



fill level



water level



pressure



temperature



flow



visualization



signal converter



sensoric

*Sensors for all your applications*

# Temperature measurement



**ACS-CONTROL-SYSTEM**

knowhow with system

Your partner for measuring technology and automation





## Temperature sensors - well prepared for all measuring tasks.



### Informations . . . . .

page | **3-7** |

General information . . . . . page | 3 |  
Basic values . . . . . page | 5 |



### Overview . . . . .

page | **8-13** |

### Resistance thermometer with display . . . . .

page | **14-25** |



Thermocont® ST . . . . . page | 14 |  
Thermocont® TS4 . . . . . page | 18 |  
Thermocont® TSL4 . . . . . page | 22 |



### Resistance thermometer Connection diagrams, Tolerances Pt100 . . . . .

page | **26-51** |



PTA- . . . . . page | 28 |  
PTB- . . . . . page | 29 |  
PTE- . . . . . page | 30 |  
PTF- . . . . . page | 31 |  
PTG- . . . . . page | 32 |  
PTI- . . . . . page | 33 |  
PTK- . . . . . page | 34 |



PTL- . . . . . page | 35 |  
PTM- . . . . . page | 36 |  
PTO- . . . . . page | 37 |  
PTR- . . . . . page | 38 |  
PTS- . . . . . page | 39 |  
PTU- . . . . . page | 40 |  
PTW- . . . . . page | 41 |  
PTZ- . . . . . page | 42 |



PTV- . . . . . page | 43 |  
PTX- . . . . . page | 44 |  
Thermocont® TK . . . . . page | 48 |

### Equipment . . . . .

page | **52-55** |

sliding sleeves and  
weld-in sockets . . . . . page | 52 |  
immersion pocket and thread nipple  
for bayonet connector . . . . . page | 53 |  
Thermohunter . . . . . page | 54 |  
LTN . . . . . page | 55 |



### Thermocouples . . . . .

page | **56-59** |

Thermoelement TE . . . . . page | 56 |

### Head transmitter . . . . .

page | **60** |



Transcont KTM / ExKTM . . . . . page | 60 |  
Transcont UTN . . . . . page | 60 |



## Temperature measurements with resistance thermometer

### General information

#### Temperature measurements with resistance thermometer

The measuring principle of temperature measurement with resistance thermometers is based on the property of all conductors to alter its electrical resistance as a function of temperature. The relative change in electrical resistance in dependence on the temperature is called the temperature coefficient. Unfortunately, this value does not remain constant over the entire temperature range. The limit deviations are calculated:

- Class AA:  $dT = 0,1 \text{ °C} + 0,0017 \cdot |t|$
- Class A:  $dT = 0,15 \text{ °C} + 0,002 \cdot |t|$
- Class B\*:  $dT = 0,30 \text{ °C} + 0,005 \cdot |t|$  (\*Standard)
- Class C:  $dT = 0,6 \text{ °C} + 0,01 \cdot |t|$

Example of preferred class B: At 200 °C deviations of the measured value will be accepted up to  $\pm 1.3 \text{ °C}$ .

The limit deviations are smaller compared with those in standard thermocouples, which constitutes a significant advantage.

Tolerances of the Pt measuring resistors

°C	Klasse A		Klasse B	
	Ohm	entspr. °C	Ohm	entspr. °C
-200	$\pm 0.24$	$\pm 0.55$	$\pm 0.56$	$\pm 1.3$
-100	$\pm 0.14$	$\pm 0.35$	$\pm 0.32$	$\pm 0.8$
-60	-	-	-	-
0	$\pm 0.06$	$\pm 0.15$	$\pm 0.12$	$\pm 0.3$
100	$\pm 0.13$	$\pm 0.35$	$\pm 0.30$	$\pm 0.8$
180	-	-	-	-
200	$\pm 0.20$	$\pm 0.55$	$\pm 0.48$	$\pm 1.3$
300	$\pm 0.27$	$\pm 0.75$	$\pm 0.64$	$\pm 1.8$
400	$\pm 0.33$	$\pm 0.95$	$\pm 0.79$	$\pm 2.3$
500	$\pm 0.38$	$\pm 1.15$	$\pm 0.93$	$\pm 2.8$
600	$\pm 0.43$	$\pm 1.35$	$\pm 1.06$	$\pm 3.3$
650	$\pm 0.46$	$\pm 1.45$	$\pm 1.13$	$\pm 3.6$
700	-	-	$\pm 1.17$	$\pm 3.8$
800	-	-	$\pm 1.28$	$\pm 4.3$
850	-	-	$\pm 1.34$	$\pm 4.6$

1/3 DIN B (AA) =  $\pm 0,10\%$  at 0°C = 1/3 from Class B

During the actual measurement process, it is necessary to send an electrical current (0,1-6mA) through the sensing resistor itself. This generates heat and thus distorts the measurement result by so-called „self-heating“. Through appropriate wiring it is therefore desirable to keep this error, which depends on the square of measurement current as low as possible. At two circuits the inner conductor of the resistance and the resistance of the pipelines affect the measurement result. Appropriate measures such as three-wire and four-wire circuits or a resistance compensation can be preventive. The basic values for technical resistance thermometers are defined in IEC 60751.

#### Responsiveness

If the sensor is used at a sudden change in temperature, it takes a certain time until it has accepted the new temperature. This time depends on the sensor type and the Environmental conditions such as flow rate and the measured medium. The information in this catalog refers to measurements in water circulated at a flow rate of 0.4 m/s. The response times for other media can be measured using the heat transfer coefficient as per VDI/VDE3522. In the figure below the typical course of the response (transfer function) is displayed. The times are determined, in which the sensor has reached 50 or 90% of the final value. The transfer function (the history of the measured value in the form of changed track temperature at the temperature sensor) gives information about that, To determine the transfer function the sensor temperature will be flowed through by warm water or air.

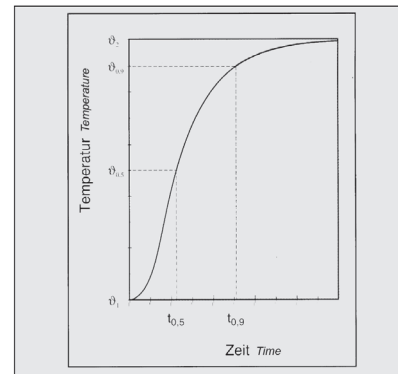
Two periods characterize the transition function.

- Half-life  $t_{0,5}$

It specifies the period in which the measured value reaches 50% of the final value, and the

- Nine-tenths of the time  $t_{0,9}$

in the 90% of the final value is reached.



#### Installation length in pipes

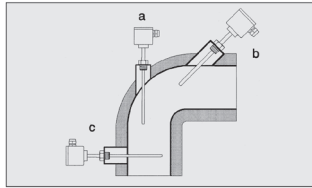
In small diameter tubes, the ideal installation length can often only be achieved by the installation of the thermometer group at an angle to the tube axis or in pipe bends. In this case, the thermometer group is always installed against the flow direction. The table provides information on the installation length in a pipe of a given diameter.

Rohrdurchmesser (mm) Pipe diameter	50	75	100	150	200	300	400
Einbaulänge ins Medium Installation length in media	30	40	50	60	80	100	120

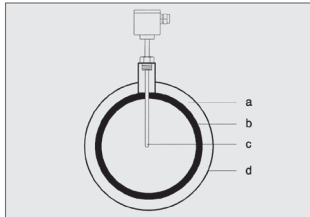
The thermometer should be installed in place of medium where the temperature is to be measured in such a depth that the heat transfer of the medium along the protective tube to the outer wall is limited to a minimum value, so cooling errors can be avoided. Otherwise, the temperature at the measuring point is lower than the average value. On the other hand, the surface which is touched by the medium has to be sufficiently large to ensure a good temperature recording. A good compromise is achieved by the following measures: in water and generally in liquids, the installation length should be 5 to 6 times larger than the diameter of the protective tube plus the sensitive length of 50 mm. In steam, air and gases, the installation length should be 10 to 15 times larger than the diameter of the protective tube plus the sensitive length of 50 mm. The shorter the installation depth, the greater the temperature difference to the actual medium temperature by the temperature derivative.



Temperature measurements with  
resistance thermometer  
General information

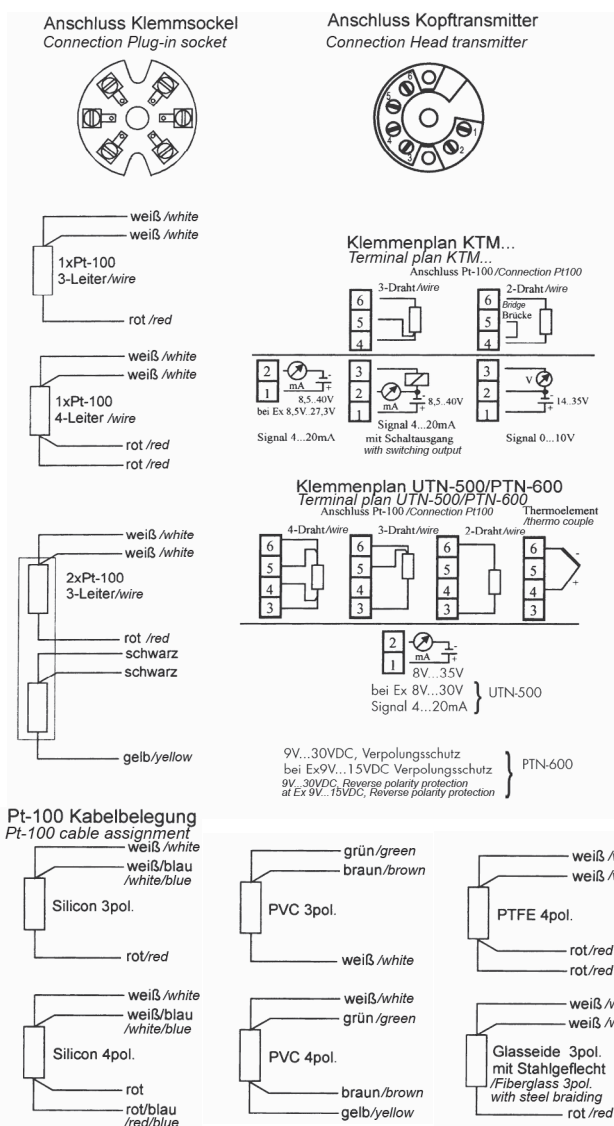


- a) the pipe bend against the flow direction
- b) in small pipes diagonal against the flow direction
- c) perpendicular to the flow direction



- Typical arrangement to reduce temperature dissipation
- a) Isolation
  - b) Pipe
  - c) Thermowell with measuring insert
  - d) Outer shell

## Resistance Thermometers - Internal wiring



## Connection types of Resistance thermometers

When measuring temperature with resistance thermometers, the measurement result is influenced by the lead resistance. In the two-wire connection of resistance is detected fully from the measuring circuit of the bridge circuit. The influence can be compensated by a temperature-independent compensation resistor at a fixed supply temperature. The application of the three-wire circuit allows measurements over much greater distances and leads to a reduction of the temperature influence of the feed line. The most accurate measurements are possible with the four-wire circuit. Both the effect of temperature on the line, and the lead resistances are omitted completely.

### Temperature measurement with Two-wire transmitter (4-20mA)

Transmitters are required when various physical quantities are to be processed together in automatically monitored manufacturing processes. The by platinum resistance thermometer electrically processable signal is reshaped by the transmitter in a standardized, unit immune to interference signal (load-independent current 4 ... 20 mA). The voltage source required to power the converter is connected in series with the load (subsequent electronics) in the output circuit in this case. Since the separate lines for supplying power to the transmitter be omitted, the internal consumption needs to be covered even after span beginning from the output circuit. The initial span can not begin at 0 mA, but only according to the specifications, at 4 mA. This arrangement results in the further requirement that the output current of 4 ... 20 mA of the terminal voltage on the two-wire transmitter (about 12-30 V DC) must be independent.

### Temperature measurement with three-wire transmitters

As an alternative to the two-wire systems these signal converter are also available with 0...10V voltage signal or with 20mA current signal and a PNP switching output.

## Temperature measurement with Profibus

Transmitter with PROFIBUS PA for converting various input signals into a digital output signal according Fieldbus standard EN 50170 and IEC 61158-2.



Basic values in ohms of -200 ... + 850 ° C  
for platinum resistance thermometer Pt100  
according to IEC 60751



**Basic values in ohms of -200 ... + 850 ° C for platinum resistance thermometer Pt100 according to IEC 60751**

The basic values are calculated according to the International Temperature Scale ITS 90. For Pt500 or Pt1000 the basic values must be multiplied by a factor of 5 or 10.

°C	Ohm	Ohm/K	°C	Ohm	Ohm/K	°C	Ohm	Ohm/K	°C	Ohm	Ohm/K	°C	Ohm	Ohm/K
-200	18,49	0,44	-120	52,11	0,41	-40	84,27	0,40	+40	115,54	0,39	+110	142,29	0,37
-199	18,93	0,43	-119	52,52	0,40	-39	84,67	0,39	-41	115,93	0,38	-111	142,66	0,38
-198	19,36	0,43	-118	52,92	0,41	-38	85,06	0,40	-42	116,31	0,39	-112	143,04	0,38
-197	19,79	0,43	-117	53,33	0,41	-37	85,46	0,40	-43	116,70	0,38	-113	143,42	0,38
-196	20,22	0,43	-116	53,74	0,41	-36	85,85	0,40	-44	117,08	0,39	-114	143,80	0,37
-195	20,65	0,43	-115	54,15	0,41	-35	86,25	0,39	-45	117,47	0,38	-115	144,17	0,38
-194	21,08	0,43	-114	54,56	0,41	-34	86,64	0,40	-46	117,85	0,39	-116	144,55	0,38
-193	21,51	0,43	-113	54,97	0,41	-33	87,04	0,39	-47	118,24	0,38	-117	144,93	0,38
-192	21,94	0,43	-112	55,38	0,40	-32	87,43	0,40	-48	118,62	0,39	-118	145,31	0,37
-191	22,37	0,43	-111	55,78	0,41	-31	87,83	0,39	-49	119,01	0,39	-119	145,68	0,38
-180	27,08	0,42	-100	60,25	0,41	-20	92,16	0,39	+60	123,24	0,38	+130	149,82	0,38
-179	27,50	0,43	-99	60,66	0,40	-19	92,55	0,40	-61	123,62	0,39	-131	150,20	0,37
-178	27,93	0,42	-98	61,06	0,41	-18	92,95	0,40	-62	124,01	0,38	-132	150,57	0,38
-177	28,35	0,43	-97	61,47	0,40	-17	93,34	0,39	-63	124,39	0,38	-133	150,95	0,38
-176	28,78	0,42	-96	61,87	0,40	-16	93,73	0,39	-64	124,77	0,39	-134	151,33	0,37
-175	29,20	0,43	-95	62,28	0,40	-15	94,12	0,40	-65	125,16	0,38	-135	151,70	0,38
-174	29,63	0,42	-94	62,68	0,41	-14	94,52	0,39	-66	125,54	0,38	-136	152,08	0,37
-173	30,05	0,42	-93	63,09	0,40	-13	94,91	0,39	-67	125,92	0,39	-137	152,45	0,38
-172	30,47	0,43	-92	63,49	0,41	-12	95,30	0,39	-68	126,31	0,38	-138	152,83	0,37
-171	30,90	0,42	-91	63,90	0,40	-11	95,69	0,40	-69	126,69	0,38	-139	153,20	0,38
-170	31,32	0,42	-90	64,30	0,40	-10	96,09	0,39	+70	127,07	0,38	+140	153,58	0,37
-169	31,74	0,42	-89	64,70	0,41	-9	96,48	0,39	-71	127,45	0,39	-141	153,95	0,37
-168	32,16	0,43	-88	65,11	0,40	-8	96,87	0,39	-72	127,84	0,38	-142	154,32	0,38
-167	32,59	0,42	-87	65,51	0,40	-7	97,26	0,39	-73	128,22	0,38	-143	154,70	0,37
-166	33,01	0,42	-86	65,91	0,40	-6	97,65	0,39	-74	128,60	0,38	-144	155,07	0,38
-165	33,43	0,42	-85	66,31	0,41	-5	98,04	0,40	-75	128,98	0,39	-145	155,45	0,37
-164	33,85	0,42	-84	66,72	0,40	-4	98,44	0,39	-76	129,37	0,38	-146	155,82	0,37
-163	34,27	0,42	-83	67,12	0,40	-3	98,83	0,39	-77	129,75	0,38	-147	156,19	0,38
-162	34,69	0,42	-82	67,52	0,40	-2	99,22	0,39	-78	130,13	0,38	-148	156,57	0,37
-161	35,11	0,42	-81	67,92	0,41	-1	99,61	0,39	-79	130,51	0,38	-149	156,94	0,37
-160	35,53	0,42	-80	68,33	0,40	+0	100,00	0,39	+80	130,89	0,38	+150	157,31	0,38
-159	35,95	0,42	-79	68,73	0,40	+1	100,39	0,39	-81	131,27	0,39	-151	157,69	0,37
-158	36,37	0,42	-78	69,13	0,40	+2	100,78	0,39	-82	131,66	0,38	-152	158,06	0,37
-157	36,79	0,42	-77	69,53	0,40	+3	101,17	0,39	-83	132,04	0,38	-153	158,43	0,38
-156	37,21	0,42	-76	69,93	0,40	+4	101,56	0,39	-84	132,42	0,38	-154	158,81	0,37
-155	37,63	0,41	-75	70,33	0,40	+5	101,95	0,39	-85	132,80	0,38	-155	159,18	0,37
-154	38,04	0,42	-74	70,73	0,40	+6	102,34	0,39	-86	133,18	0,38	-156	159,55	0,38
-153	38,46	0,42	-73	71,13	0,40	+7	102,73	0,39	-87	133,56	0,38	-157	159,93	0,37
-152	38,88	0,42	-72	71,53	0,40	+8	103,12	0,39	-88	133,94	0,38	-158	160,30	0,37
-151	39,30	0,41	-71	71,93	0,40	+9	103,51	0,39	-89	134,32	0,38	-159	160,67	0,37
-150	39,71	0,42	-70	72,33	0,40	+10	103,90	0,39	+90	134,70	0,38	+160	161,04	0,38
-149	40,13	0,42	-69	72,73	0,40	+11	104,29	0,39	-91	135,08	0,38	-161	161,42	0,37
-148	40,55	0,41	-68	73,13	0,40	+12	104,68	0,39	-92	135,46	0,38	-162	161,79	0,37
-147	40,96	0,42	-67	73,53	0,40	+13	105,07	0,39	-93	135,84	0,38	-163	162,16	0,37
-146	41,38	0,41	-66	73,93	0,40	+14	105,46	0,39	-94	136,22	0,38	-164	162,53	0,37
-145	41,79	0,42	-65	74,33	0,40	+15	105,85	0,39	-95	136,60	0,38	-165	162,90	0,37
-144	42,21	0,42	-64	74,73	0,40	+16	106,24	0,39	-96	136,98	0,38	-166	163,27	0,38
-143	42,63	0,41	-63	75,13	0,40	+17	106,63	0,39	-97	137,36	0,38	-167	163,65	0,37
-142	43,04	0,41	-62	75,53	0,40	+18	107,02	0,38	-98	137,74	0,38	-168	164,02	0,37
-141	43,45	0,42	-61	75,93	0,40	+19	107,40	0,39	-99	138,12	0,38	-169	164,39	0,37
-140	43,87	0,41	-60	76,33	0,40	+20	107,79	0,39	+100	138,50	0,38	+170	164,76	0,37
-139	44,28	0,42	-59	76,73	0,40	+21	108,18	0,39	-101	138,88	0,38	-171	165,13	0,37
-138	44,70	0,41	-58	77,13	0,39	+22	108,57	0,39	-102	139,26	0,38	-172	165,50	0,37
-137	45,11	0,41	-57	77,52	0,40	+23	108,96	0,39	-103	139,64	0,38	-173	165,87	0,37
-136	45,52	0,42	-56	77,92	0,40	+24	109,35	0,38	-104	140,02	0,37	-174	166,24	0,37
-135	45,94	0,41	-55	78,32	0,40	+25	109,73	0,39	-105	140,39	0,38	-175	166,61	0,37
-134	46,35	0,41	-54	78,72	0,39	+26	110,12	0,39	-106	140,77	0,38	-176	166,98	0,37
-133	46,76	0,41	-53	79,11	0,39	+27	110,51	0,39	-107	141,15	0,38	-177	167,35	0,37
-132	47,18	0,42	-52	79,51	0,40	+28	110,90	0,39	-108	141,53	0,38	-178	167,72	0,37
-131	47,59	0,41	-51	79,91	0,40	+29	111,28	0,39	-109	141,91	0,38	-179	168,09	0,37
-130	48,00	0,41	-50	80,31	0,39	+30	111,67	0,39	+110	142,29	0,37	+180	168,46	0,37
-129	48,41	0,41	-49	80,70	0,40	+31	112,06	0,39	-111	142,66	0,38	-181	168,83	0,37
-128	48,82	0,41	-48	81,10	0,40	+32	112,45	0,38	-112	143,04	0,38	-182	169,20	0,37
-127	49,23	0,41	-47	81,50	0,39	+33	112,83	0,39	-113	143,42	0,38	-183	169,57	0,37
-126	49,64	0,42	-46	81,89	0,40	+34	113,22	0,39	-114	143,80	0,37	-184	169,94	0,37
-125	50,06	0,41	-45	82,29	0,40	+35	113,61	0,38	-115	144,17	0,38	-185	170,31	0,37
-124	50,47	0,41	-44	82,69	0,39	+36	113,99	0,39	-116	144,55	0,38	-186	170,68	0,37
-123	50,88	0,41	-43	83,08	0,39	+37	114,38	0,39	-117	144,93	0,38	-187	171,05	0,37
-122	51,29	0,41	-42	83,48	0,40	+38	114,77	0,39	-118	145,31	0,38	-188	171,42	0,37
-121	51,70	0,41	-41	83,88	0,39	+39	115,15	0,39	-119	145,68	0,38	-189	171,79	0,37



Basic values in ohms of -200 ... + 850 °C  
for platinum resistance thermometer Pt100  
according to IEC 60751

°C	Ohm Ohm/K		°C	Ohm Ohm/K		°C	Ohm Ohm/K		°C	Ohm Ohm/K		°C	Ohm Ohm/K	
+190	172,16	0,37	+270	201,29	0,36	+350	229,67	0,35	+430	257,32	0,34	+510	284,22	0,33
191	172,53	0,37	271	201,65	0,36	351	230,02	0,35	431	257,66	0,34	511	284,55	0,33
192	172,90	0,36	272	202,01	0,35	352	230,37	0,35	432	258,00	0,34	512	284,88	0,33
193	173,26	0,37	273	202,36	0,36	353	230,72	0,35	433	258,34	0,34	513	285,21	0,33
194	173,63	0,37	274	202,72	0,36	354	231,07	0,35	434	258,68	0,34	514	285,54	0,33
195	174,00	0,37	275	203,08	0,36	355	231,42	0,35	435	259,02	0,34	515	285,87	0,33
196	174,37	0,37	276	203,44	0,36	356	231,77	0,35	436	259,36	0,34	516	286,21	0,34
197	174,74	0,37	277	203,80	0,36	357	232,12	0,35	437	259,70	0,34	517	286,54	0,33
198	175,10	0,36	278	204,16	0,36	358	232,47	0,35	438	260,04	0,34	518	286,87	0,33
199	175,47	0,37	279	204,52	0,36	359	232,82	0,35	439	260,38	0,34	519	287,20	0,33
+200	175,84	0,37	+280	204,88	0,35	+360	233,17	0,35	+440	260,72	0,34	+520	287,53	0,33
201	176,21	0,36	281	205,23	0,36	361	233,52	0,35	441	261,06	0,34	521	287,86	0,33
202	176,57	0,37	282	205,59	0,36	362	233,87	0,35	442	261,40	0,34	522	288,19	0,33
203	176,94	0,37	283	205,95	0,36	363	234,22	0,35	443	261,74	0,34	523	288,52	0,33
204	177,31	0,37	284	206,31	0,36	364	234,56	0,34	444	262,08	0,34	524	288,85	0,33
205	177,68	0,37	285	206,67	0,36	365	234,91	0,35	445	262,42	0,34	525	289,18	0,33
206	178,04	0,36	286	207,02	0,35	366	235,26	0,35	446	262,76	0,34	526	289,51	0,33
207	178,41	0,37	287	207,38	0,36	367	235,61	0,35	447	263,10	0,33	527	289,84	0,33
208	178,78	0,36	288	207,74	0,36	368	235,96	0,35	448	263,43	0,34	528	290,17	0,33
209	179,14	0,37	289	208,10	0,35	369	236,31	0,34	449	263,77	0,34	529	290,50	0,33
+210	179,51	0,37	+290	208,45	0,36	370	236,65	0,35	+450	264,11	0,34	+530	290,83	0,33
211	179,88	0,36	291	208,81	0,36	371	237,00	0,35	451	264,45	0,34	531	291,16	0,33
212	180,24	0,37	292	209,17	0,36	372	237,35	0,35	452	264,79	0,34	532	291,49	0,33
213	180,61	0,37	293	209,52	0,35	373	237,70	0,35	453	265,13	0,34	533	291,81	0,32
214	180,97	0,36	294	209,88	0,36	374	238,04	0,34	454	265,47	0,34	534	292,14	0,33
215	181,34	0,37	295	210,24	0,36	375	238,39	0,35	455	265,80	0,33	535	292,47	0,33
216	181,71	0,36	296	210,59	0,35	376	238,74	0,35	456	266,14	0,34	536	292,80	0,33
217	182,07	0,37	297	210,95	0,36	377	239,09	0,34	457	266,48	0,34	537	293,13	0,33
218	182,44	0,36	298	211,31	0,35	378	239,43	0,35	458	266,82	0,33	538	293,46	0,33
219	182,80	0,37	299	211,66	0,36	379	239,78	0,35	459	267,15	0,34	539	293,79	0,32
+220	183,17	0,36	+300	212,02	0,35	+380	240,13	0,34	+460	267,49	0,34	+540	294,11	0,33
221	183,53	0,37	301	212,37	0,36	381	240,47	0,34	461	267,83	0,34	541	294,44	0,33
222	183,90	0,36	302	212,73	0,36	382	240,82	0,35	462	268,17	0,33	542	294,77	0,33
223	184,26	0,36	303	213,09	0,36	383	241,17	0,35	463	268,50	0,34	543	295,10	0,33
224	184,63	0,36	304	213,44	0,36	384	241,51	0,35	464	268,84	0,34	544	295,43	0,32
225	184,99	0,37	305	213,80	0,35	385	241,86	0,34	465	269,18	0,33	545	295,75	0,33
226	185,36	0,36	306	214,15	0,36	386	242,20	0,35	466	269,51	0,34	546	296,08	0,33
227	185,72	0,37	307	214,51	0,35	387	242,55	0,35	467	269,85	0,34	547	296,41	0,33
228	186,09	0,36	308	214,86	0,35	388	242,90	0,34	468	270,19	0,33	548	296,74	0,33
229	186,45	0,37	309	215,22	0,35	389	243,24	0,35	469	270,52	0,34	549	297,06	0,32
+230	186,82	0,36	+310	215,57	0,36	+390	243,59	0,34	+470	270,86	0,34	+550	297,39	0,33
231	187,18	0,36	311	215,93	0,35	391	243,93	0,34	471	271,20	0,33	551	297,72	0,32
232	187,54	0,37	312	216,28	0,36	392	244,28	0,35	472	271,53	0,34	552	298,04	0,33
233	187,91	0,36	313	216,64	0,35	393	244,62	0,35	473	271,87	0,33	553	298,37	0,33
234	188,27	0,36	314	216,99	0,36	394	244,97	0,34	474	272,20	0,34	554	298,70	0,32
235	188,63	0,37	315	217,35	0,35	395	245,31	0,35	475	272,54	0,34	555	299,02	0,33
236	189,00	0,36	316	217,70	0,35	396	245,66	0,34	476	272,88	0,33	556	299,35	0,33
237	189,36	0,36	317	218,05	0,36	397	246,00	0,35	477	273,21	0,33	557	299,68	0,33
238	189,72	0,36	318	218,41	0,35	398	246,35	0,34	478	273,55	0,34	558	300,00	0,32
239	190,09	0,36	319	218,76	0,36	399	246,69	0,35	479	273,88	0,34	559	300,33	0,33
+240	190,45	0,36	+320	219,12	0,35	+400	247,04	0,34	+480	274,22	0,33	+560	300,65	0,33
241	190,81	0,37	321	219,47	0,35	401	247,38	0,35	481	274,55	0,34	561	300,98	0,33
242	191,18	0,36	322	219,82	0,36	402	247,73	0,34	482	274,89	0,33	562	301,31	0,32
243	191,54	0,36	323	220,18	0,35	403	248,07	0,34	483	275,22	0,34	563	301,63	0,33
244	191,90	0,36	324	220,53	0,35	404	248,41	0,35	484	275,56	0,33	564	301,96	0,32
245	192,26	0,36	325	220,88	0,36	405	248,76	0,34	485	275,89	0,34	565	302,28	0,33
246	192,63	0,37	326	221,24	0,36	406	249,10	0,35	486	276,23	0,34	566	302,61	0,32
247	192,99	0,36	327	221,59	0,35	407	249,45	0,35	487	276,56	0,33	567	302,93	0,33
248	193,35	0,36	328	221,94	0,35	408	249,79	0,34	488	276,89	0,33	568	303,26	0,32
249	193,71	0,36	329	222,29	0,36	409	250,13	0,35	489	277,23	0,33	569	303,58	0,33
+250	194,07	0,37	+330	222,65	0,35	+410	250,48	0,34	+490	277,56	0,34	+570	303,91	0,32
251	194,44	0,36	331	223,00	0,35	411	250,82	0,34	491	277,90	0,33	571	304,23	0,33
252	194,80	0,36	332	223,35	0,35	412	251,16	0,34	492	278,23	0,33	572	304,56	0,32
253	195,16	0,36	333	223,70	0,36	413	251,50	0,35	493	278,56	0,34	573	304,88	0,32
254	195,52	0,36	334	224,06	0,36	414	251,85	0,35	494	278,90	0,34	574	305,20	0,32
255	195,88	0,36	335	224,41	0,35	415	252,19	0,34	495	279,23	0,33	575	305,53	0,33
256	196,24	0,36	336	224,76	0,35	416	252,53	0,34	496	279,56	0,33	576	305,85	0,33
257	196,60	0,36	337	225,11	0,35	417	252,88	0,35	497	279,90	0,34	577	306,18	0,33
258	196,96	0,37	338	225,46	0,35	418	253,22	0,34	498	280,23	0,33	578	306,50	0,32
259	197,33	0,36	339	225,81	0,36	419	253,56	0,34	499	280,56	0,34	579	306,82	0,32
+260	197,69	0,36	+340	226,17	0,35	+420	253,90	0,34	+500	280,90	0,33	+580	307,15	0,32
261	198,05	0,36	341	226,52	0,35	421	254,24	0,35	501	281,23	0,33	581	307,47	0,32
262	198,41	0,36	342	226,87	0,35	422	254,59	0,35	502	281,56	0,33	582	307,79	0,33
263	198,77	0,36	343	227,22	0,35	423	254,93	0,34	503	281,89	0,33	583	308,12	0,33
264	199,13	0,36	344	227,57	0,35	424	255,27	0,34	504	282,23	0,34	584	308,44	0,32
265	199,49	0,36	345	227,92	0,35	425	255,61	0,34	505	282,56	0,33	585	308,76	0,32
266	199,85	0,36	346	228,27	0,35	426	255,95	0,34	506	282,89	0,33	586	309,09	0,33
267	200,21	0,36	347	228,62	0,35	427	256,29	0,34	507	283,22	0,33	587	309,41	0,32
268	200,57	0,36	348	228,97	0,35	428	256,64	0,35	508	283,55	0,33	588	309,	



Basic values in ohms of -200 ... + 850 °C  
for platinum resistance thermometer Pt100  
according to IEC 60751





°C	Ohm	Ohm/K	°C	Ohm	Ohm/K	°C	Ohm	Ohm/K	°C	Ohm	Ohm/K	
+590	310,38	0,32	+670	335,79	0,32	+750	360,47	0,30	+830	384,40	0,29	
591	310,70	0,32	671	336,11	0,31	751	360,77	0,30	831	384,69	0,29	
592	311,02	0,32	672	336,42	0,31	752	361,07	0,30	832	384,98	0,29	
593	311,34	0,33	673	336,73	0,31	753	361,38	0,30	833	385,28	0,29	
594	311,67	0,32	674	337,04	0,32	754	361,68	0,30	834	385,57	0,30	
595	311,99	0,32	675	337,36	0,31	755	361,98	0,31	835	385,87	0,29	
596	312,31	0,32	676	337,67	0,31	756	362,29	0,30	836	386,16	0,29	
597	312,63	0,32	677	337,98	0,31	757	362,59	0,30	837	386,45	0,30	
598	312,95	0,32	678	338,29	0,32	758	362,89	0,30	838	386,75	0,29	
599	313,27	0,32	679	338,61	0,31	759	363,19	0,31	839	387,04	0,30	
+600	313,59	0,33	+680	338,92	0,31	+760	363,50	0,30	+840	387,34	0,29	
601	313,92	0,32	681	339,23	0,31	761	363,80	0,30	841	387,63	0,29	
602	314,24	0,32	682	339,54	0,31	762	364,10	0,30	842	387,92	0,29	
603	314,56	0,32	683	339,85	0,31	763	364,40	0,31	843	388,21	0,30	
604	314,88	0,32	684	340,16	0,32	764	364,71	0,30	844	388,51	0,29	
605	315,20	0,32	685	340,48	0,31	765	365,01	0,30	845	388,80	0,29	
606	315,52	0,32	686	340,79	0,31	766	365,31	0,30	846	389,09	0,30	
607	315,84	0,32	687	341,10	0,31	767	365,61	0,30	847	389,39	0,29	
608	316,16	0,32	688	341,41	0,31	768	365,91	0,31	848	389,68	0,29	
609	316,48	0,32	689	341,72	0,31	769	366,22	0,30	849	389,97	0,29	
+610	316,80	0,32	+690	342,03	0,31	+770	366,52	0,30				
611	317,12	0,32	691	342,34	0,31	771	366,82	0,30				
612	317,44	0,32	692	342,65	0,31	772	367,12	0,30				
613	317,76	0,32	693	342,96	0,31	773	367,42	0,30				
614	318,08	0,32	694	343,27	0,31	774	367,72	0,30				
615	318,40	0,32	695	343,58	0,31	775	368,02	0,30				
616	318,72	0,32	696	343,89	0,31	776	368,32	0,31				
617	319,04	0,32	697	344,20	0,31	777	368,63	0,30				
618	319,36	0,32	698	344,51	0,31	778	368,93	0,30				
619	319,68	0,31	699	344,82	0,31	779	369,23	0,30				
+620	319,99	0,32	+700	345,13	0,31	+780	369,53	0,30				
621	320,31	0,32	701	345,44	0,31	781	369,83	0,30				
622	320,63	0,32	702	345,75	0,31	782	370,13	0,30				
623	320,95	0,32	703	346,06	0,31	783	370,43	0,30				
624	321,27	0,32	704	346,37	0,31	784	370,73	0,30				
625	321,59	0,32	705	346,68	0,31	785	371,03	0,30				
626	321,91	0,31	706	346,99	0,31	786	371,33	0,30				
627	322,22	0,31	707	347,30	0,30	787	371,63	0,30				
628	322,54	0,32	708	347,60	0,31	788	371,93	0,29				
629	322,86	0,32	709	347,91	0,31	789	372,22	0,30				
+630	323,18	0,31	+710	348,22	0,31	+790	372,52	0,30				
631	323,49	0,32	711	348,53	0,31	791	372,82	0,30				
632	323,81	0,32	712	348,84	0,31	792	373,12	0,30				
633	324,13	0,32	713	349,15	0,30	793	373,42	0,30				
634	324,45	0,31	714	349,45	0,31	794	373,72	0,30				
635	324,76	0,32	715	349,76	0,31	795	374,02	0,30				
636	325,08	0,32	716	350,07	0,31	796	374,32	0,29				
637	325,40	0,32	717	350,38	0,31	797	374,61	0,30				
638	325,72	0,31	718	350,69	0,30	798	374,91	0,30				
639	326,03	0,32	719	350,99	0,31	799	375,21	0,30				
+640	326,35	0,31	720	351,30	0,31	+800	375,51	0,30				
641	326,66	0,32	721	351,61	0,30	801	375,81	0,29				
642	326,98	0,32	722	351,91	0,31	802	376,10	0,30				
643	327,30	0,31	723	352,22	0,31	803	376,40	0,30				
644	327,61	0,32	724	352,53	0,30	804	376,70	0,30				
645	327,93	0,32	725	352,83	0,31	805	377,00	0,29				
646	328,25	0,31	726	353,14	0,31	806	377,29	0,30				
647	328,56	0,32	727	353,45	0,30	807	377,59	0,30				
648	328,88	0,31	728	353,75	0,31	808	377,89	0,30				
649	329,19	0,32	729	354,06	0,31	809	378,19	0,29				
+650	329,51	0,31	+730	354,37	0,30	+810	378,48	0,30				
651	329,82	0,32	731	354,67	0,31	811	378,78	0,30				
652	330,14	0,31	732	354,98	0,30	812	379,08	0,29				
653	330,45	0,32	733	355,28	0,31	813	379,37	0,30				
654	330,77	0,31	734	355,59	0,31	814	379,67	0,30				
655	331,08	0,32	735	355,90	0,30	815	379,97	0,29				
656	331,40	0,31	736	356,20	0,31	816	380,26	0,30				
657	331,71	0,32	737	356,51	0,30	817	380,56	0,29				
658	332,03	0,31	738	356,81	0,31	818	380,85	0,30				
659	332,34	0,32	739	357,12	0,30	819	381,15	0,30				
+660	332,66	0,31	+740	357,42	0,31	+820	381,45	0,29				
661	332,97	0,31	741	357,73	0,30	821	381,74	0,30				
662	333,28	0,32	742	358,03	0,31	822	382,04	0,29				
663	333,60	0,31	743	358,34	0,30	823	382,33	0,30				
664	333,91	0,32	744	358,64	0,31	824	382,63	0,29				
665	334,23	0,31	745	358,95	0,30	825	382,92	0,30				
666	334,54	0,31	746	359,25	0,30	826	383,22	0,29				
667	334,85	0,32	747	359,55	0,31	827	383,51	0,30				
668	335,17	0,31	748	359,86	0,30	828	383,81	0,29				
669	335,48	0,31	749	360,16	0,31	829	384,10	0,30				




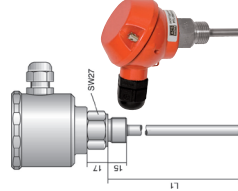
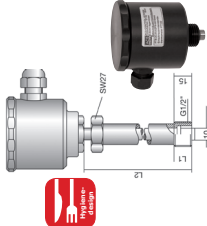
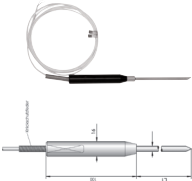
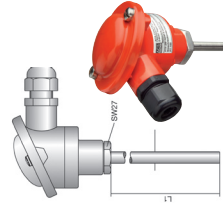


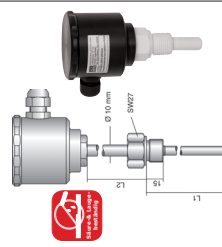
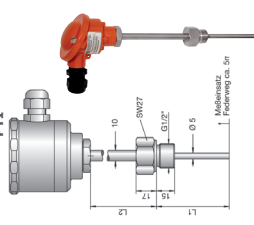
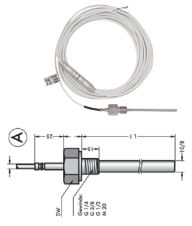
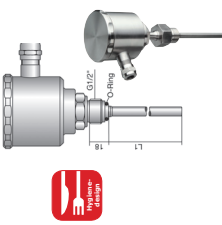
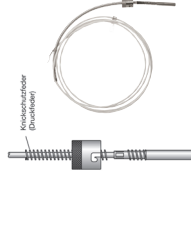
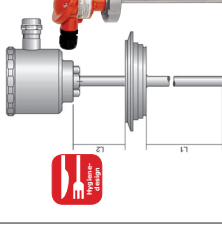
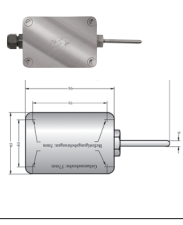
## What to use where

Function	Thermocont® ST	Thermocont® TS4S	Thermocont® TS4L	PTA	PTB	PTE	PTF	PTG	PTI	PTK	PTL	PTM	PTO	PTR	PTS	PTU	PTW	PTX	PTZ	Thermocont® TK	PTV
Pt100 Signal				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Stromausgang 0...40 mA	●	●	●																	●	●
Schaltausgang	<b>2</b>	<b>2</b>	<b>2</b>																		
Stromausgang 0...10V	●																				●
Integrierte Anzeige	●	●	●																		
V4A	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
CIP/SIP fähig	●	●	●	●			●	●	●	●	●		●					●	●	●	
Selbstüberwachung		●	●																		
Gehäuse drehbar		●	●																		
Messung in Rohrleitungen / Anlegefühler					●											●					●
Einschraubthermometer	●	●	●	●				●	●	●	●							●		●	
mit Halsrohr	●	●	●	●	●			●	●		●		●					●	●	●	
mit Handgriff						●															
Eintauchthermometer						●	●		●						●						
mit Kabel oder Stecker						●				●		●			●	●					●
Bajonettverschluss												●									
Raum-/ Außentemperatur														●							
Oberflächenfühler																●					●
Luftkanal																	●				

### Operating conditions




Hazardous area																					
Aggressive media							●											●			
Coat forming media	●	●	●	●		●	●	●	●	●	●		●					●	●		
Hygienic sector	●		●								●		●						●		●

Typ Funktionsprinzip	Thermocont® ST	Thermocont® TS	Thermocont® TL	PTA	PTB	PTE	PTF
							
page	14	18	22	28	29	30	31
Bauform	digital temperature sensor with display and switching points	digital temperature sensor with display and switching points	digital temperature sensor with display and switching points	standard - screw-in resistance thermometer measuring insert exchangeable	lamp-on sensor for front-flush welding sleeve measuring insert exchangeable	resistance thermometer zum grooving and immersion	standard- thermometer for sliding sleeve measuring insert exchangeable
Messbereiche	-99,9 up to +500°C	-99,9 up to +500°C	-99,9 up to +500°C	up to 300°C (600°C)	up to 200°C	up to 160°C	up to 300°C (600°C)
Einsatzbereiche:							
Standardanwendungen	X	X	X	X	X	X	X
Lebensmittel-/Pharmabereich	X	-	X	-	X	X	-
Heizung, Lüftung, Klima	X	X	X	X	X	X	X
Säure/Laugen	-	-	-	-	-	X	-
Ex-Bereich	X	-	-	-	-	-	-
process connections	thread G $\frac{1}{2}$ ", G $\frac{3}{8}$ ", G1", milk tube, Varivent, DRD, Tri-Clamp, DIN-flange	thread G $\frac{1}{2}$ ", G $\frac{3}{8}$ "	milk tube, Varivent, Tri-Clamp, for welding sleeve SEM-22, SEM-42	thread G $\frac{1}{2}$ ", G $\frac{3}{8}$ ", G1", DIN flange DN25, DN50	for welding sleeve TEM-10 TEM-11	grooving or immersion sensor	for sliding sleeve SEM and SEMT
Ausgang/Elektronik	4...20 mA, 2-wire 0...10 V, 3-wire 2 PNP switching outputs	1 (2) PNP switching outputs 4...20 mA 3-wire	1 (2) PNP switching outputs 4...20 mA 3-wire	terminal socket, Pt100 head transmitter, 4...20 mA, 0...10 V, Profibus PA	terminal socket, Pt100 head transmitter, 4...20 mA, 0...10 V, Profibus PA	cable outlet, Pt100	terminal socket, Pt100 head transmitter, 4...20 mA, 0...10 V, Profibus PA
Ausgang adjustable	X	X	X	-	-	-	-
Multifunktionsausgang	-	-	-	-	-	-	-
Ausgang passiv/aktiv	-	-	-	-	-	-	-
Multifunktionseingang	-	-	-	-	-	-	-
Betriebsspannung / Allstromnetzteil	-	-	-	-	-	-	-
Messumformerspeisung	-	-	-	-	-	-	-
Zertifikate	ATEX	-	-	-	-	-	-
Grenzwerte	-	-	-	-	-	-	-
Sonstiges	-	self-monitoring function	self-monitoring function	-	-	-	-

Typ Funktionsprinzip	PTG	PTI	PTK	PTL	PTM	PTO	PTR
							
page	32	33	34	35	36	37	38
Bauform	screw-in-thermometer acid and alkali resistant measuring insert exchangeable	thermowell thermometer with spring-loaded measuring insert measuring insert exchangeable	screw-in thermometer with cable outlet	resistance thermometer for hygienic applications measuring insert exchangeable	resistance thermometer with bayonet joint	resistance thermometer for hygienic applications measuring insert exchangeable	room sensor with connection box
Messbereiche	up to 180°C	up to 300°C (600°C)	up to 200°C (300°C)	up to 300°C	up to 200°C (300°C)	up to 300°C	-35 up to +80°C
Einsatzbereiche:							
Standardanwendungen	-	X	X	-	X	-	-
Lebensmittel-/ Pharmabereich	-	-	X	X	-	X	-
Heizung, Lüftung, Klima	-	X	X	-	X	-	X
Säure/Laugen	X	-	-	-	-	-	-
Ex-Bereich	-	-	-	-	-	-	-
process connections	thread G½", G¾", M20	thread G½", G1"	thread G¼", G¾", G1", M6, M8, M10, M20	for welding sockets SEM-12, SEM-32, SEM-42	bayonet 12,2 or 14,5	milk tube, Varivent flange, Tri-Clamp	wall mounting housing for drying room, humidor, refrigeration room
Ausgang/Elektronik	terminal socket, Pt100 head transmitter 4...20 mA, 0...10 V, Profibus PA	terminal socket, Pt100 head transmitter 4...20 mA, 0...10 V, Profibus PA	cable outlet, Pt100	terminal socket, Pt100 head transmitter 4...20 mA, 0...10 V, Profibus PA	cable outlet, Pt100	terminal socket, Pt100 head transmitter 4...20 mA, 0...10 V, Profibus PA	terminal socket, Pt100 head transmitter 4...20 mA, 0...10 V, Profibus PA
Ausgang adjustable	-	-	-	-	-	-	-
Multifunktionsausgang	-	-	-	-	-	-	-
Ausgang passiv/aktiv	-	-	-	-	-	-	-
Multifunktionseingang	-	-	-	-	-	-	-
Betriebsspannung/ Allstromnetzteil	-	-	-	-	-	-	-
Messumformerspeisung	-	-	-	-	-	-	-
Zertifikate	-	-	-	-	-	-	-
Grenzwerte	-	-	-	-	-	-	-
Sonstiges	PTFE coated or PTFE full material	-	-	-	-	-	-





Typ Funktionsprinzip	LTN for PTV	Thermoelemente	Thermohunter	KTM	UTN-500
					
page	55	56	54	60	58
	Transmitter Pt100 on 4 ... 20 mA for intermediate insertion into the sensor line	Form B, A, AUZH etc.  different protection tubes: 15x2 mm, 22 x 2mm etc.  different nominal lengths: 500 mm, 710 mm, 1000 mm, 1850 mm, 2000 mm, etc.  different fixings: G3 / 4, G1 / 2 without, G1 made of steel  different measuring temperatures: 0 ... 1100 ° C, 0 ... 1200 ° C etc.  different border deviations: Class 1 according to DIN EN 60584-2, Class 2 according to DIN EN 60584-2	Non-contact infrared temperature sensor  BA-06 TA: 0-500 ° C 6 mm field of view 200 mm; 4 ... 20 mA output  or  BA-30 TA: 0-500 ° C 30 mm field of view; 1000 mm; 4 ... 20 mA output	Head transmitter 44x26,8 mm  Pt100  8,5...40 V DC / 4...20 mA 14,5...35 V DC / 0...10 V  4...20mA, 0...10V Option passive  ATEX  1x PNP-Out	Head transmitter 44x26,8 mm  Pt100, TC  Multifunktionseingang  24V  4...20 mA passive  ATEX  Programmable via software







## Description

The device Thermocont® ST with integrated digital evaluation electronic is a compact sensor for measuring and monitoring of temperatures in the range from -100°C up to +500°C. Because of the integrated four digit digital display and two implemented PNP-switching outputs, separate evaluation and display devices are not necessary in most cases.

signal that is produced through the container wall), the PNP-switching outputs and the damping can be adjusted or the behaviour in the case of failure and the release of the fast adjustment can be set. The switching state of the two PNP-switching output is signalled by one LED for every output.

Through the resistor Pt100, that is implemented in the sensor, flows a constant current. This current leads to a voltage drop, that becomes higher or lower, dependent on the measured medium temperature. The resistance proportional signal that is produced at the Pt100 is recorded from a processor with high resolution, linearized and adjusted according to the settings and converted in to a high resolution output signal of 4...20mA or 0...10V. By using 3 keys and an LED display the sensor measurement range, a zero correction in the range of -25,0 K to +25,0 K (e.g. for extraction of dissipation's in the measurement

## Application

- Temperature ranges -100°C up to +500,0°C, free adjustable
- 2-wire 4...20mA or 3-wire 0...10V technology
- 2 PNP switching outputs
- 4-digit LED-display
- Approved for use in potentially explosive areas

## Specials



## Your benefits

- Robust design - *maintenance-free*
- Electronics rotatable by 330 degrees
- *Fast adjustment* via keyboard shortcuts and menu-driven adjustment via LED display
- *Password protection*



Ausgang		
Output variants A/B:	4..20mA, 2-Draht	
Output variants E/F:	0...10 V, 3-Draht	
Delay time output:	bei Dämpfung 1 T90 typ. 260 ms, max. 310ms	
Switching outputs (S1 / S2):	2xPNP-schaltend auf +VS	
Output current:	> 250 mA, current limited, short circuit protected	
Supply voltage		
Permissible supply voltage:	Variation A/B/E/F:	14,5 V up to 45 V DC
Residual ripple:	≤ 2 Vss	
Resolution:	≤ 1 µA resp. 0,5 mV	
Adjustment range damping:	0,3...30 seconds / 100 steps	
Measurement accuracy		
Deviation Pt100:	Class A:	0°C; ± 0,15K
	Class B:	0°C; ± 0,30K
	Class AA:	0°C; ± 0,10K
Characteristics deviation:	≤ ± 0,2K	
Material		
Sensor tube:	Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316 Ti)	
Process connection:	Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316 Ti)	
Connection housing:	CrNi-Steel / PBT / POM	
Connection cable:	PE - Polyethylen	
Environmental conditions		
Ambient, storage temperature:	-40°C...+85°C	
Process temperature:	-50°C...+200°C/-100°C...500°C	
Protection:	IP65/IP67 EN/IEC 60529	

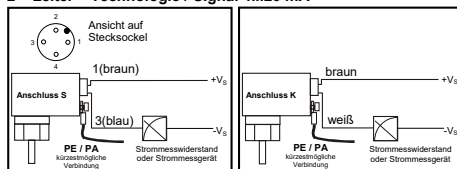
## Connection

Anschluss Typ S  
Stecker M12x1

Anschluss Typ K  
Kabel

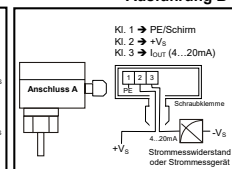
Anschluss Typ A  
Klemmraum

2 – Leiter – Technologie / Signal 4...20 mA

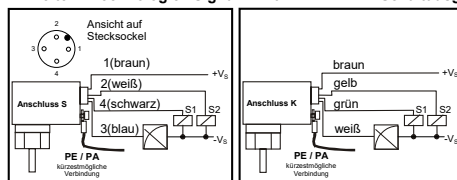


Anschluss Typ K  
Kabel

Ausführung B

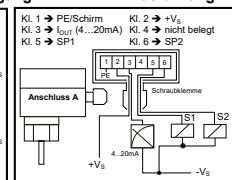


2 – Leiter – Technologie / Signal 4...20 mA / 2x PNP-Schaltausgang

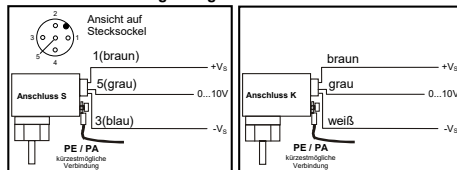


Anschluss Typ K  
Kabel

Ausführung A

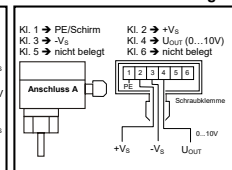


3 – Leiter – Technologie / Signal 0...10 V

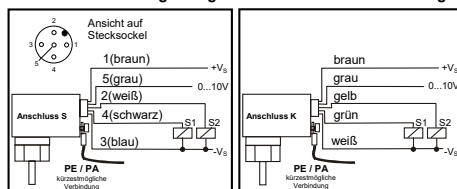


Anschluss Typ K  
Kabel

Ausführung F

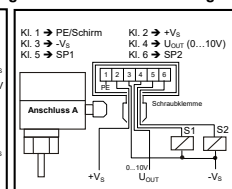


3 – Leiter – Technologie / Signal 0...10 V / 2x PNP-Schaltausgang



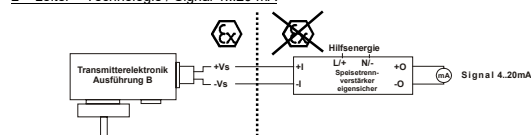
Anschluss Typ K  
Kabel

Ausführung E



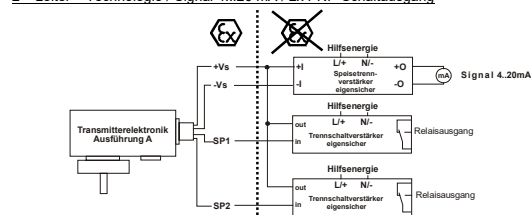
## Connection in Ex area

2 – Leiter – Technologie / Signal 4...20 mA



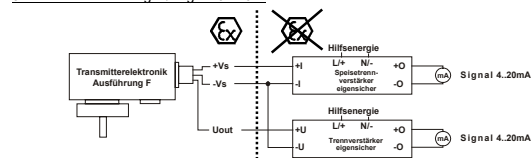
Ausführung B

2 – Leiter – Technologie / Signal 4...20 mA / 2x PNP-Schaltausgang



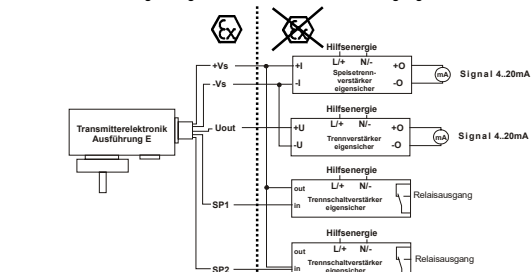
Ausführung A

3 – Leiter – Technologie / Signal 0...10 V

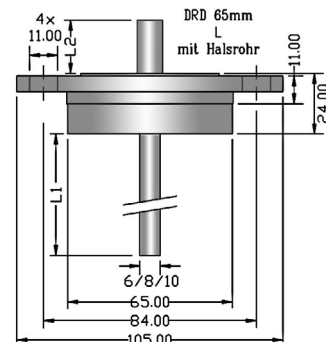
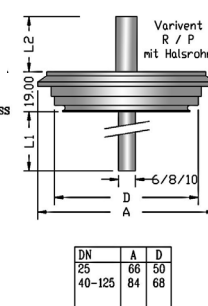
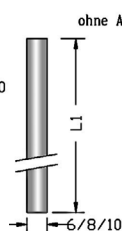
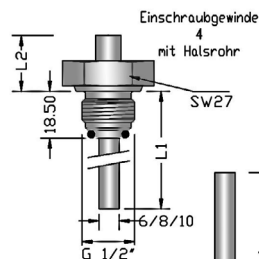
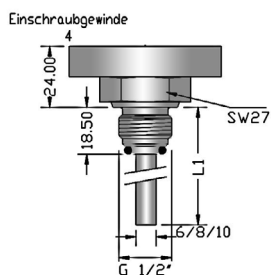
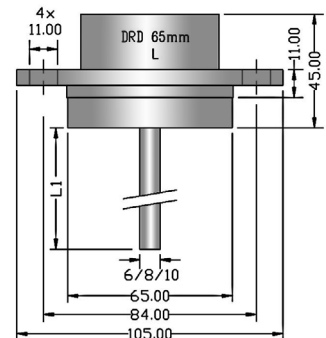
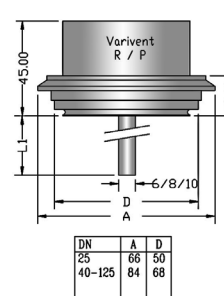
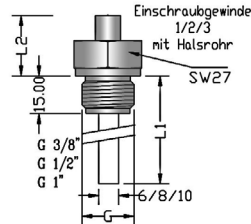
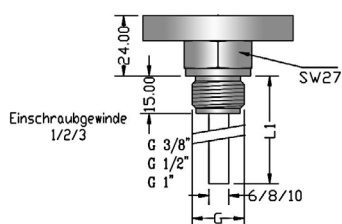
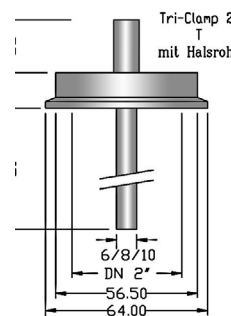
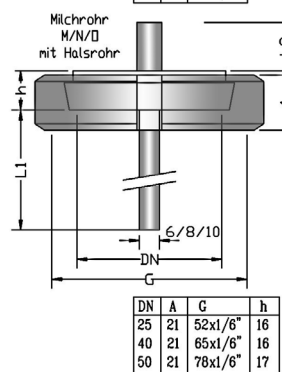
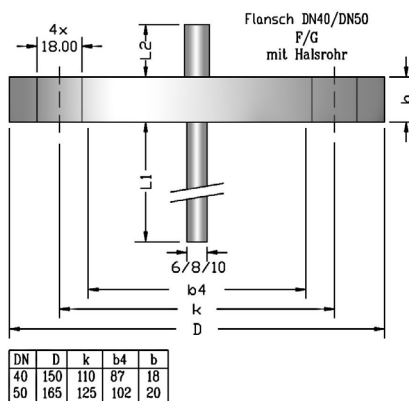
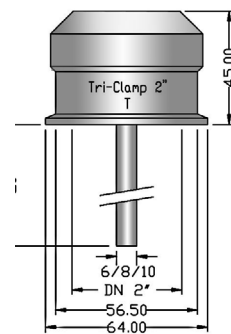
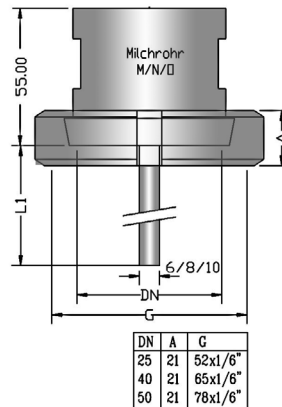
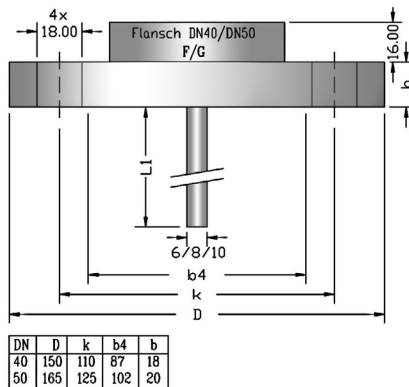
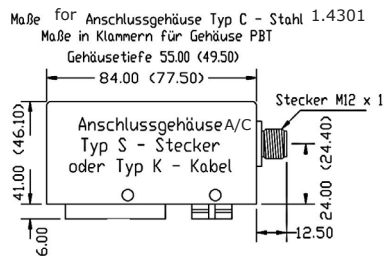
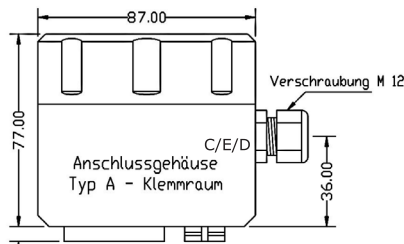


Ausführung F

3 – Leiter – Technologie / Signal 0...10 V / 2x PNP-Schaltausgang



Ausführung E







## sensor type

ST Standard  
ExST ATEX II 1/2 G Ex ia IIC T4 Ga/Gb  
XDST ATEX II 1/2 D Ex ia IIIC T85°C/T102°C Da/Db

## temperature range

2 range -50°C up to +200,0°C freely programmable  
3 range -99,9°C up to +500,0°C freely programmable  
Y preset according to customer requirements

## class

B class B  
A class A  
C class AA (formerly class 1/5B)  
Y calibration

## Process connection

1 screw-in thread G½"  
2 screw-in thread G1"  
3 screw-in thread G¾"  
4 G½" with O-ring-gasket Viton® for sleeve SEM-12 or SEM-32  
5 G½" with O-ring-gasket EPDM for sleeve SEM-12 or SEM-32  
6 G½" metal-seated for sleeve SEM-22 or SEM-42  
M Milk tube connection DN50 DIN 11851  
N Milk tube connection DN40 DIN 11851  
O Milk tube connection DN25 DIN 11851  
R Varivent flange Ø 50 mm for tube DN 25  
P Varivent flange Ø 68 mm for tubes DN 32 - 125  
L DRD-connection Ø 65 mm  
F Flange DIN EN 1092-1, A (B - DIN 2527), DN40, PN10-40  
G Flange DIN EN 1092-1, A (B - DIN 2527), DN50, PN10-40  
T Tri-Clamp® 2" ISO 2852  
Y Others  
0 Without connection (for sliding sleeves)

## Material, sensor diameter, process side

K 1.4571 / 6 mm  
N 1.4571 / 8 mm  
L 1.4571 / 10 mm  
M 1.4571 / 8 mm, reduced tip 5 mm; 40 mm long  
O 1.4571 / 10 mm, reduced tip 6 mm; 40 mm long  
R 1.4571 / 8 mm, reduced tip 3 mm, 40 mm long  
Y Others

## neck tube

A Without neck tube  
B With neck tube (standard L2 = 100 mm)  
Y With neck tube by choice in mm

## Material Connection housing

(for type XD only material steel possible)

A PBT (polybutylene terephthalate) (not with terminal compartment)  
C CrNi-steel  
D POM (Polyacetal - Delrin®) - only with terminal compartment housing

## Electrical connection

S Plug M12x1  
K Cable 2 m  
A Terminal compartment housing

## Transmitter electronics

A 4...20 mA 2-wire-electronics with display, 2 PNP-switching output  
B 4...20 mA 2-wire-electronics with display  
E 0...10 V 3-wire-electronics with display, 2 PNP-switching output  
F 0...10 V 3-wire-electronics with display

## length L1 sensor in mm

(price per commenced 100 mm)

## length L2 neck tube in mm

(price per commenced 100 mm) . . . . .

## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50

Order code

**Thermocont**

mm

mm

## Equipment

Order information  
BKZ0412-VA  
BKZ0512-VA  
LKZ0405PUR-AS  
LKZ0505PUR-AS

Model  
Matching cable socket, VA-nut  
Matching cable socket, VA-nut (at 0...10 V)  
Connection cable 5 m, 4-pole, shielded  
Connection cable 5 m, 5-pole, shielded



## Description

The device is an electronic temperature switch for monitoring, control as well as continuous measurement of temperatures in gases, vapors, liquids and dusts. Due to the device construction with process temperature from up to -99,9°C to +500°C, process pressures up to 100 bar, process contacting material stainless steel V4A as well as the availability of a variety of process connections like connection for compression fitting, thread connections ISO 228-1, thread connection ISO 228-1 with front-flush O-ring gasket the device is especially suitable for the use for machinery and plant engineering, air-conditioning and refrigeration plant engineering, hydraulic and pneumatic systems, process industry, environmental technology and paint and coating industry.

The temperature switch is suitable for demanding measuring requirements. Due to its high accuracy and the high flexibility of configuration, the device can be suited a wide variety of applications.

Compared with temperature sensors, which are calibrated cyclic, the process safety increases when using the temperature switch with self-supervision. At cyclic calibration an occurring drift will be also detected, but an undefined time it has been

produced with a drift affected sensor. Because the device generates a signal immediately at exceedance of the set drift limit, it must not be waited until to the end of the calibration interval. Thus the process safety and with this the product quality will be improved significantly.

Besides the increased process safety, the use of the temperature switch with self-supervision allows substantial cost savings. Due to the use of two redundantly working sensors, which are mutually monitored, the calibration intervals can be increased and thus calibrations can be saved. The pressure switch with front-flush O-ring gasket has been specifically designed for the measurement of viscous, paste-like, adhesive, crystallizing, particle-laden and contaminated media. The process connection is supplied with a positive seal. A reliable, dead-space free sealing between the process connection and the process adapter resp. measuring medium is thus assured.

The robust design and the high-quality workmanship turns the device into a very high quality product, which even the most adverse environmental conditions cannot affect, whether the lowest temperatures when used outdoors, extreme shock and vibration or aggressive media.

## Application

- General applications in
  - Machinery and plant engineering
  - Air-conditioning and refrigeration plant engineering
  - Hydraulic and pneumatic systems
  - Process industry
  - Environmental technology

## Your benefits

- **Wide range of applications**
- Wide process temperature range -99,9°C to +500°C
- High process pressure tightness up to 100 bar
- Wide variety of process connections
- High protection class IP65 / IP67
- Wide environmental temperature range -40°C to +85°C
- Long term stable temperature sensor platinum Pt100 class A – DIN EN60751
- Increased process safety and cost saving by self-supervising measuring system
- High accuracy – characteristic deviation ≤ 0,5% of measuring range
- Integrated evaluation electronic: Digital display, function LED's, keyboard / 2x PNP switch output / 1x current output 4...20mA / Connector plug M12
- **High operating comfort:** enclosure and display rotatable for **optimal operability** in each installation position
- Robust high brightness LED display for **best readability**
- 3-key operation without additional assistance with tactile feedback

## Specials

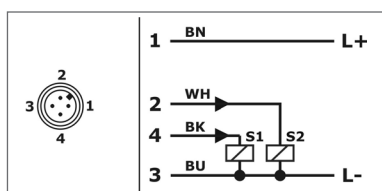


Order code ..... page | 21 |

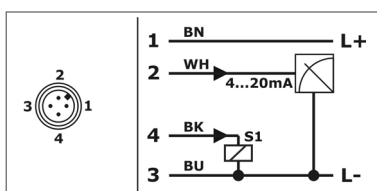


Technical Data	
Supply voltage:	10,5...35VDC, reverse polarity protected
Supply current:	≤ 60mA Analogue output max. 22,5mA Switch output with no load
Switch output S1 / S2	
Function:	PNP switch to +L
Output current:	0... ≤ 200mA current limited, short circuit protected
Analogue output 4...20mA	
Operating range:	3,9...21mA, min. 3,8mA, max. 22mA
Permitted load:	≤ (US - 10,5V) / 20mA
Start-up time:	≤ 1 ms
Measuring accuracy	
Characteristic deviation:	Display / Switch output: ≤ ±0,6% FS Current output: ≤ ±0,9K at ±100°C Type self-supervision: Display / Switch output: ≤ ±0,2K / Current output: ≤ ±0,4K / Drift monitoring: ≤ ±0,2K
Long term drift:	≤ ± 0,1% FS / year
Temperature deviation	Display / Switch output: ≤ ±0,003% FS/ K Current output: ≤ ±0,008% FS/ K
Materials	
Sensor tube: (process wetted)	Steel 1.4404/316L / Steel 1.4571/316Ti
Process connection: (process wetted)	Steel 1.4404/316L / Steel 1.4571/316Ti
Surface quality:	Ra < 0,8µm
Neck tube:	CrNi-Steel
Terminal enclosure:	CrNi-Steel
Control panel surface:	PES
Electrical connection part:	Device plug PUR
Pressure compensation element:	Acrylic copolymer
Gaskets:	FPM – fluorelastomere (e.g. Viton®) / Type 4 / type 5 process wetted: FPM – fluorelastomere (e.g. Viton®) , EPDM – ethylene-propylene-dienmonomere, FDA-listet
Environmental conditions	
Environmental temperature:	-40°C...+85°C
Process temperature:	depending on type: -50°C...+200°C / -99,9°C...+500°C / -50°C...+175°C
Process pressure:	depending on type: ≤ 20 bar / ≤ 100 bar / ≤ 50 bar
Protection:	IP65/IP67 EN/IEC 60529

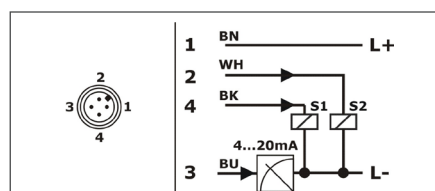
## Connection



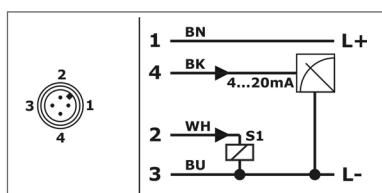
Type A – 4-wire – output 2x switch PNP  
Conductor color standard connection cable M12  
– A-coded: BN = brown, WH = white, BU = blue, BK = black



Type B – 4-wire – output 1x switch PNP / 1x current 4...20mA  
Conductor color standard connection cable M12  
– A-coded: BN = brown, WH = white, BU = blue, BK = black

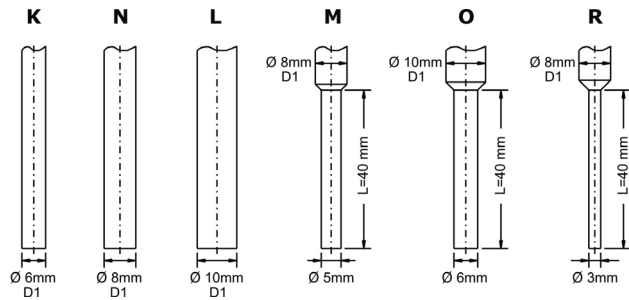


Type C – 5-wire – output 2x switch PNP / 1x current 4...20mA  
Conductor color standard connection cable M12 – A-coded:  
BN = brown, WH = white, BU = blue, BK = black, GY = grey

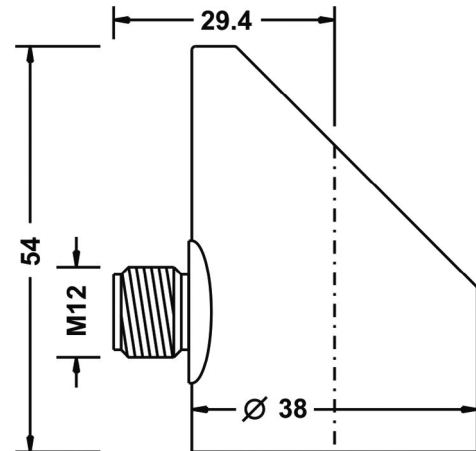


Type D – 4-wire – output 1x switch PNP / 1x current 4...20mA / Desina conformal  
Conductor color standard connection cable M12  
– A-coded: BN = brown, WH = white, BU = blue, BK = black

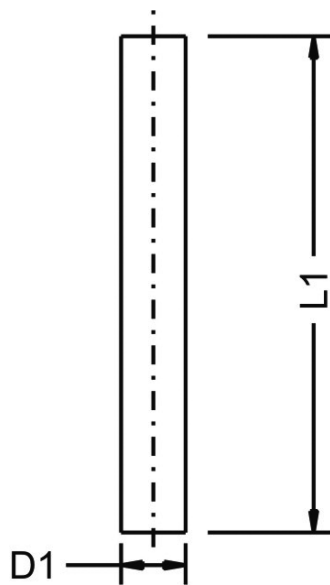
Sensor tube



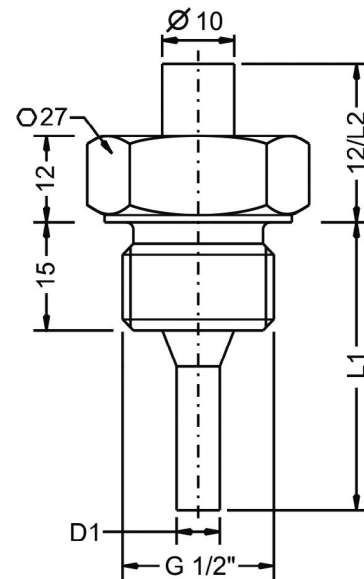
Terminal enclosure



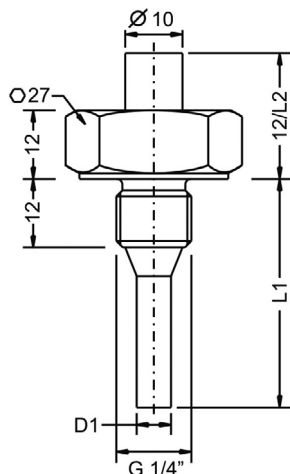
Type 0 – without thread



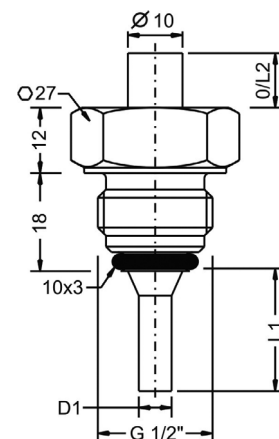
Type 1 – Thread ISO 228-1 – G½"



Type 3 – Thread ISO 228-1 – G¼" B



Type 4 / type 5 – Thread ISO 228-1 – G½" B – front-flush gasket





**Equipment**

Sliding sleeve  
and immersion sleeves  
see page 50

Order code

<b>Type</b> TS4S Standard									
<b>Measuring system</b>									
S Resistance sensor Pt100-A									
D Resistance sensor Pt100-A / semiconductor sensor, self-supervision function									
<b>Approval</b>									
S Standard									
<b>Process connection</b>									
0 without thread, for compression fitting									
1 Thread ISO 228-1 – G½"B									
3 Thread ISO 228-1 – G¼"B									
4 Thread ISO 228-1 – G½", front-flush gasket FPM (e.g. Viton®) (socket SEM-12/SEM-32)									
5 Thread ISO 228-1 – G½", front-flush gasket EPDM (FDA-listed) (socket SEM-12/SEM-32)									
Y others									
<b>Sensor tube material / diameter</b> (process wetted)									
K CrNi-steel, Ø6mm									
N CrNi-steel, Ø8mm									
L CrNi-steel, Ø10mm									
M CrNi-steel, Ø8mm, Tip Ø5mm / L 40mm – only measuring system type S									
O CrNi-steel, Ø10mm, Tip Ø6mm									
R CrNi-steel, Ø8mm, Tip Ø3mm / L 40mm – only measuring system type S									
Y others									
<b>Neck tube</b>									
0 without									
1 Neck tube, Standard L2 = 100mm									
Y Neck tube, other length L2									
<b>Material terminal enclosure</b>									
C CrNi-steel									
<b>Measuring range</b>									
2 –50°C ... +200°C – Measuring system type S									
3 –99,9°C ... +500°C – Measuring system type S									
4 –50°C ... +175°C – Measuring system type D									
<b>Electronic – output</b>									
A 2x switch PNP, supply 24VDC									
B 1x switch PNP, 1x signal 4...20mA , supply 24VDC									
C 2x switch PNP, 1x signal 4...20mA, supply 24VDC									
D 1x switch PNP, 1x signal 4...20mA, supply 24VDC, Desina									
<b>Electronic – function</b>									
S Standard									
<b>Electrical connection</b>									
S Plug M12x1									
<b>Length L1 – Sensor tube / mm (L1 ≤ 2000mm)</b>									
<b>Length L2 – Neck tube / mm (L2 ≤ 200mm)</b>									
<b>Thermocont®</b> TS4S S C S S									





## Description

The device is an electronic temperature switch for monitoring, control as well as continuous measurement of temperatures in gases, vapors, liquids and dusts. Due to the device construction with process temperature from up to -99,9°C to +500°C, process pressures up to 50 bar, process contacting material stainless steel V4A as well as the availability of a variety of process connections like elastomer-free and free of dead space metallic sealing connection (EHEDG-/3A-/FDA-conformal), Varivent®, dairy coupling DIN 11851, clamp ISO 2852 / BS 4825 / DIN 32676 and aseptic tube coupling DIN 11864-1-A the device is especially suitable for the use for food and beverage industry, pharmaceutical industry, biotechnology and sterile process engineering. The temperature switch is suitable for demanding measuring requirements. Due to its high accuracy and the high flexibility of configuration, the device can be suited a wide variety of applications. Compared with temperature sensors, which are calibrated cyclic, the process safety increases when using the temperature switch with self-supervision. At cyclic calibration an occurring drift will be also detected, but an undefined time it has been

produced with a drift affected sensor. Because the device generates a signal immediately at exceedance of the set drift limit, it must not be waited until to the end of the calibration interval. Thus the process safety and with this the product quality will be improved significantly. Besides the increased process safety, the use of the temperature switch with self-supervision allows substantial cost savings. Due to the use of two redundantly working sensors, which are mutually monitored, the calibration intervals can be increased and thus calibrations can be saved. The process connection with metallic sealing has been specifically designed for the hygienic, dead-space and elastomer-free process adaption. The robust design and the high-quality workmanship turns the device into a very high quality product, which even the most adverse environmental conditions cannot affect, whether the lowest temperatures when used outdoors, extreme shock and vibration or aggressive media. A captive laser marking of the type label ensures the identifiability throughout the entire lifetime of the device.

## Application

- Hygienic and aseptic applications in
  - Food and beverage industry
  - Pharmaceutical industry
  - Biotechnology
  - Sterile process engineering

## Your benefits

- *Wide range of applications*
- Wide process temperature range -99,9°C to +500°C
- High process pressure tightness up to 50 bar
- Wide variety of *hygienic and aseptic process connections*
- High protection class IP65 / IP67
- Wide environmental temperature range -40°C to +85°C
- Long term stable temperature sensor platinum Pt100 class A – DIN EN60751
- Increased process safety and cost saving by self-supervising measuring system
- High accuracy – characteristic deviation ≤ 0,5% of measuring range
- Integrated evaluation electronic: Digital display, function LED's, keyboard / 2x PNP switch output / 1x current output 4...20mA / Connector plug M12
- *High operating comfort*: enclosure and display rotatable for *optimal operability* in each installation position
- Robust high brightness LED display for *best readability*
- 3-key operation without additional assistance with tactile feedback

## Specials

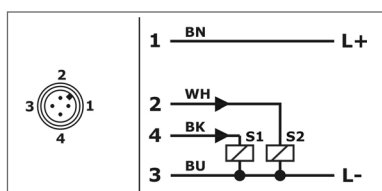


Order code ..... page | 25 |

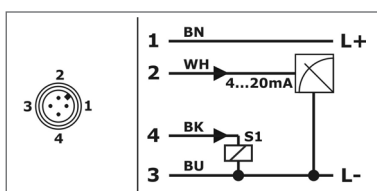


Technical Data	
Supply voltage:	10,5...35VDC, reverse polarity protected
Supply current:	≤ 60mA Analogue output max. 22,5mA Switch output with no load
Switch output S1 / S2	
Function:	PNP switch to +L
Output current:	0... ≤ 200mA current limited, short circuit protected
Analogue output 4...20mA	
Operating range:	3,9...21mA, min. 3,8mA, max. 22mA
Permitted load:	≤ (US - 10,5V) / 20mA
Start-up time:	≤ 1 ms
Measuring accuracy	
Characteristic deviation:	Display / Switch output: ≤ ±0,6% FS 2) Current output: ≤ ±0,9K at ±100°C Type self-supervision: Display / Switch output: ≤ ±0,2K / Current output: ≤ ±0,4K / Drift monitoring: ≤ ±0,2K
Long term drift:	≤ ± 0,1% FS / year
Temperature deviation	Display / Switch output: ≤ ±0,003% FS/ K Current output: ≤ ±0,008% FS/ K
Materials	
Sensor tube: (process wetted)	Steel 1.4404/316L / Steel 1.4571/316Ti
Process connection: (rocess wetted)	Steel 1.4404/316L / Steel 1.4571/316Ti
Surface quality:	Ra < 0,8µm
Neck tube:	CrNi-Steel
Terminal enclosure:	CrNi-Steel
Control panel surface:	PES
Electrical connection part:	Device plug PUR
Pressure compensation element:	Acrylic copolymer
Gaskets:	FPM – fluorelastomere (e.g Viton®)
Environmental conditions	
Environmental temperature:	-40°C...+85°C
Process temperature:	depending on type: -50°C...+200°C / -99,9°C...+500°C / -50°C...+175°C
Process pressure:	depending on type: ≤ 50 bar / ≤ 40 bar / ≤ 25 bar / ≤ 16 bar
Protection:	IP65/IP67 EN/IEC 60529

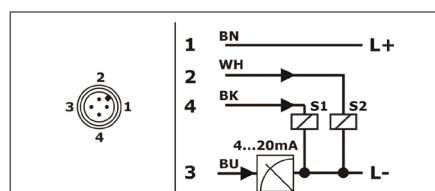
## Connection



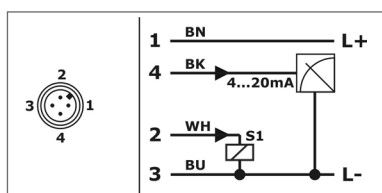
Type A – 4-wire – output 2x switch PNP  
Conductor color standard connection cable M12 – A-coded: BN = brown, WH = white, BU = blue, BK = black



Type B – 4-wire – output 1x switch PNP / 1x current 4...20mA  
Conductor color standard connection cable M12 – A-coded: BN = brown, WH = white, BU = blue, BK = black



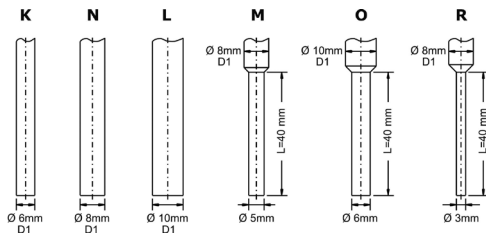
Type C – 5-wire – output 2x switch PNP / 1x current 4...20mA  
Conductor color standard connection cable M12 – A-coded: BN = brown, WH = white, BU = blue, BK = black, GY = grey



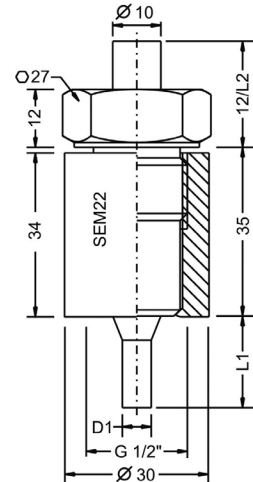
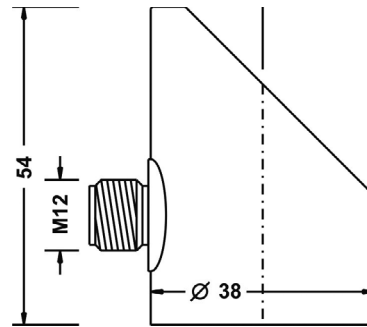
Type D – 4-wire – output 1x switch PNP / 1x current 4...20mA / Desina conformal  
Conductor color standard connection cable M12 – A-coded: BN = brown, WH = white, BU = blue, BK = black

Type 6 – Thread ISO 228-1 – G $\frac{1}{2}$ ",  
metallic/elastomer-free sealing

Sensor tube

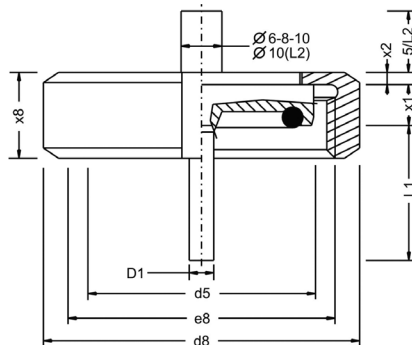


Terminal enclosure



Type F – Aseptic tube coupling DIN 11864-1-A – DN25,  
PN40

Type G – Aseptic tube coupling DIN 11864-1-A – DN40,  
PN25

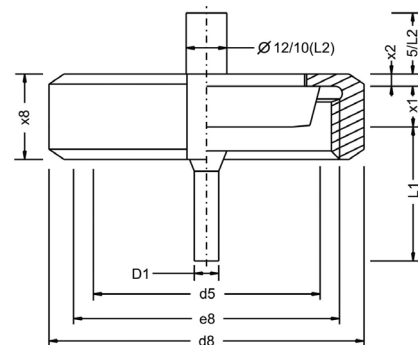


	DN	d5	x1	x2	d8	x8	e8
F	25	42,9	9	4	63	21	Rd52x1/6"
G	40	54,9	10	4	78	21	Rd65x1/6"

Type O – Dairy coupling DIN 11851 – DN25, PN40

Type N – Dairy coupling DIN 11851 – DN40, PN25

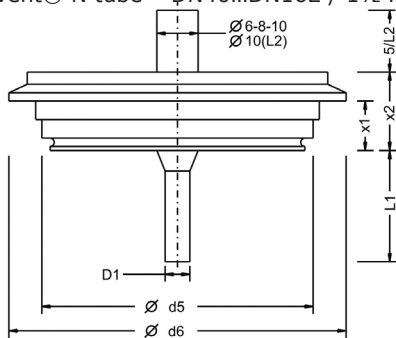
Type M – Dairy coupling DIN 11851 – DN50, PN25



	DN	d5	x1	x2	d8	x8	e8
O	25	44	10	4	63	21	Rd52x1/6"
N	40	56	10	4	78	21	Rd65x1/6"
M	50	68	11	3	92	22	Rd78x1/6"

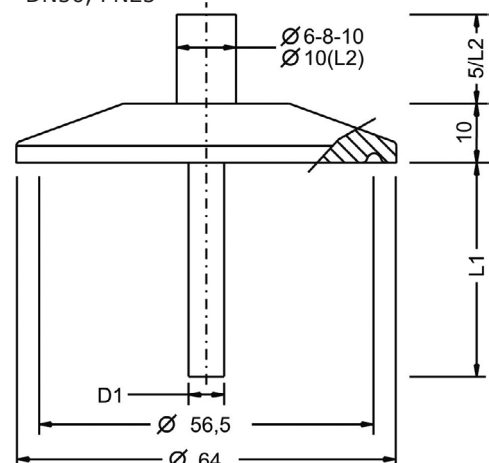
Type R – Varivent® F tube – DN25...DN32 / 1"...1¼", PN40

Type P – Varivent® N tube – DN40...DN162 / 1½"...6", PN40



	Varivent	DN	d5	d6	x1	x2
R	F	25-32	50	66	12	19
P	N	40-162	68	84	12	19

Type T – Clamp ISO 2852 – DN40-51 / BS 4825 – 2" / DIN  
32676 – DN50, PN25





Type

TS4L Hygienic applications

Measuring system

S Resistance sensor Pt100-A  
D Resistance sensor Pt100-A / semiconductor sensor, self-supervision function

Approval

S Standard

Process connection

6 Thread ISO228-1 – G½", metallic/elastomer-free sealing (socket SEM-22/SEM-42)  
F Aseptic tube coupling DIN 11864-1-A – DN25, PN40  
G Aseptik-Rohrverschraubung DIN 11864-1-A – DN40, PN25  
O Dairy coupling DIN 11851 – DN25, PN40  
N Dairy coupling DIN 11851 – DN40, PN25  
M Dairy coupling DIN 11851 – DN50, PN25  
R Varivent® F tube – DN25...DN32 / 1"...1¼", PN40  
P Varivent® N tube – DN40...DN162 / 1½"...6", PN40  
T Clamp ISO 2852 – DN40-51 / BS 4825 – 2" / DIN 32676 – DN50, PN25  
Y others

Sensor tube material / diameter (process wetted)

K CrNi-steel, Ø6mm  
N CrNi-steel, Ø8mm  
L CrNi-steel, Ø10mm  
M CrNi-steel, Ø8mm, Tip Ø5mm / L 40mm – only measuring system type S  
O CrNi-steel, Ø10mm, Tip Ø6mm  
R CrNi-steel, Ø8mm, Tip Ø3mm / L 40mm – only measuring system type S  
Y others

Neck tube

0 without  
1 Neck tube, Standard L2 = 100mm  
Y Neck tube, other length L2

Material terminal enclosure

C CrNi-steel

Measuring range

2 –50°C ... +200°C – Measuring system type S  
3 –99,9°C ... +500°C – Measuring system type S  
4 –50°C ... +175°C – Measuring system type D

Electronic – output

A 2x switch PNP, supply 24VDC  
B 1x switch PNP, 1x signal 4...20mA , supply 24VDC  
C 2x switch PNP, 1x signal 4...20mA, supply 24VDC  
D 1x switch PNP, 1x signal 4...20mA, supply 24VDC, Desina

Electronic – function

S Standard

Electrical connection

S Plug M12x1

Length L1 – Sensor tube / mm (L1 ≤ 2000mm)

Length L2 – Neck tube / mm (L2 ≤ 200mm)

Order code

Thermocont®

TS4L

S

C

S

S

Equipment

Sliding sleeve  
and immersion sleeves  
see page 50

Equipment

Order information

BKZ0412-VA  
BKZ0512-VA  
LKZ0405PUR-AS  
LKZ0505PUR-AS

Model

Matching cable socket, VA-nut  
Matching cable socket, VA-nut (at 0...10 V)  
Connection cable 5 m, 4-pole, shielded  
Connection cable 5 m, 5-pole, shielded



## Description

Fundamentals of ACS Universal resistance thermometer are standardized, high-quality platinum RTDs of a nominal resistance of 100 ohms at 0 °C, tolerance classes A, B, 1/3B (AA) - in accordance with DIN EN / IEC 60751st.

ACS Pt100 probes have a high accuracy and reproducibility are extremely reliable.

The sensing elements are embedded in the protective tube with magnesium oxide powder and are sealed hermetically.

Thus, a good heat transfer and vibration protection is achieved.

Standard measuring temperatures are -70 °C .. +300 °C; High temperature versions +500 °C / +600 °C, low-temperature versions, special materials, special process connections and OEM versions are also available. The given measuring temperature refers to an average temperature at the probe tip.

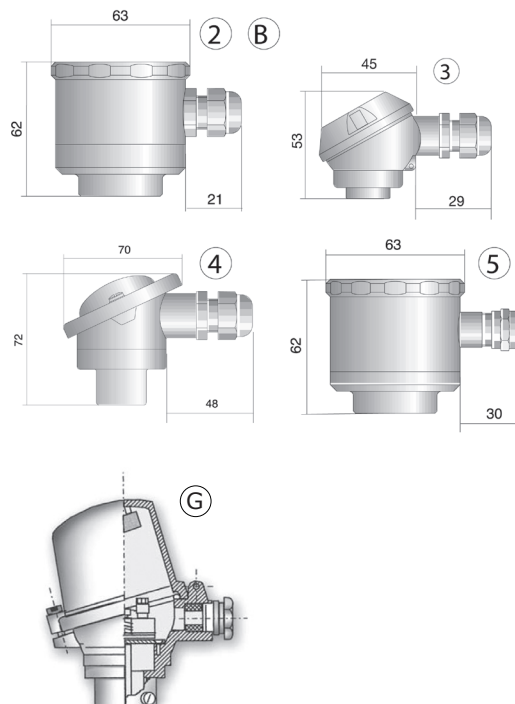
With cable versions, for example PTS / PTK and Pt100 sensors with connection head, possibly with

integrated head transmitter, the respective maximum temperature of the cable, heads, etc. with on-site isolation, use of Pt100 must be considered.

The measurement speed of the individual Pt100 sensor is highly dependent on operating conditions, the measured medium and the physical dimensions.

The immersion depth should not be less than 50 mm. Please clarify always shorter probe lengths with the ACS staff.

## Dimension drawings und Connection



## Specials



Order code ..... page | 28 |

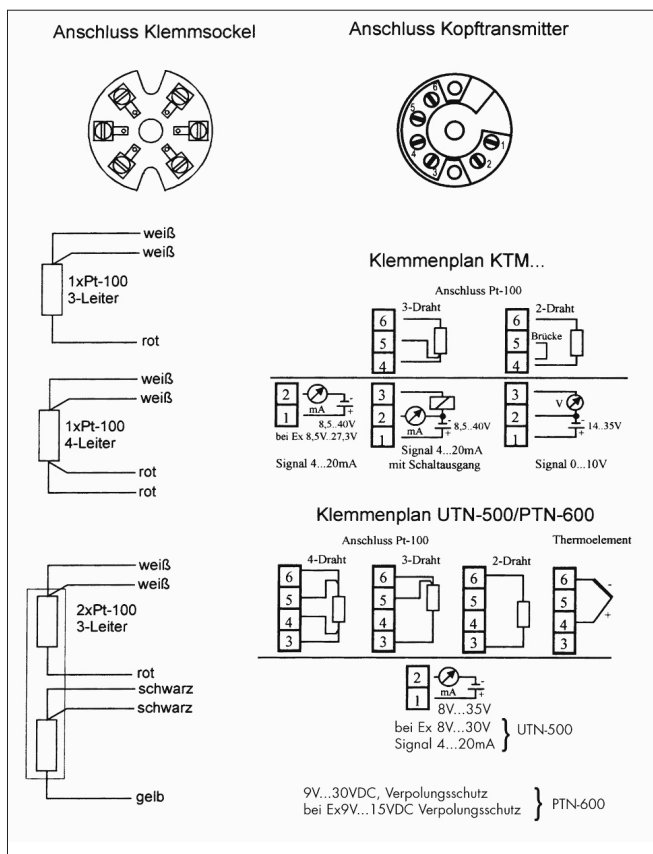


# Technical data

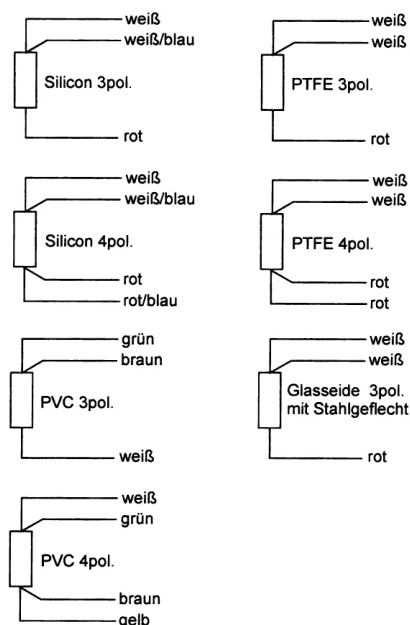


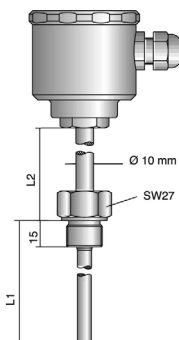
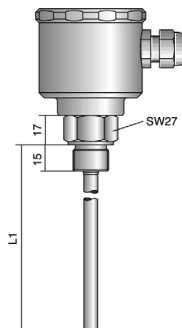
Technical data	
measuring element:	platinum resistance element Pt100/ Pt1000, others on request
temperature ranges:	at the measuring tip: -70°C...+300°C +500°C/ +600°C and low-temperature version on request
tolerance Class:	AA, A, B - according to IEC 60751
signal type:	- 1x Pt100: in 2-, 3-, 4-wire connection
	- 2x Pt100: in 2x 2-wire or 2x 3-wire connection
	- 3x Pt100: in 3x 2-wire connection
	- free skinner for self-installation of a head transmitter - head transmitter, 4...20 mA/ 0...10 V output, standard, Ex, Profibus; others on request
connection type:	- terminal compartment in Alu-, plastic- or stainless steel housing - fix connection cable - PTFE shielded, silicone, PVC, glass silk with steel mesh, others on request - Lemo-plug system, M12 plug system
Material	
materials (process side):	- protective tubes made of seamless stainless steel: 1.4571(AISI 316Ti) - flanges, process connections: 1.4571 (AISI 316 Ti) - special materials on request
materials (connection side):	- housing: aluminium, CrNi-steel, PP-polypropylene, POM-polyoxymethylene - cable material see „connection type“

## Connection and cable assignment



### Pt-100 Kabelbelegung





## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50  
Head transmitter  
page 58

Order code

**PTA**

### sensor type

- 1 1x Pt100, 2-wire
- 2 **1x Pt100, 3-wire** (preferred type)
- 3 1x Pt100, 4-wire
- 4 2x Pt100, 2-wire (Doppel Pt100 with changeable measuring insert only from ø 8 mm)
- 5 2x Pt100, 3-wire (Doppel Pt100 with changeable measuring insert only from ø 8 mm)
- 6 1x Pt1000, 3-wire
- 7 3x Pt100, 2-wire (3x Pt100 with changeable measuring insert only from ø 8 mm)

### accuracy (price x 2 at double Pt100)

- B **class B, up to +300°C** (preferred type)
- A class A, up to +300°C
- C class AA (formerly class 1/2B), up to +300°C
- Y special version e.g. high temperature etc.
- P class AA (formerly class 1/2B), paired versions for e.g. heat quantity measurement . . .

### process connection

- 1 **male thread G½"** (preferred type)
- 2 male thread G1"
- 3 male thread G¾"
- 5 union nut G¾"
- J DIN flange DN 100
- F DIN flange DN 50
- E DIN flange DN 25
- Y other process connections

### material, sensor diameter, process side

- T 1.4571 / 3 mm
- U 1.4571 / 5 mm
- K 1.4571 / 6 mm
- N **1.4571 / 8 mm** (preferred type)
- L 1.4571 / 10 mm
- W 1.4571 / 12 mm
- P 1.4571 / 6 mm, reduced head 4 mm; 40 mm long
- M 1.4571 / 8 mm, reduced head 5 mm; 40 mm long
- O 1.4571 / 10 mm, reduced head 6 mm; 40 mm long
- R 1.4571 / 8 mm, reduced head 3 mm; 40 mm long
- Y andere

### neck tube

- A **without neck tube** (preferred type)
- B **with neck tube** (standard L2 = 100 mm) (preferred type)
- Y with neck tube upon request in mm

### connection head

- A PP-head small
- B PP-head big
- 1 plastic head Delrin® small
- 2 **plastic head Delrin® big** (preferred type)
- 3 aluminium head small (not with sensor type 5 and 7)
- 4 aluminium head big
- 5 steel head big
- 7 PTFE-head small
- 8 PTFE-head big
- G aluminium head double sized
- Y others

### measurement insert

- F **fixed** (preferred type)
- W changeable (at high temperature version always mandatory)

### connection type

- K **connection with terminal socket** (preferred type)
- M **connection for headtransmitter 4-20mA/0-10V fixed value**
- X connection headtransmitter UTN-500 software programmable
- T connection for headtransmitter PTN-600 PROFIBUS PA-interface
- D connection with wire ends for installation of headtransmitter
- V 5-pole M12-plug
- G connection for 2x headtransmitter
- L connection with 2x terminal socket
- Y special version

Signal converter  
only with con-  
nector head "big"  
possible

### length L1 sensor in mm

(preferred lengths: 50 | 100 | 150 mm)

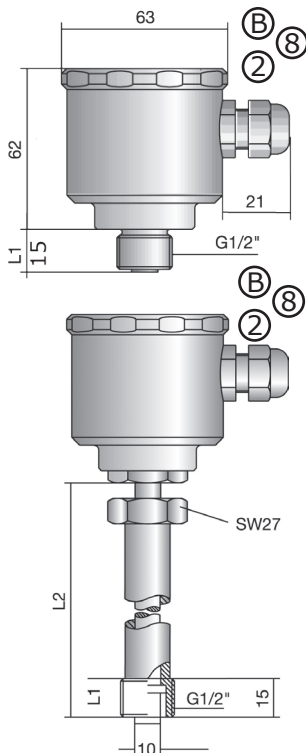
### length L2 neck tube in mm

(preferred length 100 mm)

# Order code

Resistance thermometer-clamp-on sensor Pt100 for front-flush weld-in socket

Type:  
PTB-



## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50  
Head transmitter  
page 58

Order code

**PTB**

F

mm

mm

## sensor type

- 1 1x Pt100, 2-wire
- 2 **1x Pt100, 3-wire** (preferred type)
- 3 1x Pt100, 4-wire

## Accuracy (Pt100 in 2-fold price x 2)

- B Class B
- A class A** (preferred type)

## Process connection G 1/2" (weld-see page 44)

- A weld for TEM-10 or TEM-11** (see figure A) (preferred type)
- (Weld-not included)
- Y other

## Material measuring surface

- N 1.4571** (preferred type)
- Y other

## neck tube

- A without neck tube to +85 ° C** (preferred type)
- B with neck tube made of stainless steel (standard L2 = 100 mm) up to +200 ° C aligned
- Y with neck tube of choice in mm

## type

- B PP big head
- 2 plastic head size of Delrin ®**
- 4 for valve plug DIN 43650
- 8 PTFE head large
- Y other designs

## measuring insert

- G permanently mounted in version with neck tube made of stainless steel or valve**

changeable at version without neck tube Version 2.0 (preferred type)

## Connection

Connection with terminal block (preferred type)

**K connector for head transmitter 4-20mA/0-10V fixed value**

**M connection head transmitter UTN-500 software programmable**

**T connector for head transmitter PTN-600 PROFIBUS PA interface**

**D connector with wire ends for self-installation of head transmitter**

**U with 1 m connection cable**

**Z valve plug DIN 43650**

**Y Special version**

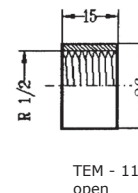
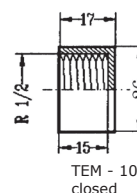
## Probe length L1 in mm (contact sensor)

Length 0015 mm

## Neck tube length L2 in mm

Neck tube made of stainless steel, Adjustable 100mm  
other lengths on request

Muffen siehe page 50





- sensor type**
- 1 1x Pt100, 2-wire
  - 2 **1x Pt100, 3-wire** (preferred type)
  - 3 1x Pt100, 4-wire
  - 4 2x Pt100, 2-wire
  - 5 2x Pt100, 3-wire

- accuracy class** (with double Pt100 price x 2)
- B class B** (preferred type)
  - A class A
  - C class AA (formerly class 1/3B)

- mechanical design**
- A** see drawing A (preferred type)

- Material, sensor diameter, process side**
- K 1.4571 / 6 mm
  - L 1.4571 / 5 mm** (preferred type)
  - M 1.4571 / 4 mm
  - N 1.4571 / 3 mm
  - Y Others

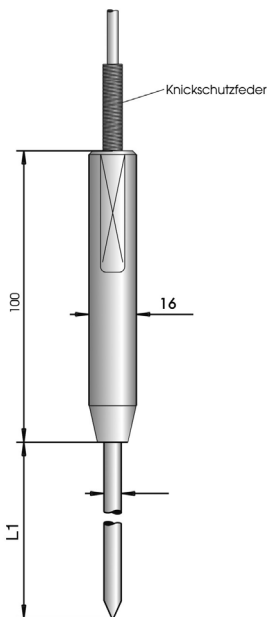
- handle for insertion and immersion, handle piece**
- A PVC black, 100 mm length up to +90°C** (preferred type)
  - C PTFE white, 100 mm length up to +160°C
  - Y Special version

- cable**
- A PVC
  - B PTFE** (6pol.) (preferred type)
  - C silicone (4pol.)
  - D glass silk with steel mesh 300°C (only 3-wire)
  - Y Special version

- Cable length**
- 1 1000 mm** silicone-PVC (preferred type)
  - A 1000 mm PTFE / glass silk
  - 2 2000 mm silicone-PVC
  - B 2000 mm PTFE / glass silk
  - Y Special length

- strain relief**
- 0 squeezed (conditionally waterproof)**
  - break protection spring** (preferred type)
  - 2 tightly rolled, IP 67, only with PTFE-cable sealing at handle for insertion and immersion via cable screw

**length L1** sensor in mm . (preferred lengths: 200 mm)  
(price per commenced 100 mm)



Order code

**PTE**

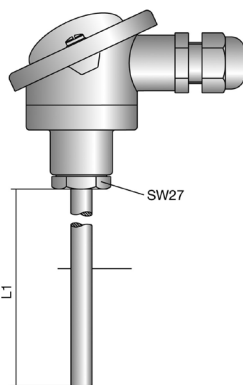
A

mm

# Order code

Standard-immersion-resistance thermometer Pt100  
for sliding sleeve

Type:  
PTF-



## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50  
Head transmitter  
page 58

Order code

**PTF**

0

mm

### sensor type

- 1 1x Pt100, 2-wire
- 2 **1x Pt100, 3-wire** (preferred type)
- 3 1x Pt100, 4-wire
- 4 2x Pt100, 2-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
- 5 2x Pt100, 3-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
- 6 1x Pt1000, 3-wire
- 7 3x Pt100, 2-wire (3x Pt100 with exchangeable measuring insert, only from ø 8 mm)

### accuracy class (with double Pt100 price x 2)

- B class B, up to +300°C** (preferred type)
- A class A, up to +300°C
- C class AA (formerly class 1/2B), up to +300°C
- Y Special version eg. high temperature etc.
- P class AA (formerly class 1/2B), paired version, for eg. heat quantity measurement

### Process connection, sensor diameter

(please order sliding sleeve separately see page 226)

- 1 **8 mm tube diameter** (preferred type)
- 2 10 mm tube diameter
- 3 6 mm tube diameter
- 4 8 mm, reduced tip 5 mm, 40 mm length
- 6 10 mm, reduced tip 6 mm, 40 mm length
- 7 15 mm x 2 mm
- Y Others

### Material process side

- N 1.4571** (preferred type)
- O heat-resistant steel 1.4841 up to 1100°C
- Y Others

0

### connector head

- A PP-head small
- B PP-head big
- 1 plastic head made of Delrin® small
- 2 plastic head made of Delrin® big
- 3 aluminum head small (not with sensor type-variation 5 and 7)
- 4 aluminum head big** (preferred type)
- 5 Stainless steel head big
- 7 PTFE-head small
- 8 PTFE-head big
- G aluminum head double size
- Y other designs

### Measuring insert

- F rigidly mounted** (preferred type)
- W exchangeable (at high temperature version always mandatory)

### Connection type

- K connection with terminal socket** (preferred type)
- M connection for head transm.<sup>(1)</sup> 4-20mA/0-10V fixed value**
- X connection head transmitter<sup>(1)</sup> UTN-500 software programmable**
- D connection with skinner for self-installation from head transmitter**
- G connection for 2x head transmitter**
- L connection with 2x terminal socket**
- Y Special version**

### length L1 sensor in mm

(price per commenced 100 mm)  
(price from 1000 mm length)  
(preferred lengths: 100 | 150 | 200 mm)





- sensor type**
- 1 1x Pt100, 2-wire
  - 2 **1x Pt100, 3-wire** (preferred type)
  - 3 1x Pt100, 4-wire
  - 4 2x Pt100, 2-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
  - 5 2x Pt100, 3-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)

- accuracy class** (with double Pt100 price x 2)
- B class B** (preferred type)
  - A class A
  - C class AA (formerly class 1/5B)

- Process connection**
- 1 **screw-in thread G 1/2"** (preferred type)
  - 2 screw-in thread G 3/8"
  - 3 screw-in thread M 20
  - Y Special version

- Material, sensor diameter, process side**
- L PTFE 12 mm** (max. 150 mm = L1) (preferred type)
  - H 1.4571 8 mm with ETFE-coating up to 1000 mm L1
  - P PTFE 12 mm made of one piece up to 150 mm L1
  - Y Special version eg. special coating

- neck tube**
- A Without neck tube**
  - B With neck tube** (standard L2 = 100 mm)
  - Y With neck tube by choice in mm

- connector head, design**
- 1 PTFE-head small
  - 2 **plastic head made of Delrin® big diameter 63 mm** (preferred type)
  - 3 PTFE-head big
  - Y Special version

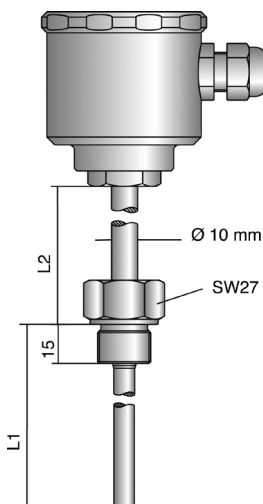
- Measuring insert**
- F rigidly mounted**
  - W exchangeable

- Connection type**
- K connection with terminal socket**
  - M connection for head transmitter<sup>(1)</sup> 4-20 mA with festem Wert
  - X connection head transmitter<sup>(1)</sup> UTN-500 software programmable
  - D connection with skinner for self-installation from head transmitter
  - Y Special version

Signal converter only  
with connector head  
"big" possible

**length L1** sensor in mm  
(price per commenced 100 mm)  
(price from 1000 mm length)

**length L2** neck tube in mm  
(price per commenced 100 mm)  
(price from 1000 mm length)



Order code

**PTG**

mm

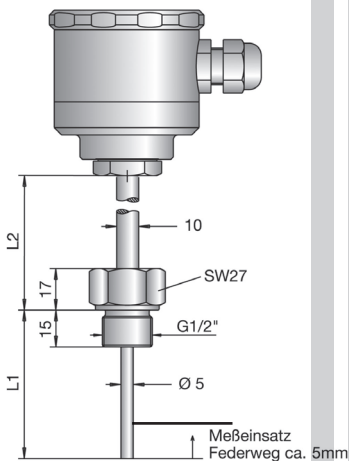
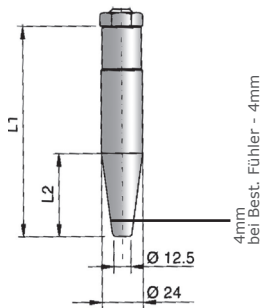
mm

Mediumsart, Temperatur, Konzentration, usw. unbedingt angeben!

# Order code

Immersion pocket - resistance thermometer Pt100  
with spring-loaded measuring insert

Type:  
PTI-



Druckdicht nur in Verbindung  
with angepasster Tauchhülse!

## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50  
Head transmitter  
page 58

Order code

**PTI**

W

mm

mm

### sensor type

- 1 1x Pt100, 2-wire
- 2 **1x Pt100, 3-wire** (preferred type)
- 3 1x Pt100, 4-wire
- 4 2x Pt100, 2-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
- 5 2x Pt100, 3-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
- 6 1x Pt1000, 3-wire
- 7 3x Pt100, 2-wire (3x Pt100 with exchangeable measuring insert, only from ø 8 mm)

### accuracy class (with double Pt100 price x 2)

- B **class B, up to +300°C** (preferred type)
- A class A, up to +300°C
- C class AA (formerly class 1/5B), up to +300°C
- P class AA (formerly class 1/5B), paired version, for eg. heat quantity measurement
- Y Special version eg. high temperature version etc.

### Process connection

- 1 **screw-in thread G1/2"** (for immersion pocket STHA/STHB/STHX) (preferred type)
- 2 screw-in thread G1"
- Y Special version

### Material, measuring insert diameter, process side

- U **1.4571 / 5 mm** (for STH with 6 mm inner diameter) (preferred type)
- Y Others

### neck tube

- A **Without neck tube** (preferred type)
- B **With neck tube** (standard L2 = 100 mm) (preferred type)
- Y With neck tube by choice in mm

### connector head

- B PP-head big
- 2 **plastic head made of Delrin® big** (preferred type)
- 4 aluminum head big
- 5 Stainless steel head big
- G aluminum head double size
- Y other designs

### Measuring insert

- W **exchangeable** (preferred type)

### Connection type

- K **connection with terminal socket** (preferred type)
- M **connection for head transm. (1) 4-20mA/0-10V fixed value**
- X connection head transmitter (1) UTN-500 software programmable.
- D connection with skinner for self-installation from head transmitter
- V 5-pole M12-plug
- G connection for 2x head transmitter
- L connection with 2x terminal socket
- Y Special version

### length L1 sensor in mm

(price per commenced 100 mm)  
(price from 1000 mm length)  
(preferred lengths 50 | 100 | 150 mm)

### length L2 neck tube in mm

(price per commenced 100 mm)  
(price from 1000 mm length)  
(preferred length 100 mm)



- sensor type**
- 1 1x Pt100, 2-wire
  - 2 **1x Pt100, 3-wire** (preferred type)
  - 3 1x Pt100, 4-wire
  - 4 2x Pt100, 2-wire (double Pt100 only from ø 5 mm)
  - 5 2x Pt100, 3-wire (double Pt100 only from ø 5 mm)

- accuracy class** (bei 2-fold Pt100 price x 2)
- B class B, up to +200°C** (preferred type)
  - A class A, up to +200°C
  - C class AA (formerly class 1/3B), up to +200°C
  - Y Special version for example High temperature, etc.

- design**
- A see dimension drawing A (thread G 1/4"; G 3/8"; G 1/2" or M20)
  - B see dimension drawing B (thread from M8)
  - C see dimension drawing C (thread from M6)
  - D see dimension drawing D (thread from M6)
  - F see dimension drawing F

- thread**
- A screw-in thread M6
  - H screw-in thread M10 x 1
  - D screw-in thread M8
  - N screw-in thread G 3/8"
  - F screw-in thread M8 x 1
  - O screw-in thread G 1/2"
  - G screw-in thread M10
  - P screw-in thread G 1/4"
  - T screw-in thread M20
  - Y andere Anschlüsse

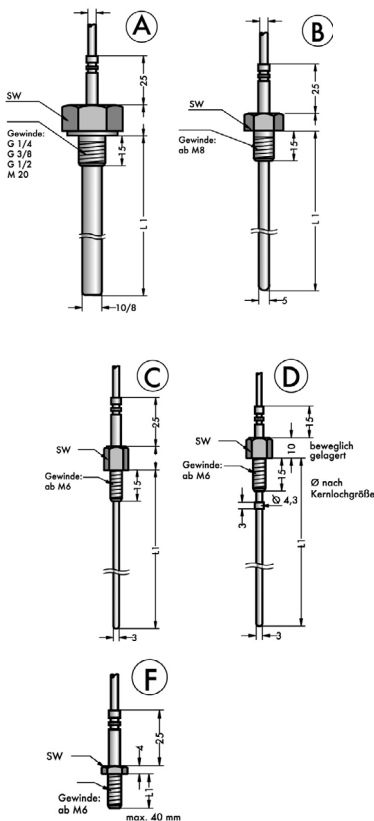
- material, probe diameter, process side**
- T 1.4571/ 3 mm (design C + D)
  - U 1.4571/ 5 mm (design B)
  - V 1.4571/ 10 mm (design A)
  - Z 1.4571/ 8 mm (design A)
  - O 1.4571/ probe diameter corresponding thread (design F)

- cable**
- A PVC
  - B PTFE** (only with 1x Pt100 possible) (preferred type)
  - C silicone
  - D fiberglass with steel mesh up to +300°C (max only 1x 3-wire)
  - L plug connector LEMO SA 4-pole size 1 up to +80°C
  - Y Sonderausführung

- cable length**
- 1 1000 mm silicone / PVC
  - A PTFE / fiberglass
  - 2 2000 mm silicone / PVC
  - B PTFE / fiberglass
  - 5 5000 mm silicone / PVC
  - C PTFE / fiberglass
  - S special length
  - 0 without cable with plug version

- strain relief**
- 0 bruised** (limited water resistance) (preferred type)
  - 2 tightle rolled, IP 67, only mit PTFE-cable
  - S wasterproof IP 68 version
  - Y special version

**length L1** sensor in mm (standard lengths: 50 | 100 | 150 mm)



Order code

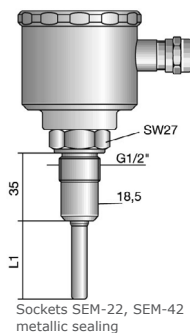
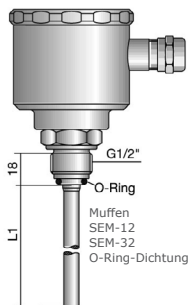
**PTK**

mm

# Order code

Screw-in Pt100 for the food industries with flush  
hygienic seal or metal seal

Type:  
PTL-



## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50  
Head transmitter  
page 58

Order code

**PTL**

### sensor type

- 1 1x Pt100, 2-wire
- 2 **1x Pt100, 3-wire** (preferred type)
- 3 1x Pt100, 4-wire
- 4 2x Pt100, 2-wire (double Pt100 only from ø 8 mm)
- 5 2x Pt100, 3-wire (double Pt100 only from ø 8 mm)

### accuracy class (bei 2-fold Pt100 price x 2)

- B class B, up to +200°C
- A class A, up to +200°C** (preferred type)
- C class AA (formerly class 1/3B), up to +200°C
- Y Special version for example High temperature, etc.

### process connection for weld-in

(weld to be ordered separately, see page 50)

- 4 G1/2" G 1/2, with O-ring Viton ® seal for socket or SEM 12 SEM 32
- 5 G1/2" with EPDM O-ring seal for socket or SEM 12 SEM 32** (preferred type)
- X G1/2" with any other O-ring seal for socket or SEM 12 SEM 32
- 6 G1/2" metal sealing sleeve for SEM or SEM-22-42** (preferred type)
- Y special version

### material, probe diameter, process side

- K 1.4571/ 6 mm
- N 1.4571/8 mm (with exchangeable measuring insert)** (preferred type)
- L 1.4571/ 10 mm
- P 1.4571/ 6 mm, reduced tip 4 mm; 40 mm long
- M 1.4571/ 8 mm, reduced tip 5 mm; 40 mm long
- O 1.4571/ 10 mm, reduced tip 6 mm; 40 mm long
- R 1.4571/ 8 mm, reduced tip 3 mm; 40 mm long
- Y others

### neck tube

- A without neck tube** (Vorzugstyp)
- B with neck tube (Standard L2 = 100 mm)** (preferred type)
- Y with neck tube of choice in mm

### connection head

- A PP-head small
- B PP-head big
- 1 plastic head of Delrin ® small
- 2 plastic head of Delrin ® big
- 3 aluminum head small (not with sensor type 5)
- 4 aluminum head big
- 5 stainless steel head big** (preferred type)
- 7 PTFE-head small
- 8 PTFE-head big
- Y other designs

### measuring insert

- F securely mounted
- W interchangeable** (at high temperature version always mandatory) (preferred type)

### connection

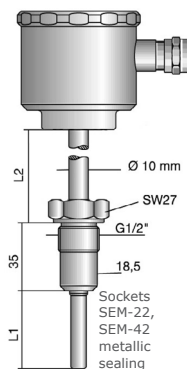
- K connection with terminal block** (preferred type)
- M connection for head transmitter 4-20mA/0-10V fixed value**
- X connection head transmitter UTN-500 software programmable
- T connection for head transmitter PTN-600 PROFIBUS PA Interface control
- D connection with wire ends for self-installation of head transmitter
- Y Special version

### length L1 probe in mm

(preferred lengths: 50 | 100 | 150 mm)

### length L2 neck tube in mm

(preferred length 100 mm)





**Sensor type**

- 1 1x Pt100, 2-wire
- 2 **1x Pt100, 3-wire** (preferred type)
- 3 1x Pt100, 4-wire
- 4 2x Pt100, 2-wire
- 5 2x Pt100, 3-wire

**Accuracy class** (with double Pt100 price x 2)

- B** class B, up to +200°C (*preferred type*)  
**A** class A, up to +200°C  
**C** class AA (*formerly class 1/3B*), up to +200°C  
**Y** Special version eg. high temperature etc.

### Design, diameter

- |   |                 |                             |
|---|-----------------|-----------------------------|
| G | see drawing G   | 6 mm measuring surface plan |
| I | see drawing I   | 6 mm measuring surface 120° |
| Y | Special version |                             |

## Bayonet

- A bayonet 12,2 mm** (preferred type)  
0 Without bayonet

### Material sensor

- N** 1.4571 (preferred type)

## Cable

- B** PTFE (6pol.) (preferred type)  
**D** glass silk with steel mesh 300°C (max only 1x 3-wire)  
**Y** Special version

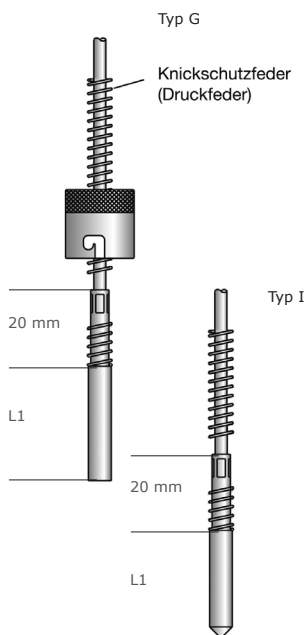
**Cable length** (PTFE / glass silk)

- |   |                |
|---|----------------|
| 1 | 1000 mm        |
| 2 | 2000 mm        |
| 5 | 5000 mm        |
| Y | Special length |

### Strain relief

- 0 squeezed (conditionally waterproof)  
With break protection spring 250 mm (preferred type)  
2 tightly rolled, IP 67, only with PTFE-cable  
Y Special version

**Length L1** sensor in mm (preferred length 30 mm)  
(price per commenced 100 mm)



Order code

PTM

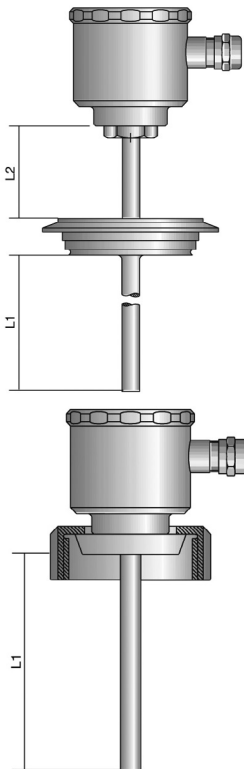
N 0 mm



# Order code

Standard diving sleeve resistance thermometer Pt-100  
with and without neck tube

Type:  
PTO-



## Sensor type

- 1 1 x Pt100, 2-wire
- 2 **1 x Pt100, 3-wire**
- 3 1 x Pt100, 4-wire
- 4 2 x Pt100, 2-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
- 5 2 x Pt100, 3-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)

## Accuracy class (with double Pt100 price x 2)

- B class B, up to +300°C
- A class A, up to +300°C**
- C class AA (formerly class 1/3B), up to +300°C
- Y Special version eg. high temperature etc.

## Process connection for weld-in sockets

- F DN 25 DIN 11864-1-A aseptic
- G DN 40 DIN 11864-1-A aseptic
- M Milk tube DN 50 DIN 11851**
- N Milk tube DN 40 DIN 11851**
- O Milk tube DN 25 DIN 11851
- P Varivent flange 68 mm diameter for tubes DN 32 - 125**
- R Varivent flange 50 mm diameter for tube DN 25
- T Tri-Clamp® G2" ISO 2852
- Y Special version

## Material, sensor diameter, process side

- K 1.4571/ 6 mm
- N 1.4571/ 8 mm (with exchangeable measuring insert)**
- L 1.4571/ 10 mm
- P 1.4571/ 6 mm, reduced tip 4 mm; 40 mm long
- M 1.4571/ 8 mm, reduced tip 5 mm; 40 mm long
- O 1.4571/ 10 mm, reduced tip 6 mm; 40 mm long
- R 1.4571/ 8 mm, reduced tip 3 mm; 40 mm long
- Y Others

## Neck tube

- A Without neck tube**
- B With neck tube (standard L2 = 100 mm)**
- Y With neck tube by choice in mm

## Connector head

- B PP-head big
- 2 plastic head made of Delrin® big
- 3 aluminum head small (not with sensor type-variation 5)
- 4 aluminum head big
- 5 Stainless steel head big**
- 8 PTFE-head big
- Y other designs

## Measuring insert

- F rigidly mounted
- W exchangeable (at high temperature version mandatory) (preferred type)**

## Connection type

- K connection with terminal socket**
- M connection for head transmitter<sup>(1)</sup> 4-20mA/0-10V fixed value**
- X connection head transmitter<sup>(1)</sup> UTN-500 software programmable**
- D connection with skinner for self-installation of head transm.**
- Y Special version**

Signal converter  
only with connector  
head "big" possible

**Length L1** sensor in mm  
(preferred lengths: 50 | 100 | 150 mm)

**Length L2** neck tube in mm  
(preferred length: 100 mm)

## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50  
Head transmitter  
page 58

Order code

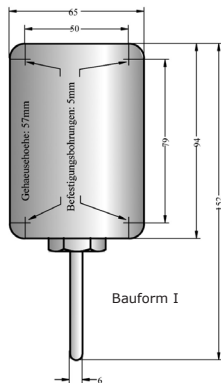
**PTO**

mm

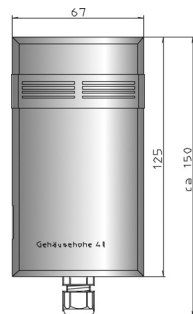
mm



Outdoor sensor



Indoor sensor



Type II

## Equipment

Head transmitter  
page 58

Order code

**PTR**

0

mm

### sensor type

- 1 1 x Pt100, 2-wire
- 2 **1 x Pt100, 3-wire** (preferred type)
- 3 1 x Pt100, 4-wire
- 4 2 x Pt100, 2-wire
- 5 2 x Pt100, 3-wire

### accuracy class (with double Pt100 price x 2)

- B class B** (preferred type)
- A class A
- C class AA (formerly class 1/3B)

### Wall housing

- 1 **Wall housing design I** (preferred type)
- 2 **Wall housing design II** (preferred type)

### Material sensor

- N 1.4571** (only at design I) (preferred type)
- T sensor in housing** (design II) (preferred type)
- Y Others

### Material housing

- K plastic** (preferred type)
- Y Others

0

### Measuring insert

- F sensor for humidor -20° up to +80°C** (design. I). . . (preferred type).
- T sensor for drying room 0° up to +80°C** (perforated protection tube design I)
- G sensor for refrigeration room -35° C** (design I)
- H sensor for interior 0 up to +60°C** (design II) (preferred type)

### Connection type

- K connection with terminal socket** (preferred type)
- M connection for head transmitter<sup>(1)</sup> 4-20mA/0-10V fixed value** connection head transmitter<sup>(1)</sup> UTN-500 software programmable.
- D connection with skinner for self-installation of head transm.**
- Y Special version**

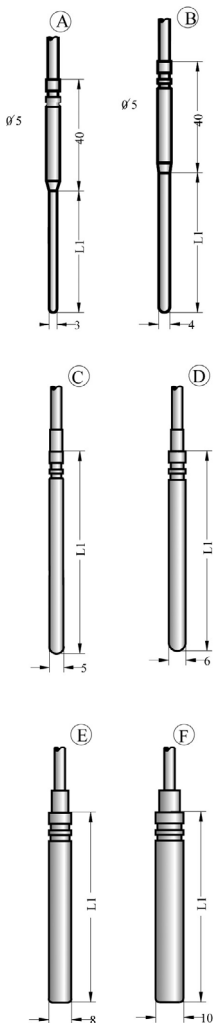
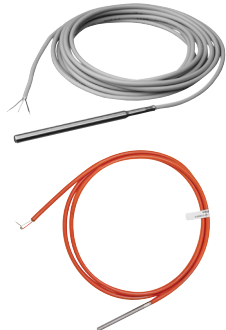
X

**length L1** sensor in mm (preferred length 50 mm at design. I)  
no length information is necessary at design II!  
(price per commenced 100 mm)

# Order code

Insertion resistance thermometer Pt100  
with pre-fitted cable or socket

Type:  
PTS-



Order code

PTS

mm

## Equipment

Order information  
LEM04  
LEM08

Model  
LEMO SA-connector 4-pole size 1  
LEMO SA-connector 8-pole size 2

### sensor type

- 1 1x Pt100, 2-wire
- 2 **1x Pt100, 3-wire** (preferred type)
- 3 1x Pt100, 4-wire
- 4 2x Pt100, 2-wire (double Pt100 only from  $\varnothing 5$  mm)
- 5 2x Pt100, 3-wire (double Pt100 only from  $\varnothing 5$  mm)
- 6 1x Pt1000, 3-wire
- 7 2x Pt100, 4-wire (double Pt100 only from  $\varnothing 5$  mm)

### accuracy class (at 2-fold Pt100 price x 2)

- B **class B, up to +200°C** (preferred type)
- A class A, up to +200°C
- C class AA (formerly class  $\frac{1}{3}B$ ), up to +200°C
- Y Special version, for example, high temperature, etc.

### design

- A see dimension drawing A 3 x 0,3 mm
- B see dimension drawing B 4 x 0,3 mm
- C see dimension drawing C 5 x 0,5 mm
- D see dimension drawing D 6 x 0,5 mm
- E see dimension drawing E 8 x 1 mm
- F see dimension drawing F 10 x 1 mm

### material sensor

- N **1.4571** (preferred type)
- T 1.4571 with PTFE coating
- Y Special version

### cable

- A PVC up to +80°C
- B **PTFE up to +200°C** (only at 1xPt100 possible) (preferred type)
- C silicone up to +180°C (not at 2xPt100 3-wire)
- D fiberglass with steel braid 300°C (max only 1x 3-wire)
- L plug connector LEMO SA 4-pole size 1 up to +80°C
- Y special version
- P plug connector LEMO SA 8-pole size 2

### cable length

- 1 1000 mm, silicone / PVC
- A PTFE / fiberglass
- 2 2000 mm, silicone / PVC
- B PTFE / fiberglass
- 5 5000 mm, silicone / PVC
- C PTFE / fiberglass
- Y Special length
- 0 without cable with plug version

### strain relief

- 0 **bruised** (limited water resistance (preferred type)
- 1 angled finish (only at  $\varnothing 8$  mm)
- 2 tightly rolled, IP 67, only with PTFE cable
- 3 tightly rolled, IP 68, only with PTFE cable
- 4 tightly rolled, IP 67, with Knickschutzfeder

length L1 sensor in mm (standard lengths: 50 | 100 | 150 mm)



- sensor type**  
1 1 x Pt100, 2-wire  
2 **1 x Pt100, 3-wire (preferred type)**  
3 1 x Pt100, 4-wire

**class**

- B class B, up to +200°C (preferred type)**  
A class A, up to +200°C  
Y Special version eg. high temperature etc.

**design**

- A 6 x 6 x 20 mm (preferred type)**  
**B 5 x 5 x 16 mm (only made of copper/PVC possible) up to +80°C (preferred type)**  
C 6 x 10 x 20 mm  
E 6 x 10 x 20 mm with bore hole  
F 10 x 12 x 30 mm with custom radius, specify radius!

**Material sensor**

- N 1.4571 (preferred type)**  
**C copper (preferred type)**  
M brass

**Cable**

- A PVC up to +80°C  
**B PTFE up to +200°C (preferred type)**  
C silicone up to +150°C  
D glass silk with steel mesh 300°C (only 3-wire)  
Y Special version

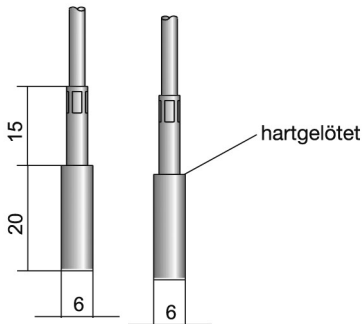
**Cable length**

- 1 1000 mm silicone / PVC  
A 1000 mm PTFE / glass silk  
2 2000 mm silicone / PVC  
B 2000 mm PTFE / glass silk  
5 5000 mm silicone / PVC  
C 5000 mm PTFE / glass silk  
Y Special length

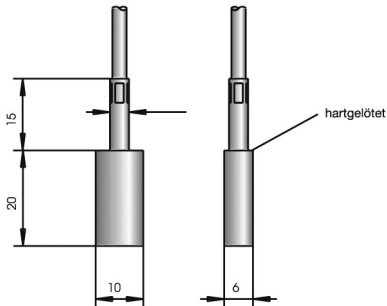
**strain relief**

- 0 squeezed (conditionally waterproof) (preferred type)**

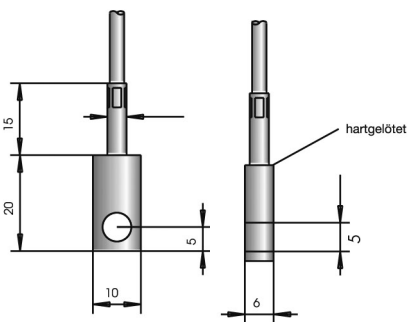
Bauform A



Bauform C



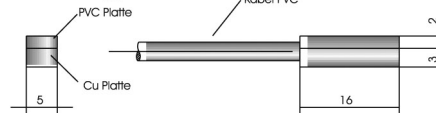
Bauform E



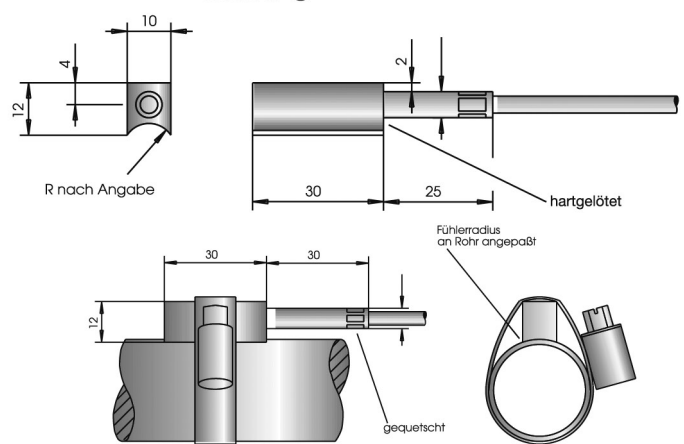
Order code

**PTU**

Bauform B



Bauform F



**Zubehör**

Order information  
**Schlauchbänder** (auf Anfrage)



- sensor type**
- 1 1x Pt100, 2-wire
  - 2 **1x Pt100, 3-wire** (preferred type)
  - 3 1x Pt100, 4-wire
  - 4 2x Pt100, 2-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
  - 5 2x Pt100, 3-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
  - 6 1x Pt1000, 3-wire
  - 7 3x Pt100, 2-wire (3x Pt100 with exchangeable measuring insert, only from ø 8 mm)

- accuracy class** (with double Pt100 price x 2)
- B **class B, up to +180°C** (preferred type)
  - A class A, up to +180°C
  - C class AA (formerly class 1/5B), up to +180°C
  - Y Special version eg. high temperature version etc.

- Process connection**
- 1 **screw-in thread G½"** (design A) (preferred type)
  - 2 screw-in thread G1" (design A)
  - 3 screw-in thread G¾" (design A)
  - 0 Without thread for sliding sleeves (design B)
  - Y Special version

- Material, sensor diameter, process side**
- L **1.4571 / 10 mm** (preferred type)
  - Y Others

- neck tube**
- A **Without neck tube** (preferred type)
  - B **With neck tube** (standard L2 = 100 mm) only at design A (preferred type)
  - Y With neck tube by choice in mm only at design A

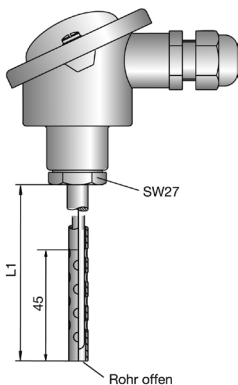
- connector head**
- B PP-head big
  - 2 **plastic head made of Delrin® big** (preferred type)
  - 3 aluminum head small (not with sensor type-variation 5 and 7)
  - 4 **aluminum head big** (preferred type)
  - 5 Stainless steel head big
  - G aluminum head double size
  - Y other designs

- Measuring insert**
- W **exchangeable** (preferred type)

- Connection type**
- K **connection with terminal socket** (preferred type)
  - M **connection for head transmitter<sup>(1)</sup> 4-20mA/0-10V fixed value**
  - X connection head transmitter<sup>(1)</sup> UTN-500 software programmable.
  - D connection with skinner for self-installation of head transm.
  - V 5-pole M12-plug
  - G connection for 2x head transmitter
  - L connection with 2x terminal socket
  - Y Special version

- length L1** sensor in mm
- (price per commenced 100 mm)
  - (price from 1000 mm length)
  - (preferred lengths 100 | 150 | 200 mm)

- length L2** neck tube in mm (only design A)
- (preferred length 100 mm)
  - (price per commenced 100 mm)
  - (price from 1000 mm length)



### Equipment

Sliding sleeves  
and immersion sleeves  
see page 50  
Head transmitter  
page 58

Order code

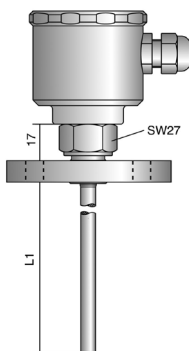
**PTW**

W

mm

mm





## sensor type

- 1 1 x Pt100, 2-wire
- 2 **1 x Pt100, 3-wire** (preferred type)
- 3 1 x Pt100, 4-wire
- 4 2 x Pt100, 2-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
- 5 2 x Pt100, 3-wire (double Pt100 with exchangeable measuring insert only from ø 8 mm)
- 6 1 x Pt1000, 3-wire
- 7 3 x Pt100, 2-wire

## accuracy class (with double Pt100 price x 2)

- B **class B, up to +180°C** (preferred type)
- A class A, up to +180°C
- C class AA (formerly class 1/5B), up to +180°C
- Y Special version eg. high temperature etc.

## Process connection

- E Flange DIN EN 1092-1, A (B - DIN 2527), DN25, PN10-40 with ETFE coating
- F Flange DIN EN 1092-1, A (B - DIN 2527), DN50, PN10-40 with ETFE coating
- G Flange DIN EN 1092-1, A (B - DIN 2527), DN40, PN10-40 with ETFE coating
- Y Special version eg. special coating

## Material, sensor diameter, process side

- K 1.4571 6 mm
- N 1.4571 8 mm
- L **1.4571 10 mm** (preferred type)
- W 1.4571 12 mm
- P 1.4571 6 mm, reduced tip 4 mm; 40 mm long
- M 1.4571 8 mm, reduced tip 5 mm; 40 mm long
- O 1.4571 10 mm, reduced tip 6 mm; 40 mm long
- R 1.4571 8 mm, reduced tip 3 mm; 40 mm long
- Y Others

## neck tube

- A Without neck tube
- B With neck tube (standard L2 = 100 mm)
- Y **With neck tube by choice in mm** (preferred type)

## connector head

- B PP-head big
- 2 plastic head made of Delrin® big
- 3 aluminum head small (not with sensor type-variation 5 and 7)
- 4 aluminum head big
- 5 Stainless steel head big
- 8 PTFE-head big
- G aluminum head double size
- Y other designs

## Measuring insert

- F **rigidly mounted** (preferred type)
- W exchangeable (at high temperature version always mandatory)

## Connection type

- K **connection with terminal socket** (preferred type)
- M **connection for head transmitter<sup>(1)</sup> 4-20mA/0-10V fixed value**
- X connection head transmitter<sup>(1)</sup> UTN-500 software programmable
- D connection with skinner for self-installation of head transm.
- V 5-pole M12-plug
- G connection for 2x head transmitter
- L connection with 2x terminal socket
- Y Special version

Signal converter  
only with con-  
nector head "big"  
possible

## length L1 sensor in mm

(price per commenced 100 mm)  
(price from 1000 mm length)

## length L2 neck tube in mm

(price per commenced 100 mm)  
(price from 1000 mm length) . . . . .

## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50  
Head transmitter  
see page 58

Order code

**PTZ**

mm

mm

# Order code

Type:  
PTV-



Resistance thermometer Pt100 acid-resistant and alkali resistant, Temperature measurement for media in pipelines for food, pharmaceutical and chemical industries and biotechnology



## Description

This sensor with integrated cable anchorage is built with a silver-based (Ag) contact surface and adapts to the radius of the respective pipeline. In addition to the positive-locking contact surface, an adjustable spring mechanism ensures optimum measuring results without the need for thermal compound. The technology of this miniaturized 4-wire Pt100 sensor with shielded silicone/PTFE cable is the core of our latest development and meets the quality requirements demanded especially for sterile technologies as used in the food and pharmaceutical industry. Plastic pipeline clamps (POM) for mounting temperature sensors onto the outside of pipes are currently available in sizes from DN8 to DN100. To remove the sensor element, the clamp only needs to be partially opened by loosening a screw. The clamp itself remains on the pipe. This ensures easy validation, where the "PTV" on the cable can be dipped

directly into the test medium. Stainless steel hose straps are also available for other pipe dimensions. Also available is a miniaturized transducer that can be integrated into the measuring line. "PTV" mini-clamp-on temperature sensors allow the temperature of the medium in the pipeline to be measured with only the slightest (unavoidable) temperature deviation. To ensure the long-term operational reliability of our pipe sensors, each sensor is subject to a rigorous testing programme before being released for sale.

### Technical data

Measuring element:	Platinum resistance element Pt100
Measuring temperature:	up to 140°C
Tolerance:	class A, according IEC 60751
Signal type:	1x Pt100 in 4-wire-switch 4...20 mA / 20...4 mA with line transmitter LTN-500
Installation:	contact sensor with special clamp
Connection:	Silikon/PTFE shielded cable, others on request

### Materials

Measuring surface:	Ag
Sensor housing:	Polyamid
Clamp:	POM; others on request
Protection class:	IP68

### Equipment

Transmitter LTN  
and pipe holder  
see page 53

Order code

**PTV**

**sensor type**  
4-wire Pt100

**class**  
class A

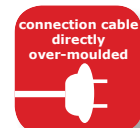
**sensor material**  
K  
aluminium with silver contact surface (Ag)

**cable**  
C  
Silicone/PTFE cable with shielding

**sensor connection**  
0T  
YY  
0.20 m, cable with moulded M8 plug (4-pin)  
special model

**protection class**  
3  
IP68

**diameter**  
mm diameter in mm





## Description

Basis of the ACS ex-RTD Series  
PTX form standardized, high-grade  
platinum measuring resistors with a  
nominal resistance of 100 ohms at  
0 °C, the tolerance classes AA, A, B  
according to IEC 60751st  
ACS ex-Pt100 probes are  
characterized by high accuracy,  
repeatability and reliability.  
PTX-resistance thermometers are  
approved for gas and dust explosion  
requirements, and are generally  
delivered with exchangeable  
measuring insert Pt100. Thus, the  
actual sensor may be removed from  
the probe tube and possibly replaced  
without draining the pipe or the  
container. This saves costs and avoids  
loss of production.

## Application

- Long term stable temperature sensor platinum Pt100 – IEC 60751
- 2 -, 3 - or 4-wire connection
- in 2-gang version in 2-wire connection for redundancy
- in accuracy classes AA, A or B
- ATEX II 1 G Ex ia IIC T6 ... T1 Ga or ATEX II 1 D Ex ia IIIC Tx ° C. Da
- 2-wire technology with current signal 4 .. 20 mA, fixed
- 2-wire technology with current signal 4 .. 20 mA, programmable

## Specials



highest  
process-  
stability &  
self-  
monitoring



**V4A**



## Your benefits

- Registering of process temperature from -200°C to 600 °C
- Wide variety of process connections, optionally with coating
- Interchangeable measuring insert
- Certification for the use in explosion hazardous areas
- Integrated temperature head transmitter

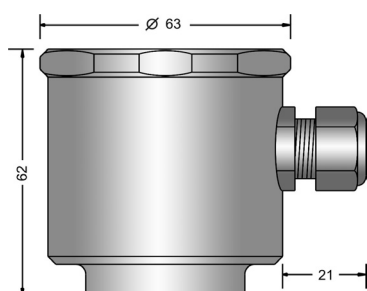
Order code ..... page | **47** |



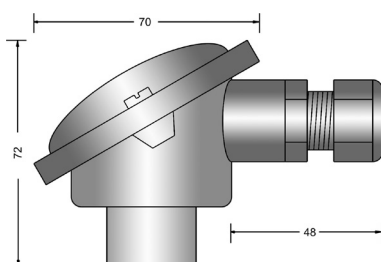
Certification	
ATEX classes	ATEX II 1 G Ex ia IIC T6...T1 Ga ATEX II 1 D Ex ia IIIC Tx°C Da
Measuring accuracy IEC 60751	
Accuracy class B – typee B	$T = -50...400^{\circ}\text{C} \leq \pm(0,3\text{K} + 0,005 *  T )$
Accuracy class A – typee A	$T = -50...250^{\circ}\text{C} \leq \pm(0,15\text{K} + 0,002 *  T )$ $T = 250...400^{\circ}\text{C} \leq \pm(0,3\text{K} + 0,005 *  T )$
Accuracy class AA – typee C	$T = 0...100^{\circ}\text{C} \leq \pm(0,1\text{K} + 0,0017 *  T )$ $T = -50...0^{\circ}\text{C} / 100...250^{\circ}\text{C} \leq \pm(0,15\text{K} + 0,002 *  T )$ $T = 250...400^{\circ}\text{C} \leq \pm(0,3\text{K} + 0,005 *  T )$
Type S – Accuracy class B	$T = -200...600^{\circ}\text{C} \leq \pm(0,3\text{K} + 0,005 *  T )$
Type S – Accuracy class A	$T = -200...600^{\circ}\text{C} \leq \pm(0,15\text{K} + 0,002 *  T )$
Type S – Accuracy class AA	$T = -50...250^{\circ}\text{C} \leq \pm(0,1\text{K} + 0,0017 *  T )$ $T = -50...0^{\circ}\text{C} / 250...600^{\circ}\text{C} \leq \pm(0,15\text{K} + 0,002 *  T )$
Materials	
Protection tube: (process wetted)	Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti), Wall thickness $\geq 1\text{mm}$
Process connection: (process wetted)	Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)
Neck tube:	CrNi-Steel
Terminal enclosure:	CrNi-steel / Aluminium lacquered / PP / POM
Environmental conditions	
Environmental temperature:	$-40^{\circ}\text{C}...+130^{\circ}\text{C}$ (limitation by material see technical manual)
Process temperature:	Limitation by category / temperature class/ electrical power, see EC conformity certificate maximum $-50^{\circ}\text{C}...+400^{\circ}\text{C}$ / high temperature version $-200^{\circ}\text{C}...+600^{\circ}\text{C}$
Process pressure:	depending on process connection, maximum $\leq 60\text{ bar}$
Protection:	IP67 (EN/IEC 60529)

|T| = Numerical value of temperature in °C, no leading sign

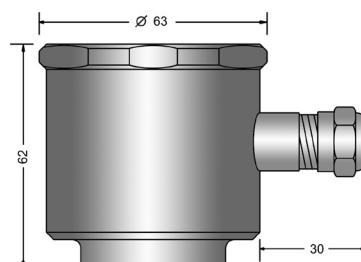
Terminal enclosure type 2 / B



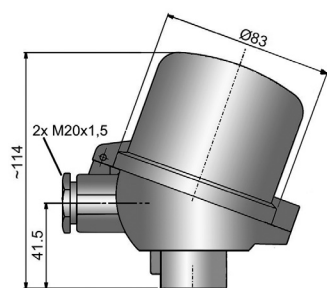
Terminal enclosure type 4



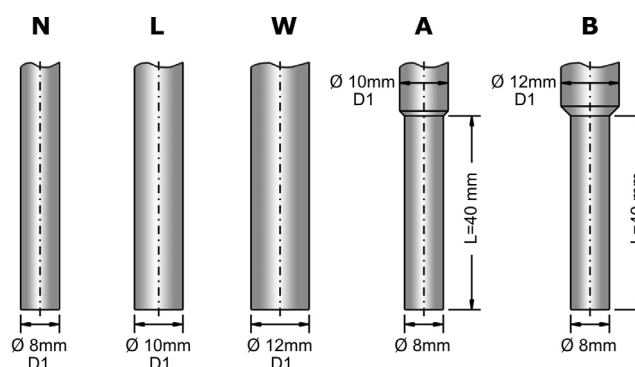
Terminal enclosure type 5



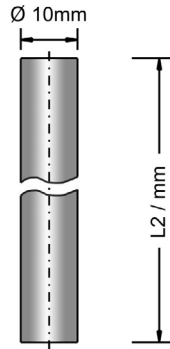
Terminal enclosure type G



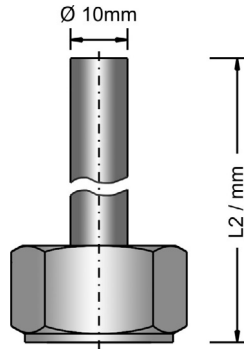
Probes



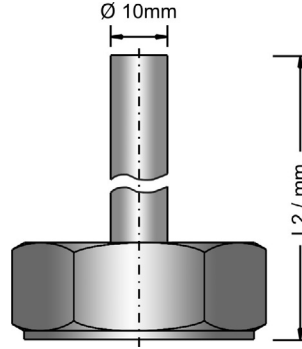
Neck tube  
process connection  
type E / F



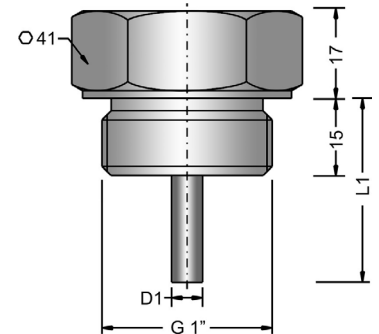
Neck tube  
process connection  
type 1



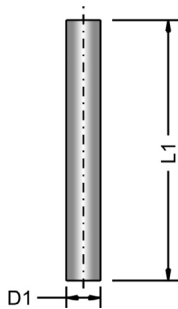
Neck tube  
process connection  
type 2



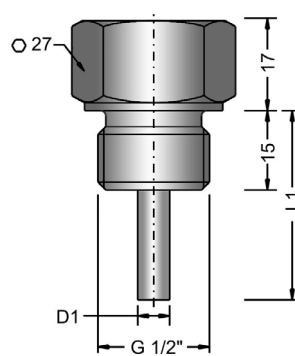
Process connection  
type 2 - G 1" ISO 228-1



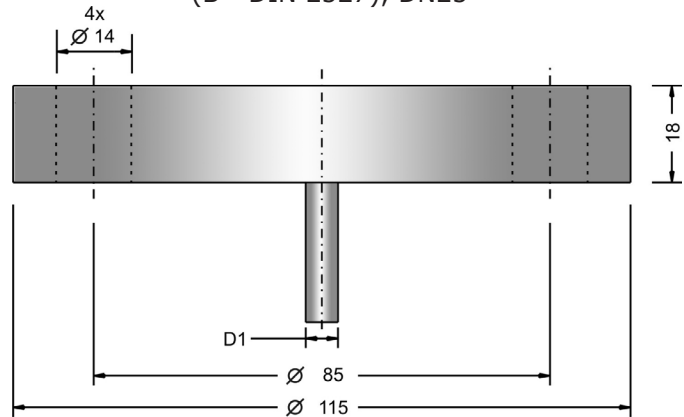
Process connection  
type 0 - without  
(for sliding sleeve)



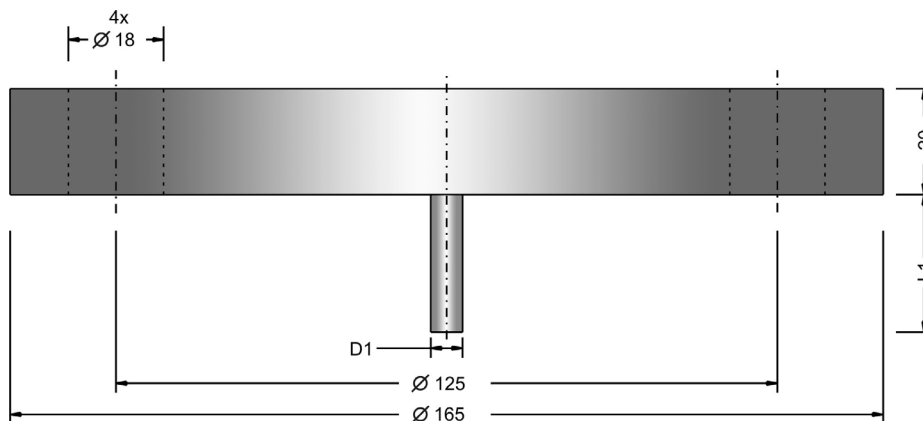
Process connection  
type 1 -  
G 1/2" ISO 228-1



Type E - flange DIN EN 1092-1, A  
(B - DIN 2527), DN25



Type F - flange DIN EN 1092-1, A(B - DIN 2527), DN50







Type certificate

- 1 ATEX II 1 G Ex ia IIC T6...T1 Ga
  - 2 ATEX II 1 G Ex ia IIC T6...T1 Ga / ATEX II 1 D Ex ia IIIC Tx°C Da
- Only with connection type K / M  
Only with material terminal enclosure type 4 / 5  
Not with surface coating

Sensor type

- 1 1x Pt100 / 2-wire
- 2 1x Pt100 / 3- wire
- 3 1x Pt100 / 4- wire
- 4 2x Pt100 / 2- wire

Accuracy class / Process temperature

- B Class B - IEC 60751 / -50°C...+400°C
- A Class A - IEC 60751 / -50°C...+400°C not for sensor type 4
- C Class AA - IEC 60751 / -50°C...+400°C not for sensor type 4
- Y others (e.g. high temperature type -200...+600°C, not for sensor type 4/ surface coating e.g. ETFE)

Process connection

- 0 without
- 1 Thread ISO 228-1 – G½”B
- 2 Thread ISO 228-1 – G1”B
- E Flange DIN EN 1092-1, A (B - DIN 2527), DN25, PN10-40
- F Flange DIN EN 1092-1, A (B - DIN 2527), DN50, PN10-40
- Y others

Material process connection/probe (process wetted) – probe diameter D1

- N CrNi-steel – Ø8 mm
- L CrNi-steel – Ø10 mm
- W CrNi-steel – Ø12 mm
- A CrNi-steel – Ø10 mm - reduced tip Ø8 mm/L=40 mm
- B CrNi-steel – Ø12 mm - reduced tip Ø8 mm/L=40 mm
- Y others

Neck tube

- A without
- B Neck tube L2=100mm
- Y Neck tube L2/mm

Material terminal enclosure

- B PP
- 2 POM
- 4 Aluminum form B – EN 50446
- 5 CrNi-steel
- G Aluminum double size
- Y others

Measuring insert

- W Exchangeable measuring insert

Connection type

- K Terminal socket
- M Head transmitter ExKTM-\_A0 (4...20mA/fix adjusted) integrated
- X Head transmitter UTN500-B (4...20mA/programmable) integrated
- D Loose wires
- G 1x terminal socket / 1x head transmitter type M/X/T/others terminal enclosure type G
- L 2x terminal socket terminal enclosure type G
- Y others

Sensor length L1 / mm

Neck tube length L2 / mm

Equipment

Sliding sleeve  
and thermowells  
see page 50  
head transmitter  
see page 58

Order code

PTX

W

mm

mm



## Description

The compact thermometer Thermocont® TK is used to measure temperatures from -50 ... 150 ° C. Locations are for example Pipelines or containers.

The ACS is available Thermocont® TK on standard process connections, but also for use in hygienic areas.

Rapid installation with M12 connector with IP66/67, small and compact design in stainless steel, high quality, reliability and accuracy characteristics of this sensor. Besides the standard version with 4 .. 20 mA output and selectable ranges, can also direct Pt100 4-wire output to work (optional). Various process connections, sensor diameter, length or other versions with reduced peak, or with neck allow a flexible use for virtually all process conditions.

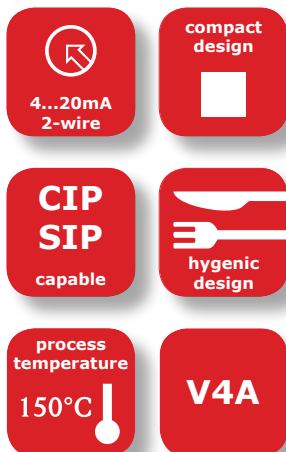
## Application

- Two-wire technology 4 ... 20mA or Pt100 sensor
- Process temperatures from -50 ° C to 150 ° C
- Threaded or hygienic process connections
- Long-term stable temperature sensor made of platinum Pt100 Class A - IEC 60751
- Optionally integrated evaluation electronics
  - 2-wire with current signal 4 ... 20 mA
  - 2-wire with current signal 4 ... 20 mA - programmable
  - Accuracy  $\leq 0,1K$  resp. 0.08%

## Your benefits

- Compact design
- Programmable with PC
- M12 connector IP67
- High accuracy due to Pt100 Class A
- Short response time

## Specials

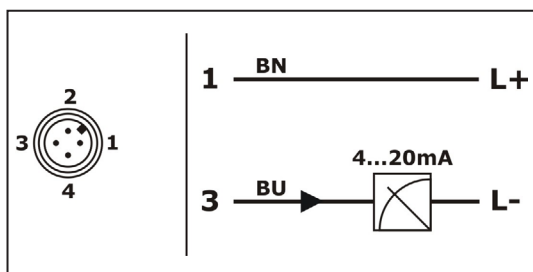


Order code ..... page | 51 |

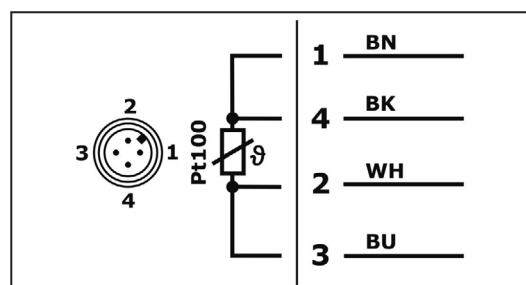


Technical data	
sensor element:	Pt100 class A according to IEC 60751
output:	analog 4...20mA
Power supply:	10...35V DC, reverse polarity protected
Measurement accuracy	
accuracy (signal converter):	0,1K or 0,08%
Long term drift:	$\leq \pm 0,1K$ or 0,05% FS / year - not cumulative
Environmental conditions	
operating temperature:	-50...+150°C
Ambient temperature:	-40...+85°C
EMV compatibility:	operating material class B / industrial sector (EN/IEC 61326)

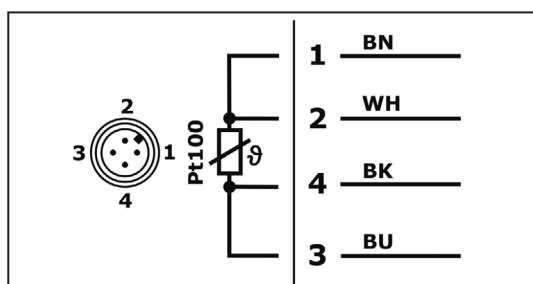
## Connection



2-wire / 4...20 mA / Typ A/E  
 Wire colors standard connection cable M12:  
 BN = brown, BU = blue  
 The connection cable is not included.

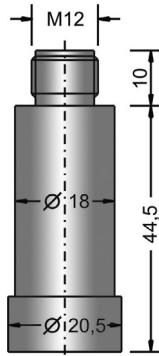


4-wire / Pt100 / Typ B  
 Wire colors standard connection cable M12:  
 BN = brown, WH = white, BU = blue, BK = Schwarz  
 The connection cable is not included.

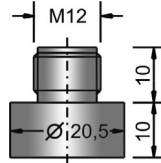


4-wire / Pt100 / Typ C  
 Wire colors standard connection cable M12:  
 BN = brown, WH = white, BU = blue, BK = Schwarz  
 Das Connection cable ist im Lieferumfang nicht enthalten.

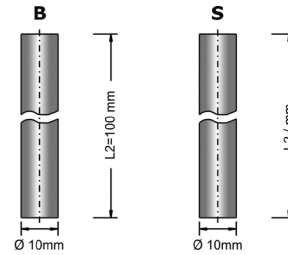
Connection housing  
Elektronic Output Type A /  
E – 2-wire, Signal 4...20mA



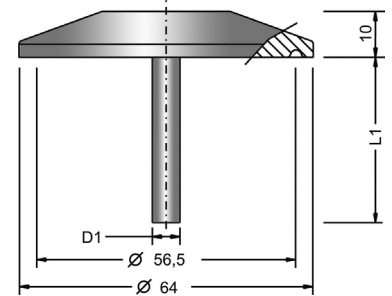
Connection housing  
Elektronic Output Type B /  
C – Pt100, 4-wire



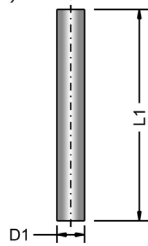
Halsrohr



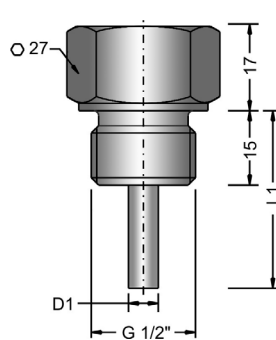
Typ T - Clamp ISO 2852 DN51  
(2") / DIN 32676 DN50



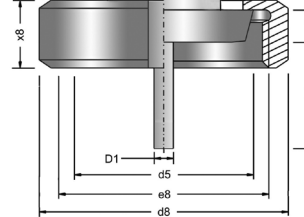
Typ 2 - without (for sliding  
sleeve)



Typ 1 - G 1/2" ISO 228-1

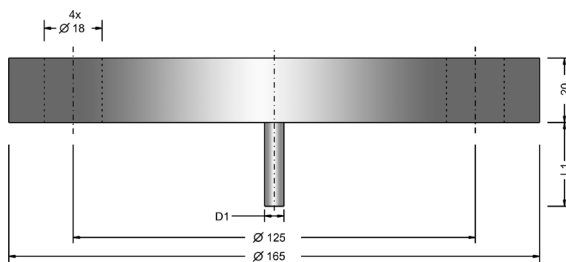


Typ M / N / O - DIN 11851

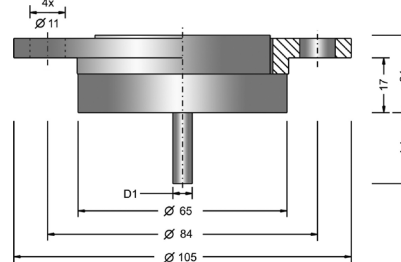


	DN	PN	d5	x1	x2	d8	x8	e8
O	25	40	44	10	4	63	21	Rd52x1/6"
N	40	40	56	10	4	78	21	Rd65x1/6"
M	50	40	68	11	3	92	22	Rd78x1/6"

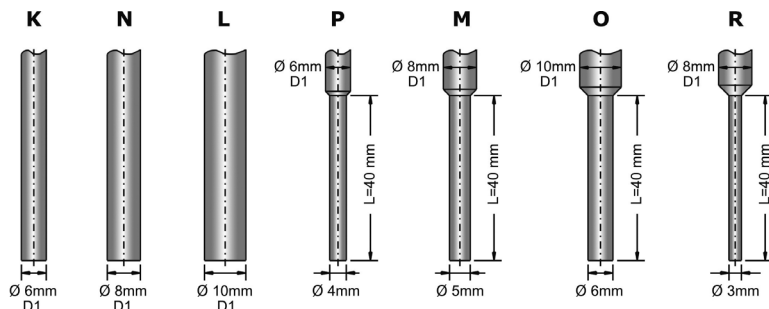
Typ G - flange DIN EN 1092-1, A  
(B - DIN 2527), DN50



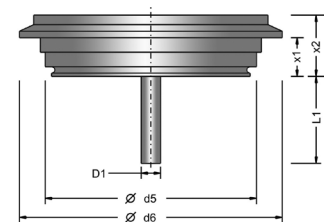
Typ L - DRD DN50, Ø65 mm



Fühler



Typ R / P - Varivent®



	DN	PN	d5	d6	x1	x2
R	25-32	40	F 50	66	12	19
P	40-125	40	N 68	84	12	19



## model

TK Standard

## design

K compact – cylindric

## sensor / class

A Pt100 class A - IEC 60751

## Process connection

- 1 G½" B, ISO 228-1
- 2 Without
- M Milk tube DIN 11851, DN50, PN40
- N Milk tube DIN 11851, DN40, PN40
- O Milk tube DIN 11851, DN25, PN40
- R Varivent® F, Ø50 mm, DN25-32, PN 40
- P Varivent® N, Ø68 mm, DN40-125, PN 40
- L DRD DN50, Ø65 mm, PN25
- G Flange DIN EN 1092-1, A (B - DIN 2527), DN50, PN10-40
- T Tri-Clamp 2"/DN51, PN16/40
- Y Others

## Material process connection/sensor

(process wetted) – sensor diameter D1

- K Steel 1.4571/316Ti - Ø6 mm
- N Steel 1.4571/316Ti - Ø8 mm
- L Steel 1.4571/316Ti - Ø10 mm
- P Steel 1.4571/316Ti - Ø6 mm - reduced tip Ø4 mm/L=40 mm
- M Steel 1.4571/316Ti - Ø8 mm - reduced tip Ø5 mm/L=40 mm
- O Steel 1.4571/316Ti - Ø10 mm - reduced tip Ø6 mm/L=40 mm
- R Steel 1.4571/316Ti - Ø8 mm - reduced tip Ø3 mm/L=40 mm
- Y Others

## neck tube

- A Without
- B neck tube L2=100mm
- Y neck tube L2/mm by choice

## Material Connection housing

- C CrNi-steel

## Electrical connection

- S Plug M12

## Electronics - output

- A 2-wire, signal 4...20mA
- B Pt100, 4-wire, connection B
- C Pt100, 4-wire, connection C
- E 2-wire, signal 4...20mA, programmable

## Measuring range

- BA -50...+100°C
- CA -40...+60°C
- DA -30...+60°C
- DB -30...+150°C
- DC -30...+70°C
- EA -20...+20°C
- EB -20...+60°C
- EN -10...+40°C
- FC 0...+50°C
- FE 0...+100°C
- FG 0...+150°C
- 00 Pt100, 4-wire
- XX Special measuring range (poss. higher deviation accuracy)

## sensor length L1 / mm

- B 50 mm
- C 100 mm
- D 150 mm
- E 200 mm
- Y Others

length L2 neck tube in mm  
(price per commenced 100 mm)

## Equipment

Sliding sleeves  
and immersion sleeves  
see page 50

Order code

**Thermocont® TK** K A C S



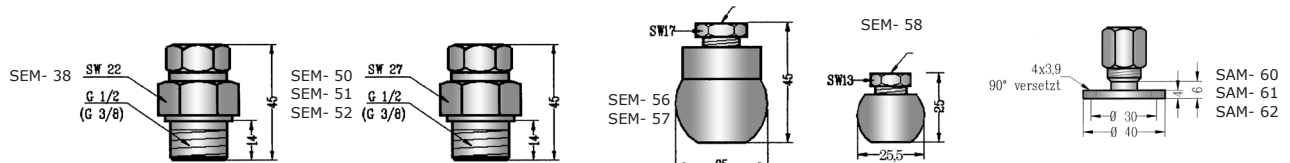
#### sliding sleeves for Pt100, press-ring made of 1.4571 / 1.4404 (pressure-resistant up to 20 bar), material 1.4571 / 1.4404

Ordering information

**SEM-38**  
**SEM-50**  
**SEM-51**  
**SEM-52**  
**SEM-56**  
**SEM-57**  
**SEM-58**  
**SAM-62**  
**SAM-60**  
**SAM-61**

Model

G $\frac{3}{8}$ " ..... 8 mm sensor diameter  
G $\frac{1}{2}$ " ..... 8 mm sensor diameter  
G $\frac{1}{2}$ " ..... 10 mm sensor diameter  
G $\frac{1}{2}$ " ..... 6 mm sensor diameter  
ball-weld-in socket Ø 35 mm ..... 8 mm sensor diameter  
ball-weld-in socket Ø 35 mm ..... 10 mm sensor diameter  
ball-weld-in socket Ø 25,5 mm ..... 6 mm sensor diameter  
screw-in-socket ..... 6 mm sensor diameter  
screw-in-socket ..... 8 mm sensor diameter  
screw-in-socket ..... 10 mm sensor diameter



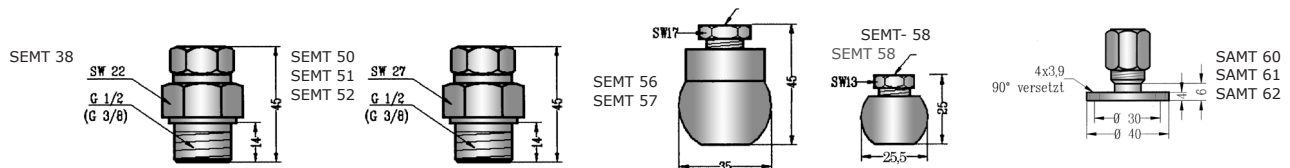
#### sliding sleeves for Pt100, with press-ring made of PTFE (Teflon®) movable (pressureless application), material 1.4571 / 1.4404

Ordering information

**SEMT 38**  
**SEMT 50**  
**SEMT 51**  
**SEMT 52**  
**SEMT 59**  
**SEMT 56**  
**SEMT 57**  
**SEMT 58**  
**SAMT 62**  
**SAMT 60**  
**SAMT 61**

Model

G $\frac{3}{8}$ " ..... 8 mm sensor diameter  
G $\frac{1}{2}$ " ..... 8 mm sensor diameter  
G $\frac{1}{2}$ " ..... 10 mm sensor diameter  
G $\frac{1}{2}$ " ..... 6 mm sensor diameter  
G $\frac{1}{2}$ " ..... 4 mm sensor diameter  
ball-weld-in socket Ø 35 mm ..... 8 mm sensor diameter  
ball-weld-in socket Ø 35 mm ..... 10 mm sensor diameter  
ball-weld-in socket Ø 25,5 mm ..... 6 mm sensor diameter  
screw-in-socket ..... 6 mm sensor diameter  
screw-in-socket ..... 8 mm sensor diameter  
screw-in-socket ..... 10 mm sensor diameter



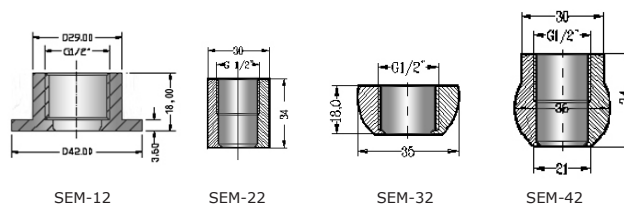
#### weld-in sockets (front-flush) for Pt100, material 1.4571 / 1.4404, for food applications and hygienic applications

Ordering information

**SEM-12**  
**SEM-22**  
**SEM-32**  
**SEM-42**

Model

G $\frac{1}{2}$ " for PTL with O-ring gasket  
G $\frac{1}{2}$ " metal-seated  
G $\frac{1}{2}$ " ball-weld-in socket for PTL with O-ring gasket  
G $\frac{1}{2}$ " metal-seated, ball-weld-in socket



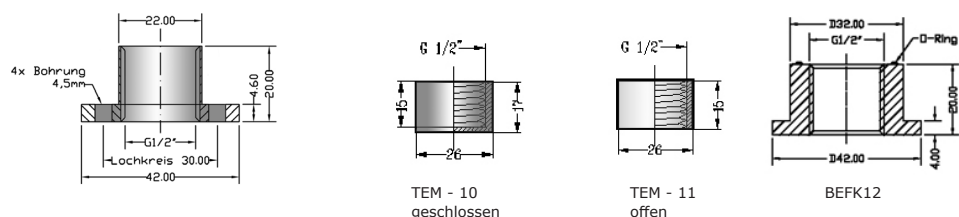
#### weld-in sockets for Pt100, material 1.4571 / 1.4404

Ordering information

**SAM-12**  
**TEM - 10**  
**TEM - 11**  
**BEFK12**

Model

screw-in-socket for air ducts  
frontally closed  
frontally open  
weld-in socket G $\frac{1}{2}$ ", sealing attachment at the back



#### marking measurement point

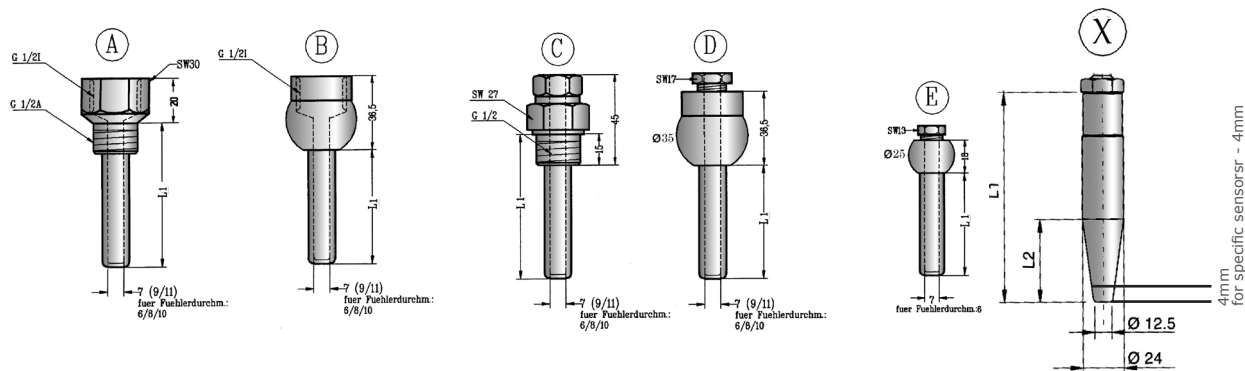
Ordering information

**AS-50**

Model

hang tag made of VA with laser inscription

## Immersion pocket and thread nipple for bayonet connector



### STH - immersion pocket for Pt100, material 1.4571 / 1.4404

#### immersion pocket sensor

- 0 design A, B with internal thread and design C, D, E  
With press-ring made of steel 1.4571
- T -press-ring made of PTFE (only with design C, D, E possible)

#### design

- A design see drawing A for Pt100 with G $\frac{1}{2}$ " thread resp. type PTI
- B design see drawing B for Pt100 with G $\frac{1}{2}$ " thread resp. type PTI
- C design see drawing C for Pt100 - sensor PTF, PTS
- D design see drawing D for Pt100 - sensor PTF, PTS
- E design see drawing E for Pt100 - sensor PTF, PTS
- X design see drawing X for Pt100 with G $\frac{1}{2}$ " thread resp. type PTI
- Y Special design

#### inner tube diameter

- 04 inner tube diameter 4 mm (for  $\phi$  3 mm sensor)
- 06 inner tube diameter 6 mm (for Pt100 sensor type PTI) (for  $\phi$  5 mm sensor)
- 07 inner tube diameter 7 mm (for  $\phi$  6 mm sensor)
- 09 inner tube diameter 9 mm (with design E not possible) (for  $\phi$  8 mm sensor)
- 11 inner tube diameter 11 mm (with design E not possible) (for  $\phi$  10 mm sensor)

#### Pressure stage

- 0 100 bar
- D 500 bar

#### length L1 incl. process connection (price per commenced 100 mm)

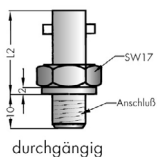
#### length L2 at STH--X (price per commenced 100 mm)

Order code

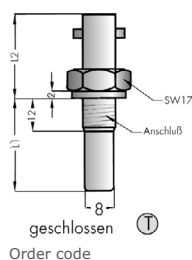
**STH-**

mm

mm



★ ⓘ



Order code

### GWN - thread nipple for bayonet joint (continuous or closed) matching for PTM 1.4571 / 1.4404

#### type

- A for 12,2 mm bayonet (only for PTM with 6 mm diameter)

#### design

- S design S (open)
- T design T (closed)

#### Connection

- 1 M10x1
- Y Special version

#### length L2 in mm 20 mm

#### length L1 in mm (only at design T) (price per commenced 100 mm)

**GWN-**

A

mm

mm



## Thermohunter contactless infrared temperature measurement device

**BA-06 TA-S, 0-500 °C** 6 mm visual field / 200 mm; 4...20 mA output  
**BA-30 TA-S, 0-500 °C** 30 mm visual field / 1000 mm; 4...20 mA output

Technical data	
temperature range	0 - 500 °C (display -20 °C / +520 °C)
min. measuring surface	Ø 6 / 200 mm
optics	silicone lens
sensor / wavelength	thermopile / 8 - 14 µm
response time	500 ms / 90%
accuracy	± 1% of the measured value or ± 2 °C ± 1-Digit (the higher value) (E = 1.0)
repetition time	± 1 °C of the measured value
resolution	1 °C
analog output	BA-06TA: 1 mV / °C BA-06TA: 4-20 mA
output resolution	0,2 °C
center	coaxial laser positioning
emission factor	0.10 - 1.20
delay	nominal 1 - 200 ( 0,05 - 10 seconds) variable
supply	12 - 24 VDC ± 10% / max. 150 mA
ambient temperature	0 - 50 °C
ambient moisture	35 - 85 % r.F. (not condensing)
storage temperature	-10 / 60 °C
vibrations	30G (20 - 50 Hz)
waterproof	IP65
weight	350 g

## Equipment for Temperature sensors

Limit switch, transmitter, signal doubler, head transmitter, and feed breaker



### GWAP-250-UO

temperature limit switch for Pt100 input, 2 limit switch, universal mains supply circuit, snap-on-housing 22,5 mm

### Transcont WTA-100-G0 and ExWTA-100-G0

Pt100 converter passive, with 2- or 3-wire connection preset, analog output 4...20 mA  
 2-wire technology or analog output 0...10 V 3-wire technology, 2 PNP-switching outputs, snap-on-housing 22,5 mm

### Transcont WTAU-100-UO

Pt100-signal converter active, galvanic isolation and conversion of a 2-wire or 3-wire- Pt100, free adjustable, 1 input / 1 output, 20...253 V AC/ DC long range supply (universal mains supply circuit), snap-on-housing 22,5 mm

### Transcont WTAU-200-UO Pt100- signal duplicators

Pt100-signal converter active, galvanic isolation and conversion of a 2-wire or 3-wire Pt100, free adjustable, 1 input / 2 outputs, 20...253 V AC / DC long range supply (universal mains supply circuit), snap-on-housing 22,5 mm

### Transcont WTAU-120-UO Pt100-signal converter, preset

Pt100-signal converter active, galvanic isolation and conversion of a 2-wire or 3-wire Pt100, preset, 1 output, 20...253 V AC / DC long range supply, universal mains supply circuit, snap-on-housing 22,5 mm, 1 input

### Transcont WTAU-220-UO Pt100- signal duplicators, preset

Pt100-signal converter active, galvanic isolation and conversion of a 2-wire or 3-wire Pt100, preset, 1 input / 2 outputs, 20...253 V AC / DC long range supply (universal mains supply circuit), snap-on-housing 22,5 mm

### Transcont UTN-500 temperature head transmitter, universal head transmitter, adjustable via PC

### Transcont KTM and Transcont ExKTM

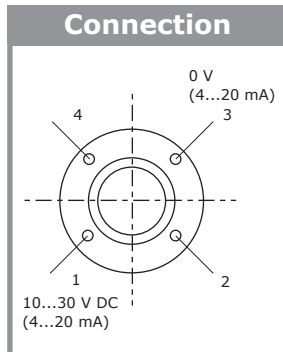
temperature head transmitter with 2- or 3-wire connection, preset, analog output 4...20 mA  
 2-wire technology or analog output 0...10 V, 3-wire technology, 1 PNP switching output

### EXTVA-500-UC supply isolators Ex-version

### Ex safety barriers, separating barriers



Signal converter Pt100 on 4...20 mA for connecting in between in the sensor line



Order code

## LTN-500

**certifications**  
A variation for Ex-free range

### Connection type

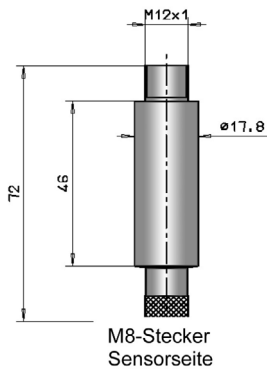
Y Input (Pt100) M8-female; Output (4...20 mA) M12-female  
S Others

### sensor type

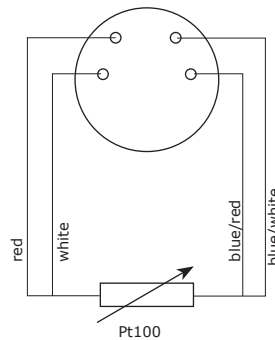
A Pt100 4-wire / 4...20 mA

### configuration

A Standard factory setting Pt100 / 0...100°C  
B customer specific setting (please specify measuring range!)



pin assignment Pt100  
plug M8



## Equipment PTV/LTN

**Ordering information**  
RH-MM-? ? ?

RH-MM-? ? ?

SB-MM-? ? ?

LKZO410PUR-AS

FKZO420SIL

### Model

Pipe clamp on aus POM up to 49 mm  
please specify outer tube diameter!  
Pipe clamp on made of POM from 50 mm...80 mm  
please specify outer tube diameter!  
tubular tape made of Inox with sensor holder  
for tube diameter 8 up to 150 mm  
please specify diameter in „mm“!  
10 m PUR-cable, 4-pole, shielded, M12 plug,  
**for connection an LTN-500**  
20 m silicone-cable, 4-pole, M8 coupling,  
**for direct connection on PTV**

Tube holder\*



Hose band



\* Picture with PTV probe; Please order PTV sensor separately

## Description

This overview contains ready-to-install large and small straight thermocouples with built-in thermocouples. Sensors of this type are used for general temperature measurement mainly in liquid and gaseous media. The listed thermocouples are exemplary ordering examples. ACS-Control-System GmbH supplies every straight standard thermocouple as well as special versions according to customer requirements. There are almost countless possible combinations depending on size, material, mounting etc.

With the aid of the article number system, the thermocouples can be assembled according to the respective conditions of use.

The maximum permissible operating temperature of the selected

Thermocouple resp. Thermowell material determines the maximum operating temperature of the thermocouple.

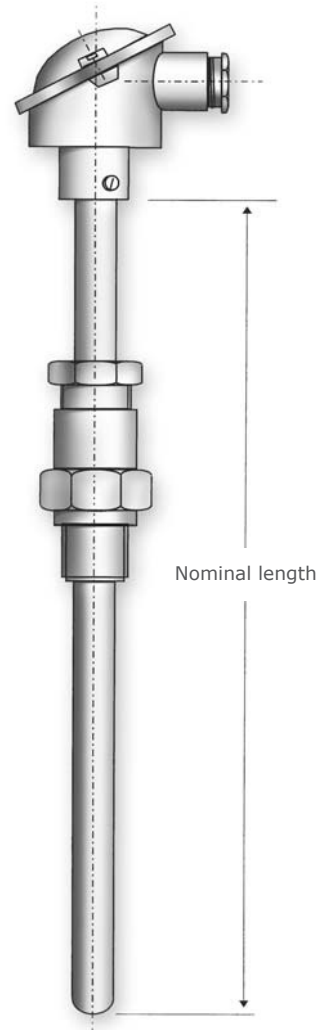
Repairs from thermocouples and resistance thermometers are carried out at ACS Control System GmbH, but are often uneconomical due to the high installation costs. The thermoelectric voltages and limit deviations of the thermocouples supplied by ACS-Control-System GmbH comply with the standard DIN EN 60584.

For the ordering examples presented in this catalog section it is a selection often in practice

used devices. By means of the numerical code of the individual components indicated on the back, the respective order number of a standard thermocouple can be created, whereby not all possible combinations of numbers and material combinations are meaningful resp. technically feasible. For special thermocouples whose design and components require a technical clarification, we issue special numbers. Please discuss with us your specific application problems regarding material and installation. With the help of our many years accumulated Experience should allow us to work out an optimal solution tailored to your problem.

### Ordering example

Small straight thermocouple 1 x NiCr-Ni/K  
with metallic protective tube and threaded sleeve



### Technical data

Order number:	TE-SK1F1A0A6...
Connection head:	Form B
Protection tube:	ø 15 x 2 mm, WSt.-Nr. 1.4762
Thermo couple:	1 x NiCr-Ni/K ø 2,0 mm
Nominal length:	710 mm
Attachment:	Threaded socket G 3/4 A steel
Measuring temperatures:	0 - 1100°C
Limiting deviation:	Class 1 according to DIN EN 60584-2

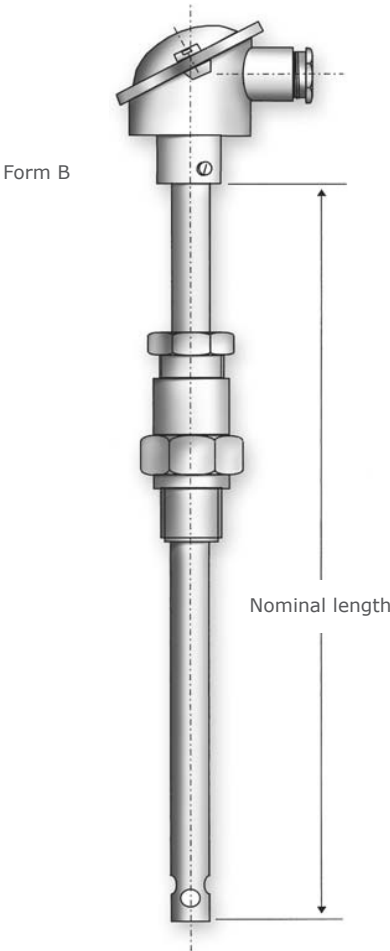
The thermocouples are calibrated in the calibration laboratory on favorable terms. All calibrations are traceable to national standards of the Physikalisch-Technische Bundesanstalt.

Order code. . . . . page |59|





Small straight thermocouple 2 x NiCr-Ni/K with open metallic protective tube and threaded sleeve

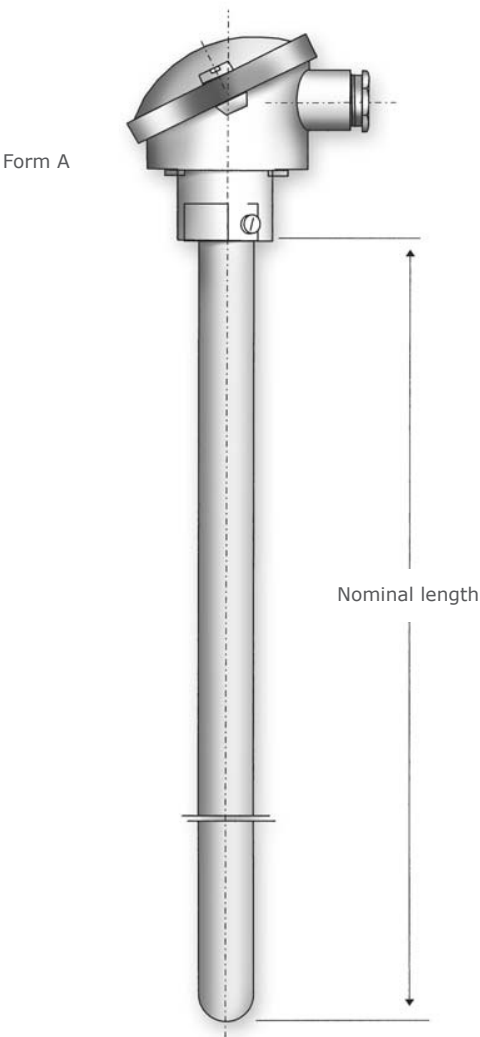


Technical data	
Ordern number:	TE-SK2G1A0A6...
Connection head:	Form B
Protection tube:	ø 15 x 2 mm, WSt.Nr. 1.4841, perforated
Thermo couple:	2 x NiCr-Ni/K ø 2,0 mm
Nominal length:	500 mm
Attachment:	Threaded socket G 1/2 A steel, galvanized
Measuring temperatures:	0 - 1100°C
Limiting deviation:	Class 1 according to DIN EN 60584-2
Special feature:	Connection head gas-tight

The thermocouples are calibrated in the calibration laboratory on favorable terms. All calibrations are traceable to national standards of the Physikalisch-Technische Bundesanstalt.

Order code. . . . . page |59|

Large straight thermocouple 1 x NiCr-Ni/K with metallic protective tube, without attachment

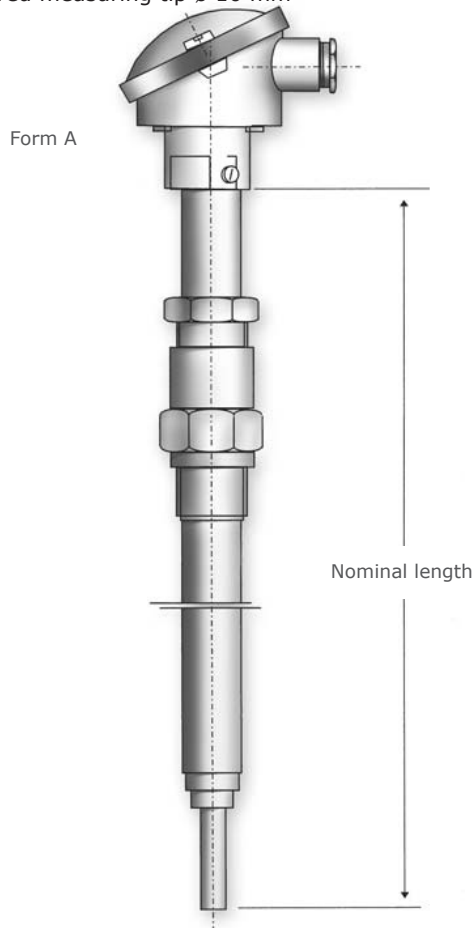


Technical data	
Ordern number:	TE-0K1F2A1A7...
Connection head:	Form A
Protection tube:	ø 22 x 2 mm, WSt.-Nr. 1.4762
Thermo couple:	1 x NiCr-Ni/K ø 3,0 mm
Nominal length:	1000 mm
Attachment:	without
Measuring temperatures:	0 - 1100°C
Limiting deviation:	Class 1 according to DIN EN 60584-2

The thermocouples are calibrated in the calibration laboratory on favorable terms. All calibrations are traceable to national standards of the Physikalisch-Technische Bundesanstalt.

Order code. . . . . page |59|

Double thermocouple 2 x PtRh10-Pt/S with Connection head, Form A and threaded socket of steel, protection tube WSt. 1.4762, 22 x 2 mm with tapered measuring tip  $\varnothing$  10 mm



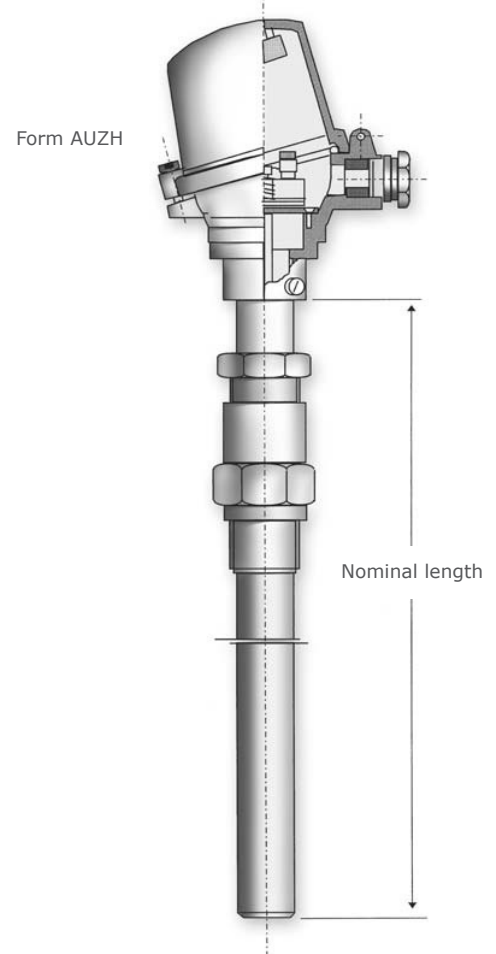
#### Technical data

Ordern number:	TE-S2F2A1BA...
Connection head:	Form A
Protection tube:	$\varnothing$ 22 x 2 mm, WSt.-Nr. 1.4762
Inner tube 1:	$\varnothing$ 15 x 11 mm, C610
Inner tube 2:	$\varnothing$ 6 x 4 mm, C799
Insulating:	$\varnothing$ 3,5 mm, 4 -Loch, C799
Thermo couple:	2 x PtRh10-Pt/S $\varnothing$ 0,5 mm
Nominal length:	1850 mm
Attachment:	Threaded socket G 1 A steel
Measuring tip:	tapered $\varnothing$ 10 x 60 mm
Measuring temperatures:	0 - 1100°C
Limiting deviation:	Class 1 according to DIN EN 60584-2

The thermocouples are calibrated in the calibration laboratory on favorable terms. All calibrations are traceable to national standards of the Physikalisch-Technische Bundesanstalt.

Order code. . . . . page |59|

Double thermocouple 2 x PtRh30-PtRh6/B with Connection head Form AUZH for signal converter, protection tube WSt. 2.4816 Inconel 22 x 2 mm



#### Technical data

Ordern number:	TE-FB4M2A2A4...
Connection head:	Form AUZH
Protection tube:	2.4816 Inconel $\varnothing$ 22 x 2 mm
Inner tube:	$\varnothing$ 15 x 11 mm, C799
Insulating:	$\varnothing$ 8,5 mm, 5 -Loch, prüfbar, C799
Thermo couple:	2 x PtRh30-PtRh6/B $\varnothing$ 0,5 mm
Nominal length:	2000 mm
Attachment:	Threaded socket G 1 A aus Steel for 25,8 mm
Measuring temperatures:	0 - 1200°C
Limiting deviation:	Class 2 according to DIN EN 60584-2

The thermocouples are calibrated in the calibration laboratory on favorable terms. All calibrations are traceable to national standards of the Physikalisch-Technische Bundesanstalt.

Order code. . . . . page |59|



**Attachment**

- 0 without
- F Flange
- S Sliding sleeve
- T Flange/counterflange
- A External thread 1/2"

**Thermo couple Type**

- R Typ R PtRh13-Pt
- S Typ S PtRh10-Pt
- B Typ B PtRh30-PtRh6
- K Typ K NiCr-Ni
- J Typ J Fe-CuNi
- L Typ L Fe-CuNi
- W Wolframrhenium Wre5-Wre26
- N Nicrosil-Nisil NiCrSi-NiSi

**Thermopaaranzahl**

- 1 one
- 2 one testable
- 3 double
- 4 double testable
- 5 three
- 6 three testable

**Protection tube (Material)**

- A St. 35.8 WNr. 1.0305
- B Kanthal
- C VA WNr. 1.4301
- D V4A WNr. 1.4571
- E X18Cr N 28 WNr. 1.4749
- F X10Cr Al 24 WNr. 1.4762
- G X15CrNi Si 25 20 WNr. 1.4841
- M Inconel WNr. 2.4816
- I hitzebest. Steel WNr. 1.4893
- K PM 2000

**Protection tube (Dimension)**

- 1 15x2 mm
- 2 22x2 mm
- 3 24x3 mm
- 4 26x4 mm
- 5 22x1,3 mm
- 6 15x1,3 mm
- 7 11x1,5 mm
- 8 10x1,5 mm
- 9 9x11 mm

**Neck tube**

- A without neck tube
- B with neck tube (Standard L2 = 110mm)
- Y with neck tube per choice in mm

**Inner tube**

- 0 without
- 1 KER 610 TEP
- 2 KER 799 aluminium oxide

**Measuring tip**

- A not tapered
- B tapered to 15 mm
- C tapered to 12 mm
- D tapered to 9 mm
- E tapered to 6 mm
- F tapered to 10 mm
- G tapered to 8 mm

**Head**

- 1 A
- 2 AUS
- 3 AUZ
- 4 AUZH
- 5 ABK
- 6 B
- 7 BUS
- 8 BUZ
- 9 BUZH
- 0 BBK

Lenght in mm:

Neck tube in mm:

Order code

Thermoelement TE-



**certifications**  
KTM- Without certificate  
ExKTM- ATEX II 1 G Ex ia IIC T4

### temperature range

A	0°C...+50°C	H	0°C...+400°C
B	0°C...+100°C	J	0°C...+500°C
C	0°C...+150°C	L	0°C...+600°C
E	0°C...+200°C	Q	-40°C...+60°C
F	0°C...+250°C	O	-50°C...+100°C
G	0°C...+300°C	N	-100°C...+50°C
		Y	custom specified measuring range

### Transmitter electronics

A0	4...20 mA, 2-wire-electronics
AS	4...20 mA, 2-wire-electronics with one PNP switching output (not for Ex-version)
AG	2-wire current, signal 4...20mA, galvanic separated (not for Ex-version)
B0	0...10 V, 3-wire-electronics (not for Ex-version) . . . . .

Order code

**Transcont KTM**



**certifications**  
A variation for Ex-free range  
B ATEX II 1 G EEx ia IIC T4/T5/T6  
C FM IS, Class I, Div. 1+2, Group A,B,C,D  
D CSA IS, Class I, Div. 1+2, Group A,B,C,D  
E ATEX II 3 G EEx nA IIC T4/T5/T6

### Connection type

A	Standard factory setting 3-wire
2	configuration connection type RTD 2-wire
3	configuration connection type RTD 3-wire
4	configuration connection type RTD 4-wire
1	configuration connection type thermal element TC

### configuration temperature sensor

A	Standard factory setting Pt100
1	Pt100 (-200°C... 850°C, min.SP 10K) according to IEC 60751 (a=0,00385)
2	Ni100 (-60°C... 180°C, min.SP 10K)
3	Pt500 (-200°C...250°C, min.SP 10K)
4	Ni500 (-60°C...150°C, min.SP 10K)
5	Pt1000 (-200°C...250°C, min.SP 10K)
6	Ni1000 (-60°C...150°C, min.SP 10K)
7	resistiv sensor 10...400 ohm, min. span 10 ohm
8	resistiv sensor 10...2000 ohm, min. span 100 ohm
B	type B (0°C...1820°C, min.SP 500K)
C	type C (0°C...2320°C, min.SP 500K)
D	type D (0°C...2495°C, min.SP 500K)
E	type E (-200°C... 1000°C, min.SP 50K)
J	type J (-200°C...1200°C, min.SP 50K)
K	type K (-200°C...1372°C, min.SP 50K)
L	type L (-200°C...900°C, min.SP 50K)
N	type N (-270°C...1300°C, min.SP 50K)
R	type R (-50°C...1768°C, min.SP 500K)
S	type S (-50°C...1768°C, min.SP 500K)
T	type T (-200°C... 400°C, min.SP 50K)
U	type U (-200°C... 600°C, min.SP 50K)
V	configuration voltage transducer -10...100mV, min. span 5mV

### configuration

A	Standard-factory setting Pt100/3-wire/0-100°C
B	custom specified configuration measuring range
C	custom specified erweiterte configuration TC
D	custom specified erweiterte configuration RTD

Order code

**UTN-500-**

**S**

[illegible]

[illegible]



[illegible]



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