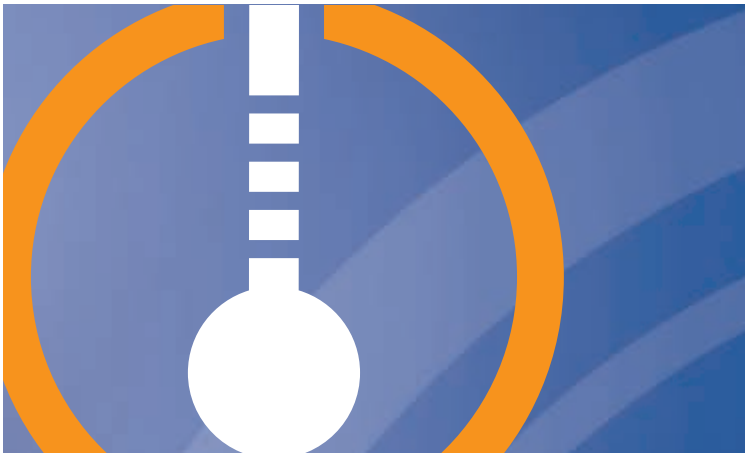
JUMO

More than sensors + automation

Temperature

Innovative solutions for the toughest requirements



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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 then 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 here is the extensive qualification measures for our products. Especially when it comes to 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 40 years.

Today JUMO temperature sensors are used in many industry and service sectors 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 using the given type and product group number at www.jumo.net.

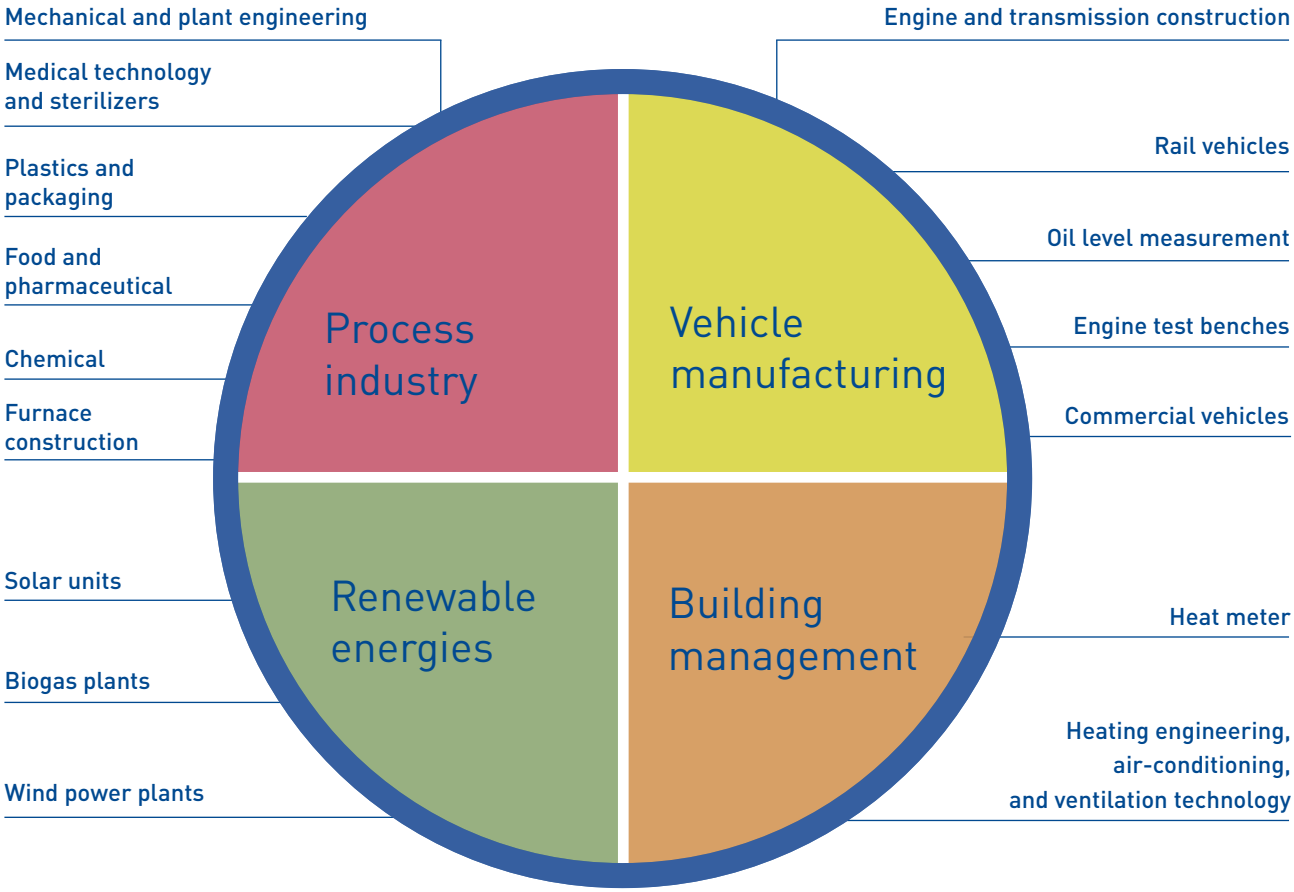
Table of contents

Temperature measurement

Temperature is one of the most important measurands in the industry. It must be acquired and processed in numerous manufacturing processes.

The application spectrum ranges from measurements in building technology to the acquisition of temperatures up to 1600 °C in industrial furnace processes (e.g. 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. Through different design types, materials, and components such as protection fittings the probes can be optimally adjusted to the respective measuring task. As a result, extreme vibrations, atmospheres containing steam and which are under pressure, as well as aggressive media are controllable.

The industries



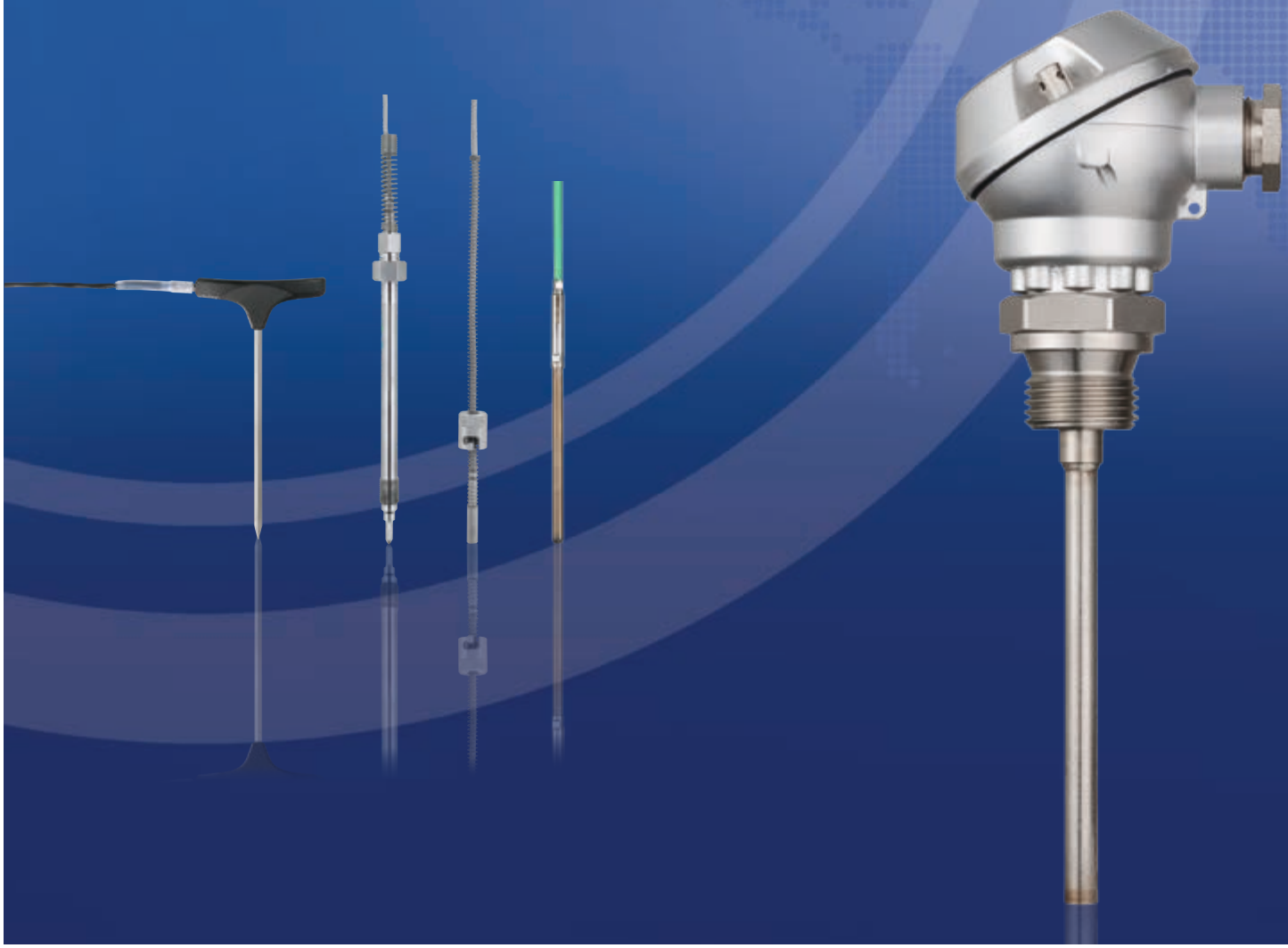
In addition to products for these industries, our portfolio also includes many other design types for other applications.
Feel free to contact us.
Thermocouples and RTD temperature probes can be used for SIL applications with manufacturer's declaration.

Approvals and standard requirements

ATEX, EAC Ex, metrological registration, PL, SIL, DNV GL, DIN EN 14597, AMS2750, CQI-9

Thermocouples

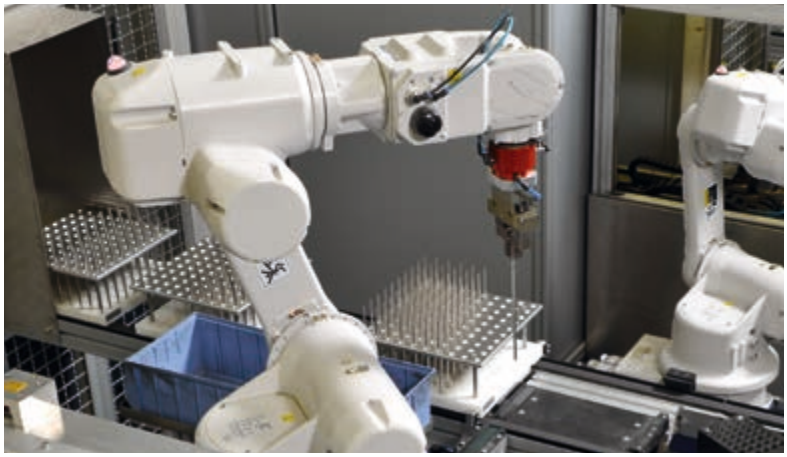
Thermocouples are mainly used to measure higher temperatures. Different thermocouples are used depending on the requirements. These are regulated in several standards including German (DIN 43710 – has now been discontinued), European (DIN EN 60584), and American (ANSI MC96.1 or ASTM E230) ones. The special requirements of the respective application (e.g. operating temperature, existing atmosphere, prevailing pressure, etc.) are considered through the construction selection and the materials. Here, thermocouples can be complemented by additional JUMO products (e.g. through transmitters for transfer of the measuring signals).



Screw-in thermocouples

	Description	**Screw-in thermocouples with terminal head form B**	**Screw-in thermocouples with terminal head form J**	**Screw-in thermocouples with connecting cable**
	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 transmitters	–	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 AMS2750 and CQI-9	

*According to DIN 43710, DIN EN 60584, and ANSI MC96.1 or ASTM E230



Screw-in thermocouples

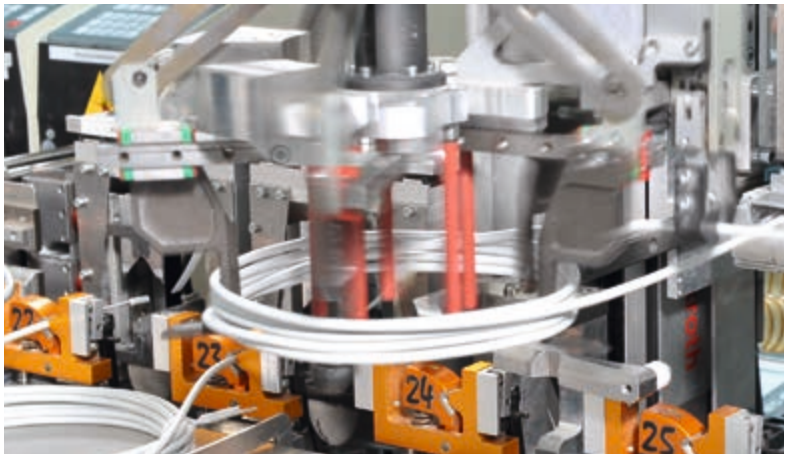
	Description	**Screw-in and push-in thermocouples for devices and plants tested according to DIN EN 14597**	**Screw-in melt thermocouples**
	Data sheet	901006	901090
Application	**Features**	For operating media water, oil, and air	–
Application	**Areas of application**	Heating construction, furnace construction, 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**	DIN EN 14597, SIL in combination with devices according to 701150 and 701155	–
Technical data	**Special features**	–	Cable made of PTFE, metal braiding, probe tip flat or blade-shaped

*According to DIN 43710, DIN EN 60584, and ANSI MC96.1 or ASTM E230

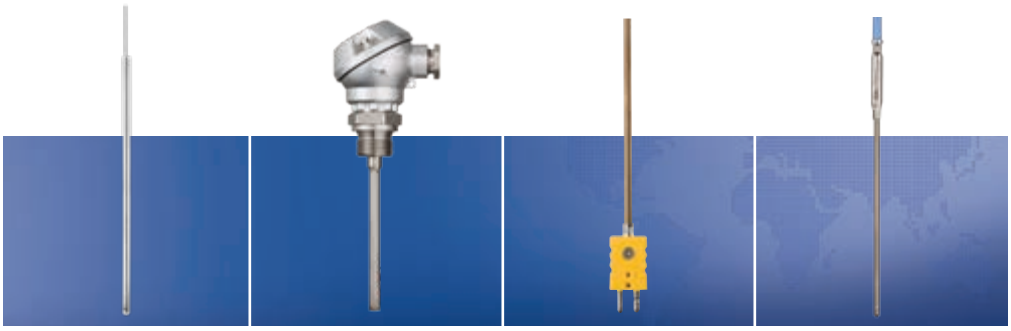
Push-in thermocouples

	Description	Push-in thermocouples with terminal head form A	Push-in thermocouples with terminal head form B	Push-in thermocouples with connecting cable	Push-in thermocouples with bayonet fastener
	Data sheet	901110	901120	901150	901190
Application	Features	Straight thermocouples according to DIN EN 50446		–	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 fastener
Technical data	Protection fitting	High-temperature steel, ceramic		Stainless steel	
Technical data	Protection type	IP54	IP65	–	–
Technical data	Option	Head transmitters		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 and CQI-9			

*According to DIN 43710, DIN EN 60584, and ANSI MC96.1 or ASTM E230



Mineral-insulated thermocouples



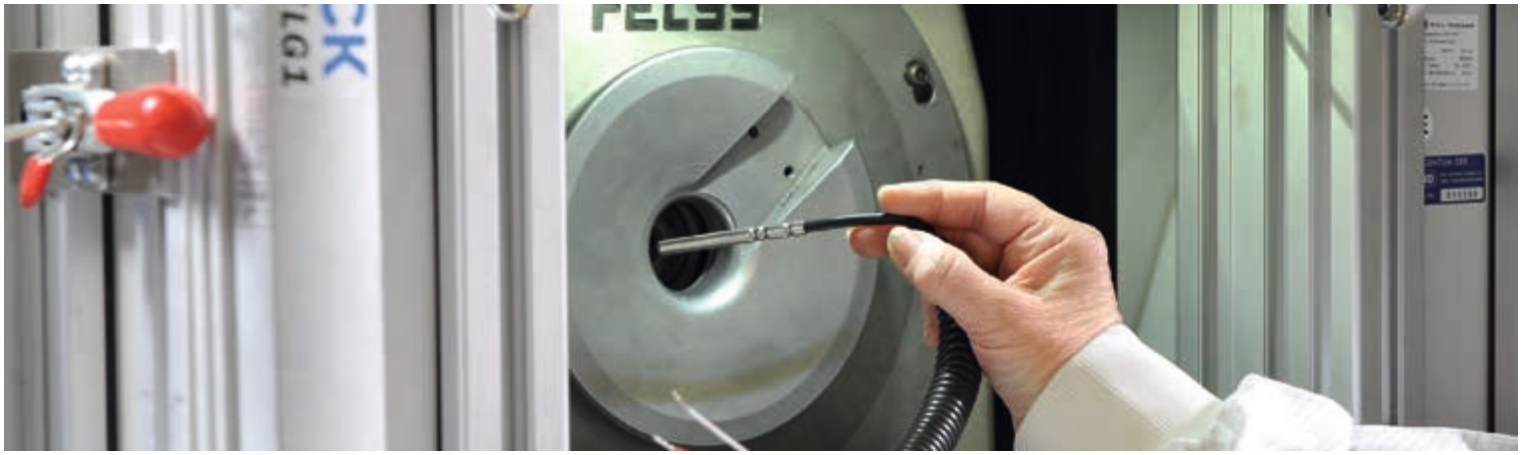
	Description	Mineral-insulated thermocouples with bare connection wires	Mineral-insulated thermocouples with terminal head form J	Mineral-insulated thermocouples with standard tab connector	Mineral-insulated thermocouples with thermal cable
	Data sheet	901210/10	901230/40	901240/20	901250/3x
Application	Features	Flexible sheath cable, vibration-resistant			
	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
	Operating temperature	-200 to +1200 °C			0 to +1200 °C
	Measuring circuits	1/2		1	1/2
	Thermocouples	J, L, K*			
	Process connection	–	Thread	–	Threaded fitting
	Protection fitting	Stainless steel, Inconel®			
	Protection type	–	IP65	–	–
	Option	Non-insulated construction	Head transmitters	Non-insulated construction	
	Approvals	Metrological registration			
	Special features	Complies with specification according to AMS2750 and CQI-9	–	∅ as of 0.5 mm	∅ as of 0.5 mm cable made of silicone, PTFE, glass fiber or metal braiding

*According to DIN 43710, DIN EN 60584, and ANSI MC96.1 or ASTM E230

Food insertion thermocouples

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

*According to DIN EN 60584

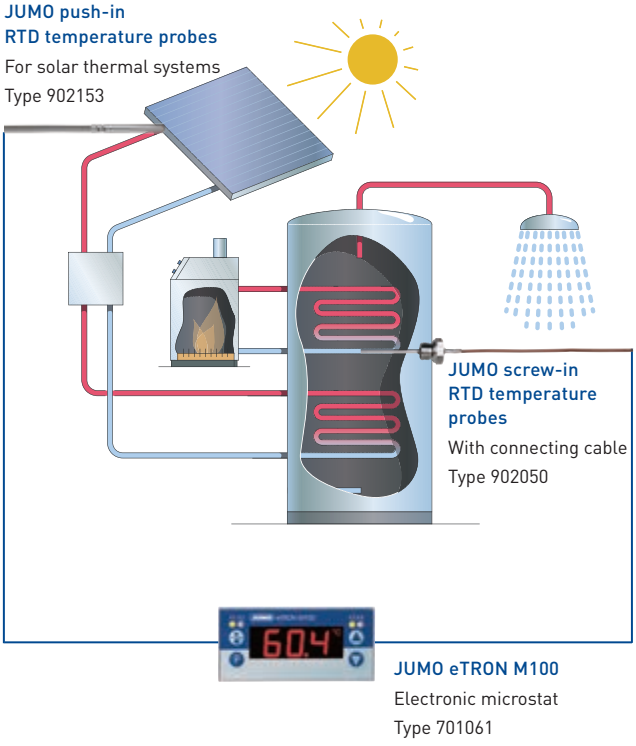


RTD temperature probes

In many industrial applications, temperature is measured with RTD temperature probes. Platinum is widely used as the resistance material because it guarantees a high degree of 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: solar thermal systems



Control of a solar unit with JUMO products

JUMO RTD temperature probes 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. The platinum temperature sensor Pt1000 is sure to fulfill these points. 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. JUMO has been recognized as a high-quality supplier of solar thermal energy sensors for many years. RTD temperature probes by JUMO 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 probes with terminal head form B**	**JUMO Etemp B Screw-in RTD temperature probes with terminal head form B for standard applications**	**Screw-in RTD temperature probes with terminal head form J**	**JUMO VIBROtemp Screw-in RTD temperature probes with plug connector**
	Data sheet	902020	902023	902030	902040
Application	**Features**	–			Highly shakeproof
Application	**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
Technical data	**Operating temperature**	-50 to +600 °C	-50 to +400 °C	-50 to +400 °C	-50 to +300 °C
Technical data	**Measuring circuits**	1/2			1
Technical data	**Sensor**	Pt100, Pt500, Pt1000			Pt100, Pt500, Pt1000, KTY
Technical data	**Process connection**	Thread			
Technical data	**Protection fitting**	Stainless steel			Stainless steel, brass
Technical data	**Protection type**	IP65			IP65, IP69K
Technical data	**Option**	Head transmitters			–
Technical data	**Approvals**	Metrological registration	–	Metrological registration	–
Technical data	**Special features**	Replaceable measuring insert, extension tube	Fast measurements in air	Fast measurements in air, spring-mounted screw connection	Vibration-resistant

Screw-in RTD temperature probes

	Description	Screw-in RTD temperature probes with plug connector	Screw-in RTD temperature probes with connecting cable	Screw-in and push-in RTD temperature probes according to DIN EN 14597	Screw-in melt RTD temperature probes
	Data sheet	902044	902050	902006	902090
Application	Features	Highly shakeproof, plug connector according to DIN EN 175301-803	–	For operating media water, oil, air	–
Application	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
Technical data	Operating temperature	-50 to +260 °C	-50 to +400 °C	-170 to +700 °C	-50 to +400 °C
Technical data	Measuring circuits	1	1/2	1/2/3	1/2
Technical data	Sensor	Pt100			
Technical data	Process connection	Thread		Thread, flange, compression fitting	Thread
Technical data	Protection fitting	Stainless steel	Stainless steel, Inconel®	Stainless steel, steel	Stainless steel, coating
Technical data	Protection type	IP65	–		
Technical data	Option	Head transmitters	Shielded cable	–	Ceramic insulated probe tip
Technical data	Approvals	GL	Metrological registration	DIN EN 14597, SIL in combination with devices according to 701150 and 701155	–
Technical data	Special features	Replaceable measuring insert for variants without transmitter	Cable made of PVC, silicone, PTFE, metal braiding	–	Cable made of PTFE, metal braiding, probe tip flat or blade-shaped

Push-in RTD temperature probes

	Description	**Push-in RTD temperature probes with terminal head form B**	**JUMO Etemp B Push-in RTD temperature probes with terminal head form B for standard applications**	**Push-in RTD temperature probes with terminal head form J**
	Data sheet	902120	902123	902130
Application	**Features**	–		
	Areas of application	Plant engineering, industrial heating plants, drying plants, 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 transmitters		
	Approvals	Metrological registration	–	Metrological registration
	Special features	Replaceable measuring insert	–	Fast measurements in air

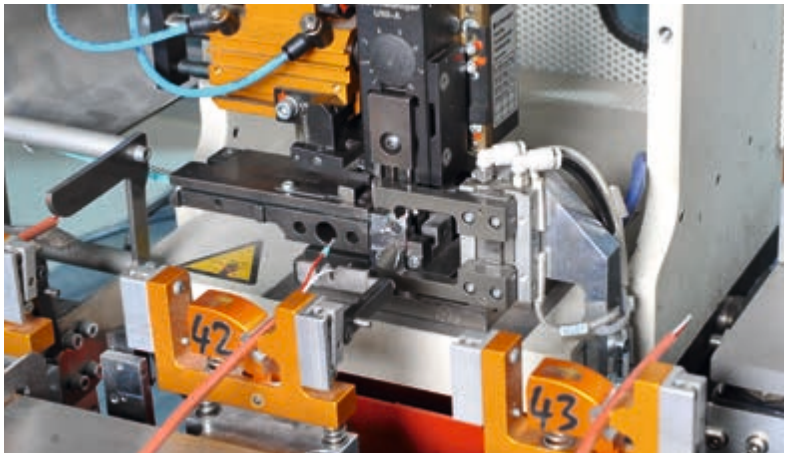
	Description	**Push-in RTD temperature probes with connecting cable**	**Push-in RTD temperature probes with connecting cable for solar thermal systems**	**Push-in RTD temperature probes with bayonet fastener**
	Data sheet	902150	902153	902190
Application	**Features**	–	For collector and accumulator temperature 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 fastener
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

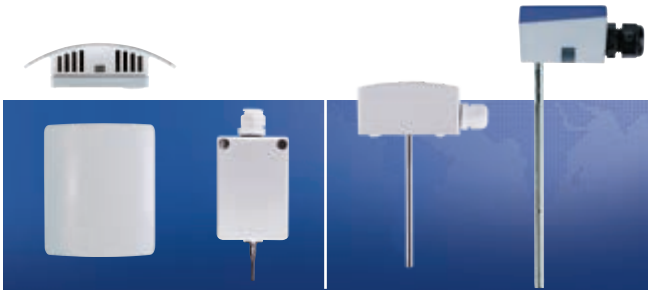
	Description	**Mineral-insulated RTD temperature probes with bare connecting wires**	**Mineral-insulated RTD temperature probes with bare terminal head**	**Mineral-insulated RTD temperature probes with LEMO connector**	**Mineral-insulated RTD temperature probes with connecting cable**
	Data sheet	902210/10	902210/40	902210/20	902210/3x
Application	**Features**	Flexible sheath cable, vibration-resistant			
Application	**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
Technical data	**Operating temperature**	-200 to +600 °C			
Technical data	**Measuring circuits**	1/2			
Technical data	**Sensor**	Pt100, Pt1000			
Technical data	**Process connection**	–	Thread	–	
Technical data	**Protection fitting**	Stainless steel			
Technical data	**Protection type**	–	IP65	–	
Technical data	**Option**	–	Head transmitters	–	
Technical data	**Approvals**	Metrological registration			
Technical data	**Special features**	∅ as of 1.9 mm			∅ as of 1.9 mm, cable made of PVC, silicone, PTFE, metal braiding

Food insertion RTD temperature probes

	Description	**JUMO FOODtemp Food insertion RTD temperature probes with PTFE handle**	**JUMO FOODtemp Food insertion RTD temperature probes with FPM handle**	**JUMO FOODtemp Food insertion RTD temperature probes with PEEK® handle**	**JUMO FOODtemp Food insertion RTD temperature probes with PEEK® handle**
	Data sheet	902350/22, 902350/23	902350/37, 902350/38	902350/82, 902350/83	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, others upon request	1	1/2, others upon request	
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	Transmitters	Non-insulated construction	
Technical data	**Approvals**	Metrological registration			
Technical data	**Special features**	Probe tip aligned centrally or angled	Probe tip aligned centrally	Probe tip aligned centrally or angled, cable outlet on the side	Probe tip aligned centrally or angled
Technical data	**Declaration of conformity**	EC 1935/2004 material confirmation			

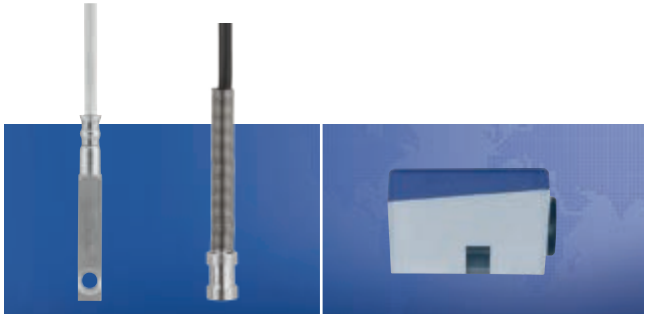


Indoor RTD temperature probes

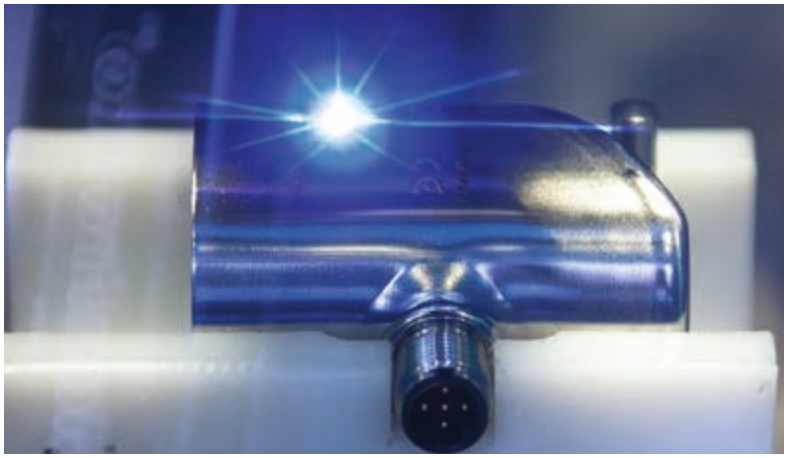


	Description	Indoor and outdoor RTD temperature probes	Channel RTD temperature probes
	Data sheet	902520	902524
Application	Features	Wall mounting	Channel mounting
	Areas of application	Building management, combined heat and power plants	Facility management, air heaters
Technical data	Connection	Terminal 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 transmitters	
	Approvals	Metrological registration	

Surface RTD temperature probes



	Description	**Surface RTD temperature probes with connecting cable**	**Surface RTD temperature probes**
	Data sheet	902550	902550
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

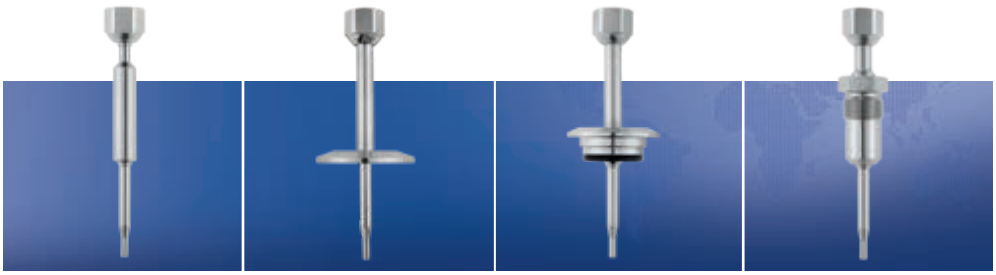


Industry RTD temperature probes

	Description	**RTD temperature probes for the food and pharmaceutical industry**	**JUMO Dtrans T100 screw-in RTD temperature probes with or without transmitter**	**JUMO DELOS T Precision RTD temperature probes**
	Data sheet	902810	902815	902940
Application	**Features**	–		Programmable, switching output, display of the unit selectable, housing and protection fitting made out of stainless steel (316L)
	Areas of application	Food and pharmaceutical applications, CIP and SIP plants, mechanical and plant engineering, refrigeration and air-conditioning engineering		
Technical data	**Connection**	Head	M12 connector	
	Operating temperature	-50 to +250 °C	-50 to +260 °C	
	Measuring circuits	1/2	1	
	Sensor	Pt100	Pt100, Pt1000	Pt1000
	Process connection	Thread, hygienic connections, screw connections, JUMO PEKA, CIP-compliant process connections, including electropolished Ra < 0.8 µm, hygienic thermowells		
	Protection fitting	Stainless steel 316L		
	Accuracy	Tolerance class: class A (optional class AA)	Tolerance class: class B (optional class A or AA)	Tolerance class: class A (optional class AA)
	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 transmitter 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
	Protection type	IP67, IP69K	IP67	
	Option	Head transmitters	Transmitter	–
	Approvals	–	ATEX upon request	–
	Declaration of conformity	EC 1935/2004 material confirmation		

Hygienic thermowells

The hygienic thermowells have been designed for use with temperature probes in the food and pharmaceutical industry.
All common process connections within the industry such as clamp, VARIVENT®, aseptic screw connection according to DIN 11864-1, and the CIP-compliant conical seal are available as a thermowell. The standard material is stainless steel 316L with surface finish Ra ≤ 0.8 µm. A surface finish of Ra ≤ 0.4 µm is also available as an optional extra. This wide variety creates a versatile system suitable for any application.
The use of hygienic thermowells hygienically seals the process. Easy replacement of the sensor is guaranteed without process interruption. This way, maintenance and repair costs can be reduced.

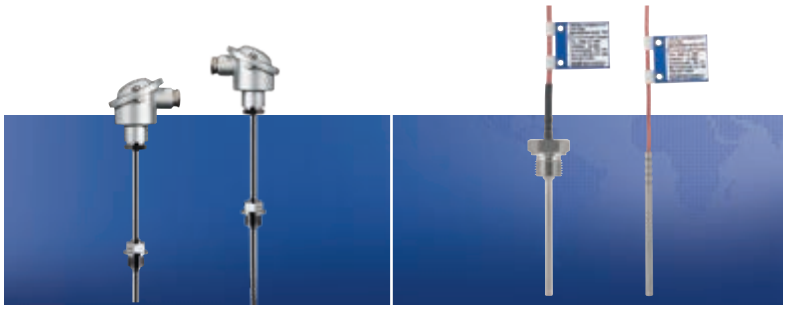


	Description	Welding sleeve	Clamp	VARIVENT®	CIP-compliant conical seal
	Data sheet	902812	902812	902812	902812
Application	Features	Hygienic thermowell with short response time			
Application	Areas of application	Food industry, pharmaceutical industry, CIP and SIP plants, mechanical and plant engineering			
Technical data	Material	1.4404 (316L)			
Technical data	Surface	Standard Ra ≤ 0.8 µm Optional Ra ≤ 0.4 µm			
Technical data	Insertion lengths	50, 100, and 150 mm			
Technical data	Response time in water	t0.50 = approx. 3 s t0.90 = approx. 8 s			
Technical data	Process connections	CIP-compliant conical seal, VARIVENT®, aseptic according to DIN 11864-1, ball welding sleeve, clamp, welding sleeve, milk cone, NEUMO BioControl®			

Industry RTD temperature probes

	Description	**JUMO STEAMtemp Push-in RTD temperature probes in steam-tight version**	**Level and temperature probes for commercial vehicles as well as construction and agricultural machinery**	**JUMO CANtrans T RTD temperature probes with CANopen output**
	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 dissolution possible (millikelvin scale)
	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		M12 connector
	Operating temperature	-70 to +200 °C	-40 to +140 °C	-50 to +450 °C
	Measuring circuits	1/2/3	1/2	
	Sensor	Pt100	Voltage, Pt100, Pt1000	Pt1000
	Process connection	Thread, flange	Thread	
	Protection fitting	Stainless steel, steel, ceramic	Stainless steel, coating	–
	Protection type	IP69	–	
	Option	Shielded cable	Corrugated hose	Transmitters
	Approvals	–		Metrological registration
	Special features	Cable made of FEP, PTFE, silicone	Cable made of polyester, cross-linked	Extension tube

ATEX and IECEx RTD temperature probes



	Description	**JUMO PROCESStemp RTD temperature probes for process technology with ATEX approval**	**ATEX and IECEx RTD temperature probes according to DIN EN 60751 with connecting cable**
	Data sheet	902820	902821
Application	**Features**	Ex and IECEX approval, protection tubes made out 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**	Screw connection/thread G 1/2, G 1, 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, 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 transmitters	Mineral-insulated RTD temperature probes
Technical data	**Approvals**	ATEX, IECEx	ATEX, IECEx
Technical data	**Special features**	Replaceable measuring insert, Ex i, Ex d	For universal application

RTD temperature probes with wireless data transmission – JUMO Wtrans transmitter

	Description	**JUMO Wtrans transmitter T01 RTD temperature probes with electronic assemblies up to 85 °C**	**JUMO Wtrans transmitter T02 RTD temperature probes with electronic assemblies up to 125 °C**	**JUMO Wtrans transmitter T03 RTD temperature probes with ATEX approval and electronic assemblies up to 85 °C**
	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, New Zealand, and 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 receiver antenna holder for wall mounting and with 3 m antenna cable		
	Transmitter detection (transmitter ID)	Five-digit ID, factory set, can be configured according to customer specifications		
	Measurement 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		
	Approvals	IC (Industry Canada) for 915 MHz; FCC (Federal Communications Commission) for 915 MHz; cULus (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
JUMO 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 even 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 a TTL/RS232 or USB/TTL converter for connecting the receiver and the PC.

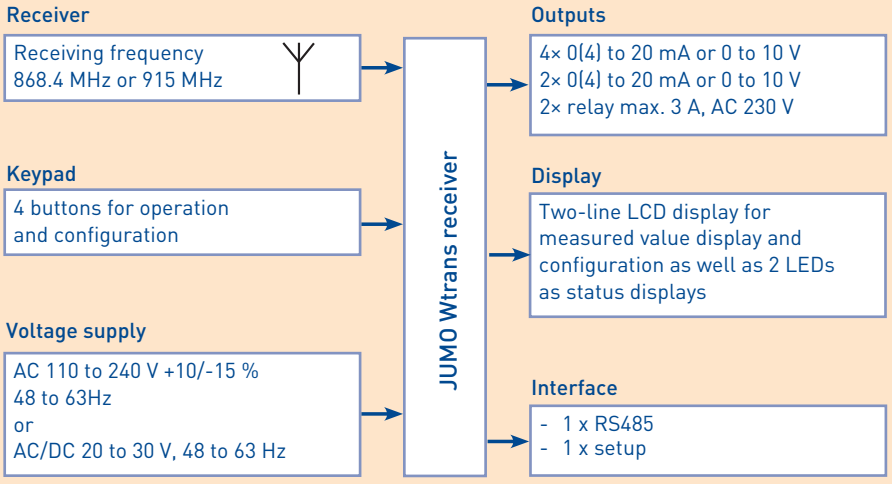
Type 902931

Features

Wtrans T01
DIN rail housing, 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



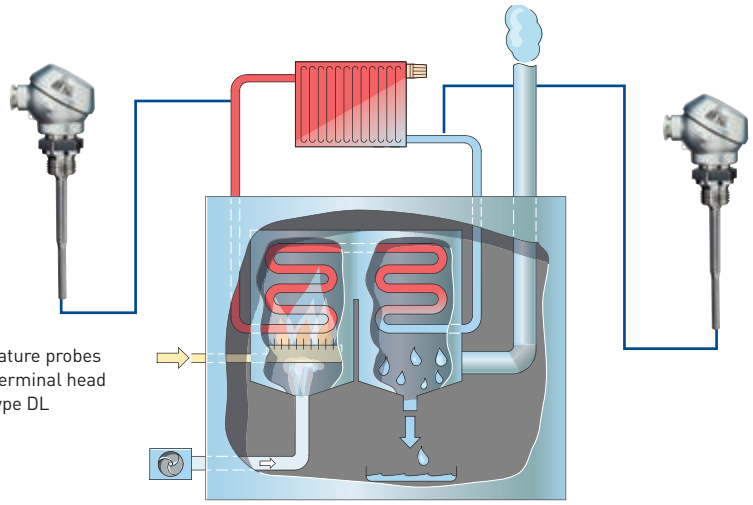
Approvals

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

RTD temperature probes for heat and cold meters

	Description	**JUMO HEATtemp With connecting cable for direct installation (type DS/DL)**	**JUMO HEATtemp With connecting cable for immersion sleeve (type PS/PL)**	**JUMO HEATtemp With terminal head for direct installation (type DL)**	**JUMO HEATtemp With terminal head for immersion sleeves (type PL)**
	Data sheet	902428, 902455	902438, 902465	902427, 902454	902437, 902464
Application	**Features**	Paired according to European MID directive and/or German Weights and Measures Act (MessEG) including declaration of conformity (conformity and additional metrology marking). Production according to module D of the MID and German Weights and Measures Act (MessEG).			
Application	**Areas of application**	Heat and cold meters			
Technical data	**Connection or connecting cable**	Connecting cables with ferrules or PVC, PUR, silicone		Terminal head with screw terminals	
Technical data	**Operating temperature**	0 to +180 °C	**Type PS:** 0 to +150 °C; **Type PL:** 0 to +180 °C	0 to +180 °C	
Technical data	**Process connection**	**Type DS:** connection M 10 x 1; **Type DL:** thread G 1/4, G 1/2 stainless steel	Push-in RTD temperature probes for thermowells	Thread G 1/2, stainless steel	Push-in RTD temperature probes for thermowells
Technical data	**Protection fitting**	**Type DS:** stainless steel ∅ 5.4 mm, offset by ∅ 3.3/∅ 3.6 mm	**Type PS:** stainless steel ∅ 5, 5.2, or 6 mm; **Type PL:** stainless steel ∅ 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
Technical data	**Temperature difference**	3 to 180 K	**Type PS:** 3 to 150 K **Type PL:** 3 to 180 K	3 to 180 K	
Technical data	**Minimum immersion depth**	**Type DS:** 15 mm **Type DL:** 30 mm	**Type PS:** ≥ 15 mm	30 mm	
Technical data	**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
Technical data	**Approvals**	MID and domestic type examination certificates for temperature probes for heat meters, cold meters, and combined cold and heat meters; fulfills the requirements of DIN EN 1434, AGFW FW 202 FW 212, TR K8, and TR K9			

Application example: heat quantity measurement



JUMO HEATtemp
Screw-in RTD temperature probes for heat meters with terminal head for direct mounting, type DL
Type 902427

JUMO RTD temperature probes – the most effective way of acquiring the temperature difference when measuring warm and cold energy

Cold and heat energy measurement – the proven and highly successful method of measuring the emitted energy from heat exchangers or heating systems. This is an area for which JUMO has developed special, high-quality sensors with which the temperature difference can be measured reliably and easily.

How you can measure the energy consumption thanks to exact temperature measurement

The JUMO RTD temperature probes for cold/warm energy measurement acquire the most important measurand in warm energy measurement: the temperature difference. For this purpose they are equipped with a precise sensor that has long-term stability to help ensure maximum precision.
JUMO offers temperature probes that correctly acquire the temperature even when the immersion depths are small. One example is in pipelines with a 12 mm diameter. To measure the temperature difference between flow and return of the heating system within the specified tolerances according to the international standard EN 1434 the 2 temperature probes that are required for this task must be metrologically coordinated with one another.

Why you can rely on your measured values thanks to JUMO

JUMO develops the temperature probes beyond the standard requirements. The compliance with tolerances in temperature difference measurement absolutely requires pairing of probes that are compatible with one another. For this purpose each temperature probe is calibrated at 3 temperatures. Based on the individual characteristic line that is calculated from that the matching temperature probes are selected via a calculation algorithm. Temperature probes that are permanently connected to the calculating engine can also transmit the individual characteristic line for programming the grid map.

Temperature sensors with IO-Link

Long plant downtimes now belong to the past. The new JUMO temperature sensors with IO-Link help you to better plan the availability or the exchange of sensors through the integrated diagnostic function. In addition, time-consuming parameterizations when changing sensors are eliminated as the necessary data is transferred from the superordinate system.

IO-Link

Sensors that have a say!

Your benefits in a nutshell:

- Optimization of the production process through communication down to the lowest field level
- Reduction of mounting and startup times
- Increase of plant efficiency due to maximum transparency down to the sensor level
- Reduction of maintenance and service costs with simultaneous increase in plant availability
- High degree of process reliability due to long operating life and great accuracy
- Flexible use through compact design type and a variety of process connections

	Description	**JUMO dTRANS T1000 Temperature sensor with IO-Link**
	Data sheet	902915
Application	**Features**	Fastest data transfer rate: COM 3, clearly assignable due to IODD
Application	**Areas of application**	Food industry, mechanical and plant engineering, packaging industry, process automation
Technical data	**Input**	-50 to +260 °C
Technical data	**Medium temperature**	-50 to +260 °C
Technical data	**Ambient temperature**	-40 to +85 °C
Technical data	**Output**	IO-Link device V 1.1 (downward compatible to IO-Link V 1.0); 2 outputs for switch operation (SIO mode; SIO = standard IO)
Technical data	**Data transfer rate**	COM 3 (230.4 kBaud)
Technical data	**Process connection**	Market-based screw connections and hygienic process connections
Technical data	**Protection type**	IP65, IP67
Technical data	**Cycle time**	2 ms
Technical data	**Special features**	Hygienic process connection with JUMO PEKA; compact design type

Accessories

Various accessories are available for installation or connection to the evaluation units. 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 thermowells and welding protective sleeves	Terminal heads and connection sockets	Compensating and connecting cables
	Data sheet	902440, 902442	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/stainless steel braiding, for single and double elements

	Description	Measuring inserts for screw-in thermocouples and screw-in RTD temperature probes with terminal head form B	Thermocouples according to DIN 43732	Compression fitting and flange, counter pieces for bayonet fasteners	Plug connectors
	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 straight thermocouples according to DIN 50446	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

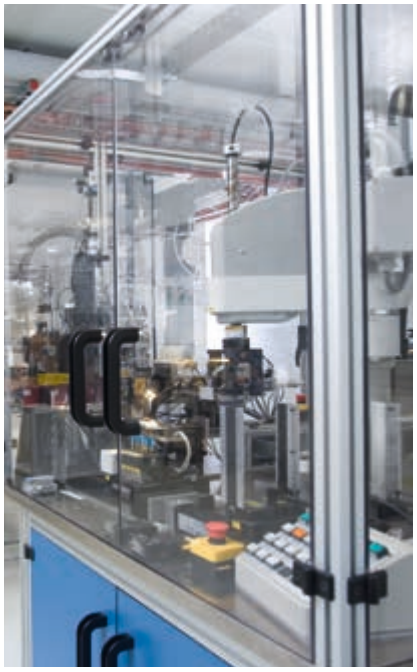
Platinum-chip temperature sensors in thin film technology

JUMO offers a multifaceted program of platinum-chip temperature sensors. With an annual production of several million temperature sensors we are one of the world's leading suppliers.

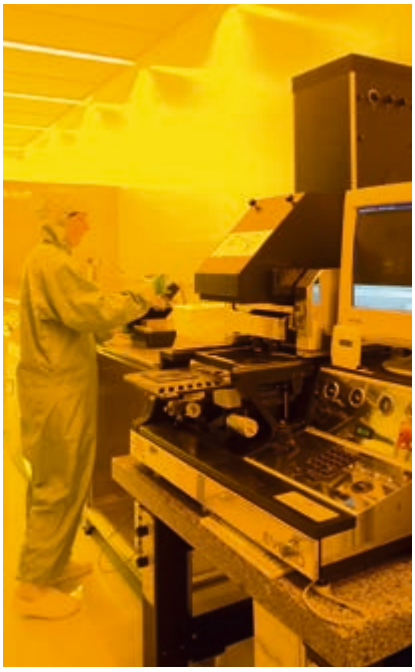
Since the 1980s modified procedures originating from the field of semiconductor production have been continuously customized to Pt100 production. We supply precision and long-term stability for the cleanroom. Tolerances as of ±0.1 K are produced in series. Cost-effective series production, combined with the highest quality standards, make customer benefits complete.

RoHS COMPLIANT 2011/65/EU

JUMO – your expert partner for sensor applications



Mechanical processes: welding, sawing



Photolithography: creating the structure on the substrate

Laser trimming of platinum-chip temperature sensors

JUMO is committed to both quality and fair market prices

Platinum-chip temperature sensors in thin film 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 so that their efficiency can create a positive price-performance ratio. Yet our system permits a high degree of flexibility so that we can do justice to special customer applications.

Over 70 years of experience for our customers

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

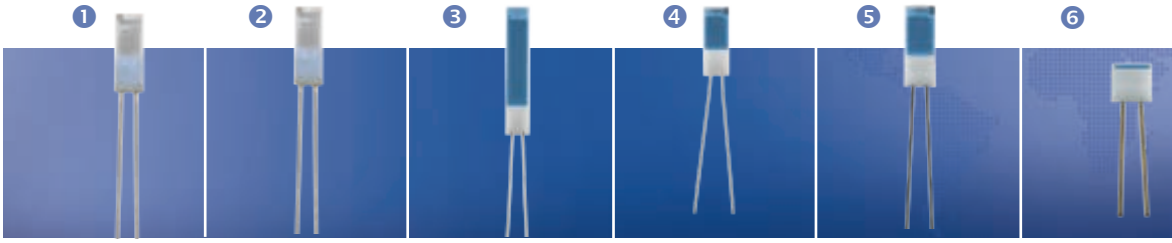
Customer-specific modifications

The customers and their expectations for the application are our primary focus – especially 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.

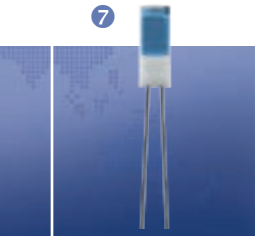
Platinum-chip temperature sensors with connection wires according to DIN EN 60751

JUMO offers a suitable solution for every application. A wide range of sensors are available in stock for almost all applications.

We offer the customer coordinated system solutions for special and OEM applications. The construction size 1.2 × 4 mm (PCA 1.1204.1S) offers maximum convenience for tight installation situations. In addition, the construction size also has a particularly fast response time. The construction size 2 × 5 mm (PCA 1.2005.1E) has an excellent price-performance ratio and is ideally suited for all manual placement tasks. Resealable packaging completes the product requirement for manual handling.



	Designation	Design type PCA/L	Design type PCA/S	Design type PCA/H	Design type PCA/M	Design type PCA/E	Design type PC
	Data sheet	906121					
Application	Features	Broad range, we have the suitable sensor for every application					
Application	Areas of application	Measurement and control technology, heating and air-conditioning technology, industrial electronics, vehicle manufacture, life sciences					
Technical data	Wires	Ag 0.2 × 0.3 Silver wire	Pt-Ni 0.2 mm Platinum wrapped wire	Pd 0.25 mm Palladium wire	Pt-Ni 0.2 mm Platinum wrapped wire	Ni 0.20 mm	Ni-Au 0.20 mm Gold-plated nickel wire
Technical data	Operating temperature	-70 to +250 °C	-70 to +400 °C	-70 to +600 °C	-70 to +550 °C	-70 to +500 °C	-70 to +500 °C
Technical data	Processing	Soft soldering	Crimping, welding, hard-soldering	Welding, hard-soldering	Crimping, welding, hard-soldering		Crimping, welc soft-soldering
Technical data	Size (W × L × H)	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	2 × 10 × 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	1.5 × 2.5 × 1.0 mm 2 × 2.5 × 1.3 mm 2 × 5 × 1.3 mm	1.5 × 2.5 × 1.0 r 2 × 2.5 × 1.3 m 2 × 5 × 1.3 mm
Technical data	Nominal values	Pt100, Pt500, Pt1000	Pt100, Pt500, Pt1000, Pt2000	Pt100, Pt500, Pt1000	Pt100, Pt200, Pt500, Pt1000	Pt100, Pt200, Pt1000	Pt100, Pt1000, others upon re
Technical data	Tolerance classes	All tolerance classes possible					



A/EG	Design type PCA/ET
n	Ni-Sn 0.20 mm Tin-plated nickel wire
ding, hard-soldering,	
mm m	1.5 × 2.5 × 1.0 mm 2 × 2.5 × 1.3 mm
equest	

1 Design type PCA/L

The "L" version is the preferred choice for the assembly of probes with connecting cables. It is particularly suitable for an electrical connection via soft-soldered joints. The connections are made of pure silver.

2 Design type PCA/S

The "S" version is the preferred choice for application temperatures above 180 °C. It is particularly suitable for an electrical connection via welded, crimp, or hard-soldered joints.

3 Design type PCA/H

The "H" version is the preferred choice for applications with particularly high and permanently higher application temperatures. They are suitable for electrical connections using melting or laser welding techniques as well as hard-soldered joints.

4 Design type PCA/M

The "M" version offers ultimate implementation possibilities for most applications. The sensors have an especially wide temperature measuring range. Their long-term stability ensures reproducible measurement values that are suitable for several thousand cycles.

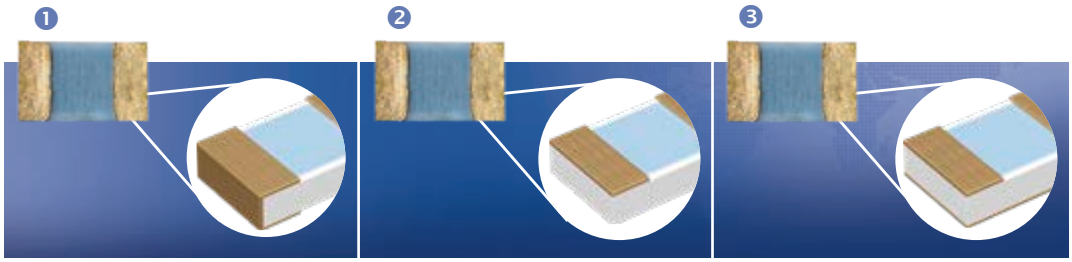
5, 6, 7 Design type PCA/E, EG, and ET

The "E" version can be used just about everywhere for numerous applications in low to high temperature ranges. The connection wires are particularly suitable for an electrical connection via welded, crimp, or hard-soldered joints.
Design type PCA EG and ET are especially suited for soft-soldering.

Platinum-chip temperature sensors in SMD design type according to DIN EN 60751

Platinum-chip temperature sensor in SMD design type are especially designed for the automatic placement on circuit boards. Their small size allows a high placement density.

The patented contact technology enables outstanding processing results and a high degree of temperature cycle stability.



	Designation	Design type PCS/SMD with wrap-around contact	Design type PCF/SMD Flip chip with one-sided contact	Design type PCF-B/SMD Flip chip with one-sided contact and solderable back part
	Data sheet	906125	906125	906125
Application	Features	For the automated placement on circuit boards, patented contact technology		
Application	Areas of application	Measurement and control technology, heating and air-conditioning technology, industrial electronics, life sciences		Surface and ambient temperature measurement on circuit boards
Technical data	Solder connections/ contact surfaces	Gold plated nickel-all-round contact	Gold-plated nickel solder contact (face down mounting)	
Technical data	Operating temperature	-50 to +250 °C		-70 to +250 °C
Technical data	Processing	Lead-free soldering; leaded soldering; high-temperature solder (HMP); low-temperature solder (LMP); conductive adhesive bonding; ultrasonic wire bonding		
Technical data	Size (W × L × H)	Type 0805 (JUMO: 1302): 1.25 × 2.0 × 0.4 mm Type 1206 (JUMO: 1503): 1.5 × 3.0 × 0.4 mm	Type 0805 (JUMO: 1302): 1.25 × 2.0 × 0.4 mm	
Technical data	Nominal values	Pt100, Pt500, Pt1000, others upon request		
Technical data	Tolerance classes	F0.1, F0.15, F0.3, F0.6		F0.3

❶, ❷ and ❸ Design type PCF/SMD and PCF/SMD

Platinum-chip temperature sensors in SMD design type have a high-quality nickel contact and are available in 3 versions. The PCS design type has a solder contact (wrap-around contact) on the back while the PCF design type (flip chip) has a solder contact on the front.
In addition, the PCF design type can be fully equipped with solderable nickel-gold metallization on the back (PCF-B design type). The result is that a soldered connection can be used to establish direct thermal contact with another body. A new construction form in combination with an innovative technology for manufacturing the solder contacts makes these sensors very robust.
They can therefore be used at temperatures up to 250 °C.

Other advantages

- Better processing results during soldering
- Up to 15 % space reduction with the PCF design type
- Optimal protection against environmental influences

Platinum-chip temperature sensors in special designs according to DIN EN 60751

JUMO has always offered customer-specific solutions, whether as a pre-assembled measuring insert or for applications in high-humidity environments. Here, not only does our 40 years of experience in thin film technology comes into play, but also our expertise in circuit board assembly as well as in measuring and control technology.

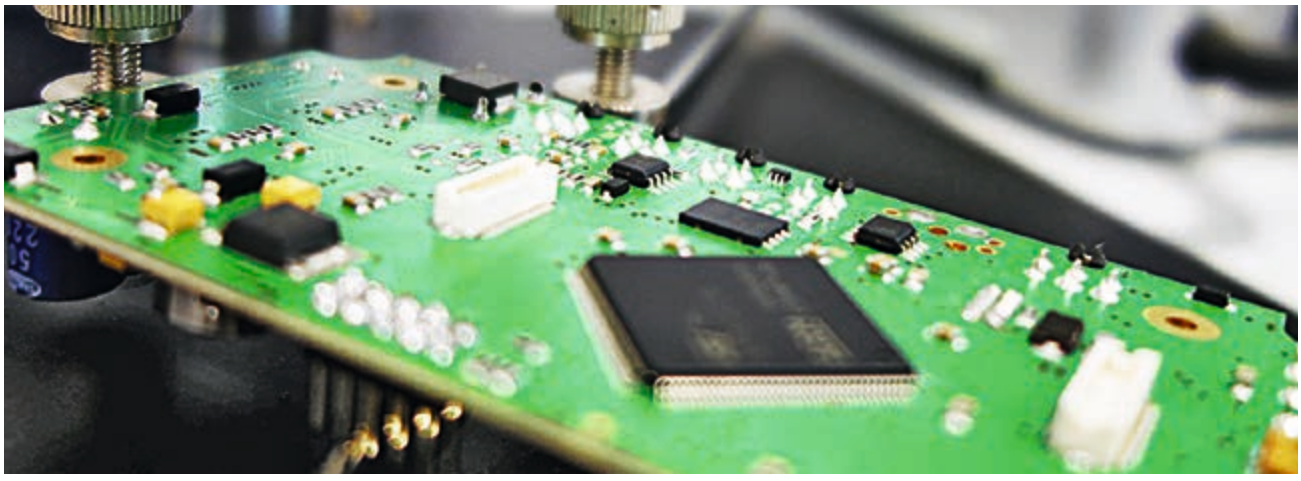
	Designation	Design type PCSE	Design type PCKL
	Data sheet	906122	906123
Application	Features	Prefabricated measuring insert, automated downstream processing possible, price advantage due to SMD temperature sensors, gold-plated contact surfaces	Stable terminal clamps, additional protective coating, tin-plated terminal clamps, suitable for high levels of humidity
	Areas of application	Measurement and control technology, heating and air-conditioning technology, industrial electronics	
Technical data	Solder connections/ contact surfaces	Gold-plated	Tin-plated (terminal clamps)
	Operating temperature	-20 to +150 °C	-30 to +105 °C
	Processing	Soft-soldering	
	Size (W × L × H)	4.3 × 15 × 2.2 mm 4.1 × 28 × 2.2 mm	3.9 × 5 × 1.5 mm
	Nominal values	Pt100, Pt500, Pt1000	Pt100, Pt1000
	Tolerance classes	Class F0.3 and F0.6 more upon request	All tolerance classes

1 Design type PCSE

The design type represents an already prefabricated measurement insert. An equipped platinum SMD temperature sensor and 2 spacers to prevent short circuits are located on an epoxy PCB.

2 Design type PCKL

Compared to the standard temperature sensors these sensors have terminal clamps with directional stability. Furthermore, an additional protective coating makes this sensor particularly well suited for humid environments.



DAkkS calibration service

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 deployed measurement technology when acquiring 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. In Europe and in many non-European countries DAkkS-calibrated temperature probes and test equipment are generally recognized as the established traceability tool.

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 calibrating service for the measurand temperature

Our range of services

In-house calibration

Calibration object	Temperature range	Measurement uncertainty[2]
RTD temperature probe[1]	-196 °C	0,05 K
	-80 to +500 °C	0.015 to 0.05 K
Thermocouple[1]	-196 °C	0,4 K
	-80 to +1100 °C	0.3 to 1 K
Transmitter with RTD temperature probes or thermo-couples[1]	-196 °C	0,075 K
	-80 to +1100 °C	0.045 to 1.5 K
Mechanical thermometer	-196 °C	0,5 K
	-80 to +500 °C	0.3 to 1.5 K
Climatic chambers (temperature)	-80 to +300 °C	0.4 to 1 K
Temperature indicating devices	-200 to +2500 °C	0.03 to 0.2 K

On-site calibration

Calibration object	Temperature range	Measurement uncertainty[2]
RTD temperature probe[1]	-40 to +500 °C	0.25 to 2.5 K
Thermocouple[1]	-40 to +700 °C	0.75 to 2.5 K
Transmitter with RTD temperature probes or thermo-couples[1]	-40 to +700 °C	0.25 to 2.5 K
Mechanical thermometer	-40 to +500 °C	0.5 to 3 K
Climatic chambers (temperature)	-80 to +300 °C	0.4 to 1 K
Temperature indicating devices	-200 to +2500 °C	0.03 to 0.2 K

[1] Direct display

[2] The assignable measurement uncertainty depends on the testing temperature and the respective calibration object

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 confirms the competence of the JUMO calibration laboratory according to DIN EN ISO/IEC 17025 and grants the authority to calibrate the following calibration objects:

- RTD temperature probes [a]
- Direct-display thermometers [a]
- Temperature transmitters, data loggers [a]
- Thermocouples [a]
- Temperature block calibrators
- Mechanical thermometer [a]
- Temperature display devices [a]
- Climatic chambers (temperature) [a]

On-site calibration service

Measurement technology 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. Among other factors, this on-site calibration service also takes the local installation conditions into consideration – the service engineer will repair and replace individual components if required.

Contact:

Email: calibration-lab@jumo.net

[a] Also as on-site calibrations

www.jumo.net

PR 90024 EN/00323124/V8