KROHNE

achieve more

A new degree of contact

Product overview temperature measurement

Contents

3	Achieve more with KROHNE
4–7	Product selection
8–21	Thermometers
24-33	Temperature transmitters
34–37	Communication technology/KROHNE proved

Achieve more with KROHNE

KROHNE ranks among the world's leading companies involved in the development and production of innovative and reliable process measuring technology, providing solutions for all sectors around the globe. KROHNE was founded in 1921 in Duisburg, Germany. It has more than 2,500 employees and has a turnover of almost 331 million euro. The company has 15 production facilities and owns 43 companies and joint ventures. In fact, KROHNE was the second company after VW to have a joint venture in Shanghai. Today, China is one of KROHNE's major markets. With an equity-to-assets ratio of approx. 41 %, the company is largely financially independent.

KROHNE is always a fair and reliable partner to its customers, business partners and employees. We provide our customers with optimal products and solutions which always meet or exceed their expectations in terms of quality, performance capability, service and design. Our customers are registered in diverse branches of industry such as chemicals, petrochemicals, water, wastewater, food, beverages, pharmaceuticals, oil and gas, power plants, pulp and paper etc.

For over 85 years, the KROHNE name has stood for maximum reliability, precision and process certainty in flow and level measurement. The OPTITEMP line continues this long tradition in the field of industrial temperature measurement: we have a wide range of industrial thermometers and transmitters and you can count on solid professional knowledge and outstanding application know-how.

KROHNE INOR, our subsidiary in Malmö, Sweden, has been successfully designing and producing temperature measurement equipment for over 70 years. It makes no difference if there are high temperature, extreme pressure or high flow velocities, KROHNE INOR meet virtually every need when it comes to temperature measuring, ensuring maximum process certainty at the same time.

Thermometer selection list

These tables will help you select the right measuring solution for your application, a selection from our product portfolio.

	Industrial for general use			High temperature
	OPTITEMP TR/CA P10	OPTITEMP TR/CA S12, S22	OPTITEMP TR/CA F13, F42	OPTITEMP TCA P62, P63
Page	8/18	8/18	8/19	9/19
Design				
Process connection	Plug-in	Screw-in	Flange	Plug-in
Standard material	Stainless steel	Stainless steel	Stainless steel	Kantahl ceramic
Operating temperature	≤ +600 °C	≤ +600 °C	≤ +600 °C	≤ +750...+1600 °C
High pressure	–	–	–	–
High flow	–	–	–	–
Medium				
Solid	x	x	x	x
Liquid	x	x	x	x
Gas	x	x	x	x
Steam	–	x	–	–
Accessories				
	Compression fittings	Weld-in connection	Coatings and covers	Gas-tight threaded sleeves, sliding flange

Advanced application			Cable		HVAC		MI-cable
OPTITEMP TR/CA TS35, S34, S50, TS53, TS54	OPTITEMP TR/CA T31, TF33, TF56, TF57	OPTITEMP TR/CA T30	OPTITEMP TRA W30, W40	OPTITEMP TRA W50, W70	OPTITEMP TRA V20	OPTITEMP TRA V30	OPTITEMP TCA M50, M70
10/11/20/21	10/11/20/21	10/20	12/22	12/22	13/23	13/23	13/23
Screw-in	Flange	Weld-in	Skin sensor	Screw-in	Wall mount	Plug-in	Plug-in
Stainless steel *	Stainless steel *	Stainless steel *	Copper	Stainless steel	Brass	Brass	Inconel®
≤ +600 °C	≤ +600 °C	≤ +600 °C	≤ +200...+300 °C	≤ +200 °C	≤ +75 °C	≤ +200 °C	≤ +750... +1250 °C
–	–	x	–	–	–	–	–
x	x	x	–	–	–	–	–
x	x	x	x	x	–	–	x
x	x	x	–	–	–	–	x
x	x	x	–	–	x	x	x
x	x	x	–	–	–	–	–
Weld-in connection	Coatings and covers	Thermowell in different material	Clamp on connection	Bayonet connection	–	Compression fitting, slide on flange	Compression fitting, connectors

x = suitable , – = not suitable , * also avalible in Barstock

Transmitter selection list

These tables will help you select the right measuring solution for your application, a selection from our product portfolio.

	Conventional		Programmable		
	OPTITEMP TT 10	OPTITEMP TT 11	OPTITEMP TT 20	OPTITEMP TT 30	OPTITEMP TT 31
Page	24/30/32	24/30/32	24/30	24/30/32	25/33
Design					
Head-mounted transmitter, TT xx C	x	x	x	x	–
Intrinsically-safe head-mounted transmitter, TT xx C Ex	x	–	–	x	–
Rail-mounted transmitter, TT xx R	x	x	–	x	x
Intrinsically-safe rail-mounted transmitter, TT xx R Ex	–	–	–	x	x
SIL2	–	–	–	–	–
Input					
Resistance thermometer	x	x	x	x	x
Thermocouples	–	–	–	x	x
Other	–	–	–	x	x
Channels/inputs					
1 Measuring channel	x	x	x	x	x
2 Measuring channels	–	–	–	–	x
2 Inputs	–	–	–	–	x
Output					
4–20 mA	x	–	x	x	x
0–10 V	–	x	–	–	–
Profibus-PA	–	–	–	–	–
HART®	–	–	–	–	–
Accuracy					
Accuracy classes	average	average	good	good	good
Circuit design					
Galvanic isolation	–	–	–	x	x
Power supply					
24 VDC	x	x	x	x	x
230 VAC	–	–	–	–	–
Accessoires					
Loop powered LED und LCD display, loop powered isolator an repeaters, transmitter configuration kit	x	x	x	x	x

	Programmable		Smart		
	OPTITEMP TT 32	OPTITEMP TT 40	OPTITEMP TT 50	OPTITEMP TT 51	OPTITEMP TT 60
Page	25/24	25/31/33	24/31/33	25/27/31/33	25/31/33
Design					
Head-mounted transmitter, TT xx C	–	x	x		x
Intrinsically-safe head-mounted transmitter, TT xx C Ex	–	–	x	x	x
Rail-mounted transmitter, TT xx R	x	x	x	x	x
Intrinsically-safe rail-mounted transmitter, TT xx R Ex	–	–	–	x	–
SIL2	–	–	–	x	–
Input					
Resistance thermometer	x	x	x	x	x
Thermocouples	x	x	x	x	x
Other	x	x	x	x	x
Channels/inputs					
1 Measuring channel	x	x	x	x	x
2 Measuring channels	–	–	–	x **	x
2 Inputs	–	–	–	x	x
Output					
4–20 mA	x	x	x	x	–
0–10 V	x	–	–	–	–
Profibus-PA	–	–	–	–	x
HART®	–	–	x	x	–
Accuracy					
Accuracy classes	good	very good	very good**	very good	good
Circuit design					
Galvanic isolation	x	x	x	x	x
Power supply					
24 VDC	x	x	x	x	– *
230 VAC	x	–	–	–	– *
Accessoires					
Loop powered LED und LCD display, loop powered isolator an repeaters, transmitter configuration kit	x	x	x	x	x

x = available, – = not available, *Profibus power supply, ** able to read 2 channels via HART®

Industrial for general purpose

OPTITEMP TR/CA P10
Insertion-type
thermometer for
universal applications

OPTITEMP TR/CA S12
Threaded thermometer
with neck tube

OPTITEMP TR/CA F13
Flange thermometer
with straight tip

OPTITEMP TR/CA S22
Threaded thermometer
with reduced tip

OPTITEMP TR/CA F42
Flange thermometer
with tapered tip

High temperature

OPTITEMP TCA P62
Flue gas thermometer

OPTITEMP TCA P63
Thermometer with holding tube
for high temperatures

Thermometers – Selection from OPTITEMP product portfolio

Industrial for advanced applications, DIN style

OPTITEMP TR/CA T30
Weld-in thermometer with bar stock thermowell

OPTITEMP TR/CA S34
Threated thermometer without thermowell

OPTITEMP TR/CA TF33
Flange thermometer for increased requirements

OPTITEMP TR/CA T31
Flange thermometer with bar stock thermowell

OPTITEMP TR/CA TS35
Threated thermometer for increased requirements

Industrial for advanced applications, ANSI style

OPTITEMP TR/CA S50
Threated thermometer without thermowell

OPTITEMP TR/CA TS54
Flange thermometer with bar stock thermowell, reduced tip

OPTITEMP TR/CA TF57
Flange thermometer with bar stock thermowell, reduced tip

OPTITEMP TR/CA TS53
Threated thermometer with bar thermowell, reduced tip

OPTITEMP TR/CA TF56
Flange thermometer with bar stock thermowell, tapered tip

Cable and HVAC

OPTITEMP TRA W30
Clamp-on surface thermometer

OPTITEMP TRA W40
Clamp-on MI surface thermometer

OPTITEMP TRA W50
Screw-in bold cable thermometer

OPTITEMP TR/CA W70
Bayonet thermometer spring loaded

OPTITEMP TRA V20
Ambient temperature thermometer, wall mounted, IP65

OPTITEMP TRA V30
Plug-in HVAC air duct thermometer

MI-cable and high temperature

OPTITEMP TCA M50
MI thermocouple with standard connector

OPTITEMP TCA M70
MI thermocouple with compensation cable and standard TC connector

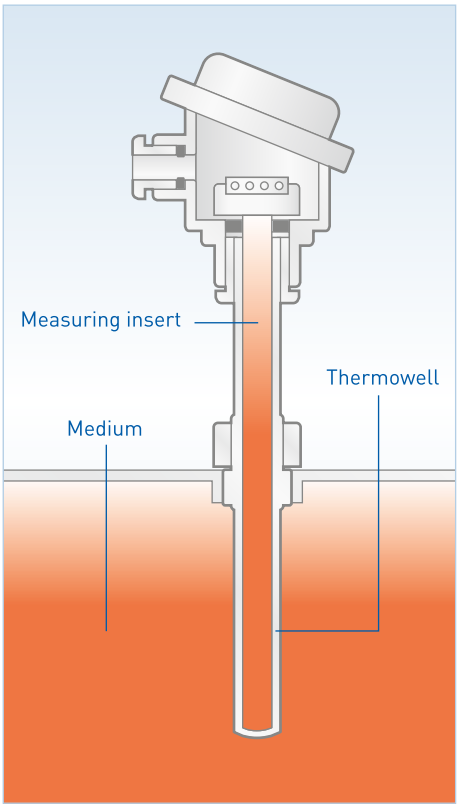
Highlights:

- Wide range of products
- Standardised and customer-specific thermometers
- Thermowells made from both standard and special materials
- Coated thermowells for use in aggressive media
- Replaceable measuring inserts made of mineral insulated cable
- Pt100 RTD and thermocouples stable over the long term
- Connection heads for a wide variety of requirements
- Extensive accessories

Exact temperature measurement: Perfect interaction of elements

The history of temperature measurement starts at the end of the 16th century: In 1596, the thermoscope of none other than Galileo Galilei becomes one of the first devices designed to measure temperature. It functioned by heating up and expanding water in small glass tubes and considered the predecessor to today's thermometer.

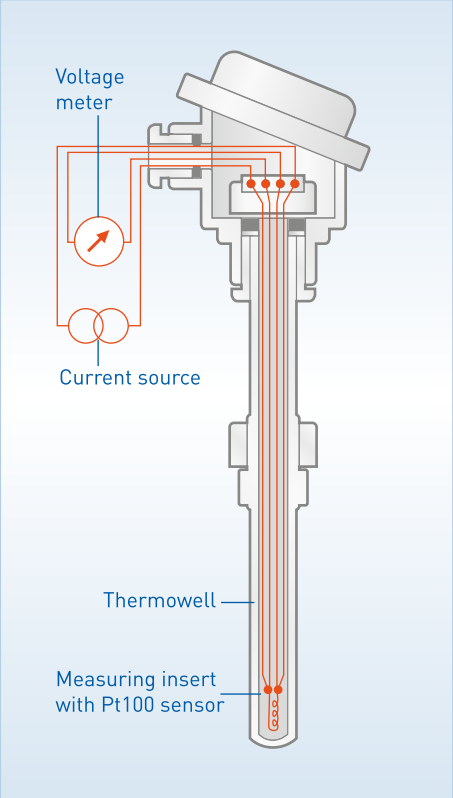
The technology behind temperature measurement has been refined and improved over the centuries and the interaction of the elements, especially when it comes to extremely demanding, industrial applications, has been continuously perfected. KROHNE has played a special role in the research and development of this field.



The measuring principle

Contact thermometers that come into direct contact with the product to be measured are predominantly used in industry today. The physical foundation for its function is described by the zeroth law of thermodynamics.

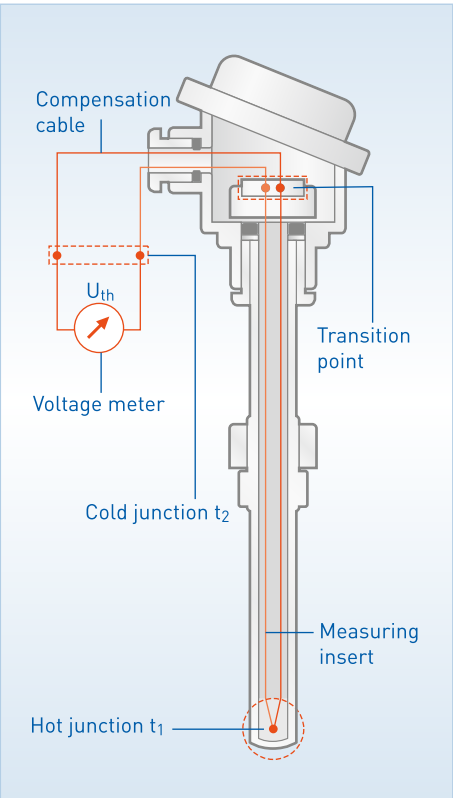
When measuring temperature, the thermometer must accept the temperature of the medium – the medium, thermowell and the measuring insert with the sensor element must be brought into thermal equilibrium. The precondition for this is good and above all rapid heat exchange amongst all components involved. Since temperature can only be indirectly measured as, for example, via the temperature dependency of the electrical resistance of metals or via thermoelectric effects, this can be used to construct sensor elements: these are usually Pt resistance sensors or thermocouples built into the appropriate measuring insert.



Resistance thermometer

For a measuring insert with a Pt100 resistance sensor, the temperature-sensitive sensor element is made from a platinum RTD whose value at 0 °C / +32 °F is 100 Ω. The electrical resistance of metals increases according to a mathematical function as the temperature rises.

This effect is used with resistance thermometers to measure the temperature: a constant current I flows through the Pt100 RTD, creating a voltage drop U. The resistance "R" follows Ohm's Law: R = U / I and corresponds to a specific temperature. The temperature dependency is repeatable and is standardised in a characteristic curve.



Thermocouples

With a thermocouple, two different electrical conductors are connected at one end to the measuring point, the hot junction. The free ends at the transition point are connected to the measuring device with a compensation cable via the so-called cold junction. Only when the hot junction t_1 and the cold junction t_2 have different temperatures is a thermovoltage U_{th} measured. The thermovoltage is then dependent on the difference $t_2 - t_1$ as well as on the material combination of the thermocouple.

Very simply put, think of the thermocouple as a battery whose voltage increases with the temperature. The temperature, dependent on the thermovoltage, is standardised and can thus be precisely determined.

Optimal solutions:
For any industry and any application

Whether it's reliable temperature measurement in steam pipelines at power plants or the exact determination of process temperatures in chemical plants, KROHNE thermometers are as versatile as the requirements and specific applications of our customers need them to be. Both tried and tested methods and the latest in production technology come into play. Thanks to this unique connection, we ensure that we can provide our customers not only with standard thermometers but that we can also meet our customers' requirements for customised temperature measurement equipment.

Highly resistant and gas-tight thermocouples in the OPTITEMP series are highly insensitive to rapid temperature changes and boast good stability in reducing atmospheres. This means that the enormous thermal and mechanical loads occurring on a daily basis in many industries pose no problems.

OPTITEMP flue gas thermocouples are used in combustion processes such as those found in the iron and steel industry. They are highly resistant to mechanical abrasion. Similar elements can also be used in ovens.

It makes no difference if there are high temperatures, extreme pressures or high flow velocities: KROHNE meets virtually every need when it comes to temperature measuring technology, ensuring maximum process certainty at the same time. Thermowells with tapered tips are as much a part of the line as metallic thermowells featuring an additional titanium or tantalum casing used, for example, in the event of high chemical exposure.

Suitable thermometer materials are always selected based on the various process media as regards corrosion and abrasion. Strength calculations when it comes to customer-specific thermowells can always be performed on an individual basis.

Other features such as the explosion-proof characteristic through intrinsic safety, flameproof enclosures or the SIL compliant design, contribute not only to the technical reliability of a wide variety of systems but also to cost reduction over the entire life cycle.

Industries:

- Chemical
- Petrochemical
- Oil and gas
- Energy supply
- Machine building
- Pharmaceutical
- Food and beverage
- Water and wastewater
- Iron and steel
- Pulp and paper
- Heating, Ventilation & Air Conditioning (HVAC)

Thermometers

Selection from the product portfolio

	Industrial for general purpose		
	Insertion type thermometer for universal applications	Threaded thermometer with neck tube	Threaded thermometer with reduced tip
	OPTITEMP TR/CA P10	OPTITEMP TR/CA S12	OPTITEMP TR/CA S22
			
Connection head			
Models	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD
Cable gland/conduit thread	M20 x 1.5 mm	M20 x 1.5 mm	M20 x 1.5 mm
Process thread	M24 x 1.5 mm	M24 x 1.5 mm	M24 x 1.5 mm
Sensitive element			
Sensor	1/2 x Pt100 or 1/2 x TC J/K	1/2 x Pt100 or 1/2 x TC J/K	1 x Pt100, 1 x TC J/K
Circuit type	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense
Tolerance class	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60584	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60584	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60584
Design	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert
Connection type	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter
Thermowell			
Process connection	Compression fitting G1/2	G1/2, G3/4, G1, 1/2" NPT, 3/4" NPT	G1/2, G3/4, G1, 1/2" NPT, 3/4" NPT
Diameter/dimensions	Ø9 , 10, 11, 12 mm	Ø9 , 10, 11, 12 mm	Ø11, 12 mm
Material	1.4571/316Ti, 1.4404/316L	1.4571/316Ti, 1.4404/316L	1.4571/316Ti, 1.4404/316L
Standard length	305, 395, 545 mm	160, 250, 400 mm	160, 250, 400 mm
Neck tube/holding tube			
Length	Variable	145 mm	145 mm
Connection thread	Thermowell and neck tube is one piece of material	Thermowell and neck tube is one piece of material	Thermowell and neck tube is one piece of material
Approvals			
	ATEX Ex-i, (IECEX Ex-i in progress)	ATEX Ex-i, (IECEX Ex-i in progress)	-

Industrial for general purpose		High temperature	
Flange thermometer with straight tip	Flange thermometer with tapered tip	Flue gas thermometer	Thermometer with holding tube for high temperatures
OPTITEMP TR/CA F13	**OPTITEMP TR/CA F42**	**OPTITEMP TCA P62**	**OPTITEMP TCA P63**
			
BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, AA	BA, BUZ-T, BUZ-S, AA
M20 x 1.5 mm	M20 x 1.5 mm	M20 x 1.5	M20 x 1.5
M24 x 1.5 mm	M24 x 1.5 mm	Ø12, 15, 19, 22, 32 mm	Ø12, 15, 19, 22, 32 mm
1/2 x Pt100 or 1/2 x TC J/K	1/2 x Pt100 or 1/2 x TC J/K	1, 2 x TC J, K	1, 2 x TC S, K
2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense	2-wire TC	2-wire TC
Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60584	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60584	Class 1 acc. EN 60584	Class 1 acc. EN 60584
Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert	Non replaceable TC sensor	Non replaceable TC sensor
Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket or flying leads	Ceramic connection socket or flying leads
DN25/PN40, DN50/PN40, ASME 1", 1 1/2", 150 lbs, 300 lbs	DN25/PN40, DN50/PN40, ASME 1", 1 1/2", 150 lbs, 300 lbs	Mounting flange acc. DIN 43734 or gas tight compression fitting G1/2, G3/4, G1	Mounting flange acc. DIN 43734 or gas tight compression fitting G1/2, G3/4, G1
Ø9, 10, 11, 12 mm	Ø12 mm	Ø15, 19, 22 mm	Ø15/10, 22/15, 32/24 mm
1.4571/316Ti, 1.4404/316L	1.4571/316Ti, 1.4404/316L	1.4762, 1.4767	C799, C610
225, 315, 465 mm	225, 315, 465 mm	500, 710, 1000, 1400, 2000 mm	500, 710, 1000, 1400, 2000 mm
80 mm	82 mm	-	80, 150, 200 mm
Thermowell and neck tube is one piece of material	Thermowell and neck tube is one piece of material	-	-
ATEX Ex-i, (IECEX Ex-i in progress)	ATEX Ex-i, (IECEX Ex-i in progress)	-	-

Thermometers

Selection from the product portfolio

	Industrial for advanced applications, DIN style				
	Weld-in thermometer with bar stock thermowell	Flange thermometer with bar stock thermowell	Flange thermometer for increased requirements	Threaded thermometer for increased requirements	Threated thermometer without thermowell
	OPTITEMP TR/CA T30	OPTITEMP TR/CA T31	OPTITEMP TR/CA TF33	OPTITEMP TR/CA TS35	OPTITEMP TR/CA S34
					
Connection head					
Models	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD
Cable gland/ conduit thread	M20 x 1.5 mm	M20 x 1.5 mm	M20 x 1.5 mm	M20 x 1.5 mm	M20 x 1.5 mm
Process thread	M24 x 1.5 mm	M24 x 1.5 mm	M24 x 1.5 mm	M24 x 1.5 mm	M24 x 1.5 mm
Sensitive element					
Sensor	1/2 x Pt100 or 1/2 x TC J/K	1/2 x Pt100 or 1/2 x TC J/K	1/2 x Pt100 or 1/2 x TC J/K	1/2 x Pt100 or 1/2 x TC J/K	1/2 x Pt100 or 1/2 x TC J/K
Circuit type	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense
Tolerance class	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585
Design	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert
Connection type	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter
Thermowell					
Process connection	Weld-in fitting	DN25/PN40, ASME 1", 1 1/2", 150 lbs, 300 lbs	DN25/PN40, ASME 1", 1 1/2", 150 lbs, 300 lbs	G1/2, G3/4, G1, 1/2" NPT, 3/4" NPT	M18 x 1.5 mm, G1/2, 1/2" NPT
Diameter/ dimensions	Ø24 h7	Ø24 h7	Ø9, 10, 11, 12, 17 mm	Ø9, 10, 11, 12, 17 mm	Ø6 mm
Material	1.4571/316Ti, 1.4404/316L, 1.7335/AISI F12, 1.0460/C 22.8	1.4571/316Ti, 1.4404/316L, 1.7335/AISI F12, 1.0460/C 22.8	1.4571/316Ti, 1.4404/316L	1.4571/316Ti, 1.4404/316L	1.4404/316L, Inconel® 600
Standard length	140, 200, 260 mm	130, 190 mm	100, 170, 260, 410 mm	100, 170, 260, 410 mm	100, 140, 200, 260, 300, 350, 400 mm
Neck tube/holding tube					
Length	80, 145, 165, 200 mm	80, 145, 165, 200 mm	80, 145, 165, 200 mm	80, 145, 165, 200 mm	80, 145, 165, 200 mm
Connection thread	M18 x 1,5 mm, G1/2, G3/4 cap nut, 1/2" NPT	M18 x 1,5 mm, G1/2, G3/4 cap nut, 1/2" NPT	M18 x 1,5 mm, G1/2, G3/4 cap nut, 1/2" NPT	M18 x 1,5 mm, G1/2, G3/4 cap nut, 1/2" NPT	M18 x 1,5 mm, G1/2, G3/4 cap nut, 1/2" NPT
Approvals					
	(ATEX Ex-ia, -d, IECEX -ia, -d in process)	(ATEX Ex-ia, -d, IECEX -ia, -d in process)	(ATEX Ex-ia, -d, IECEX -ia, -d in process)	(ATEX Ex-ia, -d, IECEX -ia, -d in process)	(ATEX Ex-ia, -d, IECEX -ia, -d in process)

	Industrial for advanced applications, ANSI style				
	Threated thermometer without thermowell	Threated thermometer with bar stock thermo-well, tapered tip	Threated thermometer with bar stock thermo-well, reduced tip	Flange thermometer with bar stock thermo-well, tapered tip	Flange thermometer with bar stock thermo-well, reduced tip
	OPTITEMP TR/CA S50	OPTITEMP TR/CA TS53	OPTITEMP TR/CA TS54	OPTITEMP TR/CA TF56	OPTITEMP TR/CA TF57
					
Connection head					
Models	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD	BA, BUZ-T, BUZ-S, BUZ-H, BUZ-HW (display), BGK, BKK, BVA, AXD
Cable gland/ conduit thread	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT
Process thread	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT
Sensitive element					
Sensor	1, 2 x Pt100 or 1/2 x TC J/K2	1, 2 x Pt100 or 1/2 x TC J/K2	1, 2 x Pt100 or 1/2 x TC J/K2	1, 2 x Pt100 or 1/2 x TC J/K2	1, 2 x Pt100 or 1/2 x TC J/K2
Circuit type	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense	2-, 3- or 4-wire, 3-wire with Smart Sense
Tolerance class	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60586	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60586	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60586	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60586	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60586
Design	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert	Replaceable spring loaded mineral isolated measuring insert
Connection type	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter	Ceramic connection socket, flying leads or temperature transmitter
Thermowell					
Process connection	1/2" NPT	G1/2, G3/4, 1/2" NPT, 3/4" NPT	G1/2, G3/4, 1/2" NPT, 3/4" NPT	DN25/PN40, DN50/PN40, ASME 1", 1 1/2", 2", 150, 300, 600 lb	DN25/PN40, DN50/PN40, ASME 1", 1 1/2", 2", 150, 300, 600 lb
Diameter/ dimensions	Ø6 mm	Ø16, 22 mm	Ø16, 22 mm	Ø22, 25 mm	
Material	1.4404/316L, Inconel® 600	1.4571/316Ti, 1.4404/316L	1.4571/316Ti, 1.4404/316L	1.4571/316Ti, 1.4404/316L	1.4571/316Ti, 1.4404/316L
Standard length	100, 150, 200, 250, 300, 350, 400 mm	100, 150, 200, 250, 300, 350, 400 mm	100, 150, 200, 250, 300, 350, 400 mm	100, 150, 200, 250, 300, 350, 400 mm	100, 150, 200, 250, 300, 350, 400 mm
Neck tube/holding tube					
Length	76, 102, 152 mm (3, 4, 6")	76, 102, 152 mm (3, 4, 6")	76, 102, 152 mm (3, 4, 6")	76, 102, 152 mm (3, 4, 6")	76, 102, 152 mm (3, 4, 6")
Connection thread	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT
Approvals					
	(ATEX Ex-ia, -d, IECEX -ia, -d in process)	(ATEX Ex-ia, -d, IECEX -ia, -d in process)	(ATEX Ex-ia, -d, IECEX -ia, -d in process)	(ATEX Ex-ia, -d, IECEX -ia, -d in process)	(ATEX Ex-ia, -d, IECEX -ia, -d in process)

Thermometers

Selection from the product portfolio

	Cable and HVAC			
	Clamp-on surface thermometer	Clamp-on MI surface thermometer	Screw-in bolt cable thermometer	Bayonet thermometer, spring loaded
	OPTITEMP TRA W30	OPTITEMP TRA W40	OPTITEMP TRA W50	OPTITEMP TR/CA W70
				
Connection head				
Models	No head required	No head required	No head required	No head required
Cable gland/conduit thread	-	-	-	-
Process thread	M24 x 1.5 mm	M24 x 1.5 mm	M24 x 1.5 mm	M24 x 1.5 mm
Sensitive element				
Sensor	1, 2 x Pt100 or 1, 2 x TC J/K	1, 2 x Pt100 or 1, 2 x TC J/K	1, 2 x Pt100 or 1, 2 x TC J/K	1, 2 x Pt100 or 1, 2 x TC J/K
Circuit type	2-, 3- or 4-wire RTD, 2-wire TC	2-, 3- or 4-wire RTD, 2-wire TC	2-, 3- or 4-wire RTD, 2-wire TC	2-, 3- or 4-wire RTD, 2-wire TC
Tolerance class	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60585
Design	Non replaceable RTD or TC sensor	Non replaceable RTD or TC sensor	Non replaceable RTD or TC sensor	Non replaceable RTD or TC sensor
Connection type	Flying leads or connector	Flying leads or connector	Flying leads or connector	Flying leads or connector
Thermowell				
Process connection	Clamp-on	Clamp-on	Screw-in bolt	Bayonet
Diameter/dimensions	Block 26x18x50 mm	Block 5x5x25 mm	M6, M8	Ø6 mm
Material	Cu, PTFE	Cu, 1.4404/316L	1.4404/316L	Brass, Ni-coated
Standard length	500, 1000, 3000 mm	100, 300, 500 mm	15, 25, 30 mm	25 mm
Neck tube/holding tube				
Length	-	-	-	-
Connection thread	-	-	-	-
Approvals				
	-	-	-	–

	Cable and HVAC		MI-cable and high temperature	
	Ambient temperature thermometer, wall mounted, IP65	Plug-in HVAC air duct thermometer	MI thermocouple with standard TC connector	MI thermocouple with compensation cable and standard TC connector
	OPTITEMP TRA V20	OPTITEMP TRA V30	OPTITEMP TCA M50	OPTITEMP TCA M70
				
Connection head				
Models	64x58x34 mm, Alu box, IP65	64x58x34 mm, Alu box, IP65	No head required	No head required
Cable gland/conduit thread	-	-	-	-
Process thread	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT
Sensitive element				
Sensor	1, 2 x Pt100 or 1/2 x TC J/K2	1, 2 x Pt100 or 1/2 x TC J/K2	1, 2 x TC J, K, N, grounded/isolated	1, 2 x TC J, K, N, grounded/isolated
Circuit type	2-, 3- or 4-wire RTD, 2-wire TC	2-, 3- or 4-wire RTD, 2-wire TC	2-wire TC	2-wire TC
Tolerance class	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60586	Class A, B or 1/3 B acc. EN 60751, class 1 acc. EN 60586	Class 1 acc. EN 60584	Class 1 acc. EN 60584
Design	Non replaceable RTD or TC sensor	Non replaceable RTD or TC sensor	Non replaceable RTD or TC sensor	Non replaceable RTD or TC sensor
Connection type	Connection block or temp. transmitter	Connection block or temp. transmitter	Standard- or mini TC connector	Standard- or mini TC connector
Thermowell				
Process connection	Wall mount	Plug-in, compression fitting, mounting flange	Plug-in, compression fitting M8, G 1/8", G 1/4", G 1/2"	Plug-in, compression fitting M8, G 1/8", G 1/4", G 1/2"
Diameter/dimensions	Ø6 mm	Ø6 mm	Ø1, 2, 3, 4, 5, 6 mm	Ø1, 2, 3, 4, 5, 6 mm
Material	Brass, perforated	Brass	Inconel® 600	Inconel® 600
Standard length	50 mm	50, 100, 200, 300 mm	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600 mm	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600 mm
Neck tube/holding tube				
Length	-	-	-	-
Connection thread	-	-	-	-
Approvals				
	-	-	-	

OPTITEMP TT 10 C, TT 10 C Ex OPTITEMP TT 10 R
Analogue, adjustable, two-wire transmitters for Pt100 with current output

OPTITEMP TT 11 C OPTITEMP TT 11 R
Analogue, adjustable three-wire transmitters for Pt100 or Pt1000 with voltage output

OPTITEMP TT 20 C
Analogue, programmable two-wire transmitter for Pt100 with current output

OPTITEMP TT 30 C, TT 30 C Ex OPTITEMP TT 30 R, TT 30 R Ex
Universally, programmable two-wire transmitters for thermocouples and resistance thermometers with current output

OPTITEMP TT 50 OPTITEMP TT 50, TT 50 C Ex
Universally, programmable two-wire HART® transmitters for themocouples and resistance thermometers with current output

OPTITEMP TT 31 R, TT 31 R Ex
One- or two-channel universally programmable two-wire transmitters for thermocouples and resistance thermometers with current output

OPTITEMP TT 40 C OPTITEMP TT 40 R
Highly precise, universally, programmable two-wire transmitters for thermocouples and resistance thermometers with current output

OPTITEMP TT 32 R
Universally programmable four-wire transmitter for thermocouples and resistance thermometers with current and voltage output

OPTITEMP TT 51 C, TT 51 C Ex OPTITEMP TT 51 R, TT 51 R Ex
Highly precise, universally, programmable two-wire HART transmitters for thermocouples and resistance thermometers with current output

OPTITEMP TT 60 C, TT 60 C Ex OPTITEMP TT 60 R
Highly precise, universally programmable Profibus transmitters for thermocouples and resistance thermometers

Temperature transmitters

Precision that stands the test of time

Our engineers are constantly researching and developing with the goal of combining innovative technology, superior user friendliness and above all, long-lasting reliability. The success is tangible! With the new generation of OPTITEMP TT 51 temperature transmitters, KROHNE has once again set the standard when it comes to measuring accuracy and maximum measurement stability.

Just one of many good examples

Thanks to its rugged design and the sensor backup function, the OPTITEMP TT 51 temperature transmitter fulfils its duties reliably and precisely, especially over the long term. External influences such as the ambient temperature, vibrations, moisture or electromagnetic disturbances have almost no influence on the measuring result.

Right down to the smallest detail, KROHNE's innovative measurement technology comes out on top in market comparisons. This holds true whether it comes to simple configuration, installation, maintenance or the currently one-of-a-kind isolation resistance monitoring (SmartSense) used to detect moisture in the thermowell. SIL2 approval and NAMUR compatibility mean that the OPTITEMP TT 51 can be used without difficulty over the long term, even in safety-oriented applications.

OPTITEMP TT 51 C OPTITEMP TT 51 R

Minimal tolerance for maximum accuracy

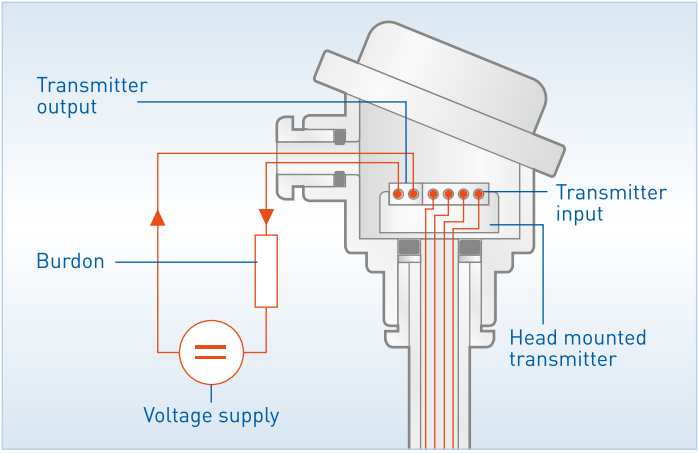
In 1974, INOR launched the world's first temperature transmitter that could be built into the connection head of a thermometer. This breakthrough made it possible to convert the sensitive thermometer signal directly at the measuring station into a fail-safe current and to relay it undisturbed over long distances. This also meant that special compensating lines and thermocouple wires could be eliminated for thermocouples.

Highlights:

- Fits any B-connection head and on the rail
- Analogue temperature transmitters for simple, low cost applications
- Digital, universally programmable state-of-the-art transmitters for demanding applications
- HART 6 compatible transmitter variants
- Transmitters with Profibus interface
- SIL2-approved design
- High accuracy, reliability and long-term stability
- Extensive diagnostics functions
- Intrinsically safe design with ATEX, FM and CSA approval
- High galvanic isolation
- Easy installation
- Rugged design

The measuring principle

Electrical thermometers have just one small, sensitive output signal. Temperature transmitters convert that signal into a standardised current signal, proportional to the temperature, that can be transported over long distances without problem. 2-wire transmitters get the required energy from the loop. Their output current of 4...20 mA corresponds to the measuring signal and is always proportional to the temperature. Resistance thermometers and different types of thermocouples can be connected to the transmitter input. Head-mounted transmitters are built into the connection head of a thermometer. If the ambient temperature is too high, a rail-mounted variant is used for the control cabinet.



Industries:

- Chemical
- Petrochemical
- Oil and gas
- Energy supply
- Machine building
- Pharmaceutical
- Food and beverage
- Water and wastewater
- Iron and steel
- Pulp and paper
- Heating, Ventilation & Air Conditioning (HVAC)

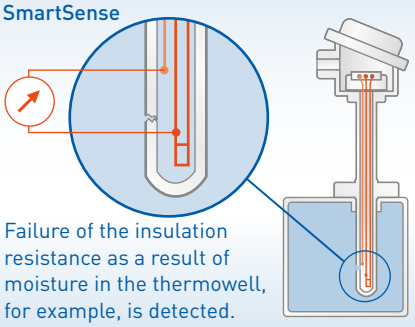
Maximum reliability for permanent best results

With the OPTITEMP series, KROHNE always offers customers more than just temperature measuring devices. Depending on the type, our transmitters feature a variety of diagnostic functions which allow users to address the following problems with a high degree of certainty:

- low sensor isolation resistance
- sensor break
- sensor short-circuit
- sensor drift

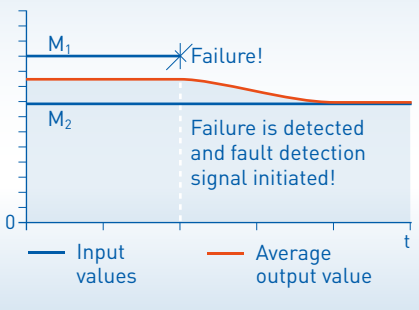
In addition, our dual-input transmitters feature a sensor backup function which allows them to actively intervene in the case of a malfunction of one sensor by automatically switching to the other sensor. With the help of the sensor error correction, temperature probe measurement errors can be corrected by adjusting the transmitter. Furthermore, depending on the type of transmitter there is the option of an individual linearisation of characteristics to help achieve maximum compliance to any connected sensor.

Insulation resistance monitoring SmartSense



Failure of the insulation resistance as a result of moisture in the thermowell, for example, is detected.

Sensor backup with dual measurement



Head-mounted transmitters

	Analogue, adjustable, two-wire transmitter for Pt100 with current output	Analogue, adjustable three-wire transmitter for Pt100 or Pt1000 with voltage output	Analogue, programmable two-wire transmitter for Pt100 with current output	Universally, programmable two-wire transmitters for thermocouples and resistance thermometers with current output
	OPTITEMP TT 10 C, OPTITEMP TT 10 C Ex	**OPTITEMP TT 11 C**	**OPTITEMP TT 20 C**	**OPTITEMP TT 30 C, OPTITEMP TT 30 C Ex**
				
Resistance thermometer	Pt100	Pt100, Pt1000	Pt100	Pt100, Pt1000, Ni100, Ni120, Ni1000, Cu10
Connection technology	3-wire	3-wire	3-wire	3- and 4-wire
Thermocouples	-	-	-	B, C, E, J, K, L, N, R, S, T, U
Miscellaneous	-	-	-	-10...+500 mV, potentiometer 0 ... 2000 Ω
2nd input	-	-	-	-
Smallest measuring span	50 °C	50 °C	20 °C	10 °C
Outputs	4...20 mA	0...10 V	4...20 mA	4...20 mA/20...4 mA
Communication	-	-	-	-
Measurement accuracy	0.15 % of the measuring span	0.15 % of the measuring span	0.1 % of the measuring span	0.1 % of the measuring span
Galvanic isolation	-	-	-	1500 VAC
Power supply	6.5...32 VDC	15...30 VDC	8.5...32 VDC	6.5...36 VDC
Configuration	Solder bridges	Solder bridges	PC configuration	PC configuration
Ambient temperature	-40...+85 °C	-40...+85 °C	-40...+85 °C	-40...+85 °C
Diagnostic functions				
Sensor failure detection	x	x	x	x
Isolation monitoring SmartSense	-	-	-	x
Sensor drift detection	-	-	-	-
Sensor backup function	-	-	-	-
Sensor error correction	-	-	x	x
NAMUR conformity	NE 21*	NE 21*	NE 21*	NE 21*, 43
Approvals	Ex	-	-	Ex
	OPTITEMP TT 10 C Ex			**OPTITEMP TT 30 C Ex**
ATEX	II 1 G Ex ia IIB T4-T6	-	-	II 1 G Ex ia IIC T4-T6
FM	-	-	-	-
CSA	-	-	-	-
Ex power supply	8.5...30 VDC	-	-	8...30 VDC

	Highly precise, universally, programmable two-wire transmitters for thermocouples and resistance thermometers with current output	Universally programmable two-wire HART® transmitters for thermocouples and resistance thermometers with current output	Highly precise, universally, programmable two-wire HART transmitters for thermocouples and resistance thermometers with current output	Highly precise, universally programmable Profibus transmitters for thermocouples and resistance thermometers
	OPTITEMP TT 40 C	**OPTITEMP TT 50 C, OPTITEMP TT 50 C Ex**	**OPTITEMP TT 51 C, OPTITEMP TT 51 C Ex**	**OPTITEMP TT 60 C, OPTITEMP TT 60 C Ex**
				
Resistance thermometer	Pt100, Pt1000, Ni100, Ni120, Ni1000, Cu10	Pt100/1000, Ni100/1000	Pt10/50/100/200/500/1000, Ni100/120/1000, Cu10	Pt10/50/100/200/500/1000, Ni50/100/120/1000
Connection technology	3-and 4-wire	2-, 3-, and 4-wire	2-, 3-, and 4-wire	2-, 3-, and 4-wire
Thermocouples	B, C, E, J, K, L, N, R, S, T, U	B, E, J, K, L, U, N, R, S, T	B, C, D, E, J, K, L, N, R, S, T, U	B, C, D, E, J, K, L, N, R, S, T, U
Miscellaneous	-10...+500 mV, potentiometer 0...2,000 Ω	-10...+500 mV, potentiometer 0...2,000 Ω	-10...+1000 mV, potentiometer 0...4,000 Ω 2 x Pt100 (2/3-wire)	-10...+1000 mV, potentiometer 0...4000 Ω 2 x Pt100 (2/3-wire)
2nd input	-	-	x	x
Smallest measuring span	10 °C	10 °C	10 °C	-
Outputs	4...20 mA/20...4 mA	4...20 mA/20...4 mA	4...20 mA/20...4 mA	Digital
Communication	-	HART®	HART®	Profibus
Measurement accuracy	0.05 % of the measuring span	0.1 % of measuring span	0.05 % of the measuring span	Pt100: 0.1 °C, T/C J, K, N, T: 0.2 °C, T/C R, S: 0.7 °C
Galvanic isolation	3750 VAC	1500 VAC	1500 VAC	1500 VAC
Power supply	6.5...36 VDC	10...42 VDC	10...36 VDC	Profibus supply
Configuration	PC configuration	PC configuration/HART®	PC configuration/HART®	PC configuration/Profibus
Ambient temperature	-40...+85 °C	-40...+85 °C	-40...+85 °C	-40...+85 °C
Diagnostic functions				
Sensor failure detection	x	x	x	x
Insulation monitoring SmartSense	x	x	x	x
Sensor drift detection	-	-	x	x
Sensor backup function	-	-	x	x
Sensor error correction	x	-	x	x
NAMUR conformity	NE 21*, 43	NE 21*, 43	NE 21*, 43, 53, 89, 107	NE 21*
Approvals	-	-	Ex, SIL2	Ex
		OPTITEMP TT 50 C Ex	**OPTITEMP TT 51 C Ex**	**OPTITEMP TT 60 C Ex**
ATEX	-	II 1 G Ex ia IIC T4-T6	II 1 G Ex ia IIC T4-T6 II 3 G Ex nL IIC T4-T6	II 1 G Ex ia IIC T4-T6 II 3 G Ex nL IIC T4-T6
FM	-	-	In preparation	-
CSA	-	-	In preparation	-
Ex power supply	-	12...30 VDC	10...30 VDC	Profibus supply

x = available, - = not available

* Tested from 150 kHz in accordance with EN 61000-4-6

Rail-mounted transmitters

	Analogue, adjustable, two-wire transmitters for Pt100 with current output	Analogue, adjustable three-wire transmitters for Pt100 or Pt1000 with voltage output	Universally, programmable two-wire transmitters for thermocouples and resistance thermometers with current output	One- or two-channel universally programmable two-wire transmitters for thermocouples and resistance thermometers with current output
	OPTITEMP TT 10 R	**OPTITEMP TT 11 R**	**OPTITEMP TT 30 R, TT 30 R Ex**	**OPTITEMP TT 31 R, TT 31 R Ex**
				
Resistance thermometer	Pt100	Pt100, Pt1000	Pt100, Pt1000, Ni100, Ni120, Ni1000, Cu10	Pt100, Pt1000, Ni100, Ni120, Ni1000, Cu10
Connection technology	3-wire	3-wire	3- and 4-wire	3- and 4-wire
Thermocouples	-	-	B, C, E, J, K, L, N, R, S, T, U	B, C, E, J, K, L, N, R, S, T, U
Miscellaneous	-	-	-10...+ 500 mV, potentiometer 0 ... 2,000 Ω	-10...+ 500 mV, potentiometer 0 ... 2,000 Ω
2nd input	-	-	-	1 or 2 separate channels
Smallest measuring span	50 °C	50 °C	10 °C	10 °C
Outputs	4...20 mA	0...10 V	4...20 mA/20 ... 4 mA	4...20 mA/20...4 mA
Communication	-	-	-	-
Measuring accuracy	0.15 % of the measuring span	0.15 % of the measuring span	0.1 % of the measuring span	0.1 % of the measuring span
Galvanic isolation	-	-	1500 VAC	1500 VAC
Power supply	6.5...32 VDC	15...30 VDC	7.5...36 VDC	8...36 VDC
Configuration	Solder bridges	Solder bridges	PC configuration	PC configuration
Ambient temperature	-20...+70 °C	-20...+70 °C	-20...+70 °C	-20...+70 °C
Diagnostic functions				
Sensor failure detection	x	x	x	x
Isolation monitoring SmartSense	-	-	-	-
Sensor drift detection	-	-	-	-
Sensor backup function	-	-	-	-
Sensor error correction	-	-	x	x
NAMUR conformity	NE 21*	NE 21*	NE 21*, 43	NE 21*, 43
Approvals	-	-	Ex	Ex
			OPTITEMP TT 30 R Ex	**OPTITEMP TT 31 R Ex**
ATEX	-	-	II (1) G [Ex ia] IIC	II (1) G [Ex ia] IIC II (1) D [Ex iaD]
FM	-	-	-	-
CSA	-	-	-	-
Ex ambient temperature	-	-	-20...+70 °C	-20...+60 °C
Ex power supply	-	-	8...30 VDC	8...36 VDC

Universally programmable four-wire transmitter for thermocouples and resistance thermometers with current and voltage output	Highly precise, universally, programmable two-wire transmitters for thermocouples and resistance thermometers with current output	Universally programmable two-wire HART® transmitters for thermocouples and resistance thermometers with current output	Highly precise, universally, programmable two-wire HART transmitters for thermocouples and resistance thermometers with current output	Highly precise, universally programmable Profibus transmitters for thermocouples and resistance thermometers
OPTITEMP TT 32 R	**OPTITEMP TT 40 R**	**OPTITEMP TT 50 R, TT 50 R Ex**	**OPTITEMP TT 51 R, TT 51 R Ex**	**OPTITEMP TT 60 R**
				
Pt100, Pt1000, Ni100, Ni120, Ni1000, Cu10	Pt100, Pt1000, Ni100, Ni120, Ni1000, Cu10	Pt100/1000, Ni100/1000	Pt10/50/100/200/ 500/1000, Ni100/120/1000, Cu10	Pt10/50/100/200/ 500/1000, Ni 50/100/120/1000
3- and 4-wire	3- and 4-wire	2-, 3-, and 4-wire	2-, 3-, and 4-wire	2-, 3-, and 4-wire
B, C, E, J, K, L, N, R, S, T, U	B, C, E, J, K, L, N, R, S, T, U	B, E, J, K, L, U, N, R, S, T	B, C, E, J, K, L, N, R, S, T, U	B, C, D, E, J, K, L, N, R, S, T, U
-10...+ 500 mV, -10...+50 V, -1 ... 50 mA, potentiometer 0 ... 8,000 Ω	-10...+ 500 mV, potentiometer 0...2,000 Ω	-10...+500 mV, potentiometer 0...2.000 Ω	-10...+ 1000 mV, potentiometer 0...4,000 Ω; 2 x Pt100 (2/3/4-wire)	-10...+ 1000 mV, potentiometer 0...4,000 Ω; 2 x Pt100 (2/3-wire)
-	-	-	x	x
10 °C	10 °C	+10 °C	10 °C	-
4 ... 20 mA/20 ... 4 mA; 0/2 ...10 V/10 ... 2/0 V	4...20 mA/20...4 mA	4...20 mA/20...4 mA	4...20 mA/20...4 mA	Digital
-	–	HART®	HART®	Profibus
0.10 % of the measuring span	0.05 % of the measuring span	0.1 % of measuring span	0.05 % of the measuring span	Pt100: 0.1 °C, T/C J, K, N, T: 0.2 °C, T/C R, S: 0.7 °C
4,000 VAC	3750 VAC	1500 VAC	1500 VAC	1500 VAC
20 ... 30 VDC, 110 ... 220 VDC, 90 ... 250 VAC	7.5...36 VDC	10...42 VDC	10...36 VDC	Profibus supply
PC configuration	PC configuration	PC configuration/HART®	PC configuration/HART®	PC configuration/Profibus
-20 ... +70 °C	-20...+70 °C	-20...+85 °C	-20...+70 °C	-20...+70 °C
x	x	x	x	x
x	x	x	x	x
-	-	-	x	x
-	-	-	x	x
x	x	-	x	x
NE 21*, 43	NE 21*, 43	NE 21*, 43	NE 21, 43, 53, 89, 107	NE 21*
-	-	-	Ex, SIL2	-
			OPTITEMP TT 51 R Ex	
-	-	-	II 2(1) G Ex ia IIC T4-T6 II 3 G Ex nL IIC T4-T6	-
-	-	-	In preparation	-
-	-	-	In preparation	-
-	-	-	-20...+70 °C	-
-	-	-	10...30 VDC	-

x = available, - = not available

* Tested from 150 kHz in accordance with EN 61000-4-6

Beyond the highest requirements

Communicaton at KROHNE: Open for the future

Industrial automation in the process industry has been undergoing rapid change for the past twenty years. This has also affected industrial measurement technology. Where it was once centralized and largely self-contained structures that dominated, today the pace is set by intelligent, decentralized architectures. Thus, system concepts in which the products of a variety of manufacturers work harmoniously together are becoming a reality via open, standard interfaces such as HART, PROFIBUS and FOUNDATION FIELDBUS.

KROHNE has been actively following this development for years. Whether we are talking about flow measurement, level measurement, temperature measurement or analytical measuring technology, KROHNE field devices are open for the future. They communicate reliably with controllers, control systems and PCs and can also be used for a variety of control and regulating tasks.

Online configurator
To select your device down to the last detail, take advantage of our online platform Configure It. It allows you to quickly and conveniently find the product that is right for you, check its availability and request a non-binding quote.
For more information on Configure It go to **www.krohne-direct.com**

Integration is a top priority at KROHNE

But KROHNE field devices are capable of much more. They meet all of the prerequisites for integration into plant asset management systems. And they allow the supplying of serious integration technologies such as DD/EDD and FDT/DTM.

What's so special about FDT/DTM? For the first time, open, bus-independent integration of field technology into the plant asset management system is possible – this is without a doubt a milestone for industrial communication and KROHNE, a long-standing member of PACTware and the FDT group, has played and continues to play a significant role. So it is no wonder that, we have made DTMs available for our field units with HART and/or PROFIBUS interfaces since the beginning of 2003.

KROHNE proved:
Expect more – achieve more

Every one of our thermometers is given a thorough inspection before leaving one of our global manufacturing facilities.

We call these specific measurements, tests and factory inspections "KROHNE proved". They go well beyond any legal requirements, thus guaranteeing our customers not only compliance with specified technical data but also the precise and reliable use of our devices under extremely difficult conditions.

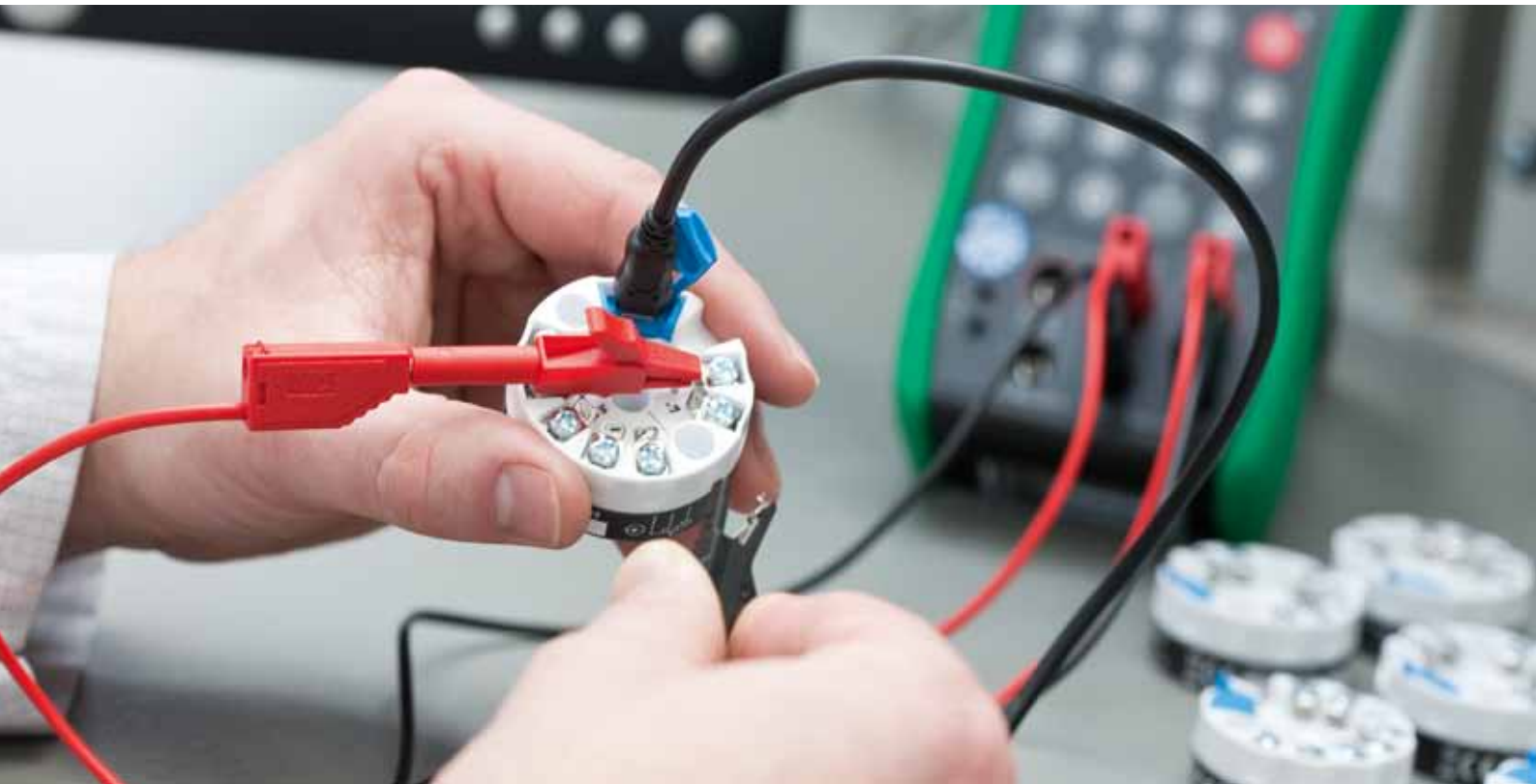
The true quality of a thermometer can only be judged under the most difficult conditions such as rapid temperature changes, high ongoing temperatures, vibration, high pressures and flow velocities as well as aggressive products. That is why we at KROHNE do everything to ensure that our thermometers come out shining even in extreme conditions, demonstrating maximum accuracy, reliability and repeatability.

And we pay special attention to the careful manufacture of our measuring inserts as they are instrumental to the accuracy of our thermometers. They are manufactured using mineral isolated cables and are subject to strict quality controls including the measurement of insulation resistance and checking for adherence to the required tolerance class.

As an additional service we also provide multipoint calibration, also at customers facilities. Pair matching sensors to gain higher assurance is another service from our calibration lab we can support you with. Customizing thermometers have for a long time been our expertise area, everything from high volume OEM sensor to multi-point sensors for advanced applications.

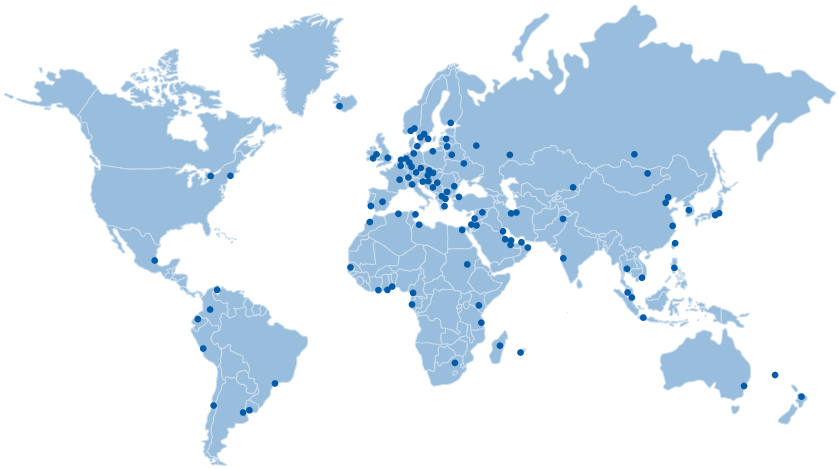
So not only can we support you with quality assured production of sensor but also design solutions for your temperature measurement. Welcome, challenge us.

Configuring an OPTITEMP transmitter with ICON



KROHNE
Product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature meters
- Pressure meters
- Analysis products
- Measuring systems for the oil and gas industry
- Measuring systems for sea-going tankers



Contact

Head office
KROHNE Messtechnik GmbH
Ludwig-Krohne-Str. 5
47058 Duisburg
Germany
Tel.:+49 203 301 0
Fax:+49 203 301 103 89
info@krohne.de

Global companies and representatives
The current list of all
KROHNE contacts and
addresses can be found at:
www.krohne.com