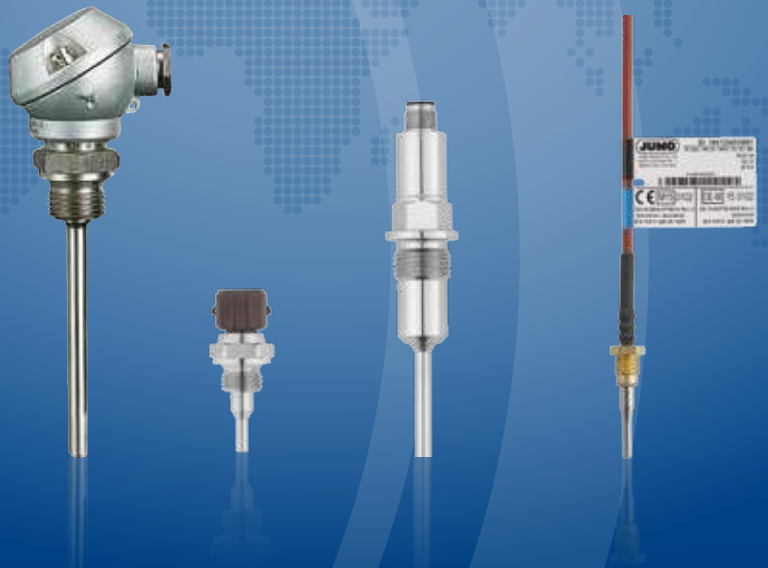




More than **sensors + automation**



Temperature

Innovative solutions for the toughest requirements



Contact:

Phone: +49 661 6003-0

Email: sensors@jumo.net



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 is 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 under the specified type/product group number at www.jumo.net.



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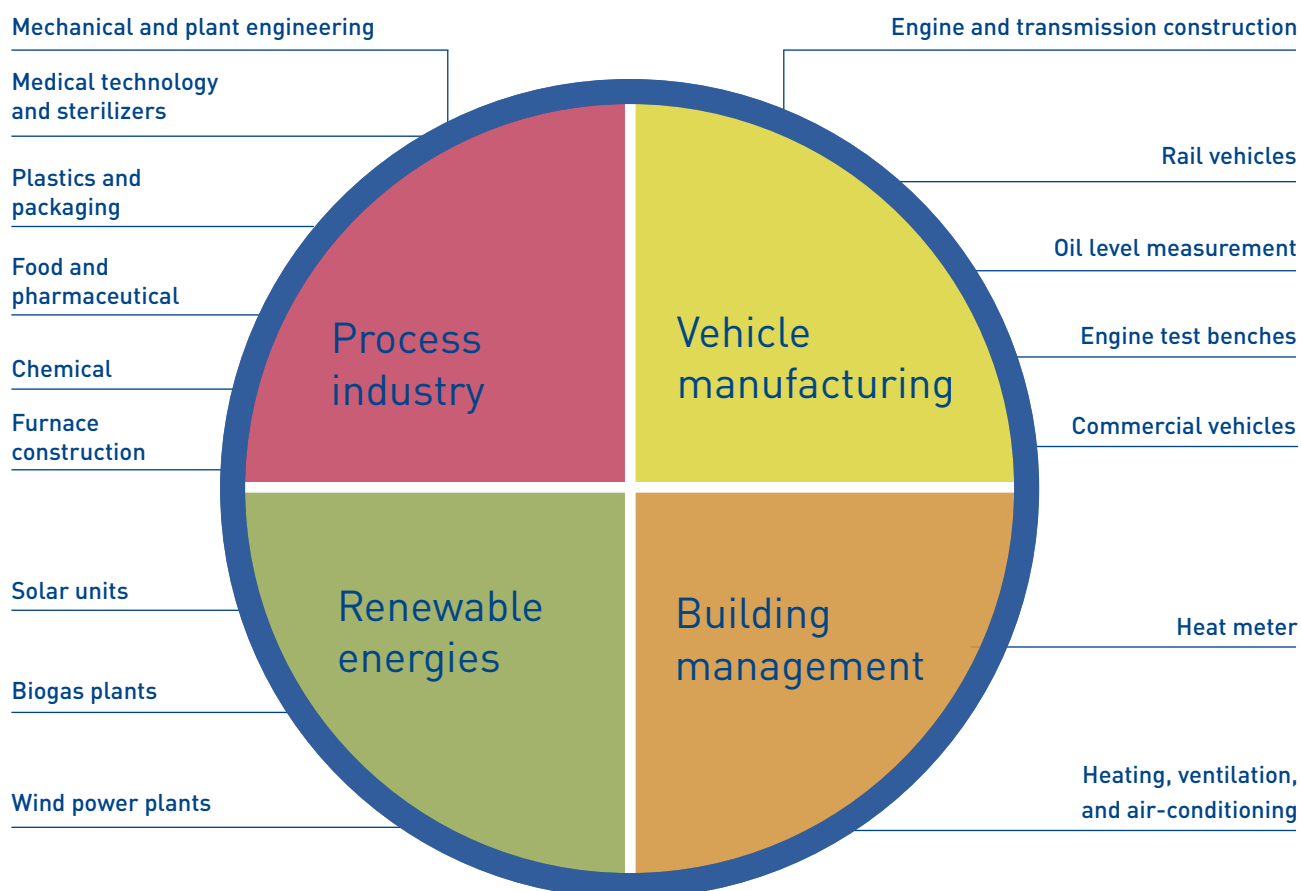
Temperature measurement

Temperature is one of the most important measurands in the industry. It must be recorded and processed for 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. Contact us and find out!

Thermocouples and RTD temperature probes can be used for SIL applications with manufacturer's declaration.

Approvals/standard requirements

ATEX, EAC Ex, metrological registration, PL, SIL, GL, EHEDG, DIN EN 14597, AMS 2750 E, CQI-9





Thermocouples

Thermocouples are mainly used to measure higher temperatures. Depending on the requirement, different thermocouples are used here that 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

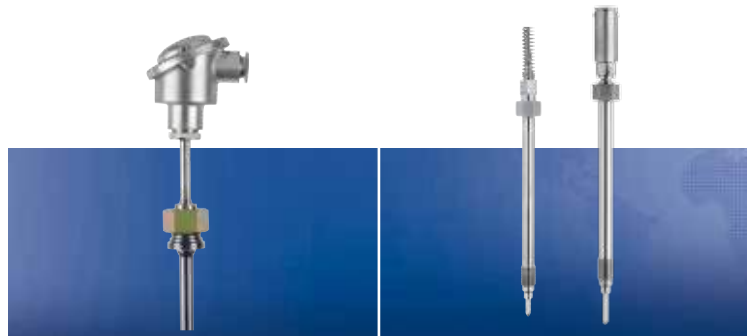


Description		Screw-in thermocouple with terminal head form B	Screw-in thermocouple with terminal head form J	Screw-in thermocouple with connecting cable
Type/data sheet		901020	901030	901050
Application	Features	-		
	Areas of application	Woodworking machines, dryer systems, baking ovens, smelting works, 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	

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



Screw-in thermocouples



Description		Screw-in/push-in thermocouple for devices and plants tested according to DIN EN 14597	Screw-in melt thermocouple
Type/data sheet		901006	901090
Application	Features	For operating media water, oil, and air	-
	Areas of application	Heating construction, furnace construction, apparatus construction	Plastics industry
Technical data	Connection	Head, cable	Cable, connector
	Operating temperature	0 to +1500 °C	-40 to +600 °C
	Measuring circuits	1/2	1
	Thermocouples	L, K, S, B*	J, L, K*
	Process connection	Thread, flange, compression fitting	Thread
	Protection fitting	Stainless steel, steel, ceramic	Stainless steel, coating
	Protection type	-	-
	Option	Non-insulated construction	
	Approvals	DIN EN 14597, SIL in combination with devices according to 701150/55	-
	Special features	-	Cable made of PTFE, metal braiding, probe tip flat/blade-shaped

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



Push-in thermocouples



Description		Push-in thermocouple with form A terminal head	Push-in thermocouple with form B terminal head	Push-in thermocouple with connecting cable	Push-in thermocouple with bayonet fastener
Type/data sheet		901110	901120	901150	901190
Application	Features	Straight thermocouples according to DIN EN 50446		-	Adjustable spring pressure ensures good heat transfer
	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	
	Operating temperature	-200 to +1600 °C		-50 to +600 °C	0 to +400 °C
	Measuring circuits	1/2		1	1/2
	Thermocouples	J, L, K, S, B*		L, K*	J, L, K*
	Process connection	Flange, compression fitting		-	Bayonet fastener
	Protection fitting	High-temperature steel, ceramic		Stainless steel	
	Protection type	IP54	IP65	-	-
	Option	Head transmitter		Non-insulated construction	Shielded cable
	Approvals	Metrological registration		-	
	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
		Complies with specification according to AMS 2750 E and CQI-9			

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

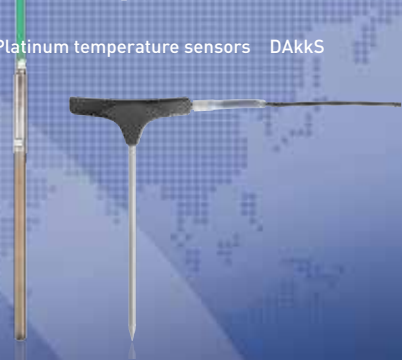


Mineral-insulated thermocouples



	Description	Mineral-insulated thermocouple with bare connecting wires	Mineral-insulated thermocouple with terminal head form J	Mineral-insulated thermocouple with standard tab connector	Mineral-insulated thermocouple with thermal cable
	Type/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 transmitter	Non-insulated construction	
	Approvals	Metrological registration			
	Special features	Complies with specification according to AMS 2750 E and CQI-9	-	Ø as of 0.5 mm	Ø as of 0.5 mm Cable made of silicone, PTFE, glass fiber/ metal braiding

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

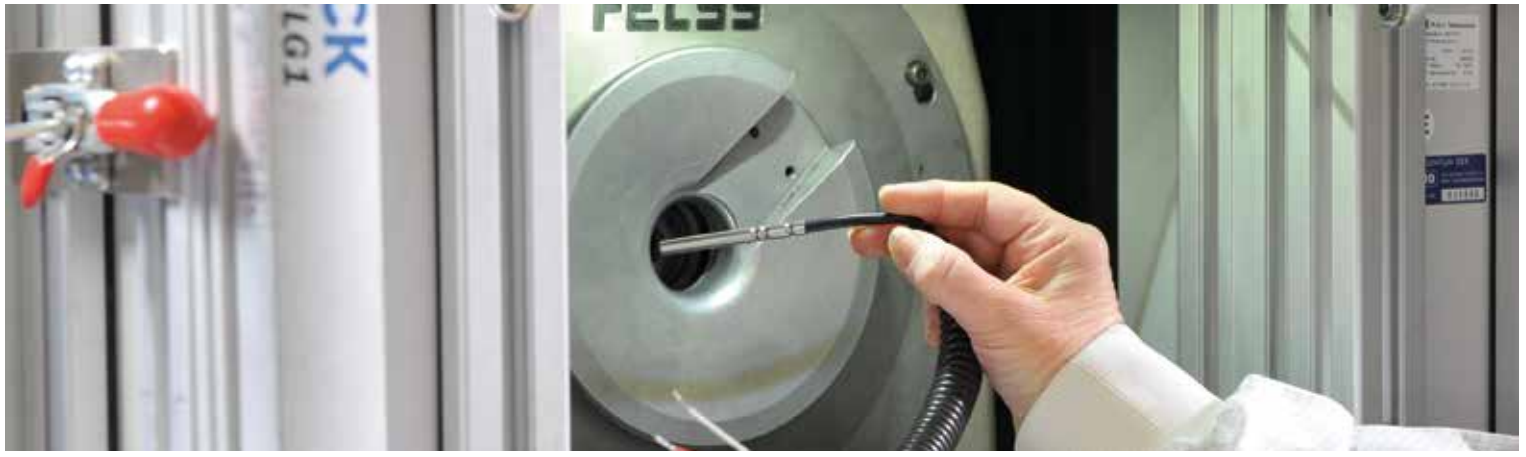


Insertion thermocouples



Description	JUMO FOODtemp Insertion thermocouple with PTFE handle	JUMO FOODtemp Insertion thermocouples with PTFE® handle	JUMO FOODtemp Insertion thermocouples with PTFE® handle
Type/data sheet	901350/33, 901350/63	901350/83	901350/84
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
Connection	Cable		
Operating temperature	-100 to +260 °C		
Measuring circuits	3/4/5	3/4	
Thermocouples	K*		
Handle	Ø 12 mm, 15 mm	T-form	Ø 11.5 mm
Protection fitting	Stainless steel		
Protection type	IP67		
Special features	Probe tip aligned centrally/angled	Probe tip aligned centrally/angled cable outlet on the side	Probe tip aligned centrally/angled
Declaration of conformity	EC 1935/2004 material confirmation		

*According to DIN EN 60584



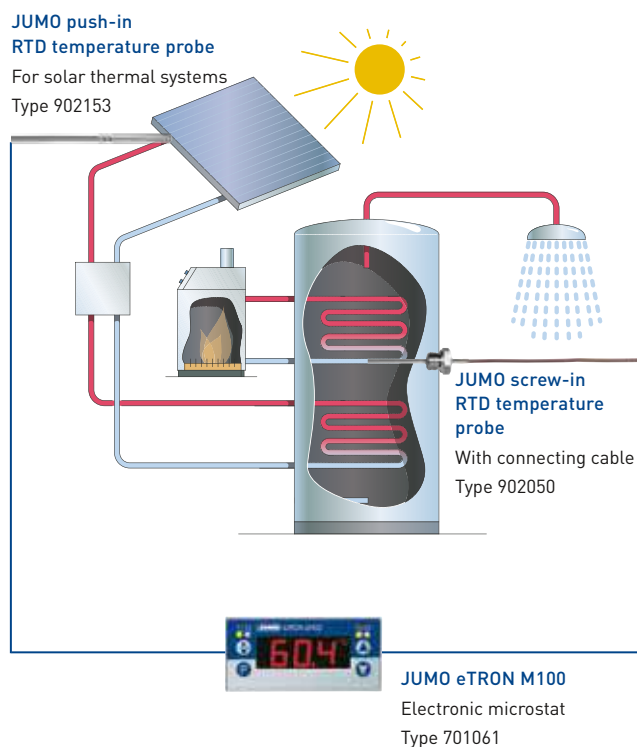
RTD temperature probes

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



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. 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 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	-			Highly shakeproof
	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 screw connection	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 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	DIN EN 14597, SIL in combination with devices according to 701150/55	-
	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/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 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 transmitter			
	Approvals	Metrological registration	-		Metrological registration
	Special features	Replaceable measuring insert	-		Fast measurements in air



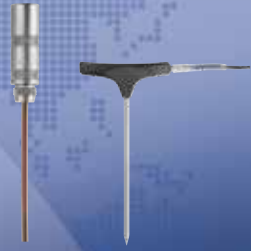
Description		Push-in RTD temperature probe with connecting cable	Push-in RTD temperature probe with connecting cable for solar thermal systems	Push-in RTD temperature probe with bayonet fastener
Type/data sheet		902150	902153	902190
Application	Features	-	For collector and accumulator temperature measurement	Adjustable spring pressure ensures good heat transfer
	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		
	Operating temperature	-50 to +400 °C	-50 to +260 °C	-50 to +350 °C
	Measuring circuits	1/2	1	1/2
	Sensor	Pt100	Pt100, Pt1000	Pt100
	Process connection	-		Bayonet fastener
	Protection fitting	Stainless steel	Stainless steel, brass	Stainless steel
	Protection type	-		
	Option	Shielded cable	-	Shielded cable
	Approvals	-		
	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



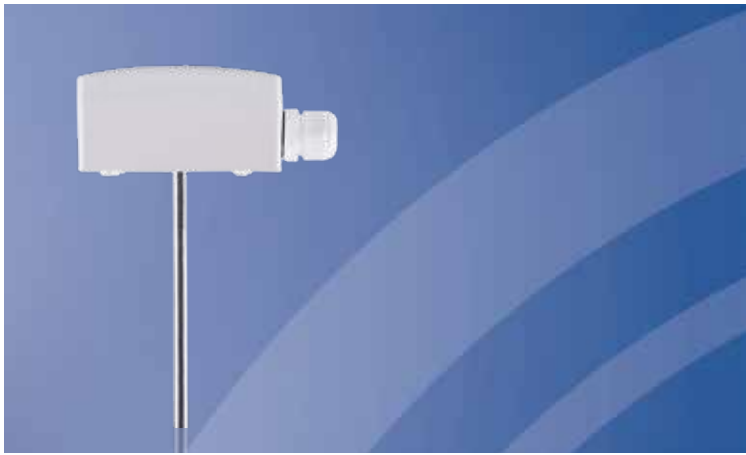
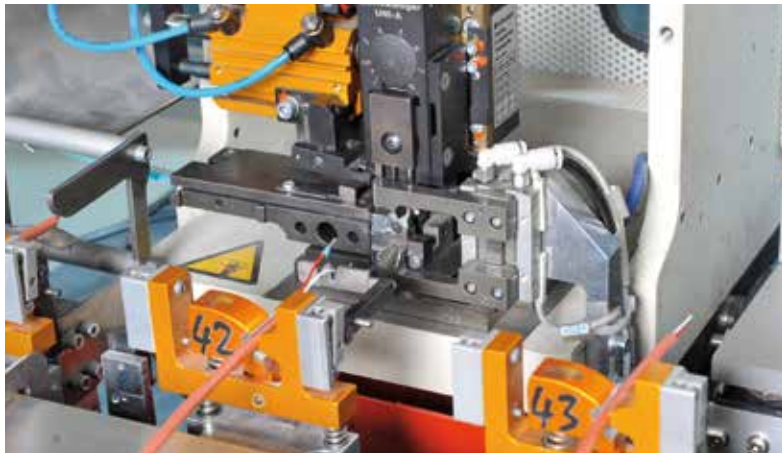
Description		Mineral-insulated RTD temperature probe with bare connecting wires	Mineral-insulated RTD temperature probe with terminal head	Mineral-insulated RTD temperature probe with Lemo® connector	Mineral-insulated RTD temperature probe with connecting cable
Type/data sheet		902210/10	902210/40	902210/20	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	Ø as of 1.9 mm			Ø as of 1.9 mm, cable made of PVC, silicone, PTFE, metal braiding



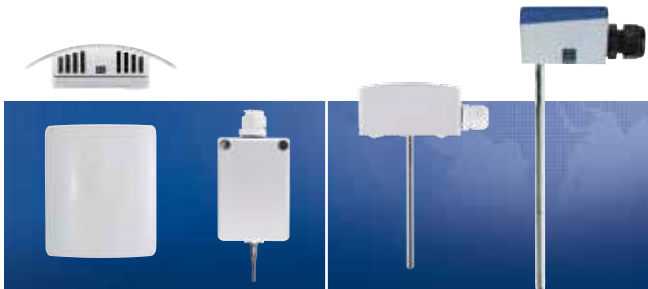
Insertion RTD temperature probes



	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, 902350/23	902350/37, 902350/38	902350/82, 902350/83	902350/84
Application	Features	Steam-tight, high-degree of mechanical strength			
	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			
	Operating temperature	-50 to +260 °C	-50 to +200 °C	-50 to +260 °C	
	Measuring circuits	1/2, others upon request	1	1/2, others upon request	
	Sensor	Pt100			
	Handle	Ø 10 mm, Ø 12 mm, Ø 15 mm	Ø 6.5 mm	T-form	Ø 11.5 mm, Ø 20 mm, Ø 15 mm
	Protection fitting	Stainless steel	-	Stainless steel	
	Protection type	IP67			
	Option	Non-insulated construction	Transmitters	Non-insulated construction	
	Approvals	Metrological registration			
	Special features	Probe tip aligned centrally/angled	Probe tip aligned centrally	Probe tip aligned centrally/angled cable outlet on the side	Probe tip aligned centrally/angled
	Declaration of conformity	EC 1935/2004 material confirmation			



Indoor RTD temperature probes



	Description	Indoor and outdoor RTD temperature probe		Channel RTD temperature probe
	Type/data sheet	902520		902524
	Features	Wall mounting		Channel mounting
Application	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 probe
Type/data sheet		902550	902550
Application	Features	Low thermal mass for round and level surfaces	
	Areas of application	Packing machines, pipeline construction	Plant engineering
Technical data	Connection	Cable	Terminal enclosure
	Operating temperature	-50 to +260 °C	-50 to +120 °C
	Measuring circuits	1	
	Sensor	Pt100, Pt500, Pt1000	Pt100, Pt500, Pt1000, Ni1000
	Process connection	Screw, fastener strap	Fastener strap
	Protection fitting	Stainless steel, aluminum	-
	Protection type	-	IP65
	Option	Strain relief	-
	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	JUMO Dtrans T100 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, display of the unit selectable, housing and protection fitting made out of stainless steel (316L)
	Areas of application	Food and pharmaceutical applications, CIP/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 transmitter	Transmitter	-
	Approvals	EHEDG	EHEDG, ATEX upon request	EHEDG
	Declaration of conformity	EC 1935/2004 material confirmation		



Hygienic thermowells

The hygienic thermowells have been designed for use with standard 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 $Ra \leq 0.8 \mu m$. A surface finish of

$Ra \leq 0.4 \mu m$ is also available as an optional extra. Individual process connections, such as the CIP-compliant conical seal, are EHEDG certified. 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
		Type/data sheet	902812	902812	902812	902812
Application	Features	Hygienic thermowell with short response time				
	Areas of application	Food industry, pharmaceutical industry, CIP/SIP plants, mechanical and plant engineering				
Technical data	Material	1.4404 (316L)				
	Surface	Standard $Ra \leq 0.8 \mu m$ Optional $Ra \leq 0.4 \mu m$				
	Insertion lengths	50, 100, and 150 mm				
	Response time in water	$t_{0.50}$ = approx. 3 s $t_{0.90}$ = approx. 8 s				
	Process connections	CIP-compliant conical seal, VARIVENT®, aseptic according to DIN 11864-1, ball welding sleeve, clamp, welding sleeve, milk cone, NEUMO BioControl®				
Approvals		-	-	-	-	EHEDG



Industry-specific RTD temperature probes



Application	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
	Features	Steam-tight, high protection type	High shock-resistance, level measurement according to the hot-wire principle	Very high dissolution possible (millikelvin scale)
Technical data	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
	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/IECEX RTD temperature probes



Description		JUMO PROCESStemp RTD temperature probe for process technology with ATEX approval	ATEX/IECEX RTD temperature probe according to DIN EN 60751 with connecting cable
Type/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
	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®)
	Operating temperature	-200 to +600 °C	-100 to +260 °C -100 to +600 °C (mineral-insulated thermometer)
	Measuring circuits	1/2	1/2
	Sensor	Single or double Pt100, Pt500, Pt1000	Pt100, Pt500, Pt1000, Pt2000, NTC
	Process connection	Screw connection/thread G 1/2, G 1, NPT, others upon request	Various threads
	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, Ø 3 mm, Ø 4 mm, Ø 5 mm, Ø 6 mm, Ø 7 mm, Ø 8 mm, and Ø 9 mm
	Protection type	IP65	
	Option	Head transmitter	Mineral-insulated RTD temperature probes
	Approvals	ATEX, IECEX	ATEX, IECEX
	Special features	Replaceable measuring insert, Ex i, Ex d	For 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, 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 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 Available approvals/ approval marks 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 – 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 TTL/RS232 or USB/TTL converter for connecting the receiver and the PC.



Type 902931

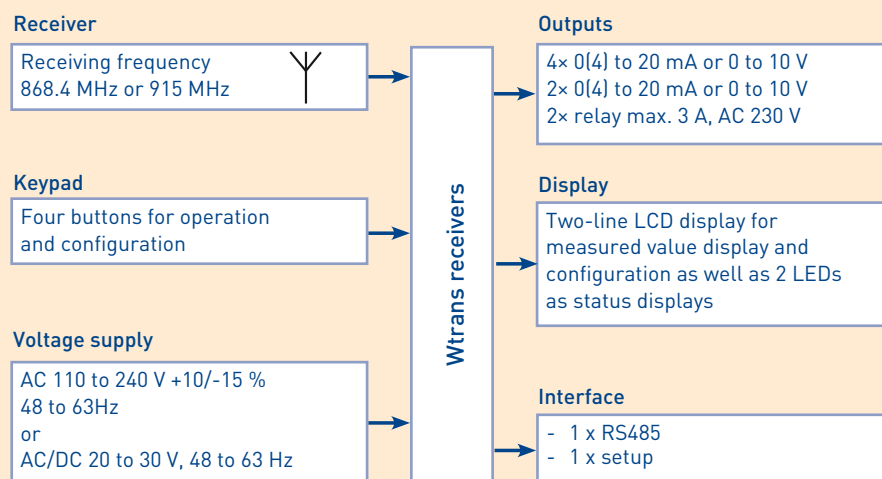
Features

Wtrans T01

DIN-rail case, IP20

- 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
- cULus (Underwriters Laboratories) 902931/10, 230 V



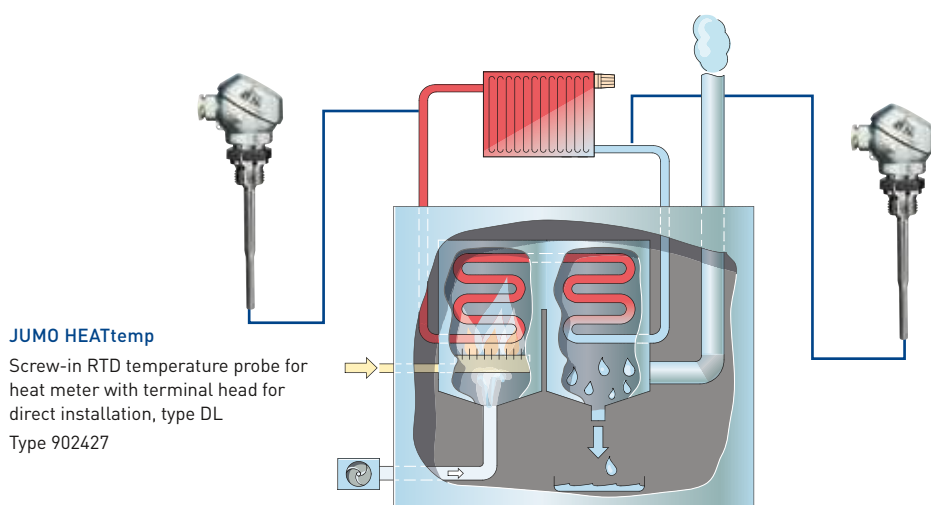
Heat meter RTD temperature probes



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)
Type/data sheet		902425	902435	902424	902434
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).			
	Areas of application	Heat and cold meters			
Technical data	Connection/ connecting cable	Connecting cables with ferrules/ PVC, PUR, 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: connection M 10x1; 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 Ø 5.4 mm, offset by Ø 3.3/Ø 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, Ø 8 mm, offset by Ø 6 mm	Ø 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 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		MID and domestic type examination certificates for temperature probes for heat meters, cold meters, and combined cold/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 RTD temperature probes – the most effective way of acquiring the temperature difference when measuring warm/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 two 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 three 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.



JUM0 IO-Link temperature sensors

Long plant downtimes now belong to the past. The new JUM0 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.



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
	Type/data sheet	902915
	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
	Medium temperature	-50 to +260 °C
	Ambient temperature	-40 to +85 °C
	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)
	Data transfer rate	COM 3 (230.4 kBaud)
	Process connection	Market-based screw connections and hygienic process connections
	Protection type	IP65/67
	Cycle time	2 ms
	Approvals	EHEDG for process connection JUMO PEKA
	Special features	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



Application	Description	Installation locations for temperature probe	Screw-in thermowells and welding protective sleeves	Terminal heads and connection sockets	Compensating and connecting cables
	Type/data sheet	902440, 902442	909710	909715	909735
	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



Application	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 fasteners	Plug connectors
	Type/data sheet	909735	909744	909750	909760
	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

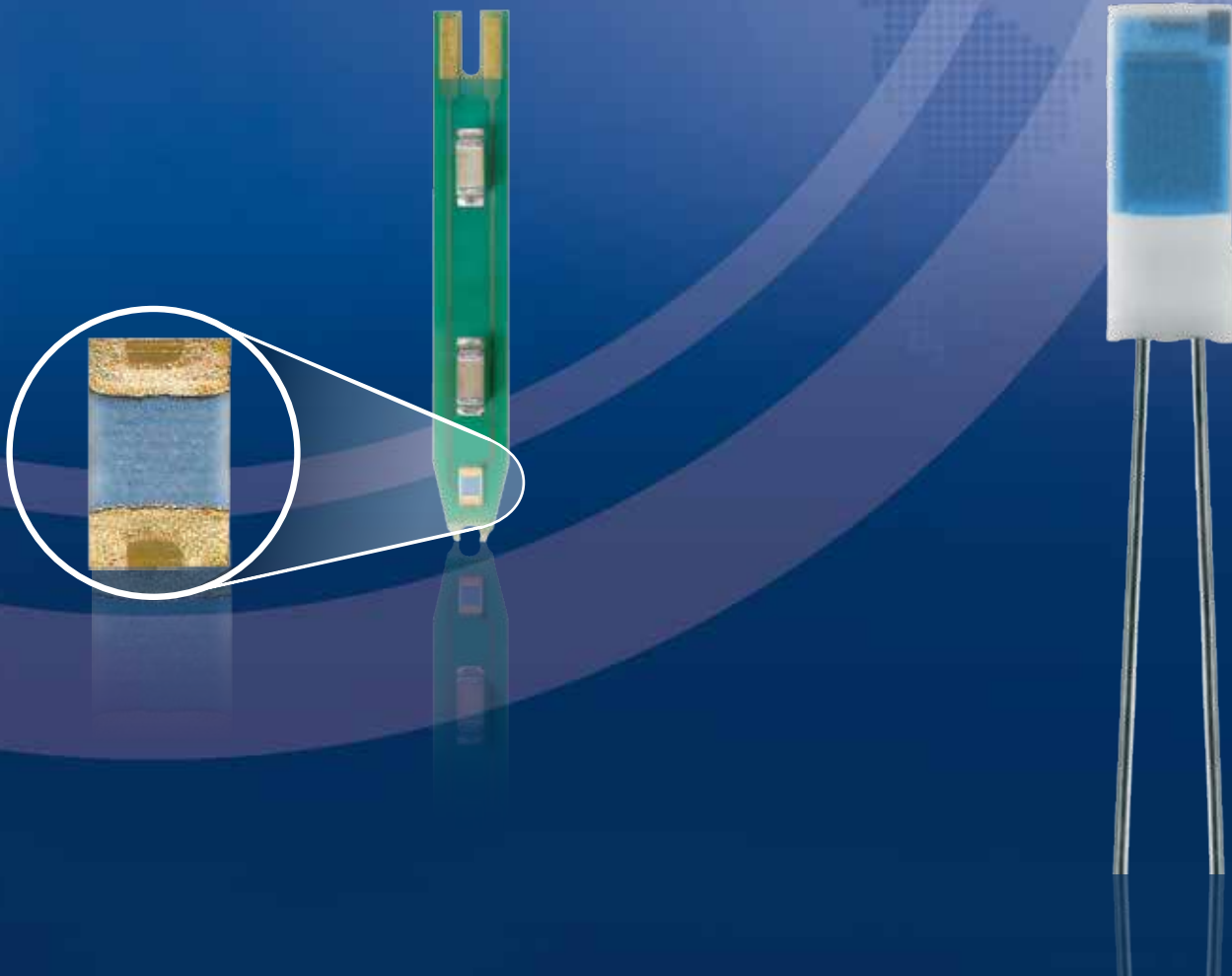


Platinum temperature sensors in thin-layer technology

JUMO offers a multifaceted program of platinum temperature sensors.

With an annual production of several million temperature sensors we are one of the world's leading suppliers.

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



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 both quality and fair market prices

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

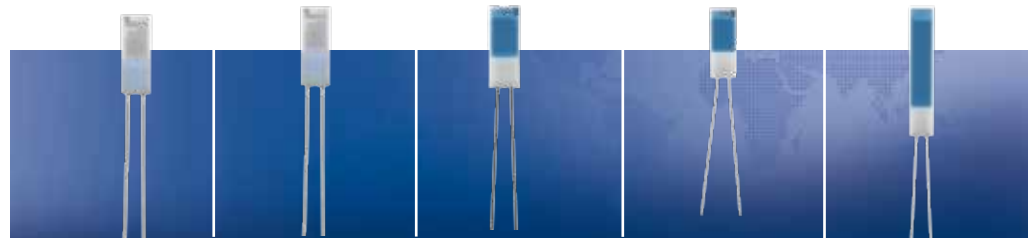
The experience from our own temperature probe production goes straight into the development of new temperature sensors. JUMO offers expert support for the assembly of temperature sensors.

Customer-specific modifications

The customers and their expectations 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 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, we have the suitable sensor for every application				
	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
	Size (W x L x H)	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 × 10 × 1.3 mm
	Nominal values	Pt100 Pt500 Pt1000	Pt100 Pt500 Pt1000 Pt2000	Pt100 Pt200 Pt1000	Pt100 Pt200 Pt500 Pt1000	Pt100 Pt500 Pt1000
	Tolerance classes	F0.1, F0.15, F0.3, and F0.6 according to DIN 60751; application-specific tolerance classes upon request				



Platinum temperature sensors in special designs



Description		Design type PCSE	Design type PCKL	Design type PCS
Type/data sheet		906122	906123	906125
Application	Features	Prefabricated measuring insert, automated downstream processing possible, price advantage thanks to SMD temperature sensors, gold plated contact surfaces	Stable terminal clamps, additional protective coating, tin-plated terminal clamps, suitable for high levels of humidity	Very good linear characteristic curve and mechanical large-scale production
	Areas of application	Measurement and control technology, heating/ventilation/air-conditioning, industrial electronics		
Technical data	Solder connections/contact surfaces	Gold-plated	Tin-plated (terminal clamps)	Gold plated nickel-all-round contact
	Operating temperature	-20 to +150 °C	-30 to +105 °C	-50 to +250 °C
	Processing	Soft soldering		Reflow soldering
	Size (W x L x H)	4.3 × 15 × 2.2 mm 4.1 × 28 × 2.2 mm	3.9 × 5 × 1.5 mm	Type 0805: 1.25 × 2.0 × 0.4 mm Type 1206: 1.5 × 3.0 × 0.4 mm
	Nominal values	Pt100 Pt500 Pt1000	Pt100 Pt1000	Pt100 Pt500 Pt1000
Tolerance classes		Class F0.3 and F0.6, additional available upon request	All tolerance classes	



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		0001 D-K 15129-01-00 Calibration mark 2010-12
Gegenstand Object	Platinwiderstandsthermometer	Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten im 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.
Hersteller Manufacturer	JUMO GmbH & Co. KG	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.
Typ Type	90.286-F30 /A	
Fabrikat/Serien-Nr. Serial number	0523 0009	
Auftraggeber Customer	JUMO GmbH & Co. KG	
Auftragsnummer Order No.	D-36039 Fulda 123456	
Anzahl der Seiten des Kalibrierscheines Number of pages of the certificate	5	
Datum der Kalibrierung Date of calibration	14.12.2010	
Dieser Kalibrierschein darf nur vollständig und unverändert weitergegeben 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 Accredited Body and the issuing laboratory. Calibration certificates without signature are not valid.		
Datum Date	14.12.2010	
Leiter des Kalibrierlaboratoriums Head of the calibration laboratory	Matthias Nau	
Bearbeiter Person in charge	Stefan Krummack	
(Statt) JUMO GmbH & Co. KG Maxim. Juchacz, Straße 1 D-36039 Fulda, Germany E-Mail: stefan.krummack@jumo.net Telefon: +49 (0)561 807-1111 Fax: +49 (0)561 807-1112 Web: www.jumo.net		

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 probe/thermocouple 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 display 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 probe/thermocouple 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 display 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

