

## Data Sheet

## Standard-Temperature Sensors

Type TF

No. 5320009-00/08E<sub>3</sub>

### General

The Standard Temperature Sensors of the TF series are suitable for using in free air, refrigerated cases, evaporator fins, etc.

They are **not suitable** for a durable installation in water or other liquid media (Exception: TF with IP 65/68 feature). In this case a matching dip-fitting must be used.

The **sensor elements 101 to 105 and 404** can be delivered as spare parts only because they are not longer qualified for modern controllers.

### Technical Data Sensor Elements

Accuracy..... +/- 0,5% of range  
Protection / max. temperature ..... depends on housing



### Accuracy

Because it is not possible to adapt each controller unit to an individual sensor, little deviations of the actual display may occur. To keep this deviation as small as possible, the sensors are manufactured in a small tolerance range. Contact resistances by long wires or bad screwed connections are added to the sensor value. So each ELREHA-controller offers the possibility to adjust the actual display.

### Technical Data Standard Sensor Cable

External diameter .....appr. 4 mm  
Insulation material.....PVC YM2  
Color.....grey RAL 7001  
Internal conductor.....2x litz wire 0,75 mm  
Wire insulation .....PVC Y11  
Temperature range.....-25...+70°C  
Bending radius.....39 mm  
Wire resistance.....max. 57 ohm/km  
Insulation resistance.....min. 100 kohm/km

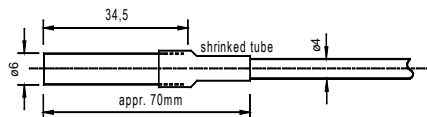


Please note that the max. temperatures of sensor head and sensor cable may differ.

°C	Widerstand in Ohm / Resistance in ohms								
	101	102	103	104	105	201	202	40x	5xx
-110	-	-	-	-	-	-	-	-	561,93
-100	-	-	-	-	-	-	-	-	602,56
-90	-	-	-	-	-	-	-	-	643
-80	-	-	-	-	-	-	-	-	683,25
-70	-	-	-	-	-	-	-	-	723,35
-60	-	-	-	-	-	-	-	-	763,28
-50	-	-	-	-	-	1032	510	80,306	803,06
-45	-	-	70 000	-	-	1084	535,5	82,29	822,9
-40	-	67 300	50 475	-	-	1135	562	84,271	842,71
-35	-	48 540	36 405	-	-	1191	589,5	86,248	862,48
-30	-	35 400	26 550	-	-	1246	617	88,222	882,22
-25	-	26 083	19 560	-	-	1306	647	90,192	901,92
-20	-	19 414	14 560	-	-	1366	677	92,16	921,6
-15	-	14 596	10 943	-	-	1430	708,5	94,124	941,24
-10	-	11 066	8 299	-	-	1493	740	96,086	960,86
-5	31 389	8 466	6 350	-	-	1561	773,5	98,044	980,44
0	23 868	6 536	4 898	-	-	1628	807	100,00	1000
5	18 299	5 078	-	-	-	1700	842	101,953	1019,53
10	14 130	3 986	-	31 170	208000	1771	877	103,903	1039,03
15	10 998	-	-	24 259	161700	1847	914	105,849	1058,49
20	8 618	-	-	19 011	126000	1922	951	107,794	1077,94
25	6 800	-	-	15 000	100000	2000	990	109,735	1097,35
30	5 401	-	-	11 933	79 422	2080	1029	111,673	1116,73
35	4 317	-	-	9 522	63 400	2162	1070	113,608	1136,08
40	3 417	-	-	7 657	51 048	2244	1111	115,541	1155,41
45	-	-	-	6 194	41 292	2330	1153,5	117,47	1174,7
50	-	-	-	5 039	33 591	2415	1196	119,397	1193,97
55	-	-	-	4 299	27 475	2505	1241	121,321	1213,21
60	-	-	-	3 756	22 590	2595	1286	123,242	1232,42
65	-	-	-	-	18 668	2689	1332	125,16	1251,6
70	-	-	-	-	15 052	2782	1378	127,075	1270,75
75	-	-	-	-	12 932	2880	1426,5	128,987	1289,87
80	-	-	-	-	10 837	2977	1475	130,897	1308,97
85	-	-	-	-	9 121	3079	1525	132,803	1328,03
90	-	-	-	-	7 708	3180	1575	134,707	1347,07
95	-	-	-	-	6 539	3285	1627	136,608	1366,08
100	-	-	-	-	5 600	3390	1679	138,506	1385,06
105	-	-	-	-	4 800	-	-	140,4	1404
110	-	-	-	-	4 100	-	-	142,293	1422,93
150	-	-	-	-	3 500	-	-	157,325	1573,25
200	-	-	-	-	3 000	-	-	175,856	1758,56
250	-	-	-	-	-	-	-	-	1940,98
Sensor	101	102	103	104	105	201	202	40x	5xx
Char.	NTC	NTC	NTC	NTC	NTC	PTC	PTC	Pt100	Pt1000

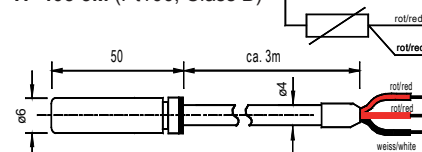
### TF 201 (Standard Cable)

TF 231 like TF 201, but shielded cable  
TF 501 (Pt1000, Class B) shielded cable



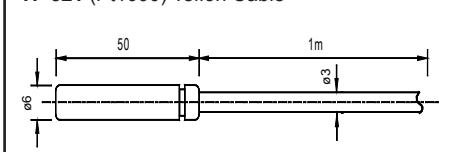
Cable Lengths..... 3m, 6m, 12m and 15m  
Min./Max Sensor Head Temperature.....-25...80°C  
Sensor Head ..... Ø 6mm, Stainless Steel 1.4305  
Protection.....IP 54, not pressure protected

### TF 403 3M (Pt100, Class B)



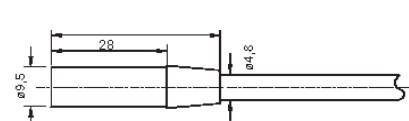
Cable Length..... 3m, 3x 0,2mm<sup>2</sup>, end sleeves  
Cable Material..... PP+Elastomer  
Min./Max Sensor Head Temp..... -40...90°C  
Sensor Head ..... Ø 6mm, Stainless Steel 1.4301  
Freezing/Melting Cycles .....min. 200.000  
Protection.....IP 68

### TF 521 (Pt1000) Teflon Cable



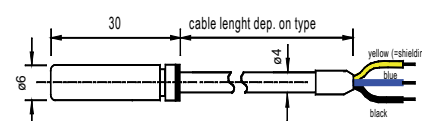
Cable Length..... 1m  
Cable Material..... Teflon  
Min./Max Sensor Head Temp..... -85...+250°C  
Sensor Head ..... Ø 6mm, Stainless Steel 1.4571  
Accuracy ..... Class B (±0,3°C at 0°C)  
Protection.....IP65

### TF 101, TF 102, TF 211 (Standard Cable)



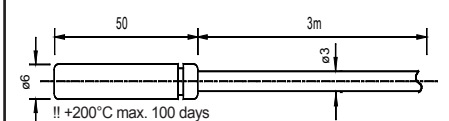
Cable Lengths..... 3m, 6m, 12m and 15m  
Min./Max. Sensor Head Temp.....-30...80°C  
Sensor Head ..... Ø 9mm, nickel plated  
Protection..... IP 54, not pressure protected

### TF 501 (Pt1000, Class B), from march 2008



Cable Lengths.....3m, 6m and 9m, shielded  
Cable Material/Temp ..PP+Elastomer/-40...+90°C  
Min./Max Sensor Head Temp.....-50...105°C  
Sensor Head ..... Ø 6mm, Stainless Steel 1.4301  
Freezing/Melting Cycles .....min. 200.000  
Protection.....IP 68

### TF 531 (Pt1000) Silicone Cable



Cable Length ..... 2m  
Cable Material..... Silicone, high flexible  
Min./Max Sensor Head Temp..... -50...+200°C  
Sensor Head ..... Ø 6mm, Stainless Steel 1.4571  
Accuracy ..... Class B (±0,3°C at 0°C)  
Protection.....IP65

**CONNECTION & SAFETY INFORMATION**

**Please read before Start-up**



- Limit of Application: This product is not designed nor manufactured for use in equipment or systems that are intended to be used under such circumstances that may affect human life. For applications requiring extremely high reliability, please contact the manufacturer first
- Please note the local safety instructions !
- Respect the environmental limits for temperature and humidity. Outside these limits malfunctions may occur.
- Don't install sensor cables in parallel with high-current cables to prevent inductive interference. A cross section of min. 0,5mm<sup>2</sup> is sufficient.
- Shielding has to be connected to PE at the end near the controller
- TF-type sensors are moisture-proof but they are not designed for being immersed in water for a long period of time (not pressure-proof). In such a case, always use dip-fittings.

**HINT:** Sometimes you have to test controller units without having a matching sensor. To simulate the input signals you can use a potentiometer or a resistor with the matching resistance value.

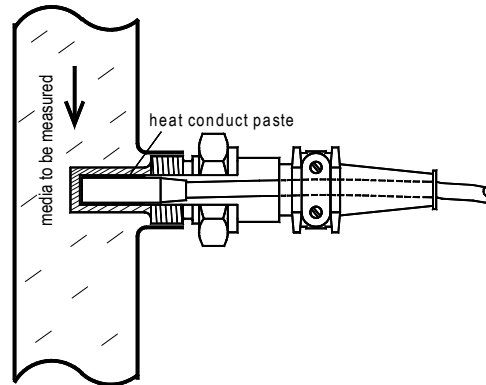
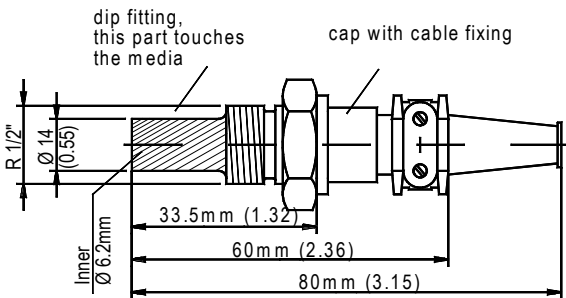


**Cable requirements for sensor extension**

2-wire, shielded cable, twisted pair not necessary. The sensor cable can be extended in any length, in practice, cable lengths of up to 100m are mostly trouble-free. The following requirements are important:  
 Min. cross-section of each core: 0,5 qmm  
 Shielding: min. 95 % optical covering, (ideal: 100 %)

**Dip-Fitting 6,2 mm, Stainless Steel,**

Dip Fittings are used for measuring temperatures in fluid-filled tubes. Standard sensors cannot be mounted directly in the fluid, because they are not pressure protected durable and not resistant against chemical influences.



**EG-Conformity**



For all described products there is a declaration of conformity which describes that, when operated in accordance with the technical manual, the criteria have been met that are outlined in the guidelines of the council for alignment of statutory orders of the member states on EMC-Directive (2004/108/EC) and the Low Voltage Directive (LVD 2006/95/EC). This declarations are valid for those products covered by the technical manual which itself is part of the declaration. To meet the requirements, the currently valid versions of the relevant standards have been used.

This statement is made from the manufacturer / importer

by:

**ELREHA Elektronische Regelungen GmbH**  
**D-68766 Hockenheim**  
 www.elreha.de  
 (name / adress)

**Werner Roemer, Technical Director**

**Hockenheim**..... **1.10.2008**.....  
 city date

sign

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