Cable Resistance Thermometers
Model TR101

Application

- Plastic processing machines
- Injection moulding machines
- Engine cylinder heads and oil sumps
- Bearings
- Pipelines and tanks

Special Features

- Up to max. 250 °C
- Rigid probe, easily interchanged
- Can be fixed with optional process connection
- Cable insulation made of PVC, Silicon or PTFE
- Optional: plugs and/or sokets fitted to cable and intrinsic-safe versions with manufacturer's certification

Cable Resistance Thermometer Model TR101

Description

Probe

This series of cable resistance thermometer has a rigid probe. Cable resistance thermometers can be inserted into holes without thermowells, for example into machine parts. The standard version is made without a process connection. Mounting devices such as threads, union nuts etc. are available as optional extras.

Cable

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

Cable Thermocouples	*Model TC101*	*see data sheet TE 65.05*
Sheated Resistance Thermometers with Cable	*Model TR730*	*see data sheet TE 60.40*
Sheated Thermocouples with Cable	*Model TC730*	*see data sheet TE 65.40*

Sensor

Application range
The application range of the sensor is limited by the permissible ambient 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 compounds the error.

Sensor limiting error
- class B to DIN EN 60 751
- class A to DIN EN 60 751
- ⅓ DIN B at 0 °C

It makes no sence to combine 2 wire connection with class A or 2 wire connection with ⅓ DIN B, because the lead resistance of the cable overrides the higher sensor accuracy.

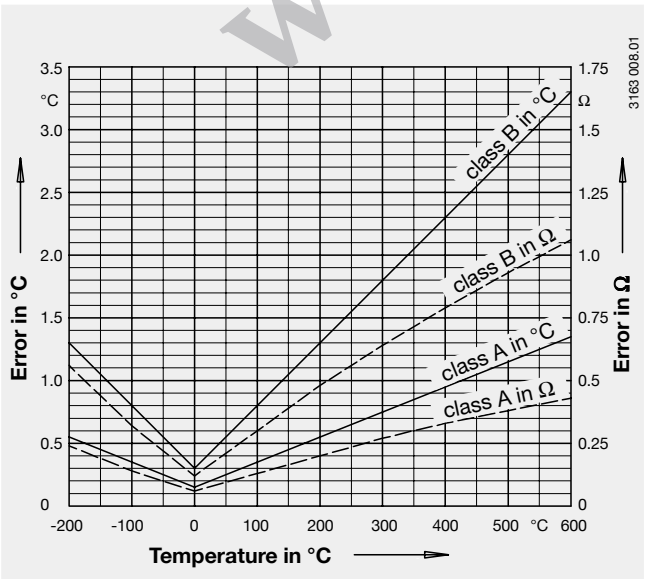
Basic values and limiting errors
Basic values and limiting errors for the platinum measuring resistors are laid down in DIN EN 60 751.
The nominal value of Pt 100 sensors is 100 Ω at 0 °C. The temperature coefficient α can be stated simply to be between 0 °C and 100 °C with:

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

The relationship between the temperature and the electrical resistance is described by polynomes 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 • | t | [1]
B	0.3 + 0.005 • | t |

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



Temperature (ITS 90)	Basic value	Limiting error DIN EN 60 751 Class A		Class B	
°C	Ω	°C	Ω	°C	Ω
-50	80.31	± 0.25	± 0.09	± 0.55	± 0.21
0	100	± 0.15	± 0.06	± 0.3	± 0.12
50	119.40	± 0.25	± 0.09	± 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	± 0.20	± 1.3	± 0.48

Probe

Design: rigid tube
Material: stainless steel
Diameter: 6 mm or 8 mm
Length: 50 mm, 70 mm, 100 mm, 150 mm
Other versions on request.

The sealing olive of a compression fitting can not be situated within 20 mm of where the flexible cable joins the rigid tube.

When temperatures in a solid body are measured, the diameter of the bore into which the probe is inserted, must not be greater than 1 mm of the probe's diameter as a maximum.

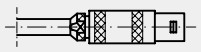
Cable

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
Insulation (material / permissible ambient temperature):
PVC -20 °C ... +100 °C
Silicon -50 °C ... +200 °C
PTFE -50 °C ... +250 °C

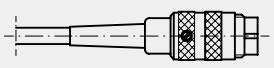
Connector, fitted to cable (optional)

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

Lemo connector (male) at cable



Binder connector (male) at cable



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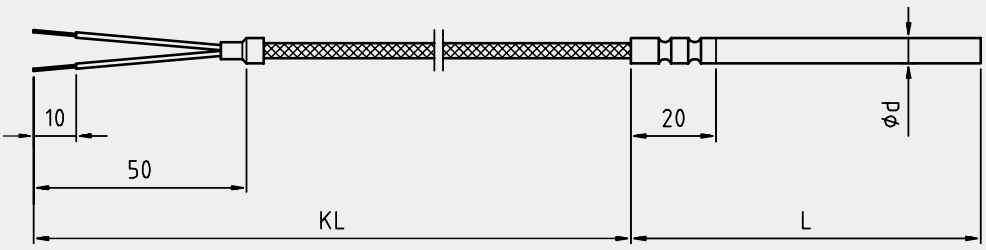
Explosion protection (optional)

Electrical thermometers can be certified with manufacturer's certification for Ex i applications if these thermometers fulfil the requirements to the Ex Protection Standards.
Such certified thermometers must only be used in Zone 1 and Zone 2.

Dimensions in mm

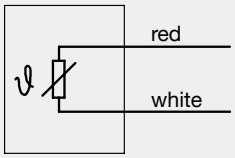
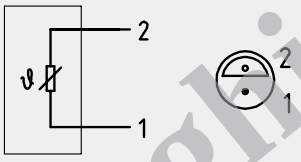
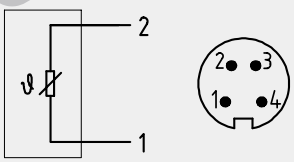
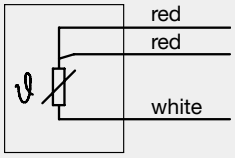
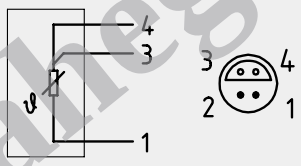
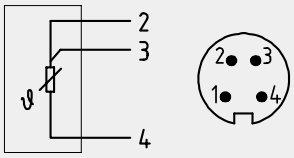
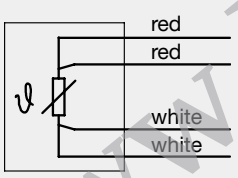
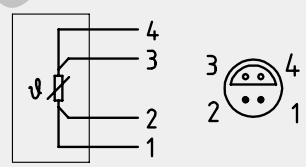
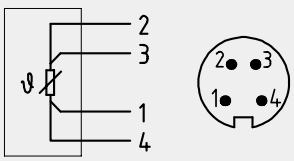
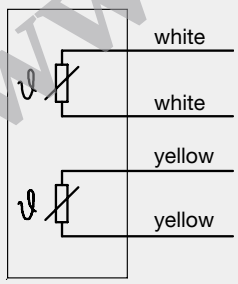
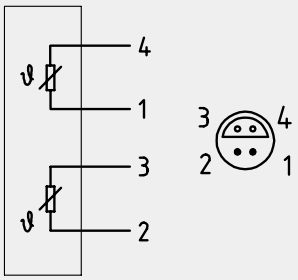
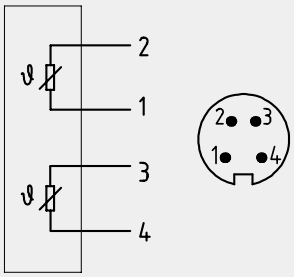
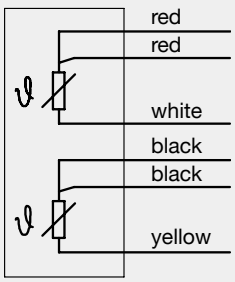
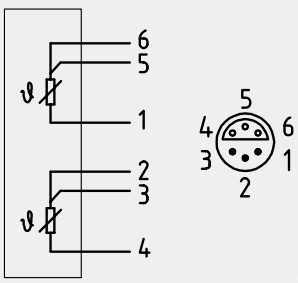
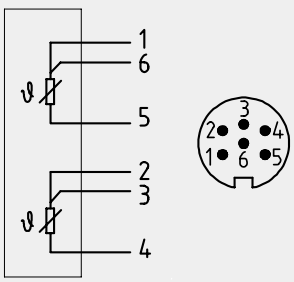


3160 661.03

Legend:

Ø d	Probe diameter
L	Probe length
KL	Cable length

Electrical connection

	Cable	Lemo male connector, fitted to cable	Binder male connector, fitted to cable
	3160 696.01	3366 036.01	3366 142.01
1 x Pt 100 2 wire			
1 x Pt 100 3 wire			
1 x Pt 100 4 wire			
2 x Pt 100 2 wire			
2 x Pt 100 3 wire			

Ordering information

Field No.		Code	Features	
			Explosion protection	
		Z	without	
		B	intrinsically safe with manufacturer's certificate to NAMUR NE 24 [1]	
1		C	intrinsically safe with manufacturer's certificate to EN 50020 [1]	
			Type and number of sensors	
		V	1 x Pt100 application range limited by max. allowed cable temperature	
		W	2 x Pt100 application range limited by max. allowed cable temperature	
2		?	other	*please state as additional text*
			Sensor method of connection	
		2	2 wire	
		3	3 wire	
3		4	4 wire	
			Sensor limiting error	
		B	class B to DIN EN 60 751	
		A	class A to DIN EN 60751 (max. 450 °C)	*not with 2 wire connection*
		C	1/3 DIN B at 0 °C	*not with 2 wire connection*
4		?	other	*please state as additional text*
			Process connection	
		ZZ	without	
		K1	G 1/4 B, compression fitting, stainless steel	
5		??	other	*please state as additional text*
			Probe material	
		2	stainless steel	
6		?	other	*please state as additional text*
			Probe diameter	
		3	6 mm	
		4	8 mm	
7		?	other	*please state as additional text*
			Probe length	
		0050	50 mm	
		0070	70 mm	
		0100	100 mm	
8		0150	150 mm	*maximum length (greater lengths see Model TR730)*
			Cable	
		P	PVC, application range -20 °C ... +100 °C	
		S	Silicon, application range -50 °C ... +200 °C	
		T	PTFE, application range -50 °C ... +250 °C	
9		?	other	*please state as additional text*
			Cable length	
			length in mm, e.g. 0850 for 850 mm	
10		????	longer than 9999 mm	*please state as additional text*
			Connector, fitted at cable	
		Z	without	
		6	Lemo, size 1 S (male), max. temperature at connector 85 °C	
		F	Lemo, size 1 S (male) with mating connector (female), max. temperature at connector 85 °C	
11		?	other	*please state as additional text*

Additional order info				
	YES	NO		
12		1	Z	quality certificates	*see price list*
13		T	Z	additional text	*Please state as clearly understandable text!*

1) Please pay attention to the table of exclusions, see price list.

Order code:

	1	2	3	4		5		6	7	8		9	10		11		12	13
TR101	-				-		-				-			-		-		

Additional text: _____

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.

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