



S+S REGELTECHNIK

THERMASGARD® ALTF 1

Ⓓ Bedienungs- und Montageanleitung

Anlegetemperaturfühler / Rohranlegefühler,
incl. Spannband, mit passivem Ausgang

ⒼⒷ Operating Instructions, Mounting & Installation

Surface contact temperature sensors / tube contact sensors,
including strap, with passive output

Ⓕ Notice d'instruction

Sonde de température à applique / sonde d'applique pour conduites,
y compris collier de serrage, avec sortie passive

ⒼⒶ Руководство по монтажу и обслуживанию

Датчик температуры накладной / накладной для труб,
вкл. хомут, с пассивным выходом



S+S REGELTECHNIK

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Herzlichen Glückwunsch!

Sie haben ein deutsches Qualitätsprodukt erworben.

Congratulations!

You have bought a German quality product.

Félicitations!

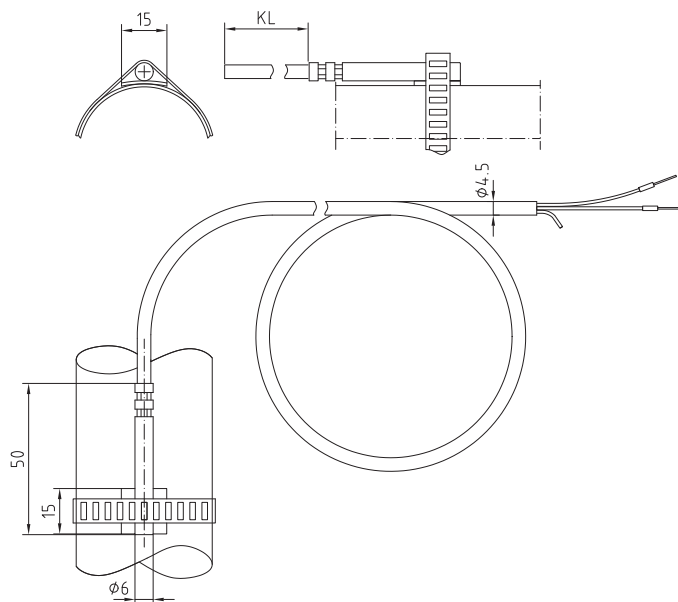
Vous avez fait l'acquisition d'un produit allemand de qualité.

Примите наши поздравления!

Вы приобрели качественный продукт, изготовленный в Германии.

Maßzeichnung
Dimensional drawing
Plan coté
Габаритный чертёж

ALTF 1

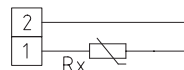


THERMASGARD® ALTF 1 surface contact sensors are electric contact thermometers and are used for measuring surface temperatures of solids, having at least one so-called contact area that is brought into contact with the surface to be measured. The surface contact temperature sensor ALTF 1 with connection cable and passive output determines the temperature of a medium flowing inside a pipe (e.g. water temperature) via the surface temperature. ALTF 1 is a tube contact resistance thermometer with strap and axial feeler tube for measuring temperature on piping and tubes (e.g. cold-water and hot-water), or at heating sections for heating system control.

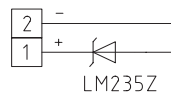
TECHNICAL DATA

Measuring range:	–35...+105 °C PVC –35...+180 °C silicone ($T_{\max}$ NTC = +150 °C, $T_{\max}$ LM235Z = +125 °C)
Sensors / output:	see table, passive (optional also with 2 sensors) (Perfect Sensor Protection with IP68)
Connection type:	2-wire connection (4-wire connection optional)
Testing current:	approx. 1 mA
Process connection:	endless strap and metal tightener (included in the scope of delivery)
Protective tube:	stainless steel, V4A (1.4571), including pre-bent contact plate
Strap dimensions:	$\varnothing = 13 - 92$ mm (1/4 - 3"); length 300 mm
Connecting cable:	PVC; 1.5 m, LiYY, 2 x 0.25 mm ² or silicone, SIHF, 2 x 0.25 mm ² ends stripped, with wire end sleeves
Insulating resistance:	≥ 100 MΩ, at +20 °C (500 V DC)
Humidity:	< 95 % r.H., non-precipitating air
Protection class:	III (according to EN 60730)
Protection type:	IP65 (according to EN 60529) humidity-tight stamped IP68 (optional sensor sleeve watertight compound-filled*)

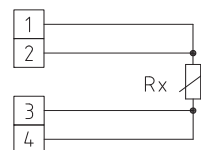
1x two-wire connection
Standard



1x two-wire connection
LM235Z (KP10)



1x four-wire connection
(optional)



* High-performance encapsulation against vibration, mechanical stress and humidity

PS-PROTECTION
PERFECT SENSOR PROTECTION

THERMASGARD® ALTF 1 – Surface contact temperature sensors / tube contact temperature sensors

Type/WG03	Sensor/Output	Item No.
ALTF 1 xx PVC	Measuring range: –35...+105 °C	IP65, PVC
ALTF1 PT100	Pt100 (according to DIN EN 60751, class B)	1101-6020-1211-110
ALTF1 PT1000	Pt1000 (according to DIN EN 60751, class B)	1101-6020-5211-110
ALTF1 Ni1000	Ni1000 (according to DIN EN 43760, class B, TCR = 6180 ppm/K)	1101-6020-9211-110
ALTF1 NITK	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-6021-0211-110
ALTF1 LM235Z	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-6022-1211-110
ALTF1 NTC1,8K	NTC 1.8K	1101-6021-2211-110
ALTF1 NTC10K	NTC 10K	1101-6021-5211-110
ALTF1 NTC20K	NTC 20K	1101-6021-6211-110
ALTF 1 xx SILIKON	Measuring range: –35...+180 °C	IP65, silicone
ALTF1 PT100	Pt100 (according to DIN EN 60751, class B)	1101-6020-1211-120
ALTF1 PT1000	Pt1000 (according to DIN EN 60751, class B)	1101-6020-5211-120
ALTF1 Ni1000	Ni1000 (according to DIN EN 43760, class B, TCR = 6180 ppm/K)	1101-6020-9211-120
ALTF1 NITK	Ni1000 TK5000 (TCR = 5000 ppm/K), LG-Ni1000	1101-6021-0211-120
ALTF1 LM235Z	LM235Z (TCR = 10 mV/K; 2.73 V at 0 °C), KP10	1101-6022-1211-120
ALTF1 NTC1,8K	NTC 1.8K	1101-6021-2211-120
ALTF1 NTC10K	NTC 10K	1101-6021-5211-120
ALTF1 NTC20K	NTC 20K	1101-6021-6211-120
Extra charge:	Other sensors optional	
Accessories		
WLP-1	Heat-conductive paste set	7100-0060-1000-000

Measuring principle of HVAC temperature sensors in general:

The measuring principle of temperature sensors is based on an internal sensor that outputs a temperature-dependent resistance signal. The type of the internal sensor determines the output signal. The following active/passive temperature sensors are distinguished:

- a) Pt 100 measuring resistor (according to DIN EN 60 751)
- b) Pt 1000 measuring resistor (according to DIN EN 60751)
- c) Ni 1000 measuring resistor (according to DIN EN 43 760, TCR = 6180 ppm/K)
- d) Ni 1000_TK 5000 measuring resistor (TCR = 5000 ppm/K)
- e) LM235Z, semiconductor IC (10 mV/K, 2.73 V/°C). Ensure correct polarity +/- when connecting!
- f) NTC (according to DIN 44070)
- g) PTC
- h) KTY silicon temperature sensors

The most important resistance characteristics are shown on the last page of these operating instructions. According to their characteristics, individual temperature sensors exhibit different slopes in the range between 0 °C and +100 °C (TK value). Maximum-possible measuring ranges also vary from sensor to sensor (for some examples to this see under technical data).

Design of HVAC temperature sensors in general:

Sensors are distinguished by shape type as follows: surface-contacting sensors, cable temperature sensors, and enclosure-type and built-in temperature sensors.

- On surface-contacting sensors, the temperature sensor has at least one contact area that must be brought in contact, e.g. with the surface of radiators or pipes. If the contact area is not positioned correctly relative to the surface to be measured, significant temperature measurement errors may occur. Good contact area and temperature conduction must be ensured, dirt and unevenness must be avoided, and heat-conductive paste is to be used where necessary.
- On cable temperature sensors, the temperature sensor is installed inside a sensor sleeve, from which a connecting cable is leading out. In addition to the standard insulating materials PVC, silicone, and fibreglass with stainless steel texture, other versions are also available that may allow a wider range of application.
- On enclosure-type sensors, the temperature sensor is embedded in a respective enclosure. Different designs of enclosures are available, e.g. with an external sensor sleeve (see outside temperature sensor ATF2). Enclosure-type sensors are normally distinguished into in-wall (FSTF) and on-wall (RTF, ATF) types and indoor and wet room versions. Connection terminals are placed on a plate inside the connecting enclosure.
- Duct and built-in temperature sensors are distinguished into temperature sensors with interchangeable measuring insert and without interchangeable measuring insert. Connection parts are placed inside a connecting head. Standard process connection for immersion sensors is a pipe thread (sizes in inches) and a mounting flange for duct sensors. However, it may be designed differently. When a built-in sensor has a neck tube, the application range is usually somewhat wider since ascending heat cannot flow directly and immediately into the connecting head. This is to be noted especially when transmitters are installed. The temperature sensor in built-in sensors is always placed inside the front part of the protective tube. On temperature sensors with short reaction times, protective tubes are stepped.

Note!

Select immersion depth for built-in sensors so that the error caused by heat dissipation stays within the admissible error margins. A standard value is: 10 x diameter of protection tube + sensor length. In connection with enclosure-type sensors, particularly with outdoor sensors, please consider the influence of thermal radiation. For that purpose, a sunshade and radiation protector SS-02 can be attached.

Maximum thermal load on components:

On principle, all temperature sensors shall be protected against unacceptable overheating!

Standard values for individual components and materials selected are shown for operation under neutral atmosphere and otherwise normal conditions (see table to the right).

For combinations of different insulating materials, the lowest temperature limit shall always apply.

Component max. thermal load

Connecting cable

PVC, normal.....+70 °C
PVC, heat-stabilized.....+105 °C
Silicone+180 °C
PTFE+200 °C
Fibreglass insulation with stainless steel texture+400 °C

Enclosure/Sensor

see table "Technical Data"

Mounting and Installation

Devices are to be connected under dead-voltage condition. Devices must only be connected to safety extra-low voltage. Consequential damages caused by a fault in this device are excluded from warranty or liability. Installation of these devices must only be realized by authorized qualified personnel. The technical data and connecting conditions shown on the device labels and in the mounting and operating instructions delivered together with the device are exclusively valid. Deviations from the catalogue representation are not explicitly mentioned and are possible in terms of technical progress and continuous improvement of our products. In case of any modifications made by the user, all warranty claims are forfeited. Operating this device close to other devices that do not comply with EMC directives may influence functionality. This device must not be used for monitoring applications, which serve the purpose of protecting persons against hazards or injury, or as an EMERGENCY STOP switch for systems or machinery, or for any other similar safety-relevant purposes.

Dimensions of enclosures or enclosure accessories may show slight tolerances on the specifications provided in these instructions.

Modifications of these records are not permitted.

In case of a complaint, only complete devices returned in original packing will be accepted.

Notes regarding mechanical mounting and attachment:

Mounting shall take place while observing all relevant regulations and standards applicable for the place of measurement (e.g. such as welding instructions, etc.). Particularly the following shall be regarded:

- VDE/VDI directive technical temperature measurements, measurement set-up for temperature measurements.
- The EMC directives must be adhered to.
- It is imperative to avoid parallel laying of current-carrying lines.
- We recommend to use shielded cables with the shielding being attached at one side to the DDC/PLC.

Before mounting, make sure that the existing thermometer's technical parameters comply with the actual conditions at the place of utilization, in particular in respect of:

- Measuring range
- Permissible maximum pressure, flow velocity
- Installation length, tube dimensions
- Oscillations, vibrations, shocks are to be avoided (< 0.5 g)

Attention! In any case, please observe the mechanical and thermal load limits of protective tubes according to DIN 43763 respectively according to specific S+S standards!

Resistance characteristics of passive temperature sensors (see last page)

In order to avoid damages/errors, preferably shielded cables are to be used.

Laying measuring cables parallel with current-carrying cables must in any case be avoided. EMC directives shall be observed! These instruments must be installed by authorised specialists only!

Limiting deviation according to classes:

Tolerances at 0 °C:

Platinum sensors [Pt100, Pt1000]:

DIN EN 60751, class B ± 0.3 K
1/3 DIN EN 60751, class B ± 0.1 K

Nickel sensors:

Ni1000 DIN EN 43760, class B ± 0.4 K
Ni1000 1/2 DIN EN 43760, class B ± 0.2 K
Ni1000 TK5000 ± 0.4 K

ATTENTION, NOTE!

Testing current influences the thermometer's measuring accuracy due to intrinsic heating and therefore, should never be greater than as specified below:

Standard values for testing current:

Sensor current, maximum $I_{\max}$
Pt100, Pt1000 (thin-layer) < 0.1 - 0.3 mA
Ni1000 (DIN), Ni1000 TK5000 < 2 mA
NTC's < 1 mA
LM235 400 µA... 5 mA

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Irrtümer und technische Änderungen vorbehalten.

Errors and technical changes excepted.

Sous réserve d'erreurs et de modifications techniques.

Возможны ошибки и технические изменения.

Widerstandskennlinien für passive Temperatursensoren
Resistance characteristics of passive temperature sensors
Courbes caractéristiques pour capteurs de température passive
Характеристики сопротивления пассивных датчиков температуры



S+S REGELTECHNIK

	PT 100	PT 1000	Ni 1000	Ni 1000 TK 5000	FeT (T1)	KTY 81-210	LM235Z (KP10)	
°C	Ω	Ω	Ω	Ω	Ω	Ω	mV	°C
- 50	80.3	803	743	790.8	-	1030	-	- 50
- 40	84.3	843	791	826.8	-	1135	2330	- 40
- 30	88.2	882	842	871.7	1935	1247	2430	- 30
- 20	92.2	922	893	913.4	2031	1367	2530	- 20
- 10	96.1	961	946	956.2	2128	1495	2630	- 10
0	100.0	1000	1000	1000.0	2227	1630	2730	0
+ 10	103.9	1039	1056	1044.8	2328	1772	2830	+ 10
+ 20	107.8	1078	1112	1090.7	2429	1922	2930	+ 20
+ 30	111.7	1117	1171	1137.6	2534	2080	3030	+ 30
+ 40	115.5	1155	1230	1185.7	2639	2245	3130	+ 40
+ 50	119.4	1194	1291	1235.0	2746	2417	3230	+ 50
+ 60	123.2	1232	1353	1285.4	2856	2597	3330	+ 60
+ 70	127.1	1271	1417	1337.1	2967	2785	3430	+ 70
+ 80	130.9	1309	1483	1390.1	3079	2980	3530	+ 80
+ 90	134.7	1347	1549	1444.4	3195	3182	3630	+ 90
+ 100	138.5	1385	1618	1500.0	3312	3392	3730	+ 100
+ 110	142.3	1423	1688	1557.0	3431	3607	3830	+ 110
+ 120	146.1	1461	1760	1625.4	3552	3817	3930	+ 120
+ 130	149.8	1498	1833	-	3676	4008	-	+ 130
+ 140	153.6	1536	1909	-	3802	4166	-	+ 140
+ 150	157.3	1573	1987	-	3929	4280	-	+ 150

	NTC 1.8 kΩhm	NTC 2.2 kΩhm	NTC 3 kΩhm	NTC 5 kΩhm	NTC 10 kΩhm	NTC 10 kΩPRE	NTC 20 kΩhm	NTC 50 kΩhm	
°C	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	°C
- 50	-	-	-	-	-	-	-	-	- 50
- 40	39073	-	-	-	-	-	806800	2017000	- 40
- 30	22301	27886	53093	88488	175785	135200	413400	1033500	- 30
- 20	13196	16502	29125	48541	96597	78910	220600	551500	- 20
- 10	8069	10070	16599	27664	55142	47540	122260	305650	- 10
0	5085	6452	9795	16325	32590	29490	70140	175350	0
+ 10	3294	4138	5971	9951	19880	18790	41540	103850	+ 10
+ 20	2189	2719	3747	6246	12491	12270	25340	63350	+ 20
+ 30	1489	1812	2417	4028	8058	8196	15886	39715	+ 30
+ 40	1034	1248	1597	2662	5329	5594	10212	25530	+ 40
+ 50	733	876	1081	1801	3605	3893	6718	16795	+ 50
+ 60	529	626	746	1244	2489	2760	4518	11295	+ 60
+ 70	389	454	526	876	1753	1900	3098	7745	+ 70
+ 80	290	335	346	627	1256	1457	2166	5415	+ 80
+ 90	220	251	275	458	915	1084	1541	3852	+ 90
+ 100	169	190	204	339	678	817	1114	2785	+ 100
+ 110	131	146	138	255	509	624	818	2045	+ 110
+ 120	103	-	105	195	389	482	609	1523	+ 120
+ 130	-	-	81	151	300	377	460	1149	+ 130
+ 140	-	-	64	118	234	298	351	878	+ 140
+ 150	-	-	50	93	185	238	272	679	+ 150