

Cable Resistance Thermometers Model TR165, with Bayonet-Type Connection

WIKA Data Sheet TE 60.06



Applications

- Plastics processing machinery
- Injection moulding machinery
- Engine cylinder heads and oil sumps
- Bearings
- Pipelines and vessels

Special Features

- Application ranges up to 250 °C max.
- Single and duplex resistance thermometer
- Adjustable spring pressure ensures optimised heat transmission
- Easy installation and removal, no tools needed
- Intrinsically safe versions (ATEX)



Cable Resistance Thermometer with Bayonet-Type Connection Model TR165 (threaded nipple, right)

Description

Probe

These cable resistance thermometers feature a bayonet-type probe connection.

They can be inserted directly into drilled holes without thermowells, for example into machine components.

Cable

There are various insulating materials available to match different environmental conditions. The free ends of the cable are made up ready for connection, or can be fitted with plugs and/or sockets as optional extras.

Intrinsically safe designs are available for applications in hazardous areas.

The TR165 series feature a type-examination certificate for "intrinsically safe" protection according to directive 94/9/EC (ATEX).

Manufacturer's Declarations in accordance with EN 50 020 are also available.

Sensor

Application range

The application range of the sensor is limited by the permissible temperature of the cable insulation.

Sensor method of connection

- 2 wire
- 3 wire
- 4 wire

With 2-wire connection the lead resistance of the cable increases the error.

With 3-wire connection, measurement errors can occur if the cable length is approx. 30 m or longer.

Sensor limiting error

- class B to DIN EN 60 751
- class A to DIN EN 60 751
- 1/3 DIN B at 0 °C

It makes no sense to combine a 2-wire connection with class A or a 2-wire connection with 1/3 DIN B, because the lead resistance error over-rides the higher sensor accuracy.

Basic values and limiting errors

Basic values and limiting errors for platinum measurement resistances are laid down in DIN EN 60 751.

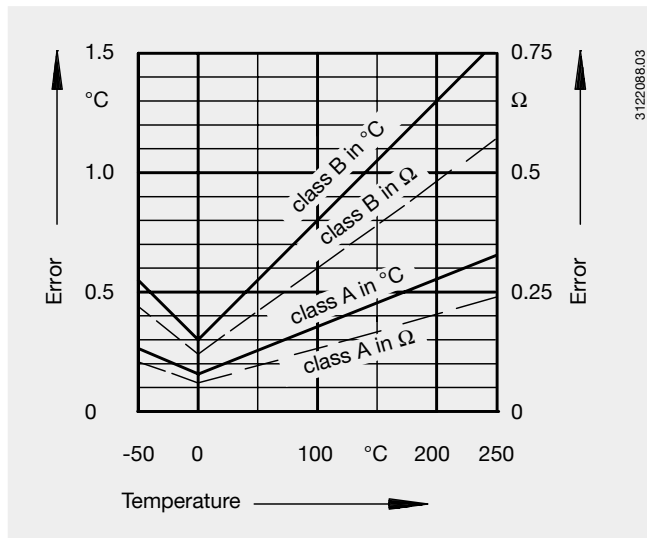
The nominal value of Pt 100 sensors is 100 Ω at 0 °C. The temperature coefficient α can be stated simply to be between 0 °C and 100 °C with:

$$\alpha = 3.85 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$$

The relationship between the temperature and the electrical resistance is characterised by polynomials which are defined in DIN EN 60 751. Furthermore, this standard lays down the basic values in °C stages.

Class	Limiting error in °C
A	$0.15 + 0.002 \cdot t $ ¹⁾
B	$0.3 + 0.005 \cdot t $

1) |t| is the value of the temperature in °C without consideration of the sign



Temperature (ITS 90) °C	Basic value Ω	Limiting error			
		Class A		Class B	
°C	Ω	°C	Ω	°C	Ω
-50	80.31	± 0.25	± 0.10	± 0.55	± 0.22
0	100	± 0.15	± 0.06	± 0.3	± 0.12
50	119.40	± 0.25	± 0.10	± 0.55	± 0.21
100	138.51	± 0.35	± 0.13	± 0.8	± 0.30
150	157.33	± 0.45	± 0.17	± 1.05	± 0.39
200	175.86	± 0.55	± 0.2	± 1.3	± 0.48
250	194.1	± 0.65	± 0.24	± 1.55	± 0.56

Cable

- Core material: Cu (strand)
 Core cross section: approx. 0.22 mm²
 Number of cores: according to number of sensors and method of sensor connection
 Wire ends: bare

Probe diameter d in mm	Cable insulation Silicon		Cable insulation PTFE		
	Working temperature -50 °C ... +200 °C standard	shielded	Working temperature -50 °C ... +250 °C standard	shielded	with SS braiding
6	1 x 2 wire	-	1 x 2 wire	1 x 2 wire	1 x 2 wire
			1 x 3 wire	1 x 3 wire	1 x 3 wire
			1 x 4 wire	1 x 4 wire	1 x 4 wire
			2 x 2 wire	2 x 2 wire	2 x 2 wire
8	1 x 2 wire	1 x 2 wire	1 x 2 wire	1 x 2 wire	1 x 2 wire
	1 x 3 wire	1 x 3 wire	1 x 3 wire	1 x 3 wire	1 x 3 wire
	1 x 4 wire	1 x 4 wire	1 x 4 wire	1 x 4 wire	1 x 4 wire
	2 x 2 wire	2 x 2 wire	2 x 2 wire	2 x 2 wire	2 x 2 wire
	2 x 3 wire		2 x 3 wire	2 x 3 wire	2 x 3 wire

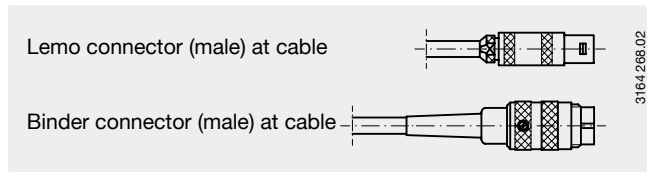
Probe

Design: rigid tube
 Material: stainless steel
 Diameter: 6 mm or 8 mm
 Length: 10 mm
 Other versions on request.

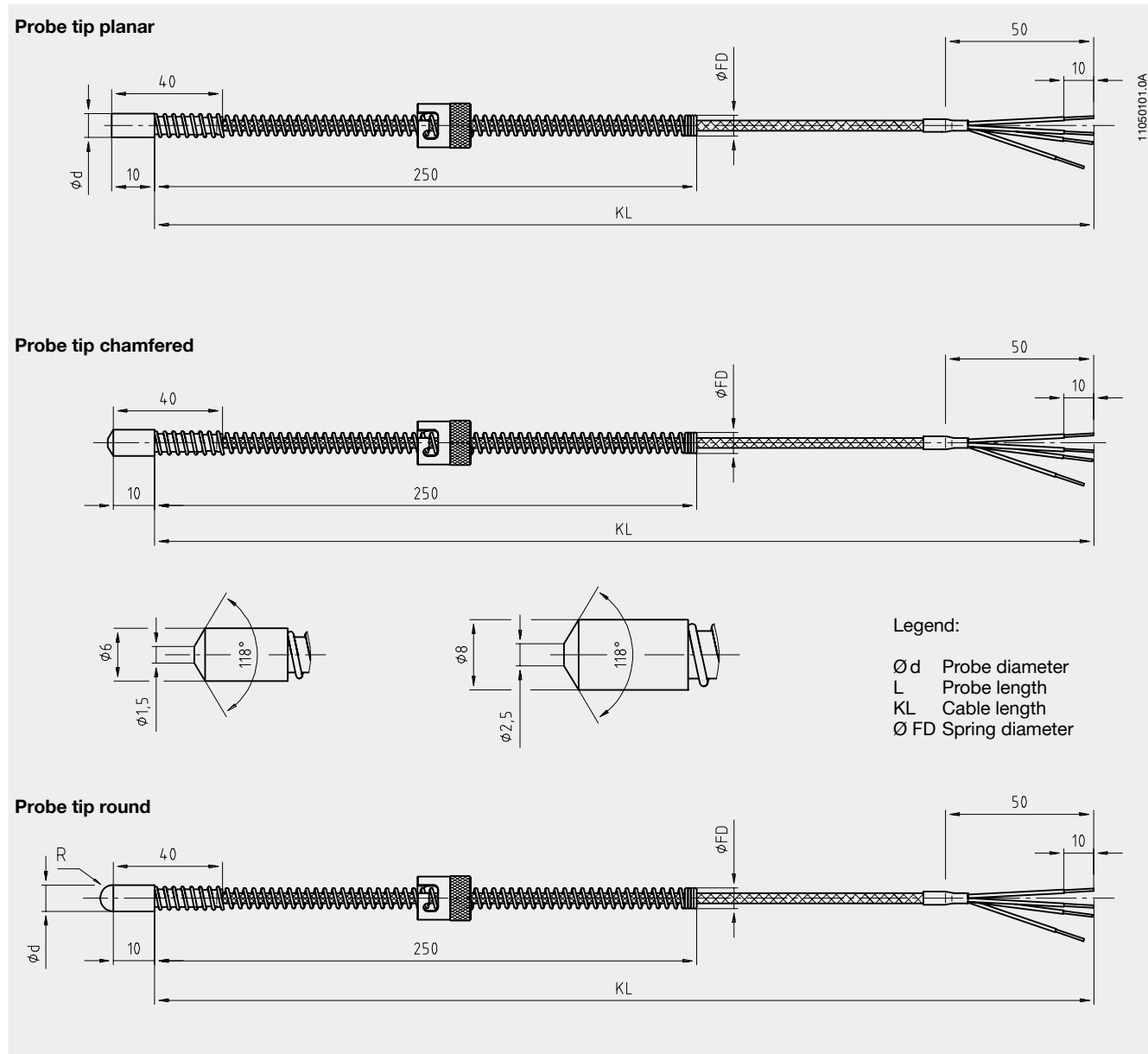
When temperature measurements are made in a solid body, the diameter of the bore into which the probe is inserted must not be more than 1 mm greater than the probe's diameter.

Connector, fitted to cable (optional)

- Lemo, size 1 S (male) for cable diameters up to 4.5 mm (only available with PTFE cable sheath material)
- Lemo, size 2 S (male) for cable diameters up to 8 mm
- Binder connector (male)
- Lemo or Binder connectors (female) on request
- Mating connectors are available

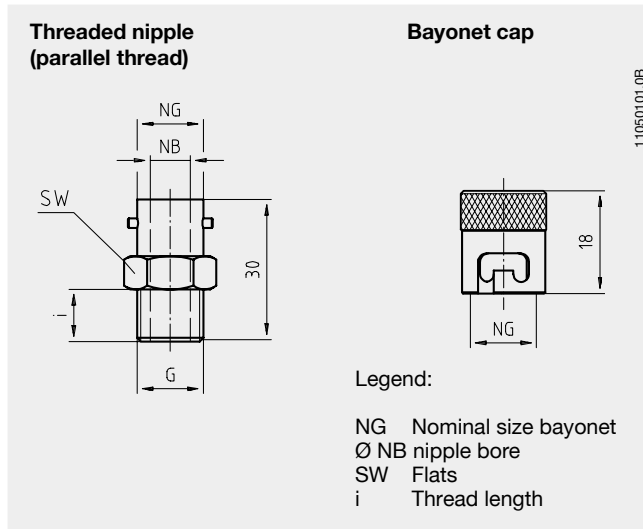


Dimensions in mm



Process connection

Bayonet cap on the probe, with matching threaded nipple for screw-fitting to a solid body (process).



Dimensions in mm

Probe diameter d	Process connection	Nominal size NG	Nipple bore Ø NB	Spring diameter Ø FD	Flats SW	Thread length i
6	M10 x 1	12	6.4	6	14	10
	M14 x 1.5	14	8.4	6	17	10
	G 1/4 B	14	8.4	6	17	10
	G 3/8 B	14	8.4	6	17	11
8	M14 x 1.5	14	8.4	7	17	10
	G 1/4 B	14	8.4	7	17	10
	G 3/8 B	14	8.4	7	17	11

Explosion protection (optional)

TR165 series resistance thermometers are available with a type-examination certificate for "intrinsically safe" ignition protection (TÜV 02 ATEX 1793 X).

These thermometers comply with the requirements of directive 94/9/EC (ATEX), EEx-i, for gases and dust.

Manufacturer's Declarations in accordance with EN 50 020 are also available.

The classification / suitability of the instrument (permissible power P_{max} , neck length and permissible ambient temperature) for the respective category is shown on the type-examination certificate and in the operating instructions.

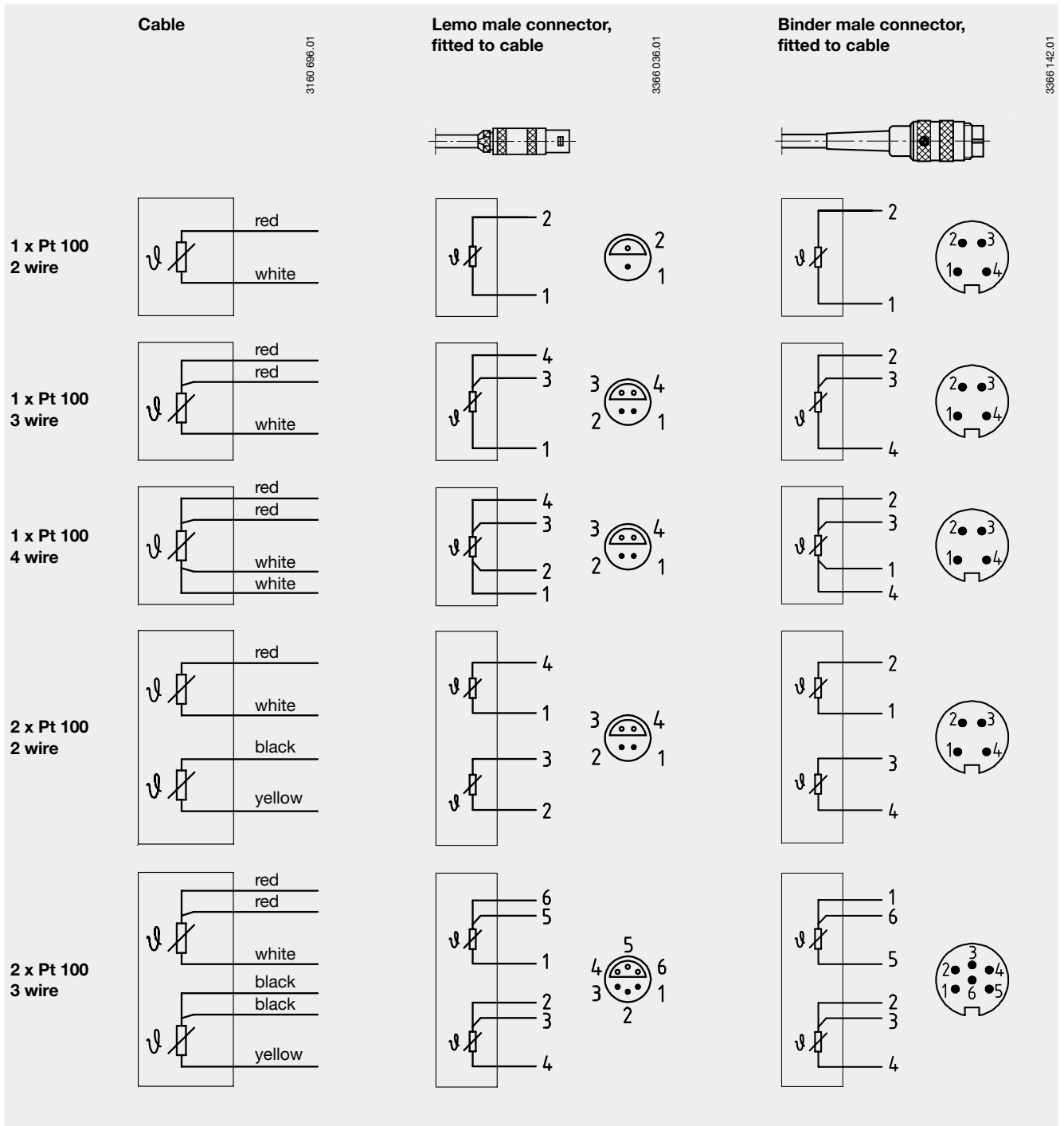
Note:

When mounting thermometers with flying leads, installation personnel must ensure that installation is carried out properly and in compliance with the appropriate regulations.

If the cable ends of the thermometer are within the hazardous area, suitable adapters / connectors must be used.

Flying leads must be connected outside the hazardous area or, when operated in explosive atmospheres caused by dust, within a case which is certified according to the 94/9/EC and EN 50 281-1-1 directives and provides an ingress protection of at least IP 65. A minimum air and leakage path of 2 mm must be ensured.

Electrical connection



OBSOLETE

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.
Modifications may take place and materials specified may be replaced by others without prior notice.



WIKAI Alexander Wiegand GmbH & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg/Germany
Phone (+49) 93 72/132-0
Fax (+49) 93 72/132-406
E-Mail info@wika.de
www.wika.de