KROHNE

achieve more

The highest degree of precision.

Product overview I Temperature measurement technology

The OPTITEMP series at a glance

From the standard measuring device to individually designed measuring stations, the OPTITEMP series will help you solve your measuring tasks:

» Standardized thermometers with replaceable measuring inserts

» Individually designed thermowells made of standard and special materials

» Measuring inserts with thermocouples or stable Pt 100 RTDs

» Customized thermocouples and resistance thermometers

» Connecting heads for a wide variety of requirements

» Analog and digital temperature transmitters for head and rail mounting

» A selection of useful accessories

Trust is good, experience is better.

Maximum reliability, precision and process safety – these are the values KROHNE stands for, developing process instrumentation and measurement solutions for more than 85 years. We now continue this long tradition in the field of industrial temperature measurement with the OPTITEMP series: we have a wide range of industrial thermometers and accessories – made with solid professional knowledge and outstanding application know-how of KROHNE engineers and technicians.

Whether measuring temperature in power plant steam pipelines or determining the exact temperature of milk in a dairy: KROHNE's OPTITEMP series is as versatile as the requirements and applications of our customers.

Long-term proven and tested methods as well as the latest manufacturing technologies has been applied. Thanks to this unique connection, we can provide our customers not only standard thermometers but also tailor-made temperature measurement technology at an extremely attractive price.

INOR, our subsidiary in Malmö, Sweden, has been successfully designing and producing temperature measurement technology for over 60 years. Since the development of the world's first head-mounted temperature transmitter in 1974, INOR has built up its reputation as a leading international company for thermometers and transmitters. Now we manufacture in Duisburg with the same proven and tested technology.

KROHNE – Your partner for precise temperature measurement.

The parameter temperature is playing an increasingly important role in industrial manufacturing processes. Product quality, efficiency and the operational safety of the production facility are directly related to reliable and accurate temperature measurement. KROHNE rises to the challenge, using the OPTITEMP devices for the continuing economic success of our customers.

Genuinely versatile – OPTITEMP TRA S12.

The OPTITEMP TRA S12 screw-in resistance thermometer can be used universally due to its extremely simple installation. Both the temperature transmitter and a digital display have ample space in the high connecting head. That makes the on-site reading of values especially easy.

Clean and safe – OPTITEMP TSR H10.

From hygienic screw sockets to the typical clamp fasteners – the OPTIMTEMP TSR H10 hygienic resistance thermometer can be supplied with all common process connections. The measuring device, made completely of stainless steel, is free of dead spaces and available in various diameters and sheath lengths. Materials for the wetted parts can be selected. The OPTITEMP TSR H10 is available with or without transmitter.

Rugged and consistent – OPTITEMP TR 100 and TC 100 measuring inserts.

The OPTITEMP TR 100 and TC 100 measuring inserts feature accurate workmanship, high insulation resistance and superior long-term stability. The measuring inserts, made of mineral insulated cable, can be built into all thermowells. Tolerance classes A and B as per EN 60751 and 1/3 DIN B are available as standard. Head transmitters can be mounted instead of terminal sockets upon request.

Analog and digital – OPTITEMP temperature transmitters.

KROHNE manufactures OPTITEMP temperature transmitters for in-head and rail mounting, both as simple analog devices as well as in digital versions with different bus protocols. All temperature transmitters, except for type TT10/11, are galvanically separated. In addition to the standard analog current output, devices with digital output are also available, e.g. Profibus. The measuring ranges can be adjusted individually. All temperature transmitters are also available with ATEX approval.

Industries

» Chemical

» Food and beverage

» Water and wastewater

» Oil and gas

» Shipping

» Pharmaceutical

» Pulp and Paper

» Steel and iron

» Petrochemical

» Energy supply

The right solution.
For any industry and any application.

Superior even at high temperatures: the OPTITEMP solutions for the iron, steel and glass industry.

Enormous exposure to thermal and mechanical stresses in these industry branches makes the use of highly resistant and gas-tight thermocouples of the OPTITEMP series essential. They are non-susceptible to rapid temperature changes and boast good stability in reducing atmospheres.

Particular attention is paid to the selection of suitable materials for the thermowells. The thermowell, along with the thermocouple used, significantly affects the accuracy and the lifetime of the temperature sensor.

Depending on the application and the range of temperature, the thermocouples used have either metal or ceramic, gas-tight thermowells. The thermocouples can also be fitted with ceramic.

OPTITEMP exhaust gas thermocouples are used for combustion processes. They are highly resistant to mechanical abrasion caused by ashes and soot particles. Similar elements can also be used in ovens and open gutters. For glass production, it is mainly ceramic sheathed metal thermocouples built into the furnace chamber and glass feeder.

When quality and hygiene count: OPTITEMP solutions for the food and beverage industry.

Strict legal hygienic requirements not only determine the manufacturing process in the food industry but also the construction and manufacture of the hygienic temperature measuring technology of the OPTITEMP series. An easy-to clean design plays a decisive role.

From the special construction features to the surface processing – the OPTITEMP devices boast outstanding industry-specific features. Thanks to the extremely flush surfaces of the components in contact with the media, the risk of deposits is minimized, ensuring quicker and better cleaning of system components. Gap-free construction reduces the risk of microbacterial contamination. Dead spaces, dimples, grooves and crevices are avoided at the design stage.

To achieve particularly flush welded seams, KROHNE then uses the WIG and laser welding techniques. And when selecting process connections, hygienic connections such as clamps, milk pipes and varivent connections are used.

The CIP and SIP cleaning places high demands on the thermal and mechanical stability of the thermometer and its process connections. In this case, too, the OPTITEMP devices reliably withstand frequent, rapid temperature changes, impact with aggressive media and pressure.

It goes without saying that the OPTITEMP thermometers are a minimum protetion class IP 65 and comply with the requirements of relevant FDA and EHEDG guidelines.

From material to resource: OPTITEMP solutions for the chemical industry.

The chemical industry, like almost no other, has a great emphasis on system safety which can be seen in two ways:

- the safety of the system itself, particularly when it comes to accident-free operation,
- and on system optimization and thus on decreasing down time and maintenance time.

Whether it is internally coated containers or high pressures and flow rates, KROHNE meets the industry's needs for temperature measuring technology and ensures maximum process reliability at the same time. NAMUR thermowells with reduced tips are as much a part of the range as metal thermowells with additional coatings such as titanium or tantalum, which are used in the event of high chemical exposure. Suitable thermometer materials are selected based on the various process media as regards corrosion and abrasion. Strength calculations when it comes to customer-specific thermowells can be performed individually.

Other features, such as the explosion-proof characteristic through intrinsic safety, flameproof enclosure or the SIL conforming thermometer design not only contribute to the technical reliability of the system but also to cost reduction over the entire life cycle.

OPTITEMP Thermometer

	Threaded thermometer TR/CA S12	Weld-in thermometer TR/CA T30	Threaded thermometer TR/CA S41	Hygiene thermometer TSR H10
				
Form	Form 2G (DIN 43772)	Form 4 (DIN 43772)	NAMUR, similar to 3G, reduced cone end	
Connection heads	BA, BUZ-S, BUZ-T, BGK, BUZ-H, BUZ-HW (display), BBK, BVA	BA, BUZ-S, BUZ-T, BGK, BUZ-H, BUZ-HW (display), BBK, BVA	BA, BUZ-S, BUZ-T, BGK, BUZ-H, BUZ-HW (display), BBK, BVA	BVA BA, BUZ-S, BUZ-T, BGK, BUZ-H, BUZ-HW (display), BBK
Measuring insert				
Sensor	1 x Pt 100, 2 x Pt 100 1 x thermocouple type J, 1 x thermocouple type K 2 x thermocouple type J 2 x thermocouple type K	1 x Pt 100, 2 x Pt 100 1 x thermocouple type J 1 x thermocouple type K 2 x thermocouple type J 2 x thermocouple type K	1 x Pt 100, 2 x Pt 100 1 x thermocouple type J 1 x thermocouple type K 2 x thermocouple type J 2 x thermocouple type K	1 x Pt 100 2 x Pt 100
Connection arrangement	2-, 3-, 4-wire, 3-wire + Smart Sense 2 x 3-wire (1/3 DIN B) free wire	2-, 3-, 4-wire, 3-wire + Smart Sense 2 x 3-wire (1/3 DIN B) free wire	2-, 3-, 4-wire, 3-wire + Smart Sense 2 x 3-wire (1/3 DIN B) free wire	3-wire, 4-wire (not 2 x Pt100)
Measuring insert	Mineral insulated, Mi, changeable	Mineral insulated, Mi, changeable	Mineral insulated, Mi, changeable	Mineral insulated, Mi, changeable
Accuracy class	Class A, class B, 1/3 DIN B, class 1	Class A, class B, 1/3 DIN B, class 1	Class A, class B, 1/3 DIN B, class 1	Class A, class B, 1/3 DIN B, class 1
Thermowell				
Material	1.4571/316TI, 1.4841/314 another materials available	1.4571/316TI, 1.4841/314 1.7335, 1.7380, another materials available	1.4571 another materials available	1.4436 another materials available
Diameter	9 x 1 mm 10 x 1,5 mm (only 1.4841) 11 x 2 mm 12 x 2,5 mm	D1, D2, D4, D5 Ø 24 mm	12 x 2,5 mm	6 mm 10 mm
Process connection	Threaded, G 1/2, G 3/4, G 1, 1/2" NPT, 3/4" NPT	Weld in	Threaded, G 1/2, G 3/4, G 1, 1/2" NPT, 3/4" NPT	Flange DN25/38, DIN ISO 2852 another types available
Immersion depth (L/U)	160 mm, 250 mm, 400 mm special sizes available	D1 = 140 mm; 65 mm; D2/D4 = 200 mm; 125/65 mm; D5 = 260 mm; 125 mm	160 mm, 220 mm, 280 mm, special sizes available	50 mm, 100 mm
Connection screw (N/P)	80 mm, 145 mm special sizes available	M18 x 1,5		
Extension lenght (M)	80 mm, 145 mm special lenght	80 mm, 145 mm, 165 mm special lenght	80 mm, 145 mm special lenght	50 mm special lenght
Transmitter				
Connection type	Free wire, terminal block, TT 10 C, TT 11 C, TT 20 C *, TT 30 C, TT 40 C, TT 41 C *, TT 50 C, TT 60 C	Free wire, terminal block, TT 10 C, TT 11 C, TT 20 C *, TT 30 C, TT 40 C, TT 41 C *, TT 50 C, TT 60 C	Free wire, terminal block, TT 10 C, TT 11 C, TT 20 C*, TT 30 C, TT 40 C, TT 41 C *, TT 50 C, TT 60 C	Free wire, terminal block, TT 10 C, TT 11 C, TT 20 C*, TT 30 C, TT 40 C, TT 41 C *, TT 50 C, TT 60 C

* pending

OPTITEMP Head transmitter

	TT 10 C	TT 30 C	TT 40 C	TT 50 C	TT 60 C
					
Input	RTD (Pt 100), 3-wire	RTD, TC, Ni, Ω, mA	RTD, TC, Ni, Ω, mA	RTD, TC, Ni, Ω, mA	RTD, TC, Ni, Ω, mA
Output	4–20 mA	4–20 mA, 20–4 mA	4–20 mA, 20–4 mA	4–20 mA, 20–4 mA	Profibus PA
Communication		PC programmable	PC programmable	HART	Profibus PA
Accuracy	0,15 % of temperature span	0,1 % of temperature span	0,05 % of temperature span	0,1 % of temperature span	Pt 100: 0,10°C
Galvanic Isolation	no	1500 VAC, 1 min	3750 VAC, 1 min	1500 VAC, 1 min	1500 VAC, 1 min
Power supply	6,5...32 VDC 8,5...30 VDC (Ex)	6,5...36 VDC 8...30 VDC (Ex)	6,5...36 VDC	10...42 VDC 12...30VDC (Ex)	9...32 VDC 9...17,5 VDC (Ex)
Connection head	DIN B or larger	DIN B or larger	DIN B or larger	DIN B or larger	DIN B or larger
Certificates	ATEX: EEx ia	ATEX: EEx ia		ATEX: EEx ia	ATEX: EEx ia
Note	Analog adjustable 2-wire transmitter, sensor break detection	Universal programmable 2-wire transmitter, sensor break detection	Universal programmable 2-wire transmitter, high accuracy, quick update (300 ms), sensor break detection	Universal HART compatible 2-wire transmitter, sensor break detection	Universal Profibus-PA, high-perfomance transmitter 2 x Pt 100, 3-wire

OPTITEMP Rail mounted transmitter

	TT 30 R	TT 31 R	TT 40 R	TT 50 R	TT 60 R
					
Input	RTD, TC, Ni, Ω, mA	RTD, TC, Ni, Ω, mA	RTD, TC, Ni, Ω, mA	RTD, TC, Ni, Ω, mA	RTD, TC, Ni, Ω, mA
Output	4–20 mA, 20–4 mA	4–20 mA, 20–4 mA	4–20 mA, 20–4 mA	4–20 mA, 20–4 mA	Profibus PA
Communication	PC programmable	PC programmable	PC programmable	HART	Profibus PA
Accuracy	0,1 % of temperature span	0,1 % of temperature span	0,05 % of temperature span	0,1 % of temperature span	Pt 100: 0,10°C
Galvanic Isolation	1500 VAC, 1 min	1500 VAC, 1 min	1500 VAC, 1 min	1500 VAC, 1 min	1500 VAC, 1 min
Power supply	7,5...36 VDC 8...30 VDC (Ex)	8...36 VDC	9...32 VDC 9...17,5 VDC (Ex)	10...42 VDC 12...30 VDC (Ex)	9...32 VDC 9...17,5 VDC (Ex)
Connection head	Rail acc. to DIN EN50022, 35 mm	Rail acc. to DIN EN50022, 35 mm	Rail acc. to DIN EN50022, 35 mm	Rail acc. to DIN EN50022, 35 mm	Rail acc. to DIN EN50022, 35 mm
Certificates	ATEX: EEx ia	ATEX: EEx ia	ATEX: EEx ia	ATEX: EEx ia	ATEX: EEx ia
Note	Universal programmable 2-wire transmitter, sensor break detection	Universal programmable 1- and 2-port 2-wire transmitter, sensor error and system error correction	Universal programmable 2-wire transmitter, high accuracy, quick update (300ms), sensor break detection	Universal programmable 2-wire transmitter, high accuracy, quick update (300ms), sensor break detection	Universal Profibus-PA, high-perfomance transmitter 2 x Pt 100, 3-wire

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