

Thermocouples

Model TC602, for Flat Surfaces

Model TC603, for Pipe Surfaces

WIKA Data Sheet TE 65.35

Application

- To measure surface temperatures on flat surfaces or pipes in laboratories and industrial applications.

Special Features

- Up to max. 400 °C
- Easily interchanged, no thermowell necessary
- Mounting: screwed, welded or by means of worm drive hose clip
- Cable insulation: PVC, Silicon, PTFE or glass filament
- Optional: plugs and/or sockets fitted to cable



Fig. left: Thermocouple Model TC602

Fig. right: Thermocouple Model TC603

Description

Probe

In the case of thermocouples for flat surfaces, the probe is installed into a contact block, which can be screwed or welded to the vessel surface. Thermometer designs for pipes will simply be fixed with a worm drive hose clip.

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.

Sensor

Type

- K (NiCr-Ni)
- J (Fe-CuNi)

The application range of these thermocouples is limited by the permissible ambient temperature of the cable insulation. Listed sensor types are available both as simplex or duplex thermocouples.

The measuring point (hot junction) of the probe is supplied as ungrounded unless specified otherwise.

Sensor limited error

A cold junction temperature of 0 °C is taken as basis with the definition of the sensor limited error of thermocouples.

Type K

Class	Temperature range	Limited error
DIN EN 60584 part 2		
1	-40 °C ... +375 °C	± 1.5 °C
1	+375 °C ... +1000 °C	± 0.0040 • t ¹⁾
2	-40 °C ... +333 °C	± 2.5 °C
2	+333 °C ... +1200 °C	± 0.0075 • t ¹⁾
ANSI MC96.1		
Standard	0 °C ... +1250 °C	± 2.2 °C or ²⁾ ± 0.75 %
Special	0 °C ... +1250 °C	± 1.1 °C or ²⁾ ± 0.4 %

Type J

Class	Temperature range	Limited error
DIN EN 60584 part 2		
1	-40 °C ... +375 °C	± 1.5 °C
1	+375 °C ... +750 °C	± 0.0040 • t ¹⁾
2	-40 °C ... +333 °C	± 2.5 °C
2	+333 °C ... +750 °C	± 0.0075 • t ¹⁾
ANSI MC96.1		
Standard	0 °C ... +750 °C	± 2.2 °C or ²⁾ ± 0.75 %
Special	0 °C ... +750 °C	± 1.1 °C or ²⁾ ± 0.4 %

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

Limited error with selected temperatures in °C for thermocouples type K and type J

Temperature (ITS 90) °C	Limited error DIN EN 60584	
	Class 1 °C	Class 2 °C
0	± 1.5	± 2.5
100	± 1.5	± 2.5
200	± 1.5	± 2.5
300	± 1.5	± 2.5
400	± 1.6	± 3

Probe

Design: rigid tube, firmly connected to the process connection

Material: stainless steel

Other versions on request.

Process connection

TC602 for flat surfaces

Design: contact block for screwing or welding to flat surfaces

Material: stainless steel

Dimensions: see drawing

Other versions on request.

TC603 for pipe surfaces

Design: worm drive hose clip

Material: stainless steel

Cable

Core material: compensating cable according to type of sensor (lead)

Core cross section: approx. 0.22 mm²

Number of cores: according to number of sensors

Shielding: without

Wire ends: bare

Insulation (material / permissible ambient temperature):

PVC -20 °C ... +100 °C

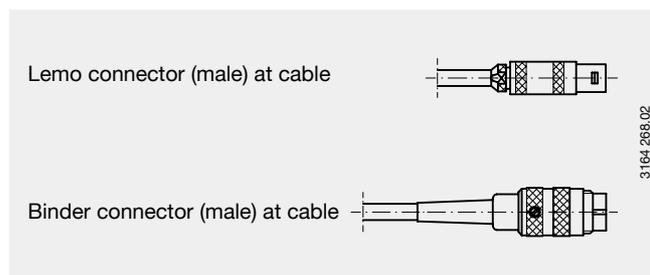
Silicon -50 °C ... +200 °C

PTFE -50 °C ... +250 °C

glass filament 0 °C ... +400 °C

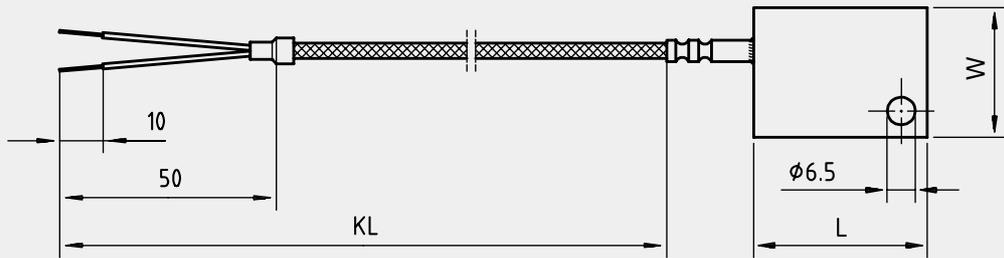
Connector, fitted to cable (optional)

- 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
- Other connectors on request



Dimensions in mm

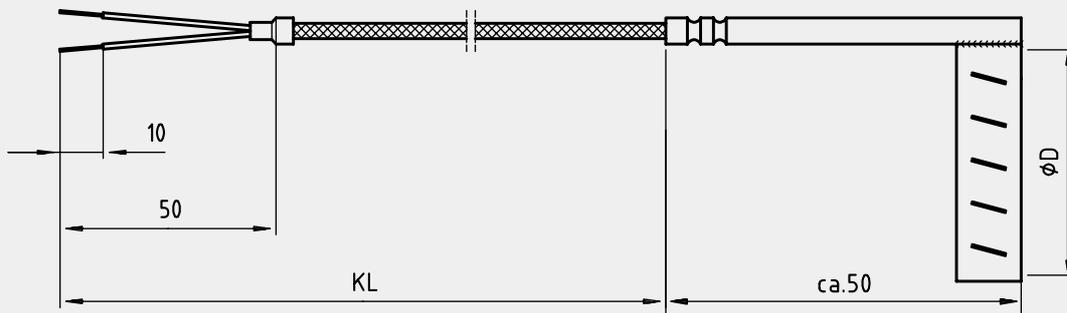
TC602 for flat surfaces, standard version



Legend:

- Ø D For pipe diameter
- H Height of contact block, not shown
- KL Cable length
- L Length of contact block
- W Width of contact block

TC603 for pipe surfaces, standard version



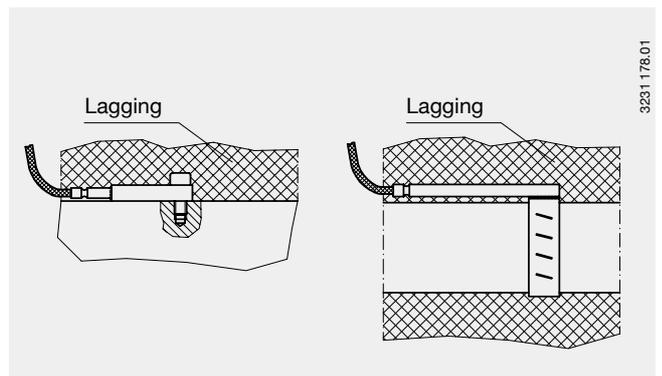
Process connection	Dimensions in mm			
	Ø D	W	L	H
contact block 30 x 40 x 8 mm	-	30	40	8
worm drive hose clip for pipe diameter 11 mm ... 25 mm	11 ... 25	-	-	-
worm drive hose clip for pipe diameter 19 mm ... 44 mm	19 ... 44	-	-	-
worm drive hose clip for pipe diameter 23 mm ... 70 mm	23 ... 70	-	-	-
worm drive hose clip for pipe diameter 70 mm ... 90 mm	70 ... 90	-	-	-
worm drive hose clip for pipe diameter 90 mm ... 100 mm	90 ... 100	-	-	-
worm drive hose clip for pipe diameter 100 mm ... 130 mm	100 ... 130	-	-	-

Mounting instructions

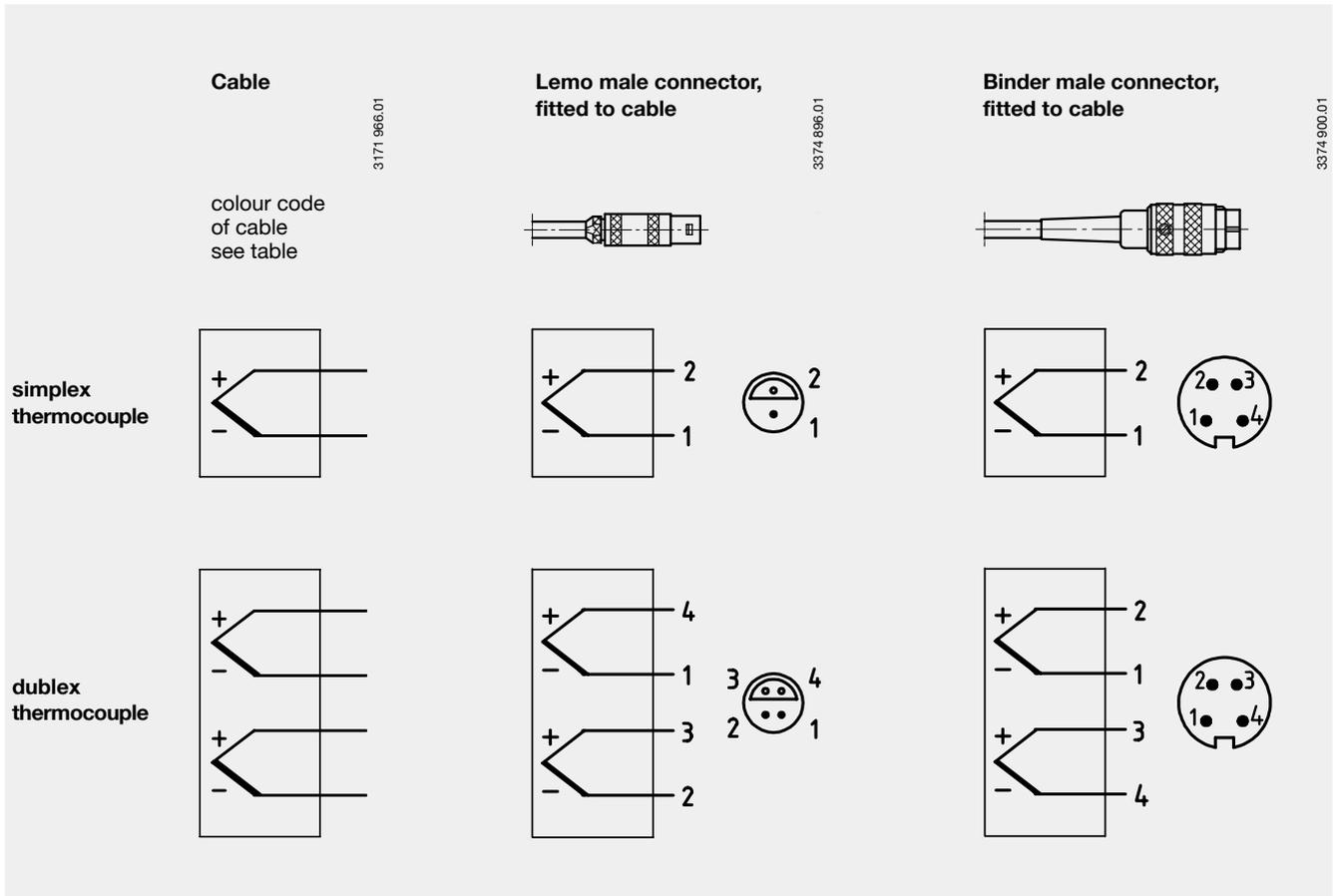
The basic requirements to ensure perfect measurement results is to retain good thermal contact between the probe and the outside wall of the tank or pipe. Minimal heat loss to the ambient from the probe and measuring point is imperative.

The probe should have direct metallic contact with the measuring point and have firm contact with the measuring point.

Lagging must be applied where the probe has been mounted to avoid error due to heat loss. This lagging must have sufficient temperature resistance and is not provided with the probe.



Electrical connection



Colour code of cable

Sensor Type	Standard	Positive Terminal	Negative Terminal
K	DIN EN 60 584	green	white
J	DIN EN 60 584	black	white

Ordering information, Model TC602

Field No.	Code	Features	
Type and number of sensors			
1	A	1 x type K (NiCr-Ni)	
	B	2 x type K (NiCr-Ni)	
	C	1 x type J (Fe-CuNi)	
	D	2 x type J (Fe-CuNi)	
	?	other <i>please state as additional text</i>	
Sensor limiting error			
2	2	class 2 per DIN EN 60 584	
	1	class 1 per DIN EN 60 584	
	8	ANSI standard to MC96.1	
	9	ANSI special to MC96.1	
	?	other <i>please state as additional text</i>	
Measuring point			
3	1	insulated	
	2	not insulated	
Process connection			
4	KB	contact block 30 x 40 x 8 mm (W x L x H)	
	??	other <i>please state as additional text</i>	
Process connection material			
5	9	stainless steel	
	?	other <i>please state as additional text</i>	
Cable			
6	P	PVC, application range -20 °C ... +100 °C <i>without shield</i>	
	S	Silicon, application range -50 °C ... +200 °C <i>without shield</i>	
	T	PTFE, application range -50 °C ... +250 °C <i>without shield</i>	
	G	glass filament, application range 0 °C ... +400 °C <i>without shield</i>	
	?	other <i>please state as additional text</i>	
Cable length			
7		length in mm, e.g. 0850 for 850 mm	
	????	longer than 9999 mm <i>please state as additional text</i>	
Connector, fitted at cable			
8	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	
	?	other <i>please state as additional text</i>	
Additional order info			
9	YES	NO	
	1	Z	quality certificates <i>see price list</i>
10	T	Z	additional text <i>Please state as clearly understandable text!</i>

Order code:

TC602 - Z	-	1	2	3	-	4	-	5	6	7	8	-	9	10

Additional text: _____

Ordering information, Model TC603

Field No.	Code	Features	
Type and number of sensors			
1	A	1 x type K (NiCr-Ni)	
	B	2 x type K (NiCr-Ni)	
	C	1 x type J (Fe-CuNi)	
	D	2 x type J (Fe-CuNi)	
	?	other <i>please state as additional text</i>	
Sensor limiting error			
2	2	class 2 per DIN EN 60 584	
	1	class 1 per DIN EN 60 584	
	8	ANSI standard to MC96.1	
	9	ANSI special to MC96.1	
	?	other <i>please state as additional text</i>	
Measuring point			
3	1	insulated	
	2	not insulated	
Process connection			
4	S0	worm drive hose clip for pipe diameter 11 mm ... 25 mm	
	S1	worm drive hose clip for pipe diameter 19 mm ... 44 mm	
	S2	worm drive hose clip for pipe diameter 23 mm ... 70 mm	
	S3	worm drive hose clip for pipe diameter 70 mm ... 90 mm	
	S4	worm drive hose clip for pipe diameter 90 mm ... 100 mm	
	S6	worm drive hose clip for pipe diameter 100 mm ... 130 mm	
	??	other <i>please state as additional text</i>	
Process connection material			
5	9	stainless steel	
	?	other <i>please state as additional text</i>	
Cable			
6	P	PVC, application range -20 °C ... +100 °C <i>without shield</i>	
	S	Silicon, application range -50 °C ... +200 °C <i>without shield</i>	
	T	PTFE, application range -50 °C ... +250 °C <i>without shield</i>	
	G	glass filament, application range 0 °C ... +400 °C <i>without shield</i>	
	?	other <i>please state as additional text</i>	
Cable length			
7		length in mm, e.g. 0850 for 850 mm	
	????	longer than 9999 mm <i>please state as additional text</i>	
Connector, fitted at cable			
8	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	
	?	other <i>please state as additional text</i>	
Additional order info			
9	YES	NO	
	1	Z	quality certificates <i>see price list</i>
10	T	Z	additional text <i>Please state as clearly understandable text!</i>

Order code:

	1	2	3	4	5	6	7	8	9	10
TC603 - Z	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>

Additional text: _____

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