures good heat transfer
Application	Areas of application	Furnace construction, smelteries, rolling mills, steel plants, iron plants, waste incineration	Furnace construction, industrial heating plants, foundry industry	Industrial kitchen equipment suppliers, industrial hot runner systems, analysis devices	Plastics industry, woodworking machines, printing machines
Technical data	Connection	Head		Cable	
Technical data	Operating temperature	–200 to +1600 °C		–50 to +600 °C	0 to 400 °C
Technical data	Measuring circuits	1/2		1	1/2
Technical data	Thermocouples	J, L, K, S, B		L, K	J, L, K
Technical data	Process connection	Flange, compression fitting		–	Bayonet connection
Technical data	Protection fitting	High-temperature steel, ceramic		Stainless steel	
Technical data	Protection type	IP54	IP65	–	–
Technical data	Option	Head transmitter		Non-insulated construction	Shielded cable
Technical data	Approvals	Metrological registration		–	
Technical data	Special features	–		Cable made of silicone, metal braiding, also available with right-angle cable outlet	Cable made of silicone, PTFE, metal braiding, ceramic probe tip
Technical data		Complies with specification according to AMS 2750 E and CQI-9			

Mineral-insulated thermocouples

	Description	Mineral-insulated thermocouples with bare connecting wires	Mineral-insulated thermocouples with terminal head form J	Mineral-insulated thermocouples with standard tab connector	Mineral-insulated thermocouples with thermal cable
	Type / data sheet	901210/10	901230/40	901240/20	901250/3x
Application	Features	Flexible sheath cable, vibration-resistant			
Application	Areas of application	Converters	Meat processing industry, combined heat and power plants, baking ovens	Hot runner industry, plastics industry	Hot runner industry, industrial heating plants, industrial kitchen equipment suppliers, biogas plants
Technical data	Connection	Connection wires	Head	Connector	Connecting cable
Technical data	Operating temperature	–200 to +1200 °C			0 to 1200 °C
Technical data	Measuring circuits	1/2		1	1/2
Technical data	Thermocouples	J, L, K			
Technical data	Process connection	–	Thread	–	Threaded fitting
Technical data	Protection fitting	Stainless steel, Inconel®			
Technical data	Protection type	–	IP65	–	–
Technical data	Option	Non-insulated construction	Head transmitter	Non-insulated construction	
Technical data	Approvals	Metrological registration			
Technical data	Special features	Complies with specification according to AMS 2750 E and CQI-9	–	∅ as of 0.5 mm	∅ as of 0.5 mm Cable made of silicone, PTFE, glass fiber/ metal braiding

Insertion thermocouples

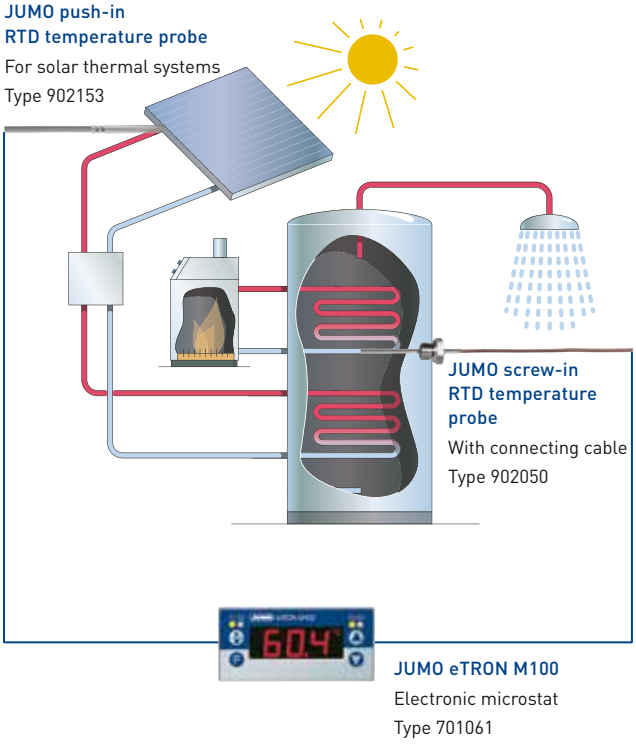
	Description	**JUMO FOODtemp Insertion thermocouples with PTFE handle**	**JUMO FOODtemp Insertion thermocouples with PEEK® handle**	**JUMO FOODtemp Insertion thermocouples with PEEK® handle**
	Type / data sheet	901350/33/63	901350/83	901350/84
Application	**Features**	Steam-tight, high-degree of mechanical strength, multiple measuring points		
Application	**Areas of application**	Industrial kitchen equipment suppliers, sterilizers	Industrial kitchen equipment suppliers	Industrial kitchen equipment
Technical data	**Connection**	Cable		
Technical data	**Operating temperature**	–100 to +260 °C		
Technical data	**Measuring circuits**	3/4/5	3/4	
Technical data	**Thermocouples**	K		
Technical data	**Handle**	∅ 12 mm, 15 mm	T-form	∅ 11.5 mm
Technical data	**Protection fitting**	Stainless steel		
Technical data	**Protection type**	IP67		
Technical data	**Special features**	Probe tip aligned centrally/angled	Probe tip aligned centrally/angled cable outlet on the side	Probe tip aligned centrally/angled
Technical data	**Declaration of conformity**	EC 1935/2004 material declaration		



RTD temperature probes

In many industrial applications, temperature is measured with RTD temperature probes. Platinum is widely used as the resistance material because it guarantees high measuring accuracy and long-term stability. The temperature-dependent electrical resistance, which increases with rising temperature, functions as the measured value here.
This is referred to as a positive temperature coefficient (PTC). The most widely used nominal values are Pt100, Pt500, and Pt1000. The various nominal values, temperature-dependent output characteristic, and tolerances are specified in DIN EN 60751.

Application example



Control of a solar unit with JUMO products

JUMO RTD temperature probe for solar thermal systems

Though often underestimated, temperature probes are an important part of a solar unit. They must be temperature-resistant as well as leak-proof, have long-term stability, must withstand extremely adverse operating conditions on the roof, and return reliable measurement results for the service life of the solar power unit – which may be 20 years or more. To guarantee that these goals are met, the use of a Pt1000 platinum temperature sensor is recommended. Because such a high nominal value is maintained, the resistance of the connecting cable has only a minimal impact on the temperature measurement.

The sun's potential is free – to help harness that potential JUMO offers cost-effective and high-quality solar sensors. The company has been recognized as a high-quality supplier of solar thermal energy sensors for many years. JUMO RTD temperature probes have proven their effectiveness in practical applications a million times over.

This applies to the small system for private houses as well as to large professional plants.

Screw-in RTD temperature probes

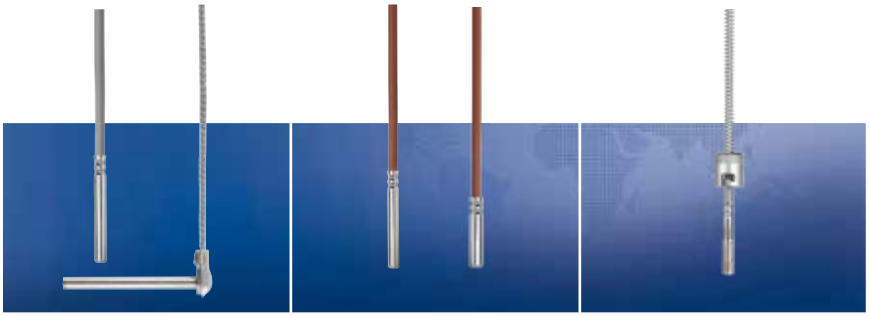
	Description	**Screw-in RTD temperature probe with terminal head form B**	**JUMO Etemp B Screw-in RTD temperature probe with terminal head form B for standard applications**	**Screw-in RTD temperature probe with terminal head form J**	**JUMO VIBROtemp Screw-in RTD temperature probe with plug connector**
	Type / data sheet	902020	902023	902030	902040
Application	**Features**	–			Vibration-resistant
	Areas of application	Plant engineering, construction material machines, dryer systems, biogas plants, combined heat and power plants	Mechanical engineering, confectionery industry	Mechanical engineering, thermostat baths, transmission construction, meat processing industry	Commercial vehicles, compressors, engine construction, railway technology
Technical data	**Connection**	Head			Connector
	Operating temperature	–50 to +600 °C	–50 to +400 °C	–50 to +400 °C	–50 to +300 °C
	Measuring circuits	1/2			1
	Sensor	Pt100, Pt500, Pt1000			Pt100, Pt500, Pt1000, KTY
	Process connection	Thread			
	Protection fitting	Stainless steel			Stainless steel, brass
	Protection type	IP65			IP65, IP69K
	Option	Head transmitter			–
	Approvals	Metrological registration	–	Metrological registration	–
	Special features	Replaceable measuring insert, extension tube	Fast measurements in air	Fast measurements in air, spring-mounted fitting	Vibration-resistant

Screw-in RTD temperature probes

	Description	Screw-in RTD temperature probe with plug connector	Screw-in RTD temperature probe with connecting cable	Screw-in/push-in RTD temperature probe for devices and plants tested according to DIN-EN-14597	Screw-in melt RTD temperature probe
	Type / data sheet	902044	902050	902006	902090
Application	Features	Highly shakeproof, plug connector according to DIN EN 175301-803	–	For operating media water, oil, air	–
	Areas of application	Shipbuilding, engine manufacturing, industrial boiler plants, pump engineering	Mechanical engineering, HVAC, cooling components, transmission construction	Heating construction, furnace construction, apparatus engineering, baking ovens	Plastics industry
Technical data	Connection	Connector	Cable	Head, cable	Cable, connector
	Operating temperature	–50 to +260 °C	–50 to +400 °C	–170 to +700 °C	–50 to +400 °C
	Measuring circuits	1	1/2	1/2/3	1/2
	Sensor	Pt100			
	Process connection	Thread		Thread, flange, compression fitting	Thread
	Protection fitting	Stainless steel	Stainless steel, Inconel®	Stainless steel, steel	Stainless steel, coating
	Protection type	IP65	–		
	Option	Head transmitter	Shielded cable	–	Ceramic insulated probe tip
	Approvals	GL	Metrological registration	For DIN EN 14597	–
	Special features	Replaceable measuring insert for variants without transmitter	Cable made of silicone, PTFE, metal braiding	–	Cable made of PTFE, metal braiding, probe tip flat / blade-shaped

Push-in RTD temperature probes

	Description	**Push-in RTD temperature probe with form B terminal head**	**JUMO Etemp B Push-in RTD temperature probe with terminal head form B for standard applications**	**Push-in RTD temperature probe with form J terminal head**
	Type / data sheet	902120	902123	902130
Application	**Features**	–		
	Areas of application	Plant engineering, industrial heating plants, drying systems, construction material machines	Mechanical engineering, plant engineering	Mechanical engineering, tempering equipment, conveyor technology, textile industry
Technical data	**Connection**	Head		
	Operating temperature	–50 to +600 °C	–50 to +400 °C	–50 to +400 °C
	Measuring circuits	1/2		
	Sensor	Pt100		Pt100, Pt1000
	Process connection	Flange, compression fitting		
	Protection fitting	Stainless steel		
	Protection type	IP65		
	Option	Head transmitter		
	Approvals	Metrological registration	–	Metrological registration
	Special features	Replaceable measuring insert	–	Fast measurements in air



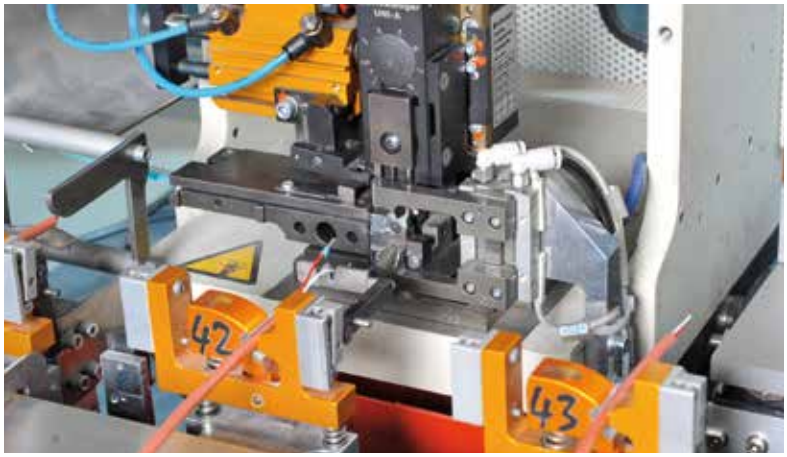
	Description	Push-in RTD temperature probe with connecting cable	Push-in RTD temperature probe with connecting cable for solar thermal systems	Push-in RTD temperature probe with bayonet connection
	Type / data sheet	902150	902153	902190
Application	Features	–	For collector and accumulator temperature measurement	Adjustable spring pressure ensures good heat transfer
Application	Areas of application	Thermostat baths, packing machine industry, heating and drying cabinets, hydraulic systems	Solar units	Plastics industry, custom machine construction
Technical data	Connection	Cable		
Technical data	Operating temperature	–50 to +400 °C	–50 to +260 °C	–50 to +350 °C
Technical data	Measuring circuits	1/2	1	1/2
Technical data	Sensor	Pt100	Pt100, Pt1000	Pt100
Technical data	Process connection	–		Bayonet connection
Technical data	Protection fitting	Stainless steel	Stainless steel, brass	Stainless steel
Technical data	Protection type	–		
Technical data	Option	Shielded cable	–	Shielded cable
Technical data	Approvals	–		
Technical data	Special features	Cable made of PVC, PUR, silicone, PTFE, metal braiding	Cable made of PVC, PUR, silicone, PTFE	Cable made of silicone, PTFE, metal braiding, ceramic probe tip

Mineral-insulated RTD temperature probes

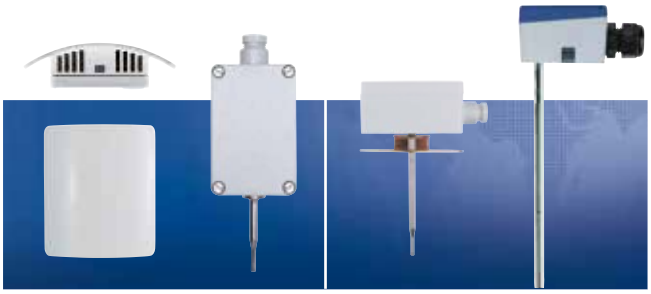
	Description	**Mineral-insulated RTD temperature probe with bare connecting wires**	**Mineral-insulated RTD temperature probe with terminal head**	**Mineral-insulated RTD temperature probe with Lemosa® connector**	**Mineral-insulated RTD temperature probe with connecting cable**
	Type / data sheet	902210/10	902210/40	902210/20	902210/3x
Application	**Features**	Flexible sheath cable, vibration-resistant			
	Areas of application	Converters	Painting and drying systems, combined heat and power plants, plant engineering	Plant engineering, chemical industry	Baking oven industry, electric motors, generators, mechanical engineering, packaging industry
Technical data	**Connection**	Connection wires	Head	Connector	Connecting cable
	Operating temperature	–200 to +600 °C			
	Measuring circuits	1/2			
	Sensor	Pt100, Pt1000			
	Process connection	–	Thread	–	
	Protection fitting	Stainless steel			
	Protection type	–	IP65	–	
	Option	–	Head transmitter	–	
	Approvals	Metrological registration			
	Special features	∅ as of 1.9 mm			∅ as of 1.9 mm, cable made of PVC, silicone, PTFE, metal braiding

Insertion RTD temperature probes

	Description	**JUMO FOODtemp Insertion RTD temperature probe with PTFE handle**	**JUMO FOODtemp Insertion RTD temperature probe with FPM handle**	**JUMO FOODtemp Insertion RTD temperature probe with PEEK® handle**	**JUMO FOODtemp Insertion RTD temperature probe with PEEK® handle**
	Type / data sheet	902350/22/23	902350/37/38	902350/82/83	902350/84
Application	**Features**	Steam-tight, high-degree of mechanical strength			
Application	**Areas of application**	Meat processing suppliers, industrial kitchen equipment suppliers, baking ovens	Apparatus engineering	Industrial kitchen equipment suppliers	Industrial kitchen equipment suppliers, baking ovens
Technical data	**Connection**	Cable			
Technical data	**Operating temperature**	–50 to +260 °C	–50 to +200 °C	–50 to +260 °C	
Technical data	**Measuring circuits**	1/2	1	1/2	
Technical data	**Sensor**	Pt100			
Technical data	**Handle**	∅ 10 mm, ∅ 12 mm, ∅ 15 mm	∅ 6.5 mm	T-form	∅ 11.5 mm, ∅ 20 mm, ∅ 15 mm
Technical data	**Protection fitting**	Stainless steel	–	Stainless steel	
Technical data	**Protection type**	IP67			
Technical data	**Option**	Non-insulated construction	Transmitter	Non-insulated construction	
Technical data	**Approvals**	Metrological registration			
Technical data	**Special features**	Probe tip aligned centrally/angled	–	Probe tip aligned centrally/angled cable outlet on the side	Probe tip aligned centrally/angled
Technical data	**Declaration of conformity**	EC 1935/2004 material declaration			



Indoor RTD temperature probes



	Description	Indoor and outdoor RTD temperature probe	Channel RTD temperature probe
	Type / data sheet	902520/10/11/13/15	902524/20/25
Application	Features	Wall mounting	Channel mounting
	Areas of application	Building management, combined heat and power plants	Facility management Air heaters
Technical data	Connection	Terminal enclosure	
	Operating temperature	–50 to +90 °C	–50 to +200 °C
	Measuring circuits	1/2	
	Sensor	Pt100, Pt1000, Ni1000	
	Process connection	–	Compression fitting, flange
	Protection fitting	–	Stainless steel
	Protection type	IP65	
	Option	Head transmitter	
	Approvals	Metrological registration	

Surface RTD temperature probes

	Description	**Surface RTD temperature probe with connecting cable**	**Surface RTD temperature probes**
	Type / data sheet	902550/10/11/20/30/31	902550/41/42
Application	**Features**	Low thermal mass for round and level surfaces	
Application	**Areas of application**	Packing machines, pipeline construction	Plant engineering
Technical data	**Connection**	Cable	Terminal enclosure
Technical data	**Operating temperature**	–50 to +260 °C	–50 to +120 °C
Technical data	**Measuring circuits**	1	
Technical data	**Sensor**	Pt100, Pt500, Pt1000	Pt100, Pt500, Pt1000, Ni1000
Technical data	**Process connection**	Screw, fastener strap	Fastener strap
Technical data	**Protection fitting**	Stainless steel, aluminum	–
Technical data	**Protection type**	–	IP65
Technical data	**Option**	Strain relief	–
Technical data	**Special features**	Cable made of PVC, silicone, PTFE, stainless steel PTFE	Including installation kit

Industry-specific RTD temperature probes

	Description	**RTD temperature probe for the food and pharmaceutical industry**	**Screw-in RTD temperature probe without/with transmitter**	**JUMO DELOS T Precision RTD temperature probe**
	Type / data sheet	902810	902815	902940
Application	**Features**	EHEDG certification		Programmable, switching output, unit display selectable, case and protection fitting from stainless steel (316L)
Application	**Areas of application**	Food industry, pharmaceutical industry	Food and pharmaceutical applications, CIP/SIP plants, machinery and plant engineering, refrigeration and air-conditioning engineering	
Technical data	**Connection**	Head	M12 connector	
Technical data	**Operating temperature**	–50 to +250 °C	–50 to +260 °C	
Technical data	**Measuring circuits**	1/2	1	
Technical data	**Sensor**	Pt100	Pt100, Pt1000	Pt1000
Technical data	**Process connection**	Thread, hygienic connections, fittings, JUMO PEKA, CIP-compliant process connections, including electropolished Ra < 0.8 µm		
Technical data	**Protection fitting**	Stainless steel 316L		
Technical data	**Accuracy**	Tolerance class: class A (optional class AA)	Tolerance class: class B (optional class A or AA)	Tolerance class: class A (optional class AA)
Technical data	**Output**	Pt100 passive 1x analog output 0(4) to 20 mA, 0 to 10 V 1x programmable transmitter output 4 to 20 mA	Pt100/Pt1000 passive 1x programmable output 4 to 20 mA	1x PNP switching output, 2x PNP switching output, 1x PNP switching output 1x analog output 0(4) to 20 mA, 0 to 10 V
Technical data	**Protection type**	IP67		
Technical data	**Option**	Head transmitter	Transmitter	–
Technical data	**Approvals**	EHEDG	EHEDG, ATEX upon request	EHEDG
Technical data	**Declaration of conformity**	EC 1935/2004 material declaration		

	Description	**JUMO STEAMtemp Push-in RTD temperature probe in steam-tight version**	**Level and temperature probe for commercial vehicles as well as construction and agricultural machinery**	**JUMO CANtrans T RTD temperature probe with CANopen output**
	Type / data sheet	902830	902880	902910
Application	**Features**	Steam-tight, high protection type	High shock-resistance, level measurement according to the hot-wire principle	Very high resolution possible (millikelvin scale)
Application	**Areas of application**	Sterilizers, pharmaceutical and food industry, institutes, research facilities	Commercial vehicle/ construction/agricultural machinery industry, engine manufacturing, transmission construction	Woodworking machines, dryer systems, baking ovens, smelting works, and rolling mills
Technical data	**Connection**	Cable		Head
Technical data	**Operating temperature**	–70 to +200 °C	–40 to +140 °C	–200 to +800 °C
Technical data	**Measuring circuits**	1/2/3	1/2	
Technical data	**Sensor**	Pt100	Voltage/Pt100, Pt1000	Pt1000
Technical data	**Process connection**	Thread, flange	Thread	
Technical data	**Protection fitting**	Stainless steel, steel, ceramic	Stainless steel, coating	–
Technical data	**Protection type**	IP69	–	
Technical data	**Option**	Shielded cable	Corrugated hose	Transmitters
Technical data	**Approvals**	–		Metrological registration
Technical data	**Special features**	Cable made of FEP, PTFE, silicone	Cable made of polyester, cross-linked	Replaceable measuring insert, extension tube

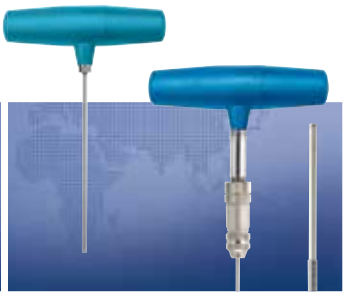
Heat meter RTD temperature probes

	Description	**JUMO HEATtemp With connecting cable for direct installation (type DS/DL)**	**JUMO HEATtemp With connecting cable for immersion sleeves (type PS/PL)**	**JUMO HEATtemp With terminal head for direct installation (type DL)**	**JUMO HEATtemp With terminal head for immersion sleeves (type PL)**
	Type / data sheet	902425	902435	902424	902434
Application	**Features**	Paired and calibrated according to the German Calibration Ordnance and MID calibration, production according to module D of the MID certification (CE and metrological identification marking)			
	Areas of application	Heat and cold meters			
Technical data	**Connection / connecting cable**	Connecting cables with ferrules/ PVC, PUR, TPE, silicone		Terminal head with screw terminals/–	
	Operating temperature	0 to 180 °C	Type PS: 0 to 150 °C; Type PL: 0 to 180 °C	0 to 180 °C	
	Process connection	Type DS: fitting M 10 x 1; Type DL: thread G 1/4, G 1/2 stainless steel	Push-in RTD temperature probe for thermowells	Thread G 1/2, stainless steel	Push-in RTD temperature probe for thermowells
	Protection fitting	Type DS: stainless steel ∅ 5.4 mm, offset by ∅ 3.3/∅ 3.6 mm	Type PS: stainless steel Ø 5, 5.2, or 6 mm; Type PL: stainless steel Ø 6 mm, protection tube with fitting tolerance for thermowells	Stainless steel, ∅ 8 mm, offset by ∅ 6 mm	∅ 6 mm with fitting tolerance for thermowell; stainless steel
	Temperature difference	3 to 180 K	Type PS: 3 to 150 K Type PL: 3 to 180 K	3 to 180 K	
	Minimum immersion depth	Type DS: 15 mm, Type DL: 30, 60 to 280 mm	Type PS: > 15 mm	30 mm	
	Insertion length	Type DS: 25 to 60 mm Type DL: 60 to 280 mm	Type PS: 45 to 85 mm Type PL: 85 to 450 mm	85 to 280 mm	85 to 400 mm
	Approvals	Approval for heat meters, MID and domestic approvals as replaceable temperature probes; fulfills requirements of DIN EN 1434, AGFW FW 202, and FW 211, approval for cold meter and combined cold/heat meters			

ATEX-/IEC Ex RTD temperature probes

	Description	**JUMO PROCESSTEMP RTD temperature probe for process technology with ATEX approval**	**ATEX/IECEx RTD temperature probe with connecting cable acc. to DIN EN 60751**
	Type / data sheet	902820	902821
Application	**Features**	Ex-approval, protection tubes made of stainless steel, titanium, tantalum, Inconel®, Hastelloy®	Ex-approval, also available as mineral-insulated RTD temperature probe
Application	**Areas of application**	Process industry, chemical industry, plant engineering, pump engineering	
Technical data	**Connection/ connecting cable**	Head	Shielded connecting cables (silicone, PTFE, metal braiding / glass fiber, PVC, PUR, FEP, RADOX®, BETAFLAM®)
Technical data	**Operating temperature**	–200 to +600 °C	–100 to +260 °C –100 to +600 °C (mineral-insulated thermometer)
Technical data	**Measuring circuits**	1/2	1/2
Technical data	**Sensor**	Single or double Pt100, Pt500, Pt1000	Pt100, Pt500, Pt1000, Pt2000, NTC
Technical data	**Process connection**	Fitting/thread G1/2, G1, NPT, others upon request	Various threads
Technical data	**Protection fitting**	Protection tube made of stainless steel 1.4571, titanium, Inconel®, Hastelloy®; with PTFE or HALAR coating	Stainless steel 1.4571, 1.4435, or others upon request ∅ 3 mm, ∅ 4 mm, ∅ 5 mm, ∅ 6 mm, ∅ 7 mm, ∅ 8 mm, and ∅ 9 mm
Technical data	**Protection type**	IP65	
Technical data	**Option**	Head transmitter	Mineral-insulated thermocouple
Technical data	**Approvals**	ATEX, EAC Ex	ATEX, IEC Ex, EAC Ex
Technical data	**Special features:**	Replaceable measuring insert, Ex i, Ex d	Universal application

RTD temperature probes with wireless data transmission – Wtrans transmitter



	Description	**JUMO Wtrans transmitter T01 RTD temperature probe with electronic assemblies up to 85 °C**	**JUMO Wtrans transmitter T02 RTD temperature probe with electronic assemblies up to 125 °C**	**JUMO Wtrans transmitter T03 RTD temperature probe with ATEX approval and electronic assemblies up to 85 °C**
	Type / data sheet	902930/10/12/50	902930/20/22/60	902930/15/17/55
Application	**Features**	- For operating temperatures from –30 to +260 °C or –200 to +600 °C * - For mobile or stationary temperature measurement - No wiring work thanks to modern wireless technology - Fail-safe transmission with telegram coding		
Technical data	**Transmission frequency**	868.4 MHz (Europe); 915 MHz (USA, Australia, Canada, and New Zealand as well as other countries); 10 frequencies can be configured in the 915 MHz frequency band		
	Transmission interval	Adjustable from 1 to 3600 s; Factory set for basic type 902930/10, 902930/12, and 902930/50 = 10 s; Factory set for basic type 902930/20, 902930/22, and 902930/60 = 15 s; Factory set for basic type 902930/15, 902930/17, and 902930/55 = 20 s; Adjustable via DIP switch 5 s, 10 s, 20 s, or 45 s		
	Range in the free field	Up to 300 m when using the antenna holder for wall mounting and with 3 m antenna cable		
	Transmitter detection (transmitter ID)	5-digit ID, factory set, can be configured according to customer specifications		
	Measuring input	Pt1000 according to DIN EN 60751, in three-wire circuit		
	Protection type	IP67 according to DIN EN 60529; For basic type 902930/10, 902930/12, 902930/15, 902930/17, 902930/20 and 902930/22; For basic type 902930/50, 902930/55 and 902930/60 **		
	Lithium battery	Voltage: 3.6 V; rated capacity: 2.2 Ah/1.7 Ah		
	Available approvals/ approval marks	- IC (Industry Canada) for 915 MHz - FCC (Federal Communications Commission) for 915 MHz - c UL us (Underwriters Laboratories) - ATEX approval for 868.4 MHz ***		

* Not for Wtrans T03

** Only with screwed-on machine connector M12×1

*** For Wtrans T03

Wireless data transmission – Wtrans receiver

Operation and configuration can be performed via the keypad in conjunction with a two-line LCD display or with an intuitively operable setup program for greater convenience. This way, parameters such as measured value scaling, offset, alarms, and limit values can be separately set for each channel. For this purpose, a connector is provided on the front for a PC interface with TTL/RS232 or USB/TTL converter for connecting the receiver and the PC.

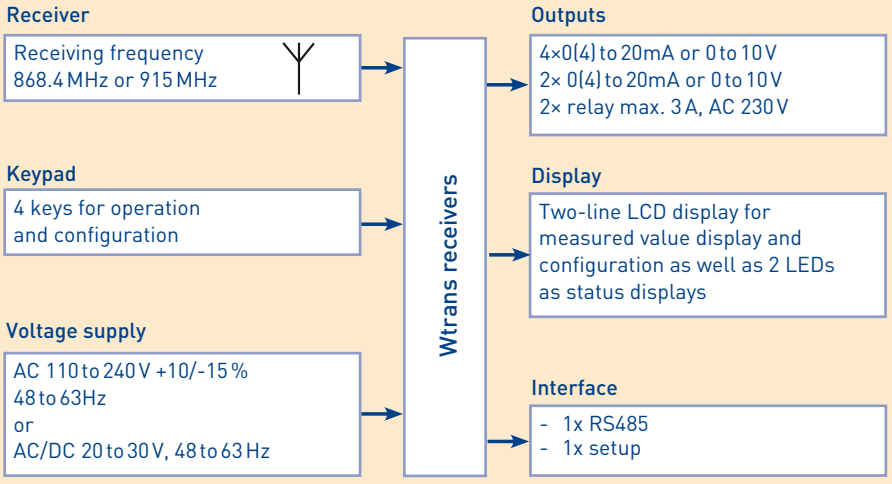
Type 902931

Features

Wtrans T01
DIN-rail case, IP 20

- For RTD temperature probe, thermocouple, potentiometer, and voltage
- RS485 interface with Modbus protocol
- Wireless measured value reception
- No wiring work thanks to modern wireless technology
- For up to 16 signals per receiver

Block diagram receiver



Approvals / approval marks

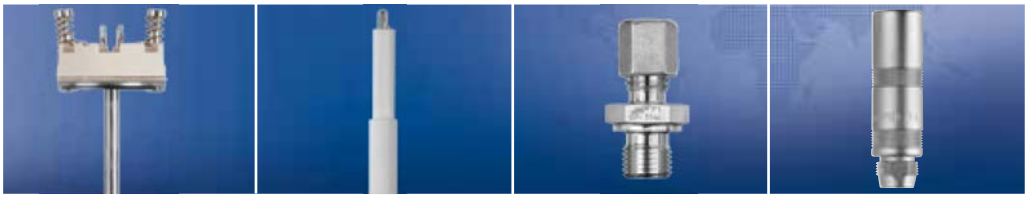
- IC (Industry Canada), for 915 MHz, 902931/10, 230 V
- FCC (Federal Communications Commission) for 915 MHz, 902931/10, 230 V
- c UL us (Underwriters Laboratories) 902931/10, 230 V

Accessories

For installation or connection to the evaluation units various accessories are available. Examples include installation fittings for thermocouples and RTD temperature probes, cables for a professional connection, thermowells and ball valves with measuring points, and plug connectors for unproblematic replacement.
Additional technical descriptions can be found at www.jumo.net by entering the data sheet number.

Accessories

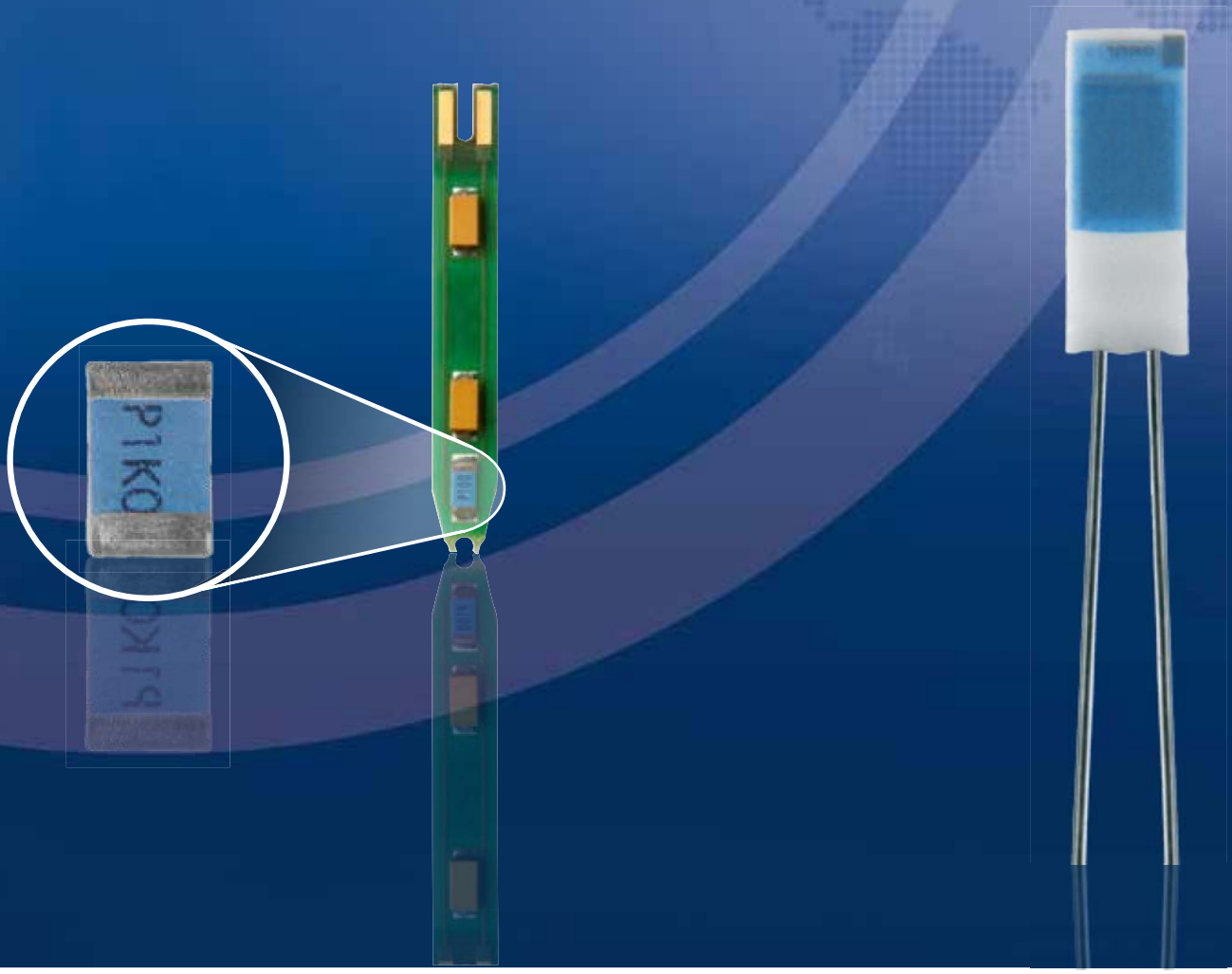
	Description	Installation locations for temperature probes	Screw-in and weld-in thermowells	Terminal heads and connection sockets	Compensating and connecting cables
	Type / data sheet	902440	909710	909715	909735
Application	Features	Ball valves, T-pieces, thermowells, adapter fittings, installation accessories	For thermocouples and RTD temperature probes, thermometers can be replaced without emptying the system, thermowells are made out of various materials, operating pressure up to 320 bar	For thermocouples and RTD temperature probes, terminal heads made out of various materials, protection type max. IP65, sealable versions	According to DIN EN 60584-3 and DIN 43713, for two/three/four wire circuits, versions from –190 to +400 °C, sheath out of PTFE, silicone, PVC, or glass fiber, steel or stainless steel braiding, for single and double elements



	Description	Measuring inserts for screw-in thermocouples and RTD temperature probes with form B terminal head	Thermocouples according to DIN 43732	Compression fitting and flange, counter pieces for bayonet connections	Plug connectors
	Type / data sheet	909735	909744	909750	909760
Application	Features	For temperatures from –200 to +1150 °C, as single and double measuring insert, available with transmitter	For temperatures up to +1600 °C, standardized thermoelectric voltage series according to DIN EN 60584, part 1, DIN 43710, for insertion thermocouples according to DIN 43733	For temperatures up to 550 °C, for variable insertion lengths, simple mounting and uncomplicated replacement, pressure-resistant seal	For temperatures from –60 to +260 °C, easy replacement with permanently installed cable, quick connection of measuring devices for test purposes, locked for contact stability

Platinum temperature sensors in thin-layer technology

JUMO offers a multi-facetted program of platinum temperature sensors.
With an annual production of several million temperature sensors we are one of the world's most important suppliers.
We supply precision and long-term stability for the clean room. Tolerances from +/– 0.1 K are produced in series. Modified methods for semiconductor production have been continuously adapted to Pt100 production since the 1980s. Cost-effective mass production, combined with the highest quality standards make the customer benefits complete.



Platinum temperature sensors in thin-layer technology

Mechanical processes: welding, sawing

Photolithography: creating the structure on the substrate

Laser trimming of platinum-chip temperature sensors

JUMO is committed to quality and fair market prices alike

Platinum temperature sensors in thin-layer technology promise excellent accuracy and long-term stability. To keep this promise, JUMO relies exclusively on Germany as the top production location. The tough requirements are met by highly-qualified employees and an efficient QM system. Our modern production plants are highly-automated and, together with their efficiency, perfect the price/performance ratio. Yet our system permits a high degree of flexibility so that we can do justice to special customer applications.

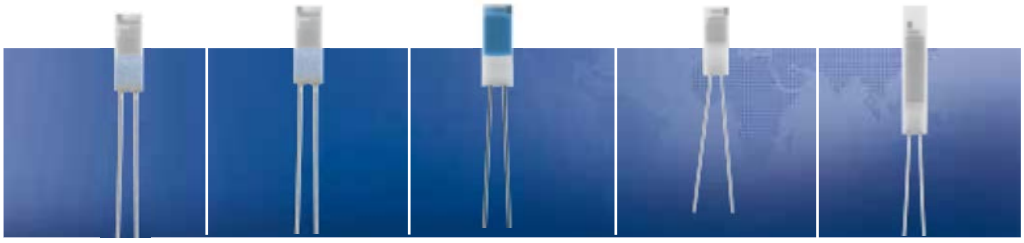
Over 50 years of experience for our customers

The experience garnered from our own temperature probe production goes straight into the development of new temperature sensors. JUMO offers expert support for the assembly of temperature sensors.

Customer-specific modifications

The customers and their expectations of the application are paramount – especially so when it comes to OEM applications. Along with the mechanical and geometrical system solutions, special selections with a small tolerance class are in great demand.

Platinum chip temperature sensors with connecting wires according to DIN EN 60751



	Description	Design type PCA/L	Design type PCA/S	Design type PCA/E	Design type PCA/M	Design type PCA/H
	Type / data sheet	906121				
Application	Features	Broad range, for every application the suitable sensor				
	Areas of application	Measurement and control technology, heating/ventilation/air-conditioning, industrial electronics, automotive industry				
Technical data	Wires	Ag 0.2 × 0.3	Pt-Ni 0.2 mm	Ni 0.25 mm	Pt-Ni 0.2 mm	Pd 0.25 mm
	Operating temperature	–70 to +250 °C	–70 to +400 °C	–70 to +500 °C	–70 to +550 °C	–70 to +600 °C
	Processing	Soft soldering	Crimping, welding, hard soldering			Welding
	Dimensions	2 × 2.5 × 1.3 mm 2 × 5 × 1.3 mm 2 × 10 × 1.3 mm 4 × 5 × 1.3 mm	2 × 2.5 × 1.3 mm 2 × 5 × 1.3 mm 2 × 10 × 1.3 mm 1.2 × 4 × 1.1 mm	1.5 × 2.5 × 1.0 mm 2 × 2.5 × 1.3 mm 2 × 5 × 1.3 mm	1.5 × 2.5 × 1.0 mm 1.5 × 5 × 1.0 mm 2 × 2.5 × 1.3 mm 2 × 5 × 1.3 mm 2 × 10 × 1.3 mm 4 × 5 × 1.3 mm	2 x 10 x 1.3 mm
	Rated values	Pt100 Pt500 Pt1000	Pt100 Pt500 Pt1000 Pt2000	Pt100 Pt200 Pt1000	Pt100 Pt200 Pt500 Pt1000	Pt100 Pt500 Pt1000

Platinum temperature sensors in special designs

	Description	Design type PCSE	Design type PCKL	Design type PCS
	Type / data sheet	906122	906123	906125
Application	Features	Pre-finished measuring insert	Robust and moisture-resistant	Very good linear characteristic line progression and high long-term stability
Application	Areas of application	Measurement and control technology, heating/ventilation/air-conditioning, industrial electronics		
Technical data	Wires	–		–
Technical data	Terminal clamps	–	Tin-plated	–
Technical data	Contact surfaces	Gold-plated	–	
Technical data	Solder connections	–	–	Galvanic tin-plated all-around contact with diffusion barrier
Technical data	Operating temperature	–20 to +150 °C	–30 to +105 °C	–50 to +150 °C
Technical data	Processing	Soft soldering		Reflow soldering, wave soldering
Technical data	Dimensions	4.3 × 15 × 2.2 mm 4.1 × 28 × 2.2 mm	3.9 × 5 × 1.5 mm	1.3 × 2.0 × 0.5 mm, 0815 1.5 × 3.1 × 0.8 mm, 1206
Technical data	Rated values	Pt100 Pt500 Pt1000	Pt100 Pt1000	Pt100 Pt500 Pt1000

DAkkS

The (EC) regulation no. 765/2008 that came into force on 1 January, 2010 set out new provisions for accreditation procedures in Europe. Accreditations are now carried out by a single national accreditation body for each member state.
In the Federal Republic of Germany the monitoring obligations will pass to Deutsche Akkreditierungsstelle GmbH (DAkkS) pursuant to Section 13, para. 1 AkkstelleG.

JUMO

akkreditiert durch die / *accredited by the*

Deutsche Akkreditierungsstelle GmbH

als Kalibrierlaboratorium im / *as calibration laboratory in the*

Deutschen Kalibrierdienst DKD

Kalibrierschein
Calibration certificate

Calibration mark	0001 / D-K-15129-01-00 / 2010-12

Gegenstand / *Object*	**Platinwiderstandsthermometer**
Hersteller / *Manufacturer*	**JUMO GmbH & Co. KG**
Typ / *Type*	**90.286-F30 /vl**
Fabrikat/Serien-Nr. / *Serial number*	**0523 0005**
Auftraggeber / *Customer*	**JUMO GmbH & Co. KG** **D – 36039 Fulda**
Auftragsnummer / *Order No.*	**123456**
Anzahl der Seiten des Kalibrierscheines / *Number of pages of the certificate*	**5**
Datum der Kalibrierung / *Date of calibration*	**14.12.2010**

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem internationalen Einheitensystem (SI).
Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).
The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.
The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Deutschen Akkreditierungsstelle als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift haben keine Gültigkeit.
This calibration certificate may not be reproduced other than in full except with the permission of both the German Accreditation Body and the issuing laboratory. Calibration certificates without signature are not valid.

Datum / *Date*	Leiter des Kalibrierlaboratoriums / *Head of the calibration laboratory*	Bearbeiter / *Person in charge*
14.12.2010	Matthias Nau	Stefan Krummeck

DAkkS calibration service

Calibration object	Measuring range	Measurement uncertainty
- RTD temperature probes - Direct display electronic thermometer (temperature measuring chain) - Data logger	0.01 °C –80 to 0 °C > 0 to 90 °C >90 to 300 °C	5 mK 15 mK 10 mK 15 mK
- Thermocouples	–80 to +200 °C >200 to 300 °C	0.2 K 0.3 K
- Precious metal thermocouples	>300 to 1100 °C	1.0 K
- Non-precious metal thermocouples - Direct display electronic thermometer	>300 to 1100 °C	1.5 K
- RTD temperature probe with transmitter - Direct display electronic thermometer with transmitter	–80 to 0 °C > 0 to 90 °C > 90 to 300 °C	45 mK 40 mK 45 mK
- Temperature/block calibrators	40 to 133 °C >133 to 660 °C > 660 to 1100 °C	0.2 K 1.5 mK x (T) 2.5 K
Laboratory identification D-K-15129-01-00, (additional options through factory-calibration upon request)		

Accuracy is key

In almost all processes the need to increase output and quality while at the same time reducing process costs continually grows. This often goes hand in hand with reducing measurement uncertainties in the used measurement technology to record the process parameters. Furthermore, new standards are increasing requirements for documenting the processes and monitoring the measuring equipment.
The traceability of the measurement results according to national standards is therefore the key criterion for all calibrations. DAkkS-calibrated temperature probes and test equipment are generally recognized in Europe and in many non-European countries as the traceability tool that does not require further specifications.

JUMO calibration laboratory

Temperature is one of the most important process variables. The JUMO calibration laboratory has been accredited for the temperature measurand since 1992. The latest DAkkS accreditation once again confirms the company's expertise according to DIN EN ISO/IEC 17025:2005 and grants the authority to calibrate RTD temperature probes, thermocouples, and block calibrators.

On-site calibration service

Measurement technology in use cannot always be decommissioned for several days or even dismantled and sent in for calibration. The DAkkS-accredited on-site calibration service is the ideal solution for exceptionally short downtimes. The JUMO on-site calibration service also takes account of the local installation conditions; the service engineer will repair and replace individual components if required. The traceable measurement results are created according to DIN EN 10204 in compliance with a certified quality management system according to DIN EN ISO 9001:2000.

Contact:

Email: calibration-lab@jumo.net

www.jumo.net

PR 90024 EN/00323124/2015-04-27/V2