

Earth Surface Temperature Transmitter

Operating Instructions 2.1241.00.000 / 2.1241.00.900

1. Range of Application



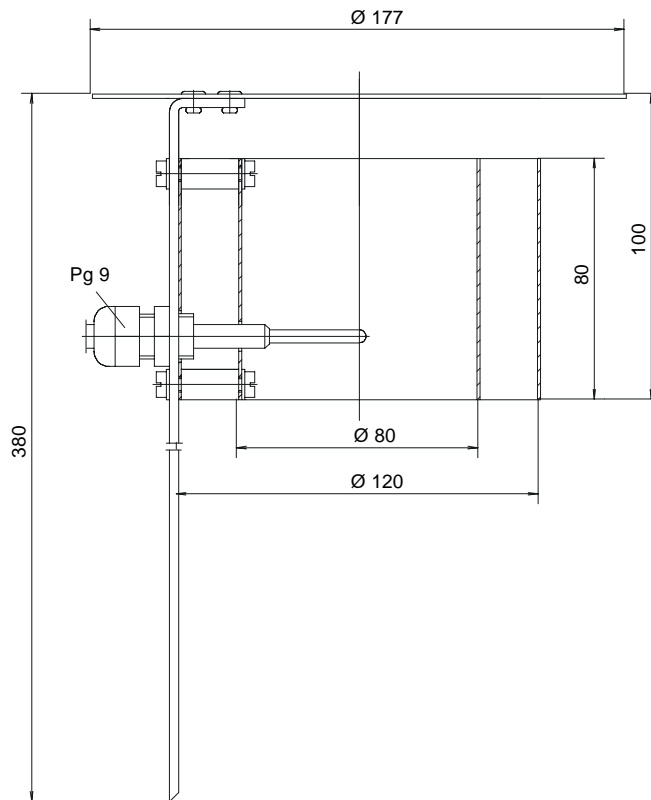
The Earth Surface Temperature Transmitter 2.1241.00.xxx is a data receiver to determine temperatures at ground level. Used in conjunction with a data logger or a measuring transducer (Ω in mA) and a display or recording instrument, it represents a complete temperature measurement system. One important area of application is the determination of ground frost. This information makes it possible to protect temperature-sensitive plants before damage can occur. Another area of application is for traffic warnings concerning ice and sleet formation on roads and highways.

The earth surface temperature is measured 5 cm above the ground, whereas air temperature is measured at a height of 2m. Interestingly enough, the temperature directly at ground level can be approx. 5°C lower than the temperature in a weather hut (at 2 m height) so that ground frost and hoarfrost are reported much more often in synoptic weather telegrams than freezing temperatures.

2. Technical Data

Order-No.	2.1241.00.000	2.1241.00.900
Measuring range	- 30 °C ... + 50 °C	- 25 °C ... + 50 °C
Measuring element	Pt 100 resistance thermometer acc. to standard IEC 751	NTC - pyroelectric conductor
Response Time	12 s at 1 m/s moving air	
Accuracy at 0°C	$\pm 0,1 \text{ K} = \pm 0,033 \Omega$	$\pm 0,2 \text{ K} (0 \dots + 30 \text{ °C})$
Self-heating error	at 1 m/s 0,04 °C / mW at 0 m/s 0,17 °C / mW	
Connecting cable	LiYCY 4 x 0,25 mm ² ; 5 m long	5 m long with flat adapter plugs
Type of circuit	4-lead circuit	2 core
Weight	1 kg	1 kg

Scale Drawing



Wiring Diagrams

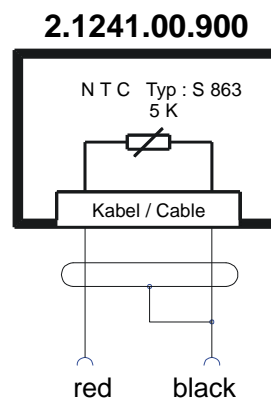
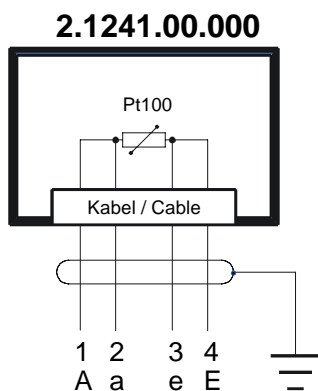


Table: Resistance values in Ohm from 1 to 1°C for Pt 100 Resistance Thermometer

°C	0	1	2	3	4	5	6	7	8	9
- 30	88,22	87,83	87,43	87,04	86,64	86,25	85,85	85,46	85,06	84,67
- 20	92,16	91,77	91,37	90,98	90,59	90,19	89,80	89,40	89,01	88,62
- 10	96,09	95,69	95,30	94,91	94,52	94,12	93,73	93,34	92,95	92,55
- 0	100,00	99,61	99,22	98,83	98,44	98,04	97,65	97,26	96,87	96,48

+ 0	100,00	100,39	100,78	101,17	101,56	101,95	102,34	102,73	103,12	103,51
+ 10	103,90	104,29	104,68	105,07	105,46	105,85	106,24	106,63	107,02	107,40
+ 20	107,79	108,18	108,57	108,96	109,35	109,73	110,12	110,51	110,90	111,28
+ 30	111,67	112,06	112,45	112,83	113,22	113,61	113,99	114,38	114,77	115,15
+ 40	115,54	115,93	116,31	116,70	117,08	117,47	117,85	118,24	118,62	119,01
+ 50	119,40	119,78	120,16	120,55	120,93	121,32	121,70	122,09	122,47	122,86
+ 60	123,24	123,62	124,01	124,39	124,77	125,16	125,54	125,92	126,31	126,69
+ 70	127,07	127,45	127,84	128,22	128,60	128,98	129,37	129,75	130,13	130,51
+ 80	130,89	131,27	131,66	132,04	132,42	132,80	133,18	133,56	133,94	134,32

3. Basic Mode of Operation

Good ventilation in order to avoid heat concentration. The change in resistance in platinum is proportional to temperature. Thus the resistance value can be taken as a standard for temperature.

In order to eliminate errors due to radiation to the greatest extent possible, the measurement sensor (Pt 100 or NTC) is protected by a roof. The outer surface of this roof is silver in colour in order to reflect radiation. The inner surface has been varnished black.

The protective tubes around the sensor reflect the radiation emitted by the roof and also serve to protect the sensor mechanically.

All parts have been arranged to guarantee.

4. Preparation for Use

Select a site where there are no protruding elements which could penetrate the protective tube in the inside of the instrument and transport heat. If the grass is high, mow it

The area around the instrument must be free of obstacles so that the measurement sensor can be properly ventilated.

Screw the holding rod on the radiation protection to the desired height or insert it into the ground. Push the sensor through the screw-type conduit fitting and screw it into place in the centre (see scale drawing).

Connect electrically as shown in the wiring diagram.

Please Note:

Make sure that the protective roof and the protective tube are clean and free of dirt. This is the only way to guarantee that solar radiation is effectively reflected and that radiation errors are avoided.

In order to attain a better degree of reflection, you can cover the roof additionally with commercially available household aluminium foil. Make sure that the shiny side of the foil is facing outwards.

5. Mechanical Construction

The sensor screw coupling is fixed to a sturdy holder. There are two protective tubes around the sensor. They too are screwed to the holder and are separated thermally. The entire unit is covered by a protective roof.

All parts are made of non-corrosive materials.

6. Maintenance

Make sure that the outer surface of the radiation protection element is clean as otherwise the sheet will heat up as a result of a radiation error.

If aluminium foil is used, it should be replaced at least once every four weeks, if dirty then at shorter intervals.

Plants or grass must be kept out of the protective tube.

7. Repair

If the sensor is defective, loosen the PG 9 screw-type conduit fitting and remove the sensor. Replace it with a new one. The cable is connected the sensor.



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