TE 60.45

Resistance Thermometers

Ambient Temperature Measurement

Electronic Temperature Measurement

Outdoor Thermometer • Model TR812
Indoor Thermometer • Model TR813

Services intendend

- Air Conditioned Rooms
- Cold Storage Rooms
- Storehouses
- Grain Storages
- Malt Storages
- etc.

General

Resistance thermometers in this series are designed for the measurement of ambient temperatures.

Model TR812

This model series features a closed probe tube and is intended for moist rooms and outdoor applications. Intrinsically safe designs with manufacturer's certification are available for applications in hazardous areas.

Model TR813

This model series is intended for dry rooms. The probe tube is perforated in the area of the sensor. Due to this perforation the sensor is in direct contact with the ambient air. This improves considerably the response time.

Probe length, case and sensor can be selected individually for the respective application.

Optional installation of analogue or digital transmitters completes the range of applications.

(- analogue, measuring range configurable:
  Model T19 to data sheet TE 19.01,
- analogue, fixed measuring ranges:
  Model T20 to data sheet TE 20.01,
- analogue, process industry series:
  Model T31 to data sheet TE 31.01,
- digital, Model T12 to data sheet TE 12.01,
- digital, with HART® Protocol: Model T32 to data sheet TE 32.01,
- digital, for PROFIBUS PA: Model T42 to data sheet TE 42.01)

Sensor

Possible combinations: probe diameter and sensor / sensor method of connection

Probe diameter in mm	Sensor / Sensor method of connection					
	1 x Pt 100			2 x Pt 100		
	2 wire	3 wire	4 wire	2 wire	3 wire	4 wire
6	x	x	x	x	x	x
8	x	x	x	x	x	x

Where 2 wire connection is concerned, inner wiring resistance appears as fault in the measurement.
3 or 4 wire connection should be selected for longer lengths or improved accuracy.

Sensor limiting error

- Class A to DIN EN 60 751 (only with 3 wire or 4 wire method of connection)
- Class B to DIN EN 60 751
- ⅓ DIN B at 0 °C

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:

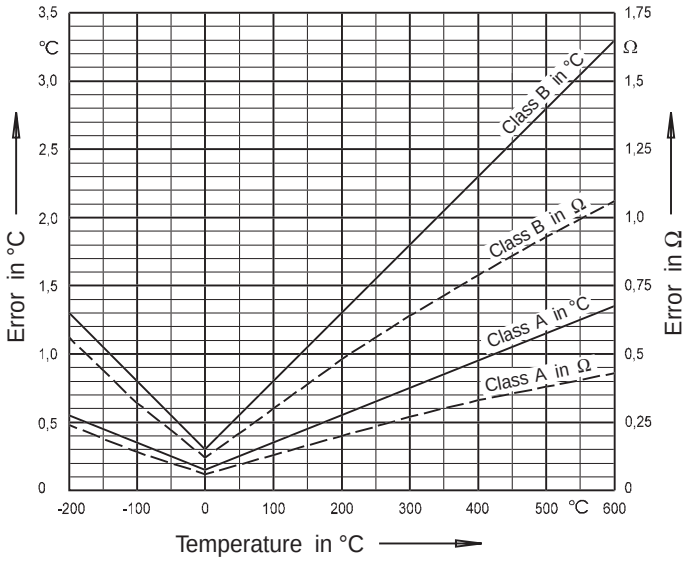
$$\alpha = 3{,}85 \times 10^{-3}\ °C^{-1}$$

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.

The limiting error is defined for two classes:

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



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Basic values and limiting errors for the platinum measuring resistors per DIN EN 60 751

Temperature		°C	- 30	- 20	- 10	0	10	20	30	40	50	60	70
Basic value		Ω	88.22	92.16	96.09	100	103.90	107.79	111.67	115.54	119.40	123.24	127.08
Limiting error	Class A	K	± 0.21	± 0.19	± 0.17	± 0.15	± 0.17	± 0.19	± 0.21	± 0.23	± 0.25	± 0.27	± 0.29
		Ω	± 0.083	± 0.075	± 0.067	± 0.059	± 0.066	± 0.074	± 0.081	± 0.089	± 0.096	± 0.104	± 0.111
	Class B	K	± 0.45	± 0.40	± 0.35	± 0.30	± 0.35	± 0.40	± 0.45	± 0.50	± 0.55	± 0.60	± 0.65
		Ω	± 0.177	± 0.157	± 0.137	± 0.117	± 0.136	± 0.155	± 0.174	± 0.193	± 0.212	± 0.230	± 0.249

Apart from the limiting errors defined in DIN EN 60 751 still more with a historical background are known such as, for example:

⅓ DIN B at 0 °C

To be noted in this case is that the limiting error restriction to ⅓ does not refer to the entire application range but only to the 0 °C value. Should the restriction in limiting error refer to a temperature range this range must be stated.

TR812 Outdoor resistance thermometer

Permissible ambient temperature: -30 ... +70 °C
Ingress protection: IP 65 (IEC 529 / EN 60 529)

Probe

Design: rigid tube, closed
Material: stainless steel 1.4571

Other versions on request.

The working temperature of the outdoor resistance thermometer is limited by the permissible ambient temperature of the case.

Case

Design: for wall mounting
Material: aluminium or plastic (ABS)
Dimensions: see dimensions

Other versions on request.

TR813 Indoor resistance thermometer

Permissible ambient temperature: -30 ... +70 °C
Ingress protection: IP 20 (IEC 529 / EN 60 529)

Probe

Design: rigid tube, perforated in the area of the sensor
Material: stainless steel 1.4571

Other versions on request.

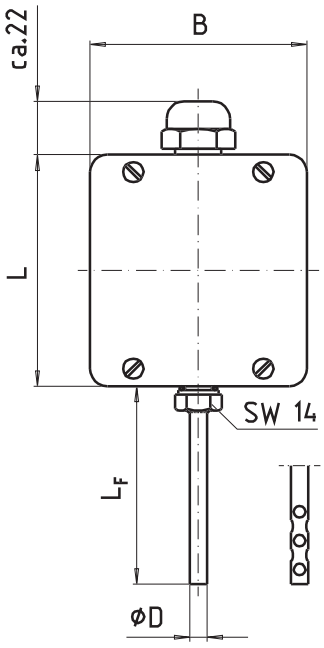
The working temperature of the indoor resistance thermometer is limited by the permissible ambient temperature of the case.

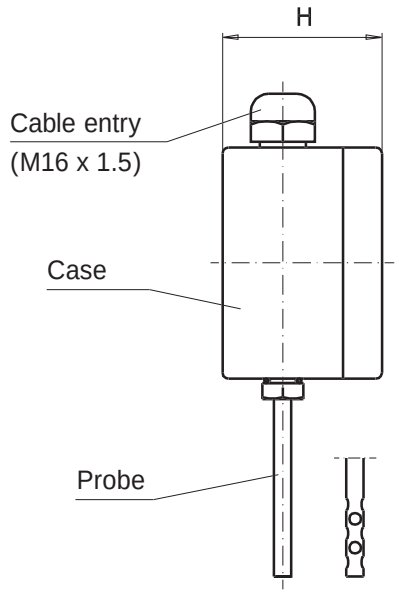
Case

Design: for wall mounting
Material: aluminium or plastic (ABS)
Dimensions: see dimensions

Other versions on request.

Dimensions in mm





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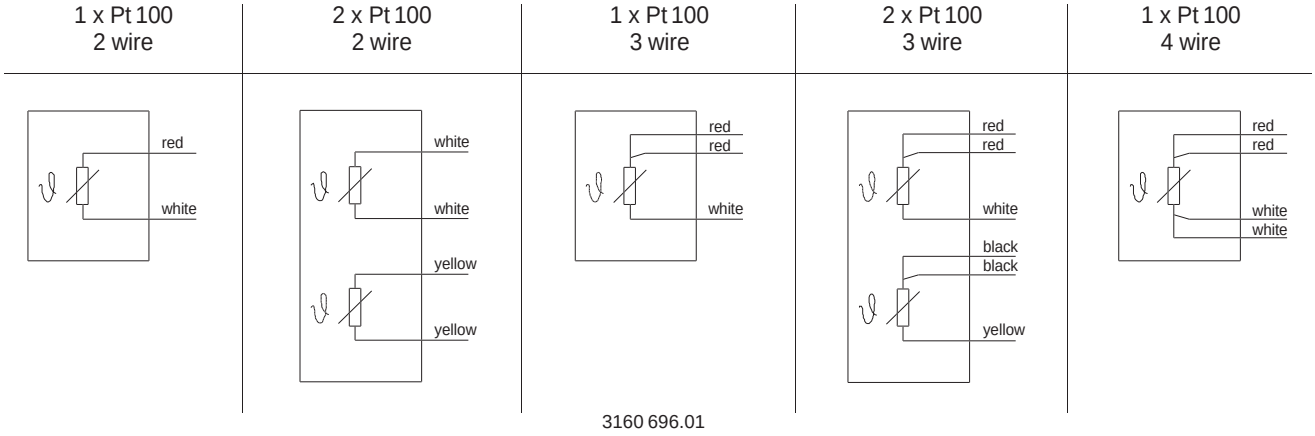
Legend:

L_F	Probe length
ø D	Probe diameter
B	Case width
H	Case height
L	Case length

Case	Dimensions in mm				
	L	B	H	L_F	Ø D
Plastic (ABS)	82	80	55	60	6
Aluminium	80	75	57	60	6

Marking of sensor connections

Connection terminals are located in the case



Explosion protection (optional, only with model TR812)

Suitability for Ex i use can be certified in accordance to NAMUR NE 24 with manufacturer's certification.
Transmitters fitted optionally have their own conformity certificate or EC Type Examination Certificate.

Transmitter (optional)

A transmitter can be fitted into the case. This is done by mounting the transmitter instead of the connection terminals.
Two transmitter installation on request.

Model	Description	Explosion protection	Data sheet
T19	analogue transmitter, measuring range configurable with soldered bridges	without	TE 19.01
T20	analogue transmitter with fixed measuring range	optional	TE 20.01
T31	analogue transmitter, process industry series	standard	TE 31.01
T12	digital transmitter, configurable	optional	TE 12.01
T32	digital transmitter with HART-Protocol, configurable	optional	TE 32.01
T42	digital transmitter for PROFIBUS PA, configurable	optional	TE 42.01

Order code for outdoor resistance thermometer Model TR812

Field No.		Code	Features	
			Explosion protection	
		Z	without	
1		**C**	intrinsically safe with manufacturer's certification to EN 50 020	*not with 2 x Pt 100 or plastic (ABS) case*
			Type and number of sensors	
		P	1 x Pt 100 application range -30 ... +70 °C	
		Q	2 x Pt 100 application range -30 ... +70 °C	*not with explosion protection*
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 60751	
		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*
			Probe material	
		1	stainless steel 1.4571	
5		**?**	other	*please state as additional text*
			Probe diameter	
		3	6 mm	
6		**?**	other	*please state as additional text*
			Probe length	
		1	60 mm	
7		**?**	other	*please state as additional text*
			Case	
		3	plastic (ABS)	*not with explosion protection*
		1	aluminium	
8		**?**	other	*please state as additional text*
			Cable entry	
		9	M16 x 1.5 , plastic	
9		**?**	other	*please state as additional text*
			Transmitter	
		ZZ	without	
		G0	model T19, analogue	*not with 4 wire connection*
		A0	model T20, analogue	*not with 4 wire connection*
		A2	model T20, analogue, EEx ia IIC T4/T5/T6	*not with 4 wire connection*
		A4	model T20, analogue, EEx ib IIC T4/T5/T6	*not with 4 wire connection*
		C2	model T31, analogue, EEx ia IIC T4/T5/T6	*not with 4 wire connection*
		C4	model T31, analogue, EEx ib IIC T4/T5/T6	*not with 4 wire connection*
		D0	model T12, programmable	
		D2	model T12, programmable, II 1G EEx ia IIC T4/T5/T6	
		D4	model T12, programmable, II 2G EEx ib IIC T4/T5/T6	
		E0	model T32, HART-protocol	
		E2	model T32, HART-protocol, II 1G EEx ia IIC T4/T5/T6	
		E4	model T32, HART-protocol, II 2G EEx ib IIC T4/T5/T6	
		F0	model T42, PROFIBUS PA	
		F2	model T42, PROFIBUS PA, II 1G EEx ia IIC T4/T5/T6	
		F4	model T42, PROFIBUS PA, II 2G EEx ib IIC T4/T5/T6	
10		**??**	other	*please state as additional text*
			Transmitter measuring range	
		ZZ	without	
			analogue transmitter (4...20 mA), standard measuring range *1)*	
		??	analogue transmitter (4...20 mA), special measuring range	*please state as additional text*
		KK	digital transmitter (4...20 mA / 20...4 mA), customer's specification *2) 3)*	
		PB	PROFIBUS PA transmitter, basic configuration	
11		**PK**	PROFIBUS PA transmitter, customer's specification *3)*	*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) Standard measuring ranges and coding see data sheet of respective transmitter.
2) Please state configuration with digital temperature transmitter, see data sheet of respective transmitter.
3) Please pay attention to the measuring range limits, see data sheet of respective transmitter.

Order code:

	1		2	3	4		5	6	7	8	9	10	11		12	13
TR812	–		–				–							–		

Additional text: _____

Order code for indoor resistance thermometer Model Typ TR813

Field No.	Code	Features	
		Type and number of sensors	
	P	1 x Pt 100 application range -30 ... +70 °C	
	Q	2 x Pt 100 application range -30 ... +70 °C	
1	**?**	other	*please state as additional text*
		Sensor method of connection	
	2	2 wire	
	3	3 wire	
2	**4**	4 wire	
		Sensor limiting error	
	B	Class B to DIN EN 60751	
	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*
3	**?**	other	*please state as additional text*
		Probe material	
	1	stainless steel 1.4571	
4	**?**	other	*please state as additional text*
		Probe diameter	
	3	6 mm	
5	**?**	other	*please state as additional text*
		Probe length	
	1	60 mm	
6	**?**	other	*please state as additional text*
		Case	
	3	plastic (ABS)	
	1	aluminium	
7	**?**	other	*please state as additional text*
		Cable entry	
	9	M16 x 1.5 , plastic	
8	**?**	other	*please state as additional text*
		Transmitter	
	ZZ	without	
	G0	model T19, analogue	*not with 4 wire connection*
	A0	model T20, analogue	*not with 4 wire connection*
	D0	model T12, programmable	
	E0	model T32, HART-protocol	
	F0	model T42, PROFIBUS PA	
9	**??**	other	*please state as additional text*
		Transmitter measuring range	
	ZZ	without	
		analogue transmitter (4...20 mA), standard measuring range *1)*	
	??	analogue transmitter (4...20 mA), special measuring range	*please state as additional text*
	KK	digital transmitter (4...20 mA / 20...4 mA), customer's specification *2) 3)*	
	PB	PROFIBUS PA transmitter, basic configuration	
10	**PK**	PROFIBUS PA transmitter, customer's specification *3)*	*please state as additional text*

Additional order info				
	YES	**NO**		
11	**1**	**Z**	quality certificates	*see price list*
12	**T**	**Z**	additional text	*Please state as clearly understandable text !*

1) Standard measuring ranges and coding see data sheet of respective transmitter.
2) Please state configuration with digital temperature transmitter, see data sheet of respective transmitter.
3) Please pay attention to the measuring range limits, see data sheet of respective transmitter.

Order code:

	1	2	3		4	5	6	7	8	9	10		11	12
TR813 – Z –				–								–		

Additional text: _____

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

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