

Passive temperature probes

CAREL



ENG User manual

**READ AND SAVE
THESE INSTRUCTIONS**



H i g h E f f i c i e n c y S o l u t i o n s

IMPORTANT



CAREL bases the development of its products on decades of experience in HVAC, on the continuous investments in technological innovations to products, procedures and strict quality processes with in-circuit and functional testing on 100% of its products, and on the most innovative production technology available on the market. CAREL and its subsidiaries nonetheless cannot guarantee that all the aspects of the product and the software included with the product respond to the requirements of the final application, despite the product being developed according to start-of-the-art techniques. The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. CAREL may, based on specific agreements, act as a consultant for the positive commissioning of the final unit/application, however in no case does it accept liability for the correct operation of the final equipment/system.

The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.CAREL.com. Each CAREL product, in relation to its advanced level of technology, requires setup / configuration / programming / commissioning to be able to operate in the best possible way for the specific application. The failure to complete such operations, which are required/indicated in the user manual, may cause the final product to malfunction; CAREL accepts no liability in such cases. Only qualified personnel may install or carry out technical service on the product. The customer must only use the product in the manner described in the documentation relating to the product.

In addition to observing any further warnings described in this manual, the following warnings must be heeded for all CAREL products:

- Prevent the electronic circuits from getting wet. Rain, humidity and all types of liquids or condensate contain corrosive minerals that may damage the electronic circuits. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual.
- Do not install the device in particularly hot environments. Too high temperatures may reduce the life of electronic devices, damage them and deform or melt the plastic parts. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual.
- Do not attempt to open the device in any way other than described in the manual.
- Do not drop, hit or shake the device, as the internal circuits and mechanisms may be irreparably damaged.
- Do not use corrosive chemicals, solvents or aggressive detergents to clean the device.
- Do not use the product for applications other than those specified in the technical manual.

All of the above suggestions likewise apply to the controllers, serial boards, programming keys or any other accessory in the CAREL product portfolio.

C

CAREL adopts a policy of continual development. Consequently, CAREL reserves the right to make changes and improvements to any product described in this document without prior warning.

The technical specifications shown in the manual may be changed without prior warning.

The liability of CAREL in relation to its products is specified in the CAREL general contract conditions, available on the website www.CAREL.com and/or by specific agreements with customers; specifically, to the extent where allowed by applicable legislation, in no case will CAREL, its employees or subsidiaries be liable for any lost earnings or sales, losses of data and information, costs of replacement goods or services, damage to things or people, downtime or any direct, indirect, incidental, actual, punitive, exemplary, special or consequential damage of any kind whatsoever, whether contractual, extra-contractual or due to negligence, or any other liabilities deriving from the installation, use or impossibility to use the product, even if CAREL or its subsidiaries are warned of the possibility of such damage.

DISPOSAL

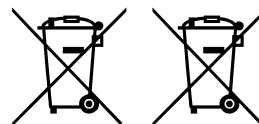


Fig. 1

Fig. 2

WITH REFERENCE TO EUROPEAN UNION DIRECTIVE 2012/19/EU ISSUED ON 4 JULY 2012 AND RELATED NATIONAL LEGISLATION, PLEASE NOTE THAT:

- Waste Electrical and Electronic Equipment (WEEE) cannot be disposed of as municipal waste but must be collected separately so as to allow subsequent recycling, treatment or disposal, as required by law;
- users are required to take Electrical and Electronic Equipment (EEE) at end-of-life, complete with all essential components, to the WEEE collection centres identified by local authorities. The directive also provides for the possibility to return the equipment to the distributor or retailer at end-of-life if purchasing equivalent new equipment, on a one-to-one basis, or one-to-zero for equipment less than 25 cm on their longest side;
- the equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment;
- the symbol (crossed-out wheeled bin, see Figure 1), is shown on the product or on the packaging, indicates that the equipment must be disposed of separately at end-of-life;
- if at end-of-life the EEE contains a battery (Figure 2), this must be removed following the instructions provided in the user manual before disposing of the equipment. Used batteries must be taken to appropriate waste collection centres as required by local regulations;
- in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

Warranty on the materials: 2 years (from the date of production, excluding consumables).

Approval: the quality and safety of CAREL INDUSTRIES Hqs products are guaranteed by the ISO 9001 certified design and production system.

Warning: separate as much as possible the probe and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance. Never run power cables (including the electrical panel wiring) and signal cables in the same conduits.

HACCP
Caution !

When the temperature measurement is important for food safety (i.e. HACCP), only the temperature probes suggested by Carel must be used. Standards in force may require specific documents to be completed and kept on file, as well as periodical verification of the instruments and sensors used. In case of doubt, contact the food safety manager or site manager.

Contents

1. INTRODUCTION	7
1.1 Description	7
2. NTC TECHNICAL SPECIFICATIONS	7
2.1 Models NTC*HP*	7
2.2 Models NTC*AC*	7
2.3 Models NTC*WF*	8
2.4 Models NTC*WH* and UEKNTC*	8
2.5 Models NTC*WP*	9
2.6 Models NTC*WG*	10
2.7 Models NTC*HT*	10
2.8 Models NTC*HF*	11
2.9 Models NTC*WS*	11
2.10 Models NTC*LT*	12
2.11 Models NTC*PS*	13
3. NTC IMMERSION PROBE TECHNICAL SPECIFICATIONS	14
3.1 Models TSN1300000	14
3.2 Models TSC1500030	15
4. NTC PIERCING PROBE TECHNICAL SPECIFICATIONS	17
4.1 Models NTC*INF*	17
4.2 Models NTCINF0340 and NTCINF0640	18
4.3 Models NTCINF0150	18
5. TABLE OF TEMPERATURE VALUES	19
5.1 Table of temperature-resistance values for NTC sensor 10K@25°C β 3435	19
5.2 Table of temperature-resistance values for NTC sensor 50K@25°C β 3977	20
5.3 Table of temperature-resistance values for NTC sensor 750 Ohm @25°C β 3969	21
6. PT100 PROBE TECHNICAL SPECIFICATIONS	21
6.1 Models PT100	21
7. TABLE OF TEMPERATURE VALUES PT100 PROBE	22
7.1 Table of temperature values PT100 Probe Class B	22
8. PT1000 PROBE TECHNICAL SPECIFICATIONS	22
8.1 Models PT1*HP*	22
8.2 Models PT1*WF*	23
8.3 Models PT1*WP*	23
8.4 Models PT1*HT*	24
8.5 Models PT1*HF*	24
8.6 Models PT1*PS*	25
8.7 Models PT1*MC	25
9. PT1000 IMMERSION PROBE TECHNICAL SPECIFICATIONS	26
9.1 Models TST1300000	26
9.2 Models TSM1500B30	27
9.3 Models TSQ15MAB00	28
10. PT1000 PIERCING PROBE TECHNICAL SPECIFICATIONS	29
10.1 Models PT1INF0340	29
11. TABLE OF PT1000 PROBE VALUES	30
11.1 Table of temperature-resistance values for PT1000 probe class B	30
12. TEMPERATURE SENSOR INSTALLATION INSTRUCTIONS	32
13. ACCESSORIES	33

1. INTRODUCTION

1.1 Description

The Carel temperature probes, are resistive transducers, that connected to a programmable or a parametric controller allow the temperature control. These are used in HVAC-R applications, and represent a complete range capable of satisfying a variety of needs in different installations. The probes are made using materials that guarantee the reliability over time. The range includes various models suitable to be used for several application fields. Are available probes made with thermistors or RTD as sensible element.

NTC thermistors:

- $750\Omega \pm 1\%$ @25°C, β (25°C/85°C) $3969 \pm 1\%$;
- $10k\Omega \pm 1\%$ @25°C, β (25°C/85°C) $3435 \pm 1\%$;
- $50k\Omega \pm 1\%$ @25°C, β (25°C/85°C) $3977 \pm 1\%$.

PTC thermistors:

- $980\Omega \div 1000\Omega$ @25°C, R100/R25 1.676min, 1.696typ, 1.716max

RTD:

- PT 100Ω @0°C, class B;
- PT 1000Ω @0°C, class B.

In addition, models are available for use in hydronic systems, applied directly at the tubing. These probes have a rapid fixing system that simplify the wiring of the HVAC-R unit. Other, with their fast response time, improve the system performance.

2. NTC TECHNICAL SPECIFICATIONS

2.1 Models NTC*HP*

Storage conditions	-50T105 °C
Operating range	-50T105 °C in air
Connections	Stripped ends, dimensions: 5 ± 1 mm
Sensor	NTC $10 k\Omega \pm 1\%$ a 25 °C Beta 3435
Precision	$\pm 0.3^\circ\text{C}$ a 25°C, $\pm 1^\circ\text{C}$ -50T80°C, $\pm 1.5^\circ\text{C}$ 80T105°C
Dissipation factor (in air)	ca. 3 mW/°C
Thermal constant over time (in air)	ca. / approx. 25 s
Cable	Black two-wire flat cable, with tinned copper wire size 0.3 mm ²
Sensitive element index of protection	IP67
Sensitive element housing	Polyolefin
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant

Tab. 2.a

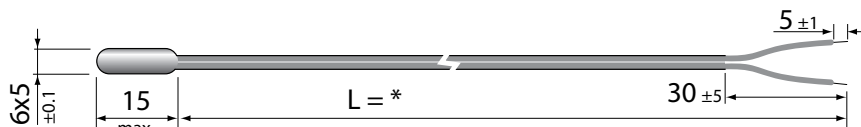


Fig. 2.a

* = see table of product codes in price list.



Warning: all measures present in this manual are in millimeters.

2.2 Models NTC*AC*

Storage conditions	-50T105 °C
Operating range	-50T105 °C in air
Connections	Stripped ends, dimensions: 5 ± 1 mm
Sensor	NTC $10 k\Omega \pm 1\%$ a 25 °C Beta 3435
Precision	$\pm 0.3^\circ\text{C}$ a 25°C, $\pm 1^\circ\text{C}$ -50T80°C, $\pm 1.5^\circ\text{C}$ 80T105°C
Dissipation factor (in air)	ca. 3 mW/°C
Thermal constant over time (in air)	ca. / approx. 25 s
Cable	Black two-wire flat cable, with tinned copper wire size 0.3 mm ²
Sensitive element index of protection	IP65
Sensitive element housing	Polyolefin
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant

Tab. 2.b

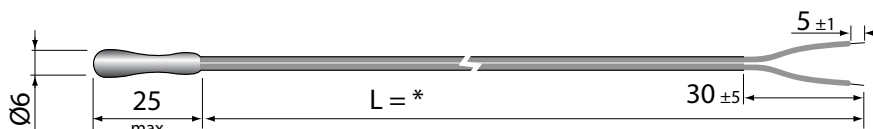


Fig. 2.b

* = see table of product codes in price list.



Warning: all measures present in this manual are in millimeters.

2.3 Models NTC*WF*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kΩ ±1% a 25 °C Beta 3435
Precision	±0.3°C a 25°C, ±1°C -50T80°C, ±1.5°C 80T105°C
Dissipation factor (in air)	ca. / approx. 7 mW/°C
Thermal constant over time (in air)	ca. / approx. 10 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max.
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 steel diameter 4 mm - L= 30 mm
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac

Tab. 2.c

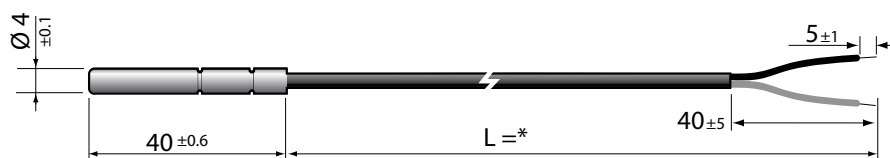


Fig. 2.c

* = see table of product codes in price list

2.4 Models NTC*WH* and UEKNTC*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kΩ ±1% a 25 °C Beta 3435
Precision	± 0,3 °C; 25 °C; ± 1,2°C; -20°C...80°C
Dissipation factor (in air)	ca. / approx. 2,2 mW/°C
Thermal constant over time (in water)	ca. / approx. 30 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max
Sensitive element index of protection	IP68
Sensitive element housing	PP/Co with AISI 316 outer cap
Classification according to protection against electric shock (sensitive element and cable)	Supplementary insulation for 250 Vac;
Category of resistance to heat and fire	Flame retardant
Standard	NSF (only for 1,5-3-6 m versions)

Tab. 2.d

Version 1

* = see table of product codes in price list



Fig. 2.d

Version 2

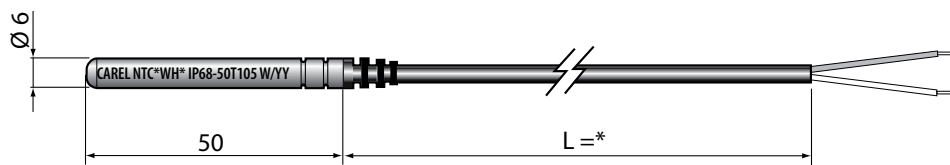


Fig. 2.e

Accessories

- Socket: nickel-coated brass - 1413306AXX
 - Maximum operating pressure 35 bar
 - Temperature -20...95°C
- Socket 2: AISI 316 - code 1413309AXX
 - Maximum operating pressure 40 bar
 - Temperature -20...95°C

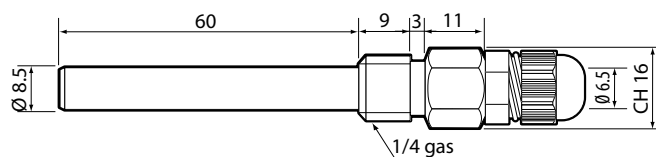


Fig. 2.f

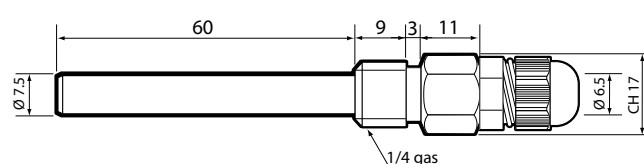


Fig. 2.g

- Socket: brass - 1413311AXX

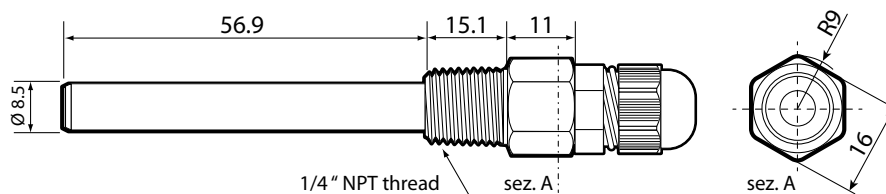


Fig. 1.a

- **Note:** cable secured with PG7, IP68 cable gland applied to hexagonal end. - kit available complete with socket and cable gland

- Compression fitting with metal olive - code 1309589AXX

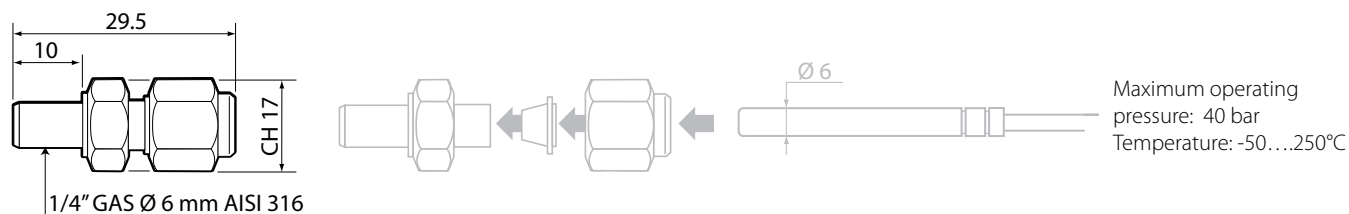


Fig. 2.h

2.5 Models NTC*WP*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kΩ ±1% a 25 °C Beta 3435
Dissipation factor (in air)	ca. / approx. 2,2 mW/°C
Thermal constant over time (in air)	ca. / approx. 30 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max
Sensitive element index of protection	IP67
Sensitive element housing	PP/Co with AISI 316 outer cap
Classification according to protection against electric shock (sensitive element and cable)	Supplementary insulation for 250 Vac;
Category of resistance to heat and fire	Flame retardant

Tab. 2.e

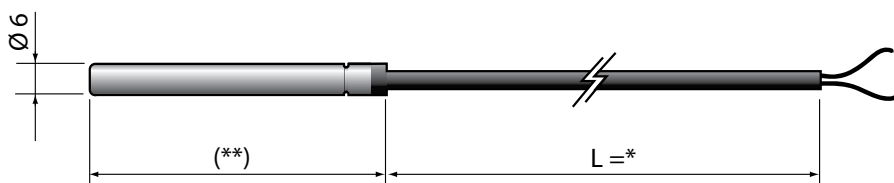


Fig. 2.i

* = see table of product codes in price list; (**) = 100, 200, 300.

- **Note:** cable secured with PG7, IP68 cable gland applied to hexagonal end. - kit available complete with socket and cable gland

- Compression fitting with metal olive - code 1309589AXX

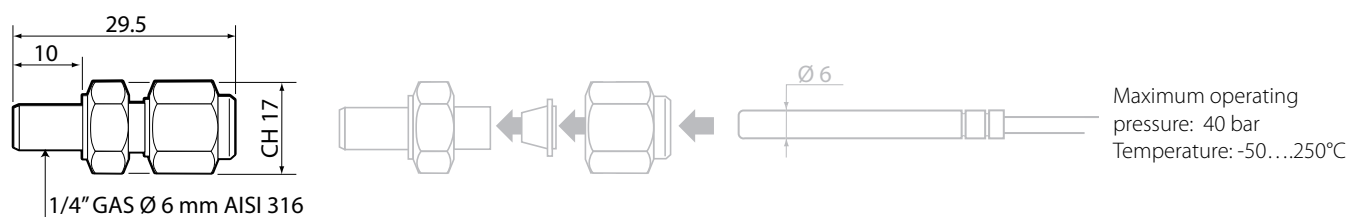


Fig. 2.j

2.6 Models NTC*WG*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kΩ ±1% a 25 °C Beta 3435
Dissipation factor (in air)	ca. / approx. 1 mW/°C
Thermal constant over time (in air)	ca. / approx. 20 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max.
Sensitive element index of protection	IP67 (in resina poliuretana)
Sensitive element housing	Aluminium 6x6x40
Classification according to protection against electric shock (sensitive element and cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant

Tab. 2.f

Cap for probe sensor

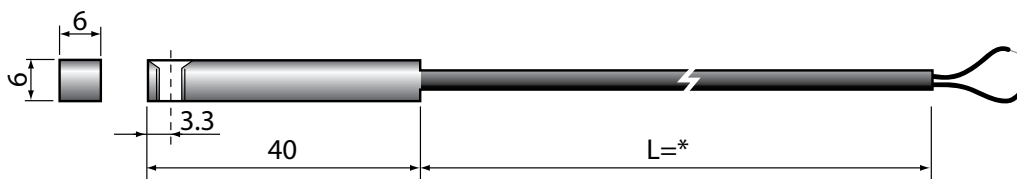


Fig. 2.k

* = see table of product codes in price list

2.7 Models NTC*HT*

Storage conditions	-30T150 °C
Operating range	-30T150°C (-30T100, RH95% in air 100T150, in dry environment)
Connections	Stripped ends, dimensions 6±1mm
Sensor	R(25 °C)= 50 kOhm 1%; Beta (25/85)3977±1%
Precision	± 1°C; -30T50 ± 1,3°C; 50T85 ± 1,9°C; 85T120 ± 2,4°C; 120T150
Dissipation factor (in air)	ca. / approx. 3 mW
Thermal constant over time (in air)	ca. / approx. 30 s
Cable	Flat 3 mm x 1.2 mm single insulation, two conductors 24 AWG, tinned copper conductors, high temperature polyester insulation suitable for hydrolysis ISO 6722 (point 11.5 hetaer hot-water).
Sensitive element index of protection	IP67
Sensitive element housing	High temperature polyester dim. 20x5 mm (available in version with AISI 316 stainless steel cap)
Classification according to protection against electric shock (sensitive element and cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	In accordance with CEI 20-35
Insulation resistance at 1000 Vdc	>100 mOhm
Dielectric strength	1500 Vac

Tab. 2.g



Note: Socket-version can be used in contact on only if the pipe is fixed in the lid with duct tape.

Version for socket

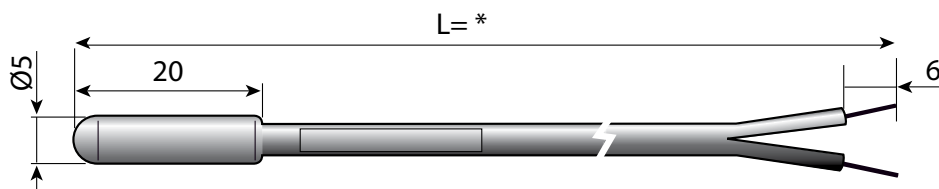


Fig. 2.l

Version with stainless steel cap

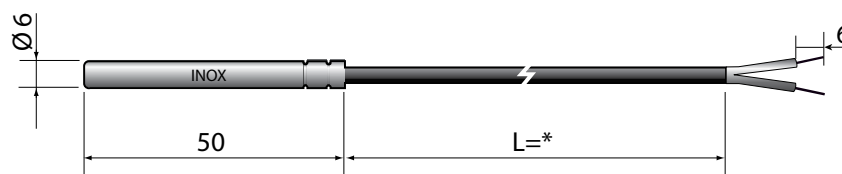


Fig. 2.m

* = see table of product codes in price list

2.8 Models NTC*HF*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions 6±1mm
Sensor	R(25 °C)= 10 kOhm 1%; Beta 3435
Precision	+/- 0.5 °C at 25 °C; +/- 1.0 °C from -50T90 °C
Dissipation factor (in air)	3 mW
Thermal constant over time (in air)	approx. 50 s
Cable	Black, thermoplastic rubber flat cable (diam. 3.6x1.6 max.)
Sensitive element index of protection	IP67
Sensitive element housing	Thermoplastic with fastening clamp
Classification according to protection against electric shock (sensitive element and cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	UL/HB cable
Insulation resistance at 500 Vdc	>20 mOhm
Dielectric strength	1500 Vac

Tab. 2.h

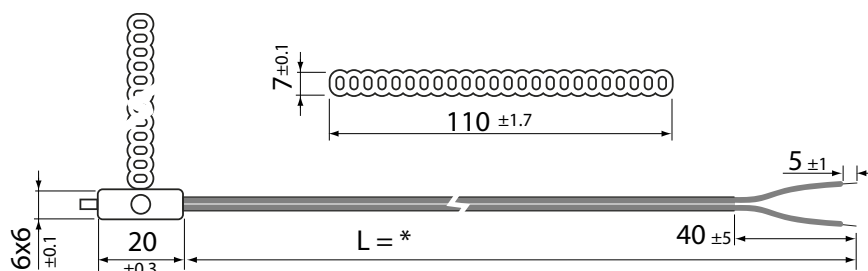


Fig. 2.n

* = see table of product codes in price list

2.9 Models NTC*WS*

Storage conditions	-40T105 °C
Operating range	-40T105 °C
Connections	Terminating pins on the cable
Sensor	R(25 °C)= 10 kOhm 1%; Beta 3435
Precision	+0.3 °C a 25 °C, ±1 °C -40T80 °C, ±1.5 °C 80T105 °C
Dissipation factor (in air)	3 mW
Thermal constant over time (in air)	approx. 50 s
Cable	Black, thermoplastic rubber cable with black-white wires, cross-section 2x0.25 mm² diam. 3.3mm
Sensitive element index of protection	IP67
Sensitive element housing	Copper cap - dimensions 4x16 mm ±1.5% with polyurethane resin packing
Band length	225 mm (See dimensions below)
Classification according to protection against electric shock (sensitive element and cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	UL/HB cable
Insulation resistance at 500 Vdc	>20 MOhm 500 Vdc
Dielectric rigidity	1500 Vac

Tab. 2.i

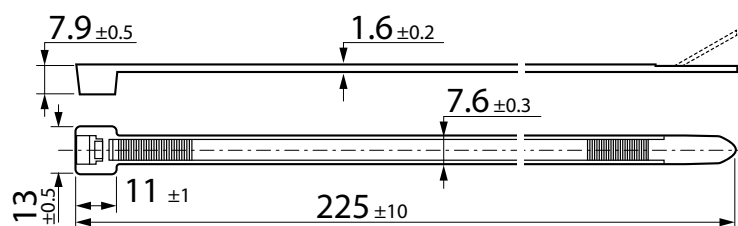


Fig. 2.o

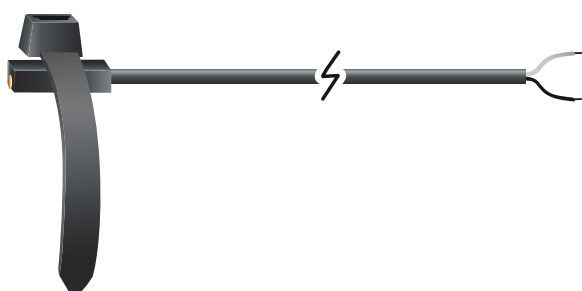


Fig. 2.p



Fig. 2.q

* = see table of product codes in price list

NTC*WS sensor assembly instructions using the cable tie tension tool

- 
- 
- 
- 1) Wrap the cable tie around the pipe and secure it; 2) On the cable tie tension tool set the tension to 250N (position 6 on the index); 3) Use the tool to tighten and then cut the cable tie;
- 
- 
- 4) Wrap the electrical cable twice around the pipe; 5) Cover the sensor with thermal insulation for at least 10 cm around the end of the cap and the wound cable;

2.10 Models NTC*LT*

Storage conditions	-80T105 °C
Operating range	-80T105 °C
Connections	M8 male-connector,
Sensor	R(25 °C)= 750 Ohm 1%; Beta 3969
Precision	+/- 0.2 °C at 25°C; +/- 1.15 °C from -80T105 °C
Dissipation factor (in air)	3 mW
Thermal constant over time (in air)	ca. 35 s in water - 10 s in air
Cable	Nickel for mounting clamp
Sensitive element index of protection	IP67
Sensitive element housing	Mineral oxide insulation MgO - sheath 316 - Ø 3mm radius of curvature (exception of the sensitive element)
Cable tie tension	Typical 250N (position 6 on the tool); Maximum 260N (position 7 on the tool);
Classification according to protection against electric shock (sensitive element and cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant
Insulation resistance	100 MOhm @ 500Vdc
Dielectric rigidity	1500 Vac
Maximum operating pressure:	40 bar

Tab. 2.j

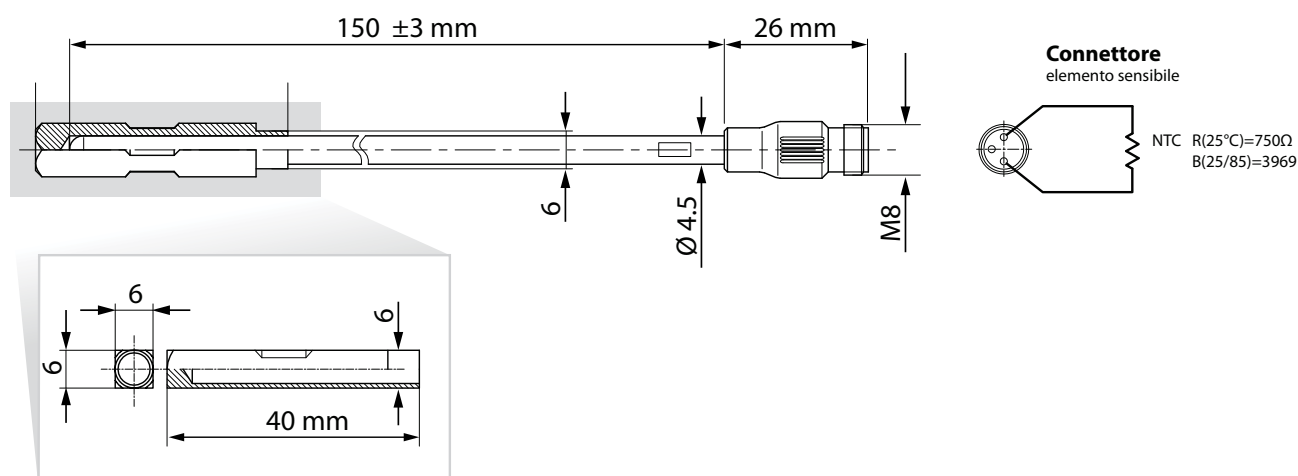


Fig. 2.r

Connection cable P/Ns for NTC*LT sensor

A	TSOPZCV030: silicone cable with M8 connector, 3 m long
	TSOPZCV100: silicone cable with M8 connector, 10 m long
B	TSOPZCV070: silicone cable extension with M8 male/female connector, 7 m long

A

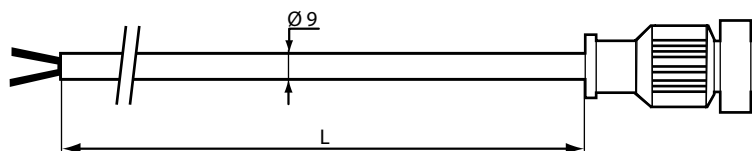


Fig. 2.s

B

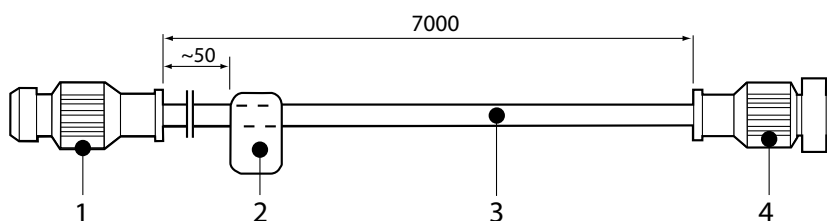


Fig. 2.t

Key:

1	M8 connector
2	rating label
3	24 AWG cable, 2 wires insulated with silicone rubber
4	M8 F connector with moulded cap

NTC*LT sensor assembly instructions using the cable tie tension tool



1) Place the sensor on the pipe, wrap and secure the cable ties around the two ends;



2) On the cable tie tension tool set the tension to 250N (position 6 on the index);



3) Use the tool to tighten and then cut the cable tie 1209874AXX;



4) Wrap the electrical cable twice around the pipe at the base of the sensor;

5) Cover the sensor with thermal insulation for at least 10 cm around the end of the cap and the wound cable;

2.11 Models NTC*PS*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped and soldered ends, dimensions: 4±1 mm
Sensors	NTC 10 kΩ ±1% a 25 °C Beta 3435
Dissipation factor (in air)	2 mW/°C
Thermal constant over time (in air)	ca. / approx. 50 min (V=1 m/s)
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤73.9 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.30+/-0.10 mm
Sensitive element index of protection	IP67
Case	Santoprene grey RAL7032
	Compatible for food contact
Classification according to protection against electric shock (sensitive element and cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant

Tab. 2.k

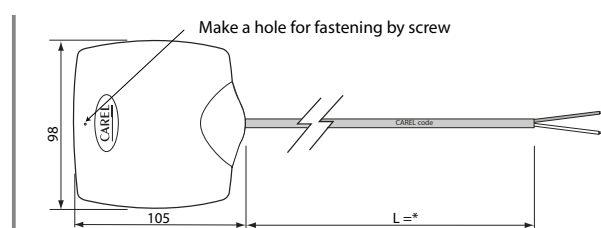
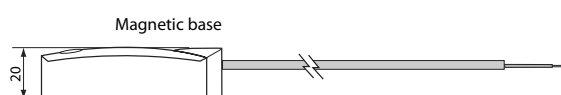


Fig. 2.u

* = see table of product codes in price list

3. NTC IMMERSION PROBE TECHNICAL SPECIFICATIONS

3.1 Models TSN1300000

Immersion probes feature the sensor directly in contact with the liquid, and are installed on the tubing. Wired using the electrical connector.

Storage conditions	-40T120 °C
Operating range	-40T120 °C
Sensor	NTC 10 kΩ ±1% a 25 °C Beta 3435
Construction	Direct immersion with connection to the 1/8" GAS male process fitting as per UNI 338
Electrical connection	4-pin co-moulded nylon, M12x1 (DIN-VDE0627) metric thread, IP67 max. temp. 90 °C
Thermal constant over time	approx. 5 s in water - 30 s in air
Sensitive element housing	AISI 316
Insulation	100 Mohm a 500 Vcc
Maximum operating pressure	40 bar

Tab. 3.a

Key:

1	NTC sensitive element 10 Kohm
2	Stainless steel socket
3	EX14
4	Co-moulded body
5	M12 male connector

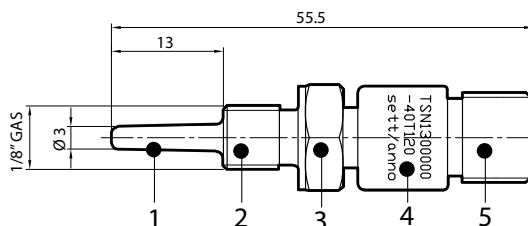


Fig. 3.w

Accessories:

- 4-pin M12 connector for 1/8 GAS sensor - cable length 3 m
Code TSOPZCW030

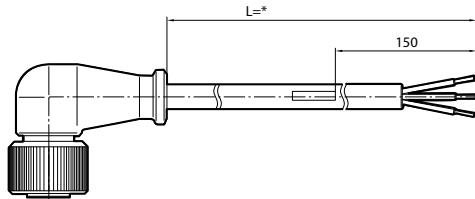
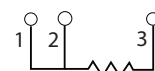


Fig. 3.x

Wiring:



NTC 10kohm	
1	red
2	red
3	white

- 4-pin M12 connector for 1/8 GAS sensor code TSOPZCM000
- M12 connector can be assembled on site, recommended cable 3x0.2 mm² with outer sheath.

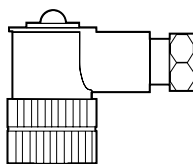
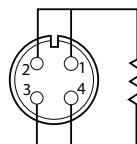


Fig. 3.y

Wiring:



NTC10K
Sensor connector side view

- Probe socket 1/4 Gas
Code TSOPZPT000

A	1/8" GAS cyl. fitting for sensor
B	1/4" GAS cyl. process fitting with immersion L= 10.5 mm

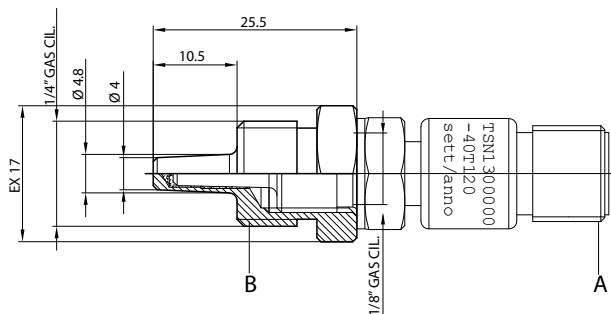


Fig. 3.z

- Welding fitting Code TSOPZRT000

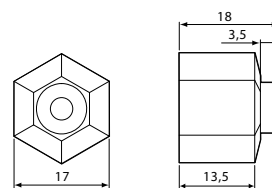


Fig. 3.aa



Cod. TSN1300000

Electrical connector	Cod.	Accessory
TSOPZCW030 (cable L = 3m)	TSN1300000	Socket TSOPZPT000 (to screw)
TSOPZCM000 (cable by the installer)		Fitting TSOPZRT000 (to weld)

Tab. 3.a

3.2 Models TSC1500030

Immersion probes feature the sensor directly in contact with the liquid and are secured to the tubing using a connector, available in the screw or weldable versions.

The body is nickel-coated brass, index of protection IP67, and the gasket (O-ring) is supplied together with the probe.

Storage conditions	-40T90 °C
Operating range	-40T90 °C
Sensor	NTC 10 kΩ ±1% at 25 °C Beta 3435
Construction	Direct immersion with connection to M14 male process fitting
Cable	2 wires AWG 22, with TPE sheath
Thermal constant over time	approx. 5 s in water - 45 s in air
Sensitive element housing	Nickel-coated brass & grey PA6 co-moulded body
Insulation	100 Mohm at 100 Vdc
Maximum operating pressure	25 bar
Compatible liquids	Water

Tab. 3.b

Key:

1	sensitive element
2	nickel-coated brass locking ring
3	co-moulded body
4	cable marking
5	tinned copper 2-wire cable
6	NTC sensor
7	2015 O-ring
8	nickel-coated brass thermome- ter socket

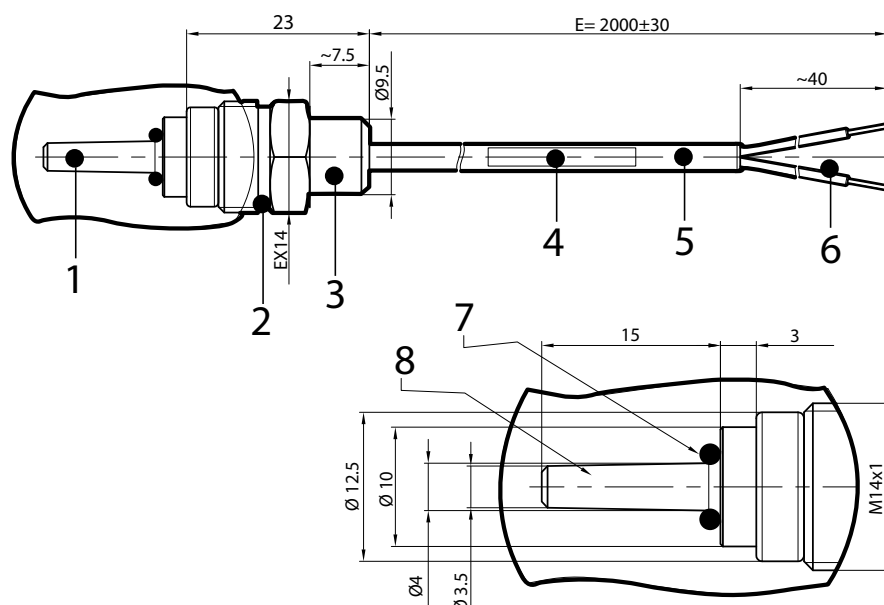


Fig. 3.ab

Wiring:

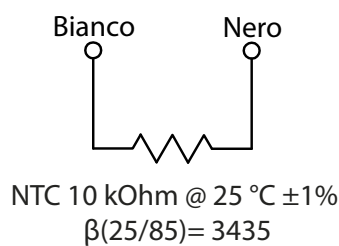


Fig. 3.ac

Accessories:

- Adapter from M14 to 3/8 GAS Code TSOPZRV000

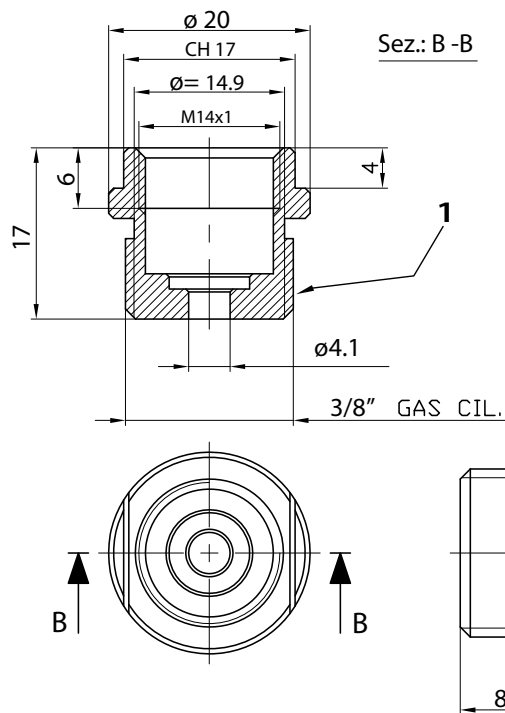


Fig. 3.ad

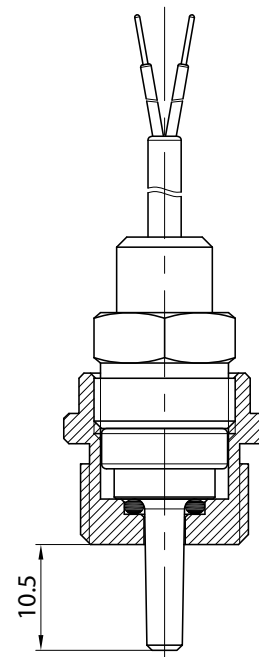


Fig. 3.ae

- Weldable adapter for M14 Code TSOPZRS000

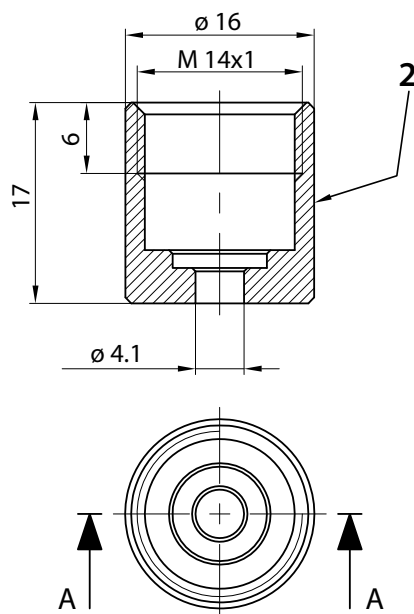


Fig. 3.af

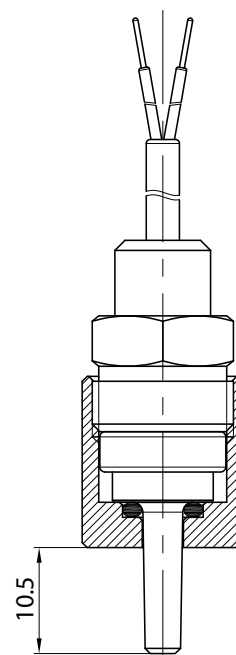


Fig. 3.ag

Key:

1	3/8 cyl. threaded fitting with round seat, nickel-coated brass	code: C058042A04
2	weldable cylindrical fitting with round seat, brass	code C058042A03

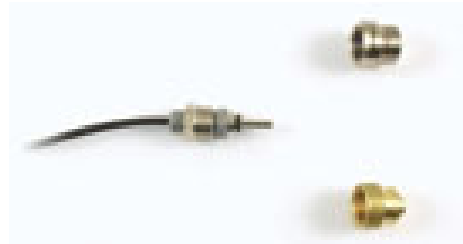


Fig. 3.ah

Cod.	Accessory
TSC1500030	Fitting TSOPZRV000 (from M14 to 3/8" Gas, to screw)
	Fitting TSOPZRS000 (for M14, to weld)

Tab. 3.c

4. NTC PIERCING PROBE TECHNICAL SPECIFICATIONS

4.1 Models NTC*INF*

Piercing probes with 90° e 180° handle

Storage conditions	-50T90 °C
Operating range	-50T90 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kOhm ±1% at 25 °C Beta 3435
Dissipation factor (in air)	approx. 2.2 mW/°C
Thermal constant over time (in air)	approx. 45 s
Cable	Two-wire with double sheath, tinned copper wire size 0.35 mm ² with electrical resistance ≤63 Ohm/km
Sensitive element index of protection	IP67
Sensitive element housing	AISI 304 stainless steel with silicone resin filling
Classification according to protection against electric shock (sensitive element and cable)	Insulation: silicone both on outer sheath and inside on wires
Category of resistance to heat and fire	Flame retardant
Food compatibility	Suitable for permanent food contact

Tab. 4.a

NTCINF600*

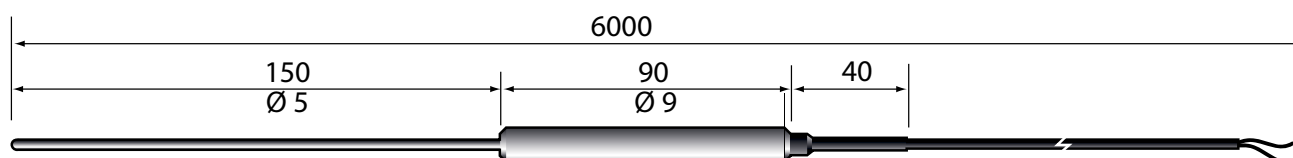


Fig. 4.a

NTCINF610*

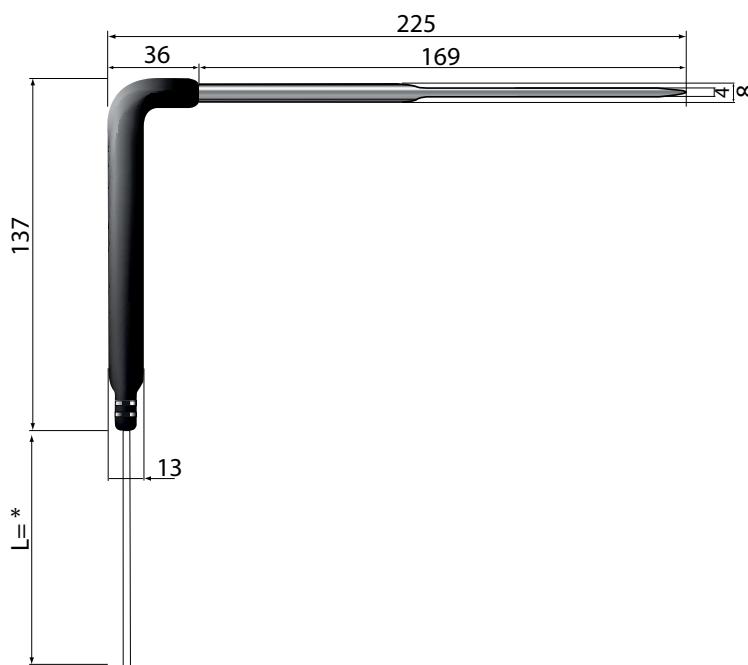


Fig. 4.b

* = see table of product codes in price list

4.2 Models NTCINF0340 and NTCINF0640

Piercing probe with 90° handle and heating system

Storage conditions	-50T90 °C
Operating range	-50T110 °C
Connections	Stripped ends, with terminals
Sensor	NTC 10 kOhm $\pm 1\%$ at 25 °C Beta 3435
Thermal constant over time (in air)	approx. 45 s
Cable	Food-safe thermoplastic sheath with 4 wires size 0.15 mm ²
Wires colours	White-black, NTC / red, electric heater.
Maximum heater voltage	24 Vac (20 W)
Electrical resistance of heater	7 Ohms ± 0.6 with a diode in series of resistance (see internal diagram)
Cable lenght	3 m
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 stainless steel. Length 100 mm diam. 4 mm. With pointed tip.
Cap filler	Aluminium
Classification according to protection against electric shock (sensitive element and cable)	Insulation: Outer sheath, and inside on wires
Category of resistance to heat and fire	Flame retardant
Insulation resistance	20 Mohm 500 Vcc
Dielectric strength	500 Vac
Food compatibility	Suitable for permanent food contact

Tab. 4.b

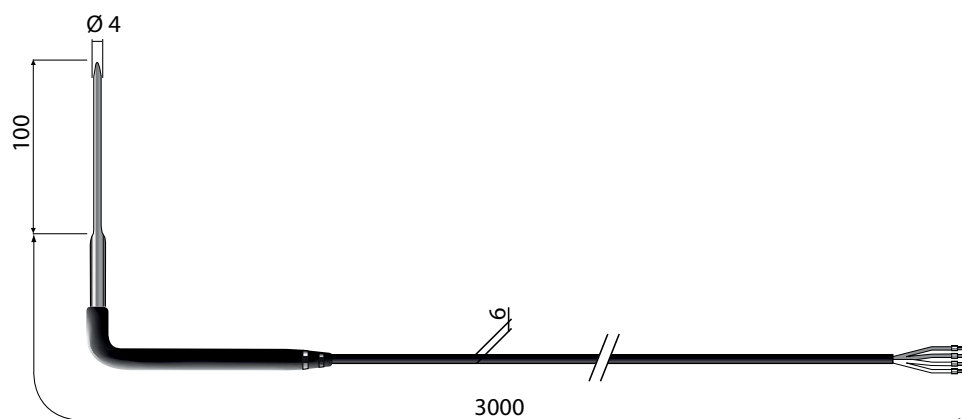
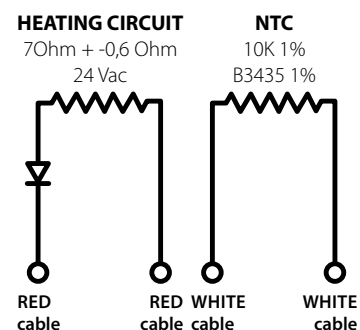


Fig. 4.e

a	red, electric heater
b	white/black, NTC



4.3 Models NTCINF0150

Piercing probe with 180° thermoplastic rubber handle and spiral cable

Storage conditions	-40T90 °C
Operating range	-40T90 °C
Connections	Tripped ends with pins
Sensor	NTC 10 kOhm $\pm 1\%$ at 25°C Beta 3435
Thermal constant over time (in air)	approx. 45 s
Cable	Spiral black cable, 2 wires, diam. 4mm
Colours	white-red, 2x0.22mm ²
Cable length	1.5 m, extendable up to 3m
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 stainless steel, 150 mm long, diam. 4 mm, with rounded tip
Packing	Polyurethane resin
Classification according to protection against electric shock (sensitive element and cable)	Insulation: external sheath and on wires
Category of resistance to heat and fire	No fire propagation
Isolation resistor	20 MOhm 500 Vdc
Rigidity	2000 Vac
Food compatibility	Suitable for permanent food contact

Tab. 4.c

Mechanical drawing

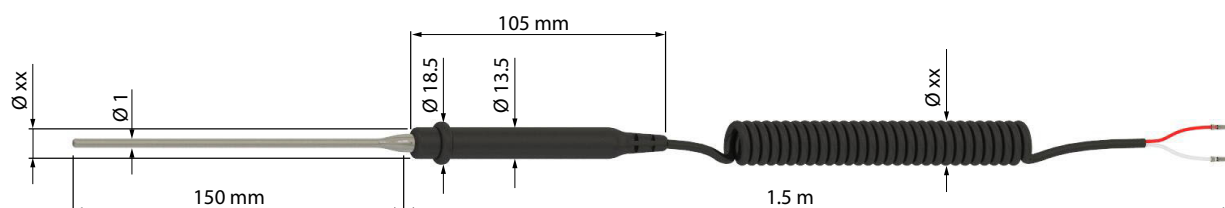


Fig. 4.c

5. TABLE OF TEMPERATURE VALUES

5.1 Table of temperature-resistance values for NTC sensor 10K@25°C β 3435

Temp. °C	Resistance value		
	Max. KΩ	Typical KΩ	Min. KΩ
-50	344,60	329,50	314,90
-49	325,00	310,90	297,30
-48	306,60	293,50	280,90
-47	289,40	277,20	265,40
-46	273,40	262,00	251,00
-45	258,30	247,70	237,40
-44	244,20	234,30	224,70
-43	231,00	221,70	212,80
-42	218,60	209,90	201,60
-41	207,00	198,90	191,00
-40	196,00	188,50	181,10
-39	185,50	178,50	171,60
-38	175,60	169,00	162,60
-37	166,30	160,20	154,20
-36	157,60	151,90	146,30
-35	149,40	144,10	138,80
-34	141,70	136,70	131,80
-33	134,50	129,80	125,20
-32	127,70	123,30	119,00
-31	121,20	117,10	113,10
-30	115,20	111,30	107,50
-29	109,40	105,70	102,20
-28	103,90	100,50	97,20
-27	98,68	95,52	92,45
-26	93,80	90,84	87,97
-25	89,20	86,43	83,73
-24	84,85	82,26	79,74
-23	80,76	78,33	75,96
-22	76,89	74,61	72,39
-21	73,23	71,10	69,01
-20	69,77	67,77	65,82
-19	66,44	64,57	62,74
-18	63,30	61,54	59,83
-17	60,32	58,68	57,07
-16	57,51	55,97	54,46
-15	54,85	53,41	51,99
-14	52,33	50,98	49,65
-13	49,95	48,68	47,43
-12	47,69	46,50	45,32
-11	45,55	44,43	43,33
-10	43,52	42,47	41,43
-9	41,55	40,57	39,60
-8	39,69	38,77	37,86
-7	37,92	37,06	36,21
-6	36,25	35,44	34,64
-5	34,66	33,90	33,15
-4	33,15	32,44	31,73
-3	31,72	31,05	30,39
-2	30,36	29,73	29,11
-1	29,06	28,48	27,89
0	27,83	27,28	26,74

Temp. °C	Resistance value		
	Max. KΩ	Typical KΩ	Min. KΩ
1	26,65	26,13	25,62
2	25,52	25,03	24,55
3	24,44	23,99	23,54
4	23,42	23,00	22,57
5	22,45	22,05	21,66
6	21,53	21,15	20,78
7	20,64	20,30	19,95
8	19,81	19,48	19,15
9	19,01	18,70	18,39
10	18,25	17,96	17,67
11	17,51	17,24	16,97
12	16,81	16,56	16,30
13	16,14	15,90	15,67
14	15,50	15,28	15,06
15	14,89	14,69	14,48
16	14,31	14,12	13,92
17	13,75	13,58	13,39
18	13,22	13,06	12,89
19	12,72	12,56	12,40
20	12,24	12,09	11,94
21	11,77	11,63	11,50
22	11,32	11,20	11,07
23	10,90	10,78	10,66
24	10,49	10,38	10,27
25	10,10	10,00	9,90
26	9,73	9,63	9,53
27	9,38	9,28	9,18
28	9,04	8,94	8,84
29	8,72	8,62	8,52
30	8,41	8,31	8,21
31	8,11	8,01	7,92
32	7,83	7,73	7,63
33	7,55	7,45	7,36
34	7,29	7,19	7,10
35	7,04	6,94	6,85
36	6,79	6,70	6,61
37	6,56	6,47	6,37
38	6,34	6,25	6,15
39	6,12	6,03	5,94
40	5,92	5,83	5,74
41	5,72	5,63	5,54
42	5,53	5,44	5,35
43	5,34	5,26	5,17
44	5,17	5,08	4,99
45	5,00	4,91	4,83
46	4,83	4,75	4,67
47	4,68	4,59	4,51
48	4,52	4,44	4,36
49	4,38	4,30	4,22
50	4,24	4,16	4,08
51	4,10	4,03	3,95
52	3,97	3,90	3,82
53	3,85	3,77	3,70
54	3,73	3,65	3,58
55	3,61	3,54	3,46

Temp. °C	Resistance value		
	Max. KΩ	Typical KΩ	Min. KΩ
56	3,50	3,43	3,35
57	3,39	3,32	3,25
58	3,28	3,22	3,15
59	3,18	3,12	3,05
60	3,09	3,02	2,95
61	2,99	2,93	2,86
62	2,90	2,84	2,77
63	2,82	2,75	2,69
64	2,73	2,67	2,61
65	2,65	2,59	2,53
66	2,57	2,51	2,45
67	2,50	2,44	2,38
68	2,42	2,36	2,31
69	2,35	2,30	2,24
70	2,28	2,23	2,17
71	2,22	2,16	2,11
72	2,15	2,10	2,05
73	2,09	2,04	1,99
74	2,03	1,98	1,93
75	1,98	1,92	1,87
76	1,92	1,87	1,82
77	1,87	1,82	1,77
78	1,81	1,77	1,72
79	1,76	1,72	1,67
80	1,72	1,67	1,62
81	1,67	1,62	1,58
82	1,62	1,58	1,53
83	1,58	1,53	1,49
84	1,54	1,49	1,45
85	1,49	1,45	1,41
86	1,45	1,41	1,37
87	1,42	1,37	1,33
88	1,38	1,34	1,30
89	1,34	1,30	1,26
90	1,31	1,27	1,23
91	1,27	1,23	1,19
92	1,24	1,20	1,16
93	1,21	1,17	1,13
94	1,17	1,14	1,10
95	1,14	1,11	1,07
96	1,12	1,08	1,04
97	1,09	1,05	1,02
98	1,06	1,02	0,99
99	1,03	1,00	0,97
100	1,01	0,97	0,94
101	0,98	0,95	0,92
102	0,96	0,92	0,89
103	0,93	0,90	0,87
104	0,91	0,88	0,85
105	0,89	0,86	0,83
106	0,87	0,84	0,81
107	0,84	0,82	0,79
108	0,82	0,80	0,77
109	0,80	0,78	0,75
110	0,79	0,76	0,73

Tab. 5.a

5.2 Table of temperature-resistance values for NTC sensor 50K@25°C β 3977

R (25°C) 50,00 k Ω			B (25/85) 3977 K		
Temp. (°C)	Rt (k Ω)	Temp. (°C)	Rt (k Ω)	Temp. (°C)	Rt (k Ω)
-30	879.0	31	38.60	92	4.259
-29	826.4	32	37.00	93	4.130
-28	777.3	33	35.47	94	4.007
-27	731.5	34	34.02	95	3.887
-26	688.6	35	32.63	96	3.772
-25	648.5	36	31.31	97	3.660
-24	611.0	37	30.04	98	3.553
-23	575.9	38	28.84	99	3.449
-22	543.0	39	27.69	100	3.349
-21	512.1	40	26.59	101	3.252
-20	483.3	41	25.54	102	3.158
-19	456.2	42	24.53	103	3.068
-18	430.9	43	23.58	104	2.980
-17	407.1	44	22.66	105	2.895
-16	384.7	45	21.78	106	2.813
-15	363.7	46	20.94	107	2.734
-14	344.0	47	20.14	108	2.658
-13	325.4	48	19.38	109	2.584
-12	308.0	49	18.64	110	2.512
-11	291.6	50	17.94	111	2.443
-10	276.2	51	17.27	112	2.375
-9	261.6	52	16.63	113	2.310
-8	247.8	53	16.02	114	2.247
-7	234.9	54	15.43	115	2.186
-6	222.7	55	14.87	116	2.127
-5	211.2	56	14.33	117	2.070
-4	200.4	57	13.81	118	2.015
-3	190.2	58	13.31	119	1.961
-2	180.6	59	12.84	120	1.909
-1	171.5	60	12.38	121	1.859
0	162.9	61	11.94	122	1.810
1	154.8	62	11.52	123	1.763
2	147.2	63	11.12	124	1.717
3	140.0	64	10.73	125	1.672
4	133.1	65	10.36	126	1.629
5	126.7	66	10.000	127	1.587
6	120.6	67	9.657	128	1.546
7	114.8	68	9.327	129	1.507
8	109.3	69	9.010	130	1.469
9	104.1	70	8.705	131	1.432
10	99.22	71	8.412	132	1.395
11	94.58	72	8.130	133	1.361
12	90.18	73	7.858	134	1.327
13	86.01	74	7.597	135	1.294
14	82.06	75	7.346	136	1.262
15	78.32	76	7.105	137	1.231
16	74.79	77	6.872	138	1.200
17	71.44	78	6.648	139	1.171
18	68.26	79	6.433	140	1.143
19	65.23	80	6.226	141	1.115
20	62.36	81	6.026	142	1.088
21	59.64	82	5.834	143	1.062
22	57.04	83	5.649	144	1.037
23	54.58	84	5.471	145	1.012
24	52.23	85	5.299	146	0.9883
25	50.00	86	5.133	147	0.9650
26	47.86	87	4.974	148	0.9424
27	45.82	88	4.820	149	0.9204
28	43.88	89	4.672	150	0.8990
29	42.03	90	4.529		
30	40.27	91	4.392		

Tab. 5.b

5.3 Table of temperature-resistance values for NTC sensor 750 Ohm @25°C B 3969

°C	Ohms	°C	Ohms	°C	Ohms	°C	Ohms	°C	Ohms
-80	577421.72	-40	25693.65	0	2457.67	40	399.77	80	94.66
-79	527949.43	-39	24032.58	1	2335.27	41	384.06	81	91.67
-78	483039.76	-38	22489.43	2	2219.68	42	369.06	82	88.78
-77	442244.46	-37	21055.15	3	2110.50	43	354.73	83	86.00
-76	405161.84	-36	19721.40	4	2007.32	44	341.03	84	83.32
-75	371431.66	-35	18480.57	5	1909.80	45	327.93	85	80.73
-74	340730.65	-34	17325.63	6	1817.58	46	315.40	86	78.24
-73	312768.50	-33	16250.14	7	1730.35	47	303.42	87	75.84
-72	287284.35	-32	15248.17	8	1647.82	48	291.96	88	73.52
-71	264043.66	-31	14314.26	9	1569.70	49	281.00	89	71.29
-70	242835.52	-30	13443.41	10	1495.74	50	270.50	90	69.13
-69	223469.52	-29	12630.97	11	1425.69	51	260.45	91	67.05
-68	205774.90	-28	11872.71	12	1359.32	52	250.83	92	65.04
-67	189597.20	-27	11164.69	13	1296.43	53	241.61	93	63.10
-66	174797.23	-26	10503.29	14	1236.81	54	232.78	94	61.23
-65	161249.35	-25	9885.19	15	1180.27	55	224.32	95	59.43
-64	148840.08	-24	9307.28	16	1126.64	56	216.22	96	57.68
-63	137466.39	-23	8766.74	17	1075.75	57	208.44	97	56.00
-62	127036.93	-22	8260.92	18	1027.45	58	200.99	98	54.37
-61	117466.39	-21	7787.41	19	981.59	59	193.84	99	52.80
-60	108679.25	-20	7343.85	20	938.04	60	186.99	100	51.28
-59	100606.67	-19	6928.47	21	896.67	61	180.41	101	49.81
-58	93186.24	-18	6539.04	22	857.36	62	174.10	102	48.39
-57	86361.37	-17	6173.88	23	819.99	63	168.04	103	47.02
-56	80080.67	-16	5831.34	24	784.46	64	162.22	104	45.69
-55	74297.50	-15	5509.89	25	750.00	65	156.64	105	44.41
-54	68969.45	-14	5208.12	26	718.52	66	151.27		
-53	64057.99	-13	4924.70	27	687.93	67	146.12		
-52	59528.05	-12	4658.43	28	658.81	68	141.17		
-51	55347.72	-11	4408.16	29	631.09	69	136.41		
-50	51489.92	-10	4172.85	30	604.69	70	131.84		
-49	47922.16	-9	3951.51	31	579.54	71	127.44		
-48	44626.30	-8	3743.25	32	555.57	72	123.21		
-47	41578.30	-7	3547.21	33	532.73	73	119.15		
-46	38758.05	-6	3362.61	34	510.95	74	115.23		
-45	36147.17	-5	3188.72	35	490.18	75	111.47		
-44	33728.89	-4	3024.86	36	470.37	76	107.85		
-43	31487.85	-3	2870.40	37	451.47	77	104.36		
-42	29410.02	-2	2724.74	38	433.43	78	101.01		
-41	27482.54	-1	2587.33	39	416.21	79	97.78		

Tab. 5.c

6. PT100 PROBE TECHNICAL SPECIFICATIONS

6.1 Models PT100

Storage conditions	-50/250 °C
Operating range elemento sensibile	PT100000A1: -50 °C...+250 °C, PT100000A2: 0 °C...+400 °C
Sensor	Pt100 Class B in accordance with DIN IEC751, 3 wire
Precision	+/- class B=(0,005xt)+0,3, a 100°C = ±0,8°C
Connections aliment. e uscita	Stripped ends, dimensions 6±1mm
Cable	PT100000A1: silicone rubber HALOGEN COMPOUNDS ≤ 1.1 x 10 ⁻³ mg/g PT100000A2: 3x0.5 mm ² fibreglass wire and secondary insulation
Dissipation factor (in air)	0,3 K/mW at 0 °C
Thermal constant over time (in air)	ca./approx 20 s
Category of resistance to heat and fire	Range -20 °C +200°C for PT100000A1, +500 °C for PT100000A2
Insulation resistance	>500 Mohm / 250 V
Dielectric strength	250 Vac (code PT100000A1 only) not applicabile for PT100000A2
Primary insulation (porbe and cable)	250 Vac
Sensitive element index of protection	IP65
Sensitive element housing	AISI 316 stainless steel

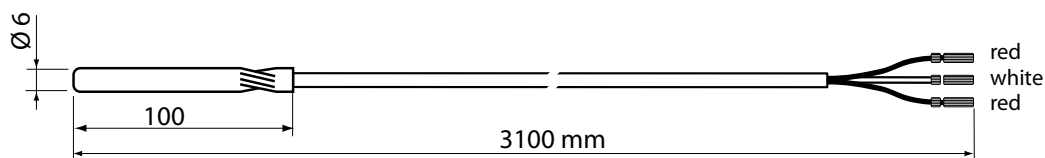


Fig. 6.a

* = see table of product codes in price list; ** = 3-wires cable compensates for the resistance introduced by the cable

7. TABLE OF TEMPERATURE VALUES PT100 PROBE

7.1 Table of temperature values PT100 Probe Class B

R (0) = 100,00 Ω $\alpha = 0,003\,850\,1/^{\circ}\text{C}$

$^{\circ}\text{C}$	0	1	2	3	4	5	6	7	8	9	10	$^{\circ}\text{C}$
-50	80,31	79,91	79,51	79,11	78,72	78,32	77,92	77,52	77,13	76,73	76,33	-50
-40	84,27	83,88	83,48	83,08	82,69	82,29	81,89	81,50	81,10	80,70	80,31	-40
-30	88,22	87,83	87,43	87,04	86,64	86,25	85,85	85,46	85,06	84,67	84,27	-30
-20	92,16	91,77	91,37	90,98	90,59	90,19	89,80	89,40	89,01	88,62	88,22	-20
-10	96,09	95,69	95,30	94,91	94,52	94,12	93,73	93,34	92,95	92,55	92,16	-10
0	100,00	99,61	99,22	98,83	98,44	98,04	97,65	97,26	96,87	96,48	96,09	0
10	103,90	104,29	104,68	105,07	105,46	105,85	106,24	106,63	107,02	107,40	107,79	10
20	107,79	108,18	108,57	108,96	109,35	109,73	110,12	110,51	110,90	111,28	111,67	20
30	111,67	112,06	112,45	112,83	113,22	113,61	113,99	114,38	114,77	115,15	115,54	30
40	115,54	115,93	116,31	116,70	117,08	117,47	117,85	118,24	118,62	119,01	119,40	40
50	119,40	119,78	120,16	120,55	120,93	121,32	121,70	122,09	122,47	122,86	123,24	50
60	123,24	123,62	124,01	124,39	124,77	125,16	125,54	125,92	126,31	126,69	127,07	60
70	127,07	127,45	127,84	128,22	128,60	128,98	129,37	129,75	130,13	130,51	130,89	70
80	130,89	131,27	131,66	132,04	132,42	132,80	133,18	133,56	133,94	134,32	134,70	80
90	134,70	135,08	135,46	135,84	136,22	136,60	136,98	137,36	137,74	138,12	138,50	90
100	138,50	138,88	139,26	139,64	140,02	140,39	140,77	141,15	141,53	141,91	142,29	100
110	142,29	142,66	143,04	143,42	143,80	144,17	144,55	144,93	145,31	145,68	146,06	110
120	146,06	146,44	146,81	147,19	147,57	147,94	148,32	148,70	149,07	149,45	149,82	120
130	149,82	150,20	150,57	150,95	151,33	151,70	152,08	152,45	152,83	153,20	153,58	130
140	153,58	153,95	154,32	154,70	155,07	155,45	155,82	156,19	156,57	156,94	157,31	140
150	157,31	157,69	158,06	158,43	158,81	159,18	159,55	159,93	160,30	160,67	161,04	150
160	161,04	161,42	161,79	162,16	162,53	162,90	163,27	163,65	164,02	164,39	164,76	160
170	164,76	165,13	165,50	165,87	166,24	166,61	166,98	167,35	167,72	168,09	168,46	170
180	168,46	168,83	169,20	169,57	169,94	170,31	170,68	171,05	171,42	171,79	172,16	180
190	172,16	172,53	172,90	173,26	173,63	174,00	174,37	174,74	175,10	175,47	175,84	190
200	175,84	176,21	176,57	176,94	177,31	177,68	178,04	178,41	178,78	179,14	179,51	200
210	179,51	179,88	180,24	180,61	180,97	181,34	181,71	182,07	182,44	182,80	183,17	210
220	183,17	183,53	183,90	184,26	184,63	184,99	185,36	185,72	186,09	186,45	186,82	220
230	186,82	187,18	187,54	187,91	188,27	188,63	189,00	189,36	189,72	190,09	190,45	230
240	190,45	190,81	191,18	191,54	191,90	192,26	192,63	192,99	193,35	193,71	194,07	240
250	194,07	194,44	194,80	195,16	195,52	195,88	196,24	196,60	196,96	197,33	197,69	250
260	197,69	198,05	198,41	198,77	199,13	199,49	199,85	200,21	200,57	200,93	201,29	260
270	201,29	201,65	202,01	202,36	202,72	203,08	203,44	203,80	204,16	204,52	204,88	270
280	204,88	205,23	205,59	205,95	206,31	206,67	207,02	207,38	207,74	208,10	208,45	280
290	208,45	208,81	209,17	209,52	209,88	210,24	210,59	210,95	211,31	211,66	212,02	290
300	212,02	212,37	212,73	213,09	213,44	213,80	214,15	214,51	214,86	215,22	215,57	300
310	215,57	215,93	216,28	216,64	216,99	217,35	217,70	218,05	218,41	218,76	219,12	310
320	219,12	219,47	219,82	220,18	220,53	220,88	221,24	221,59	221,94	222,29	222,65	320

Tab. 7.a

8. PT1000 PROBE TECHNICAL SPECIFICATIONS

8.1 Models PT1*HP*

Storage conditions	-50T105 $^{\circ}\text{C}$ in air
Operating range	-50T105 $^{\circ}\text{C}$ in air
Connections	Stripped ends, dimensions: 5 ± 1 mm
Sensor	Pt1000 - Class B
Dissipation factor (in air)	ca. 3 mW/ $^{\circ}\text{C}$
Costante term. nel tempo (in air)	ca. / approx. 20 s
Cable	Black two-wire flat cable, with tinned copper wire size 0.3 mm ²
Sensitive element index of protection	IP67
Sensitive element housing	Polyolefin
Classification according to protection against electric shock (sensitive element and cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant

Tab. 8.a

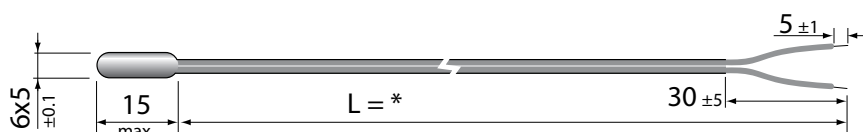


Fig. 8.a

* = see table of product codes in price list

8.2 Models PT1*WF*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	Pt1000 - Class B
Dissipation factor (in air)	ca. / approx. 7 mW/°C
Thermal constant over time (in air)	ca. / approx. 15 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max.
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 steel diameter 4 mm - L= 30 mm
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant

Tab. 8.b

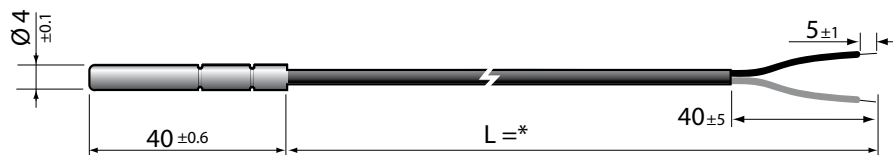


Fig. 8.b

* = see table of product codes in price list

8.3 Models PT1*WP*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	Pt1000 - Class B
Dissipation factor (in air)	ca. / approx. 2.2 mW/°C
Thermal constant over time (in air)	ca. / approx. 25 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max.
Sensitive element index of protection	IP67
Sensitive element housing	PPcop. with AISI 316 outer cap
Classification according to protection against electric shock (sensitive element and cable)	Insulation supplementare per 250 Vac;
Category of resistance to heat and fire	Flame retardant

Tab. 8.c



Fig. 8.c

* = see table of product codes in price list

Accessories

- Socket: nickel-coated brass - 1413306AXX
 - Maximum operating pressure 35 bar
 - Temperature -20...95°C
- Socket 2: AISI 316 - code 1413309AXX
 - Maximum operating pressure 40 bar
 - Temperature -20...95 °C

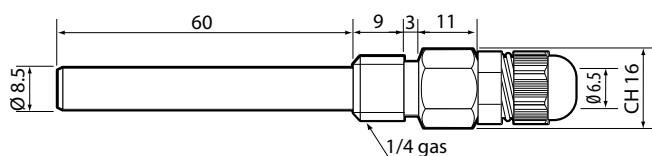


Fig. 8.d

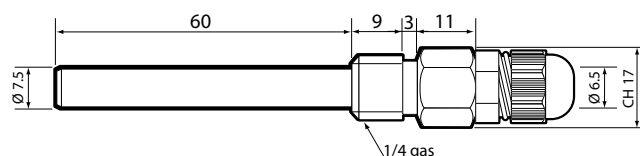


Fig. 8.e

- Socket: brass - 1413311AXX

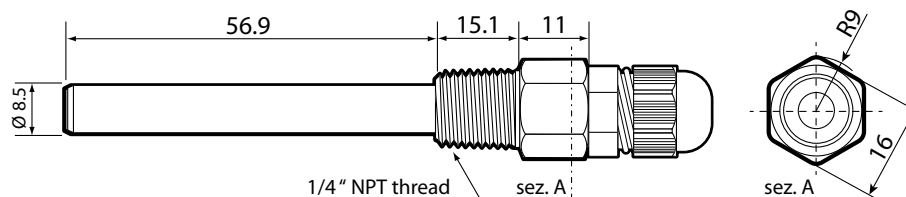


Fig. 8.f

 **Note:** cable secured with PG7 - IP68 cable gland applied to hexagonal end kit available complete with socket and cable gland.

- Compression fitting with metal olive - code 1309589AXX

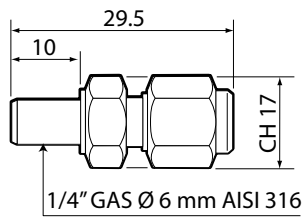


Fig. 8.g

Maximum operating
pressure 40 bars
Temperature -50 to 250°C

8.4 Models PT1*HT*

Storage conditions	-50T250 °C
Operating range	-50T250 °C
Connections	with crimped metal terminals
Sensor	Pt1000 - Class B (2 wires)
Dissipation factor (in air)	ca. / approx. 7 mW/°C
Thermal constant over time (in air)	ca. / approx. 20 s (V=2m/s)
Cable	White Teflon with two cables red and white Section. 2x0.22 mm2 Ø3 mm
Sensitive element index of protection	IP67
Sensitive element housing	Silicone resin
Materiale cappuccio	Stainless steel Aisi 304
Dimensioni cappuccio	6x40 mm
Classification according to protection against electric shock (sensitive element and cable)	additional insulation
Category of resistance to heat and fire	Flame retardant
Resistenza Insulation	20 Mohm 500 Vcc
Dielectric rigidity	2000Vac

Tab. 8.d

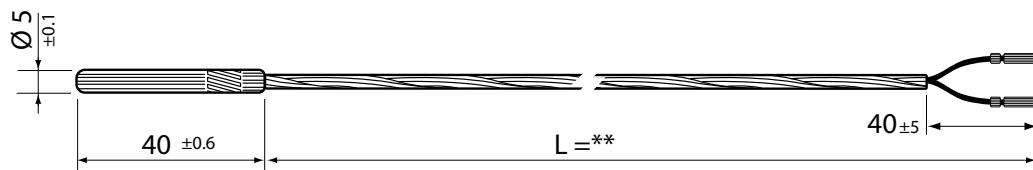


Fig. 8.h



Note:

(*) ww/yyR*: ww = week of production; yy = year of production; R* = Revision.

(**) see table of product codes in price list

8.5 Models PT1*HF

Probe with fastening clamp	
Storage conditions	-50T105 °C
Sensitive element operating range	-50T105 °C
Connections	Stripped ends, dimensions 6±1 mm
Sensor	Pt1000 Class B
Precision	+/- 0.8 °C; -50T90 °C
Dissipation factor (in air)	3 mW
Thermal constant over time (in air)	approx. 15 s
Cable	Black thermoplastic rubber flat cable (diam. 3.6x1.6 max.)
Sensitive element index of protection	IP67
Sensitive element housing	Thermoplastic with fastening clamp
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	UL/HB cable
Insulation resistance at 1000 Vdc	>20 Mohm
Dielectric strength	1500 Vac

Tab. 8.e

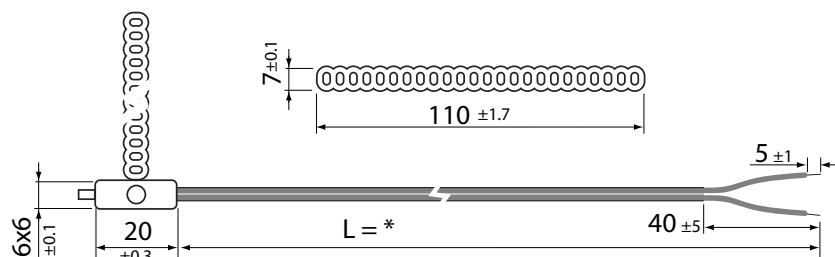


Fig. 8.i

* = see table of product codes in price list

8.6 Models PT1*PS*

Storage conditions	-50T105 °C
Operating range	-50T105 °C
Connections	Stripped and soldered ends, dimensions: 4±1 mm
Sensor	Pt1000 Class B
Dissipation factor (in air)	2 mW/°C
Thermal constant over time (in air)	approx. 50 min (V=1 m/s)
Cable	Two-wire with double sheath, AWG22, tinned copper with resistance $\leq 73.9\Omega/\text{km}$ - Insulation: TPE specific for immersion in water on outer sheath, PP/co inside on wires, OD 3.30+/-0.10 mm
Sensitive element index of protection	IP67
Case	RAL7032 grey Santoprene
	Food safe
	Supplementary insulation for 250 Vac
Classification according to protection against electric shock (sensitive element and cable)	Flame retardant
Category of resistance to heat and fire	Flame retardant

Tab. 8.f

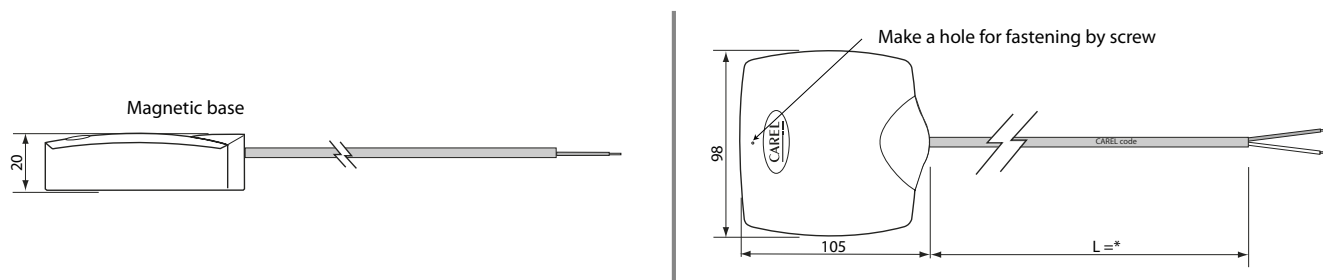


Fig. 8.j

* = see table of product codes in price list

8.7 Models PT1*MC

Storage conditions	-100T200 °C
Operating range	-100T200 °C
Connections	Stripped ends, dimensions: 5 (+2 -0) mm
Sensor	Pt1000 - Class B
Dissipation factor (in air)	approx. 7 mW/°C
Thermal constant over time (in air)	approx. 10 s
Cable	2-core tinned copper cable AWG 24 stranded PFA PFA, white conductors $\varnothing 1.0 \pm 0.05\text{mm}$, black sheath diameter $2.5 \pm 0.1\text{ mm}$.
Sensitive element index of protection	IP68
Sensitive element housing	Closed tube $\varnothing 4 \times 3.4$ stainless steel L= 40 mm
Category of resistance to heat and fire	Flame retardant
Insulation resistance	20 Mohm 1000 Vcc
Dielectric strength	2500Vac

Tab. 8.g

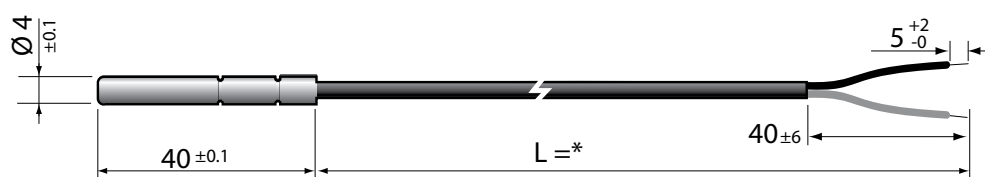


Fig. 8.k

* = see table of product codes in price list

9. PT1000 IMMERSION PROBE TECHNICAL SPECIFICATIONS

9.1 Models TST1300000

Immersion probes feature the sensor directly in contact with the liquid, and are installed on the tubing. Wired using the electrical connector.

Storage conditions	-40T120 °C
Operating range	-40T120 °C
Sensor	Pt1000 Class B
Construction	Direct immersion with connection to the 1/8" GAS male process fitting as per UNI 338
Electrical connection	4-pin co-moulded nylon, M12x1 (DIN-VDE0627) metric thread, IP67 max. temp. 90°C
Thermal constant over time	ca. / approx. 5 s in water - 30 s in air
Sensitive element housing	AISI 316
Insulation	100 Mohm a 500 Vcc
Maximum operating pressure	40 bar

Tab. 9.a

Key:

1	NTC sensitive element 10 Kohm
2	Stainless steel socket
3	EX14
4	Co-moulded body
5	M12 male connector

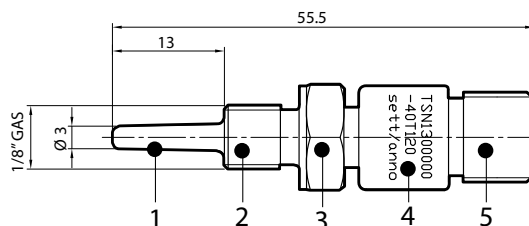


Fig. 9.l

Accessories:

- 4-pin M12 connector for 1/8 GAS sensor - cable length 3 m
Code TSOPZCW030

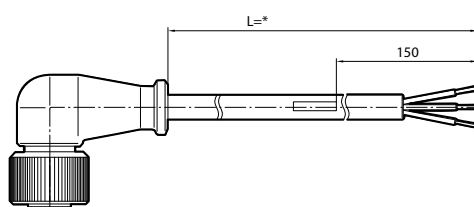
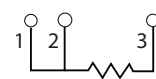


Fig. 9.m

Wiring:



NTC 10kohm	
1	red
2	red
3	white

- 4-pin M12 connector for 1/8 GAS sensor Code TSOPZCM000
- M12 connector can be assembled on site, recommended cable 3x0.2 mm² with outer sheath.

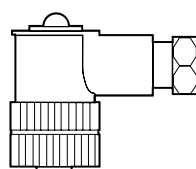
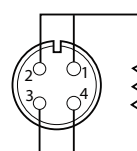


Fig. 9.n

Wiring:



NTC10K

PT1000 Sensor connector side view



Note: the three-wire connection for the Pt100 must be used when the controller is fitted accordingly. If not, the ends are to be connected together on the same terminal.

- Welding fitting Code TSOPZPT000

A	Compact thermistor with 1/8" GAS cyl. fitting
B	1/4" GAS cyl. process fitting with immersion L= 10.5 mm

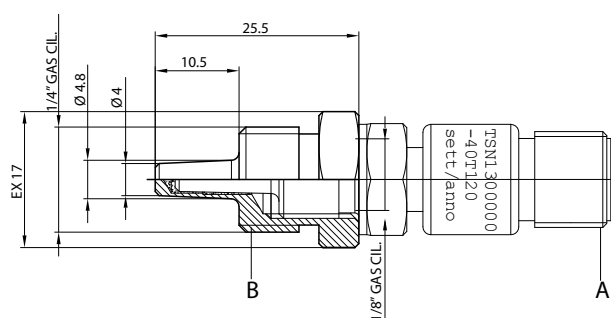


Fig. 9.o

- Welding fitting Code TSOPZRT000

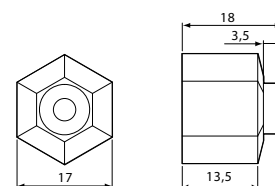


Fig. 9.p



Cod. TST1300000

Electrical connector	Cod.	Accessory
TSOPZCW030 (cable L = 3m)	TST1300000	Socket TSOPZPT000 (to screw)
TSOPZCM000 (cable by the installer)		Fitting TSOPZRT000 (to weld)

Tab. 9.b

9.2 Models TSM1500B30

Immersion probes feature the sensor directly in contact with the liquid and are secured to the tubing using a connector, available in the screw or weldable versions. The body is nickel-coated brass, index of protection IP67, and the gasket (O-ring) is supplied together with the probe.

Storage conditions	-40T90 °C
Operating range	-40T90 °C
Sensor	Pt1000 Class B
Construction	Direct immersion with connection to the M14 male process
Cable	2 wires AWG 22, with sheath in TPE
Thermal constant over time	ca. / approx. 5 s in water - 45 s in air
Sensitive element housing	Nickel-coated brass & grey PA6 co-moulded body
Insulation	100 Mohm a 100 Vcc
Maximum operating pressure	25 bar
Compatible liquids	Water

Tab. 9.c

Key:

1	sensitive element
2	nickel-coated brass locking ring
3	co-moulded body
4	cable marking
5	tinned copper 2-wire cable
6	NTC sensor
7	2015 O-ring
8	nickel-coated brass thermometer socket

Collegamento elettrici:

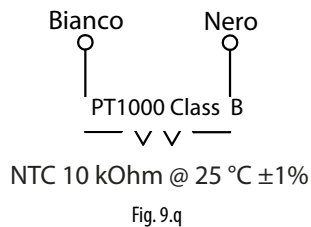


Fig. 9.q

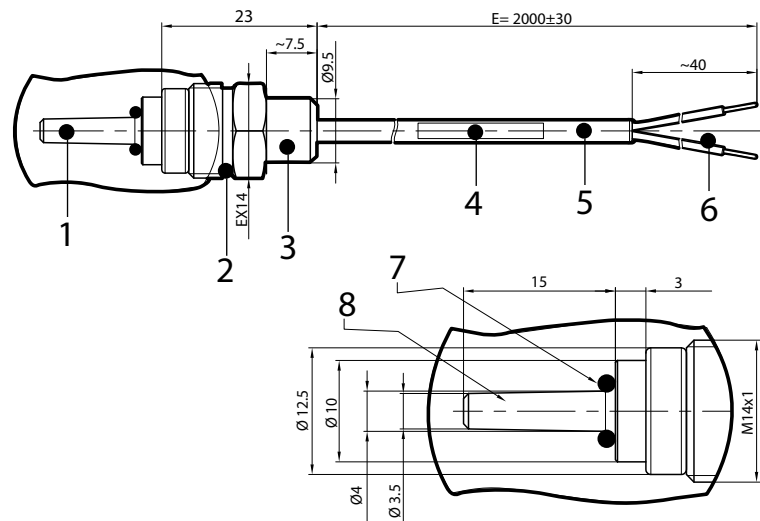


Fig. 9.r

Accessories:

- Adapter from M14 to 3/8 GA Code TSOPZRV000

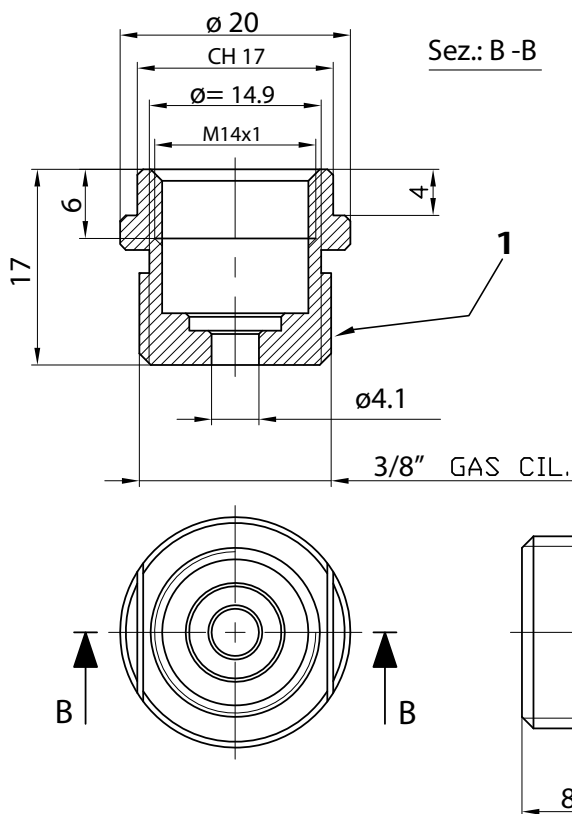


Fig. 9.s

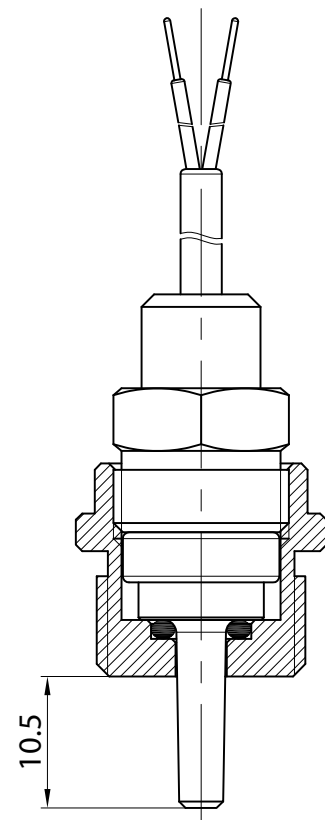


Fig. 9.t

- Weldable adapter for M14 Code TSOPZRS000

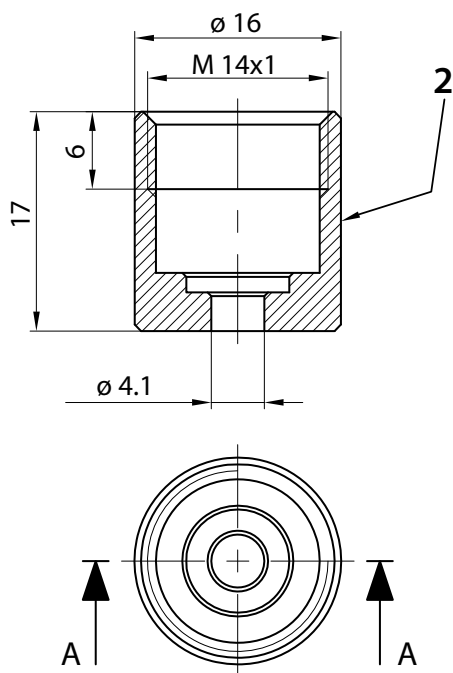


Fig. 9.u

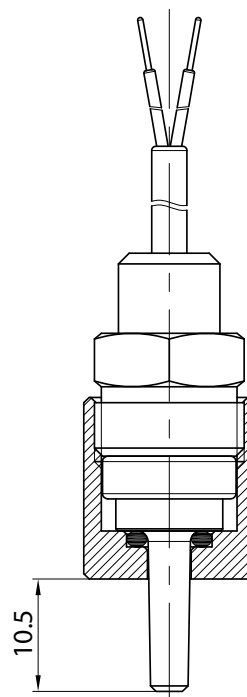


Fig. 9.v

Key:

1	3/8 cyl. threaded fitting with round seat, nickel-coated brass	cod: C058042A04
2	weldable cylindrical fitting with round seat, brass	cod. C058042A03

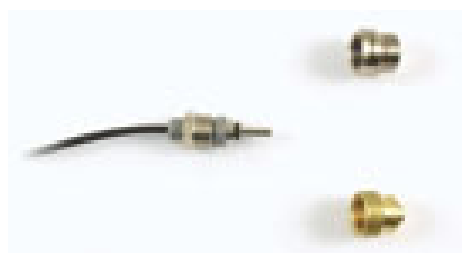


Fig. 9.w

Cod.	Accessory
TSM1500B30	Fitting TSOPZRV000 (from M14 to 3/8" Gas, to screw)
	Fitting TSOPZRS000 (for M14, to weld)

Tab. 9.d

9.3 Models TSQ15MAB00

Storage conditions	-50T350 °C
Operating range	-50T350 °C
Connections	3-pin DIN connector
Sensor	Pt1000 Class B
Thermal constant over time	approx. 2.5 s in water - 10 s in air
Cable cod.TSOPZCV030 & cod.TSOPZCV100 & extension cable cod. TSOPZCV070	silicone cable L= 3 m, 10 m (max. temp. = 180 °C) with 3-pin DIN connector (max. conn. temp.= 90 °C) as for DIN-VDE0627 with M8x1 screw coupling.
Optional compression fitting TSOPZFGD30	AISI 316, 1/4 gas (see paragraph 4.4)
Index of protection connession	IP67
Sensitive element housing	AISI 316 steel
Insulation resistance	Insulation at 100 Vdc > 100 mOhm
Maximum operating pressure	40 bar
Category of resistance to heat and fire	flame retardant

Tab. 9.e

Accessories:

A	TSOPZCV030:	silicone cable with M8 connector, length 3 m
	TSOPZCV100:	silicone cable with M8 connector, length 10 m
B	TSOPZCV070:	silicone extension cable with M8 male/female connector, length 7 m
C	TSOPZFGD30:	compression fitting suitable for 3 mm

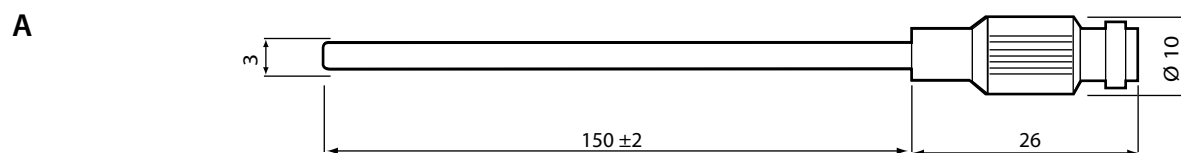


Fig. 9.x

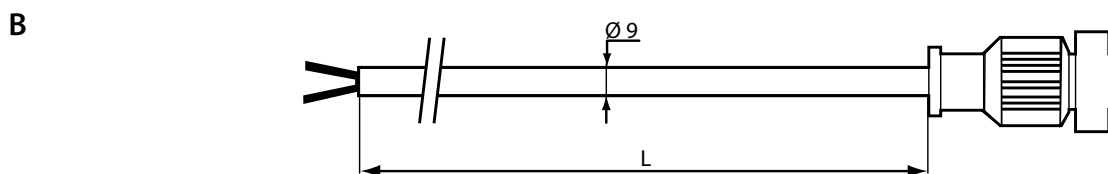


Fig. 9.y

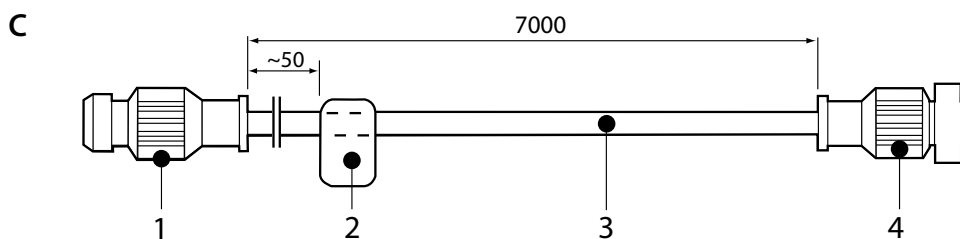


Fig. 9.z

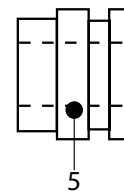


Fig. 9.aa

Key:

1	M8 connector
2	rating label
3	24 AWG 2 wire cable insulated with silicone rubber
4	M8 co-moulded connector
5	1/4" compression fitting - D= 3 mm, AISI316 steel

10. PT1000 PIERCING PROBE TECHNICAL SPECIFICATIONS

10.1 Models PT1INF0340

Piercing probe with "L" handle and heating system.

Storage conditions	-50T200 °C
Operating range	-50T200 °C
Connections	Stripped ends, with terminals
Sensor	Pt1000 Class B
Thermal constant over time (in air)	approx. 45 s
Cable	Food-safe thermoplastic sheath with 4 wires size 0.15 mm ²
Wires colours	White-black, PT1000 / red, electric heater.
Maximum heater voltage	24 Vac
Electrical resistance of heater	7 Ohm $\pm 0,6$ with a diode in series of resistance (see internal diagram)
Cable lenght	3 m
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 stainless steel. Length 100 mm diam. 4 mm. With pointed tip
Cap filler	Aluminium
Classification according to protection against electric shock (sensitive element & cable)	Insulation: Outer sheath, and inside on wires
Category of resistance to heat and fire	Flame retardant
Insulation resistance	20 Mohm 500 Vcc
Dielectric strength	500 Vac
Food compatibility	Suitable for permanent food contact

Tab. 10.a

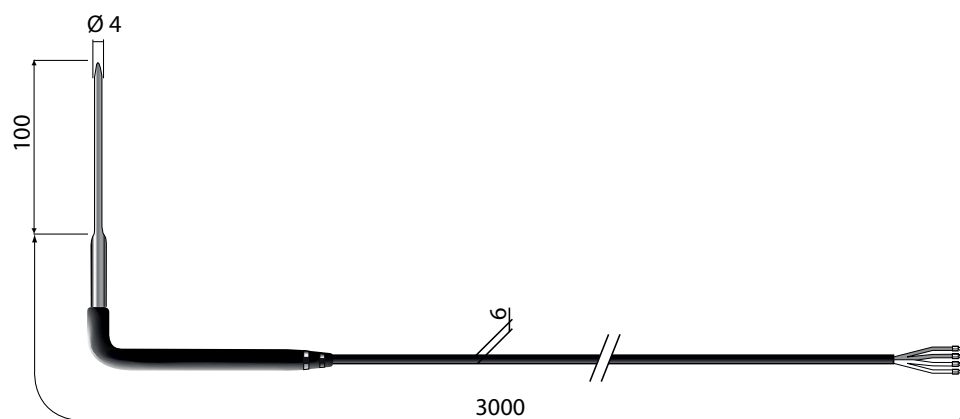
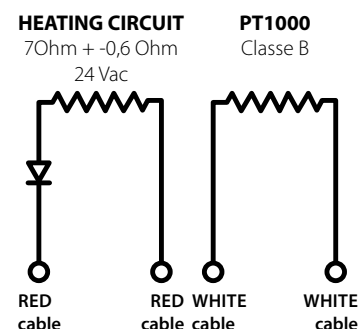


Fig.10.r

a	red, electric heater
b	white/white, NTC



11. TABLE OF PT1000 PROBE VALUES

11.1 Table of temperature-resistance values for PT1000 probe class B

R (0) = 1000.00 Ω , $\alpha = 0.003850$ 1/°C

Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]
-196	202,47	-125	500,60	-54	787,17	17	1066,27	88	1339,46	159	1606,82
-195	206,77	-124	504,70	-53	791,14	18	1070,16	89	1343,26	160	1610,54
-194	211,08	-123	508,81	-52	795,12	19	1074,05	90	1347,07	161	1614,27
-193	215,38	-122	512,91	-51	799,09	20	1077,94	91	1350,87	162	1617,99
-192	219,67	-121	517,00	-50	803,06	21	1081,82	92	1354,68	163	1621,71
-191	223,97	-120	521,10	-49	807,03	22	1085,70	93	1358,48	164	1625,43
-190	228,25	-119	525,19	-48	811,00	23	1089,59	94	1362,28	165	1629,15
-189	232,54	-118	529,28	-47	814,97	24	1093,47	95	1366,08	166	1632,86
-188	236,82	-117	533,37	-46	818,94	25	1097,35	96	1369,87	167	1636,58
-187	241,10	-116	537,46	-45	822,90	26	1101,23	97	1373,67	168	1640,30
-186	245,38	-115	541,54	-44	826,87	27	1105,10	98	1377,47	169	1644,01
-185	249,65	-114	545,62	-43	830,83	28	1108,98	99	1381,26	170	1647,72
-184	253,92	-113	549,70	-42	834,79	29	1112,86	100	1385,06	171	1651,43
-183	258,19	-112	553,78	-41	838,75	30	1116,73	101	1388,85	172	1655,14
-182	262,45	-111	557,86	-40	842,71	31	1120,60	102	1392,64	173	1658,85
-181	266,71	-110	561,93	-39	846,66	32	1124,47	103	1396,43	174	1662,56
-180	270,96	-109	566,00	-38	850,62	33	1128,35	104	1400,22	175	1666,27
-179	275,22	-108	570,07	-37	854,57	34	1132,21	105	1404,00	176	1669,97
-178	279,47	-107	574,14	-36	858,53	35	1136,08	106	1407,79	177	1673,68
-177	283,71	-106	578,21	-35	862,48	36	1139,95	107	1411,58	178	1677,38
-176	287,96	-105	582,27	-34	866,43	37	1143,82	108	1415,36	179	1681,08
-175	292,20	-104	586,33	-33	870,38	38	1147,68	109	1419,14	180	1684,78
-174	296,43	-103	590,39	-32	874,32	39	1151,55	110	1422,93	181	1688,48
-173	300,67	-102	594,45	-31	878,27	40	1155,41	111	1426,71	182	1692,18
-172	304,90	-101	598,50	-30	882,22	41	1159,27	112	1430,49	183	1695,88
-171	309,13	-100	602,56	-29	886,16	42	1163,13	113	1434,26	184	1699,58
-170	313,35	-99	606,61	-28	890,10	43	1166,99	114	1438,04	185	1703,27
-169	317,57	-98	610,66	-27	894,04	44	1170,85	115	1441,82	186	1706,96
-168	321,79	-97	614,71	-26	897,98	45	1174,70	116	1445,59	187	1710,66
-167	326,01	-96	618,76	-25	901,92	46	1178,56	117	1449,37	188	1714,35
-166	330,22	-95	622,80	-24	905,86	47	1182,41	118	1453,14	189	1718,04
-165	334,43	-94	626,84	-23	909,80	48	1186,27	119	1456,91	190	1721,73
-164	338,64	-93	630,88	-22	913,73	49	1190,12	120	1460,68	191	1725,42
-163	342,84	-92	634,92	-21	917,67	50	1193,97	121	1464,45	192	1729,10
-162	347,04	-91	638,96	-20	921,60	51	1197,82	122	1468,22	193	1732,79
-161	351,24	-90	643,00	-19	925,53	52	1201,67	123	1471,98	194	1736,48
-160	355,43	-89	647,03	-18	929,46	53	1205,52	124	1475,75	195	1740,16
-159	359,63	-88	651,06	-17	933,39	54	1209,36	125	1479,51	196	1743,84
-158	363,82	-87	655,09	-16	937,32	55	1213,21	126	1483,28	197	1747,52
-157	368,00	-86	659,12	-15	941,24	56	1217,05	127	1487,04	198	1751,20
-156	372,19	-85	663,15	-14	945,17	57	1220,90	128	1490,80	199	1754,88
-155	376,37	-84	667,17	-13	949,09	58	1224,74	129	1494,56	200	1758,56
-154	380,55	-83	671,20	-12	953,02	59	1228,58	130	1498,32	201	1762,24
-153	384,72	-82	675,22	-11	956,94	60	1232,42	131	1502,08	202	1765,91
-152	388,89	-81	679,24	-10	960,86	61	1236,26	132	1505,83	203	1769,59
-151	393,06	-80	683,25	-9	964,78	62	1240,09	133	1509,59	204	1773,26
-150	397,23	-79	687,27	-8	968,70	63	1243,93	134	1513,34	205	1776,93
-149	401,40	-78	691,29	-7	972,61	64	1247,77	135	1517,10	206	1780,60
-148	405,56	-77	695,30	-6	976,53	65	1251,60	136	1520,85	207	1784,27
-147	409,72	-76	699,31	-5	980,44	66	1255,43	137	1524,60	208	1787,94
-146	413,88	-75	703,32	-4	984,36	67	1259,26	138	1528,35	209	1791,61
-145	418,03	-74	707,33	-3	988,27	68	1263,09	139	1532,10	210	1795,28
-144	422,18	-73	711,34	-2	992,18	69	1266,92	140	1535,84	211	1798,94
-143	426,33	-72	715,34	-1	996,09	70	1270,75	141	1539,59	212	1802,60
-142	430,48	-71	719,34	0	1000,00	71	1274,58	142	1543,33	213	1806,27
-141	434,62	-70	723,35	1	1003,91	72	1278,40	143	1547,08	214	1809,93
-140	438,76	-69	727,35	2	1007,81	73	1282,23	144	1550,82	215	1813,59
-139	442,90	-68	731,34	3	1011,72	74	1286,05	145	1554,56	216	1817,25
-138	447,04	-67	735,34	4	1015,62	75	1289,87	146	1558,30	217	1820,91
-137	451,17	-66	739,34	5	1019,53	76	1293,70	147	1562,04	218	1824,56
-136	455,31	-65	743,33	6	1023,43	77	1297,52	148	1565,78	219	1828,22
-135	459,44	-64	747,32	7	1027,33	78	1301,33	149	1569,52	220	1831,88
-134	463,56	-63	751,31	8	1031,23	79	1305,15	150	1573,25	221	1835,53
-133	467,69	-62	755,30	9	1035,13	80	1308,97	151	1576,99	222	1839,18
-132	471,81	-61	759,29	10	1039,03	81	1312,78	152	1580,72	223	1842,83
-131	475,93	-60	763,28	11	1042,92	82	1316,60	153	1584,45	224	1846,48
-130	480,05	-59	767,26	12	1046,82	83	1320,41	154	1588,18	225	1850,13
-129	484,16	-58	771,25	13	1050,71	84	1324,22	155	1591,91	226	1853,78
-128	488,28	-57	775,23	14	1054,60	85	1328,03	156	1595,64	227	1857,43
-127	492,39	-56	779,21	15	1058,49	86	1331,84	157	1599,37	228	1861,07
-126	496,49	-55	783,19	16	1062,38	87	1335,65	158	1603,09	229	1864,72
230	1868,36	281	2052,63	332	2233,90	383	2412,17	434	2587,43	485	2759,68
231	1872,00	282	2056,22	333	2237,43	384	2415,63	435	2590,83	486	2763,03
232	1875,64	283	2059,80	334	2240,95	385	2419,10	436	2594,24	487	2766,38
233	1879,28	284	2063,38	335	2244,47	386	2422,56	437	2597,64	488	2769,72
234	1882,92	285	2066,96	336	2247,99	387	2426,02	438	2601,05	489	2773,07
235	1886,56	286	2070,54	337	2251,51	388	2429,48	439	2604,45	490	2776,41
236	1890,19	287	2074,11	338	2255,03	389	2432,94	440	2607,85	491	2779,75
237	1893,83	288	2077,69	339	2258,55	390	2436,40	441	2611,25	492	2783,09
238	1897,46	289	2081,27	340	2262,06	391	2439,86	442	2614,65	493	2786,43
239	1901,10	290	2084,84	341	2265,58	392	2443,31	443	2618,04	494	2789,77
240	1904,73	291	2088,41	342	2269,09	393	2446,77	444	2621,44	495	2793,11
241	1908,36	292	2091,98	343	2272,60	394	2450,22	445	2624,83	496	2796,44
242	1911,99	293	2095,55	344	2276,12	395	2453,67	446	2628,23	497	2799,78

Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]	Temper. [°C]	Resist. [Ω]
243	1915,62	294	2099,12	345	2279,63	396	2457,13	447	2631,62	498	2803,11
244	1919,24	295	2102,69	346	2283,14	397	2460,58	448	2635,01	499	2806,44
245	1922,87	296	2106,26	347	2286,64	398	2464,03	449	2638,40	500	2809,78
246	1926,49	297	2109,82	348	2290,15	399	2467,47	450	2641,79		
247	1930,12	298	2113,39	349	2293,66	400	2470,92	451	2645,18		
248	1933,74	299	2116,95	350	2297,16	401	2474,37	452	2648,57		
249	1937,36	300	2120,52	351	2300,66	402	2477,81	453	2651,95		
250	1940,98	301	2124,08	352	2304,17	403	2481,25	454	2655,34		
251	1944,60	302	2127,64	353	2307,67	404	2484,70	455	2658,72		
252	1948,22	303	2131,20	354	2311,17	405	2488,14	456	2662,10		
253	1951,83	304	2134,75	355	2314,67	406	2491,58	457	2665,48		
254	1955,45	305	2138,31	356	2318,16	407	2495,02	458	2668,86		
255	1959,06	306	2141,87	357	2321,66	408	2498,45	459	2672,24		
256	1962,68	307	2145,42	358	2325,16	409	2501,89	460	2675,62		
257	1966,29	308	2148,97	359	2328,65	410	2505,33	461	2679,00		
258	1969,90	309	2152,52	360	2332,14	411	2508,76	462	2682,37		
259	1973,51	310	2156,08	361	2335,64	412	2512,19	463	2685,74		
260	1977,12	311	2159,62	362	2339,13	413	2515,62	464	2689,12		
261	1980,73	312	2163,17	363	2342,62	414	2519,06	465	2692,49		
262	1984,33	313	2166,72	364	2346,10	415	2522,48	466	2695,86		
263	1987,94	314	2170,27	365	2349,59	416	2525,91	467	2699,23		
264	1991,54	315	2173,81	366	2353,08	417	2529,34	468	2702,60		
265	1995,14	316	2177,36	367	2356,56	418	2532,77	469	2705,97		
266	1998,75	317	2180,90	368	2360,05	419	2536,19	470	2709,33		
267	2002,35	318	2184,44	369	2363,53	420	2539,62	471	2712,70		
268	2005,95	319	2187,98	370	2367,01	421	2543,04	472	2716,06		
269	2009,54	320	2191,52	371	2370,49	422	2546,46	473	2719,42		
270	2013,14	321	2195,06	372	2373,97	423	2549,88	474	2722,78		
271	2016,74	322	2198,60	373	2377,45	424	2553,30	475	2726,14		
272	2020,33	323	2202,13	374	2380,93	425	2556,72	476	2729,50		
273	2023,93	324	2205,67	375	2384,40	426	2560,13	477	2732,86		
274	2027,52	325	2209,20	376	2387,88	427	2563,55	478	2736,22		
275	2031,11	326	2212,73	377	2391,35	428	2566,96	479	2739,57		
276	2034,70	327	2216,26	378	2394,82	429	2570,38	480	2742,93		
277	2038,29	328	2219,79	379	2398,29	430	2573,79	481	2746,28		
278	2041,88	329	2223,32	380	2401,76	431	2577,20	482	2749,63		
279	2045,46	330	2226,85	381	2405,23	432	2580,61	483	2752,98		
280	2049,05	331	2230,38	382	2408,70	433	2584,02	484	2756,33		

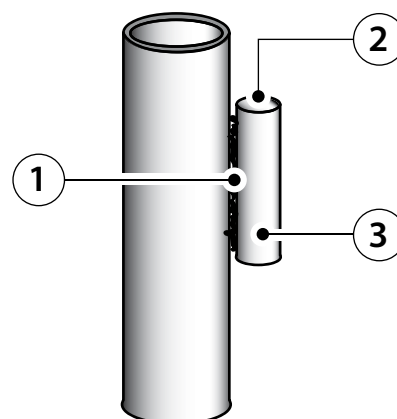
Tab. 11.a

12. TEMPERATURE SENSOR INSTALLATION INSTRUCTIONS

1



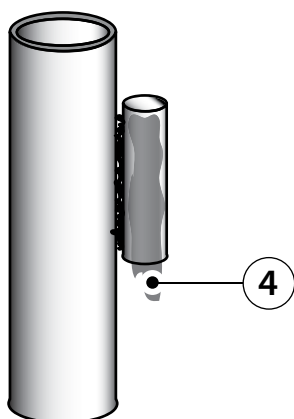
2



1. welding of socket to pipe
2. closed end of socket at top
3. tubular section ID 6 mm - min. length 70 mm

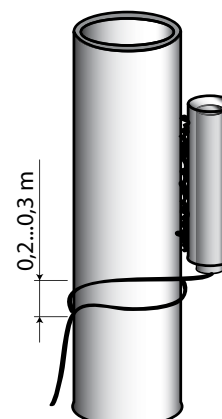
Weld the socket so as to create good thermal contact.

3



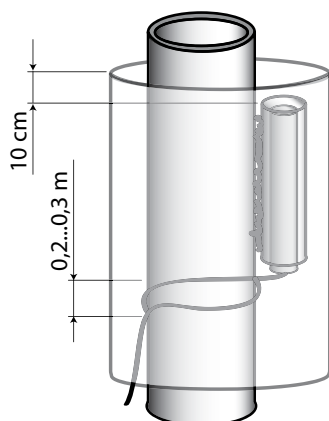
4. conductive paste
- Fill the socket with conductive paste.

4



Insert the sensor completely into the socket.
Wrap 0.2-0.3 m of cable around the pipe.

5



Make sure the contact area is thermally insulated.

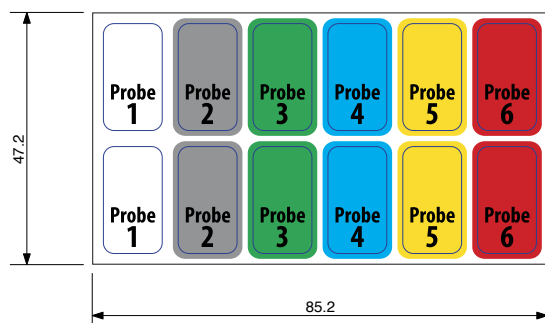


Note: if installing on a horizontal pipe, the same precautions apply, however without restrictions for the closed end of the socket.

13. ACCESSORIES

Coloured labels to be applied to the end of the sensors and simplify connection to the controller for installers

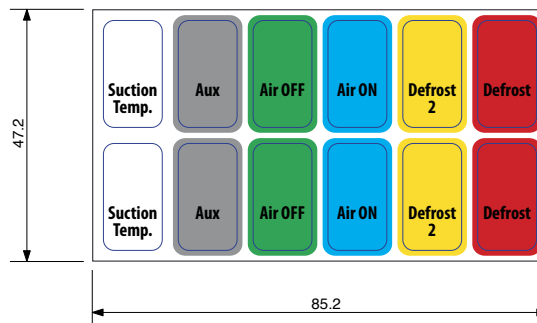
For refrigeration applications



Cod. 62C588A005

Fig. 13.a

For general applications



Cod. 62C588A006

Fig. 13.b

Example



Fig. 13.c

[illegible]



CAREL INDUSTRIES - Headquarters

Via dell'Industria, 11 - 35020 Brugine - Padova (Italy)

Tel. (+39) 049.9716611 - Fax (+39) 049.9716600

www.carel.com – e-mail: carel@carel.com

Agenzia / Agencja: