(D) (GB) (F) (RU) 20100-2011 02/2011

THERMASGARD® KTF 1
THERMASGARD® KTF 01

S+S REGELTECHNIK

(D) Bedienungs- und Montageanleitung

Kanaltemperaturfühler/Luftkanalfühler
mit passivem Ausgang,
incl. Montageflansch

(GB) Operating Instructions, Mounting & Installation

Duct/air duct temperature sensor
with passive output,
including mounting flange

(F) Notice d'instruction

Sonde de température pour gaine d'air,
avec sortie passive,
y compris bride de montage

(RU) Руководство по монтажу и обслуживанию

Датчик температуры канальный/
для воздушных каналов,
вкл. присоединительный фланец

KTF 1
KTF 01

S+S REGELTECHNIK

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

Примите наши поздравления!
Вы приобрели качественный продукт, изготовленный в Германии.

D GB F RU

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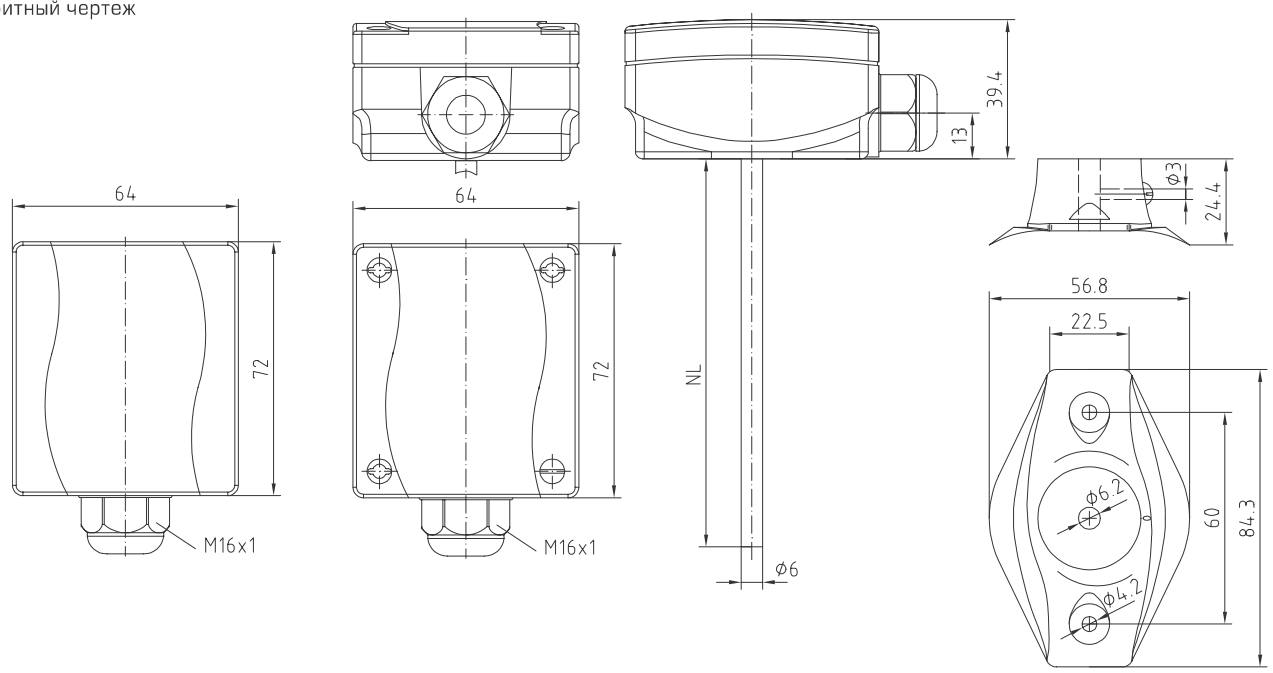
Maßzeichnung
Dimensional drawing
Plan coté
Габаритный чертеж

KTF01
KTF1



(GB) THERMASGARD® KTF 1 / KTF 01

Duct resistance thermometer with passive output, connecting head made of impact-resistant plastic, enclosure cover with quick-locking screws and plastic mounting flange.
This duct sensor is particularly designed for temperature measurement in airflows and for the detection of temperatures in gaseous media, e.g. in ventilation and air conditioning ducts.

TECHNICAL DATA::

Measuring range:.....-30...+150 °C
(T_{max} NTC = 150 °C, T_{max} LM235Z = 125 °C)

Sensors / output:.....see table, passive
(optional also with two sensors)

Connection type: .....2-wire connection
(3- or 4-wire connection optional)

Testing current:.....ca. 1 mA

Protective tube:.....stainless steel, 1.4571, V4A,
Ø = 6 mm (optional perforated)

Connecting head: .....plastic, material polyamide,
30 % glass-globe-reinforced,
KTF 1..... **with quick-locking screws,**
KTF 01 .... **with snap-on lid,**
colour pure white (similar RAL 9010),
ambient temperature -20 / +100 °C

Dimensions:.....72 x 64 x 39,4 mm

Electrical connection:.....0.14 - 1.5 mm²
via terminal screws on circuit board

Cable gland:.....M16, including strain relief

Process connection:.....by mounting flange, plastic
(included in the scope of delivery)
(galvanised steel optional, see accessories)

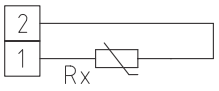
Insulating resistance:.....≥ 100 MΩ, at 20 °C (500 V DC)

Humidity:.....< 95 % r. H.

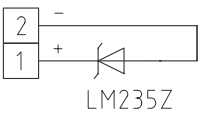
Protection class:.....**KTF 1**..... **III** (according to EN 60 730)
KTF 01 .... **II** (according to EN 60 730)

Protection type:.....**KTF 1**..... **IP 65** (according to EN 60 529)
KTF 01 .... **IP 43** (according to EN 60 529)

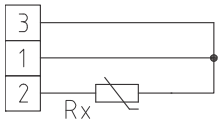
1x two-wire connection
standard



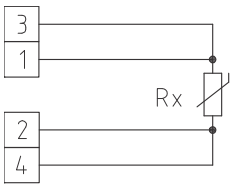
1x two-wire connection
LM 235 Z (KP 10)



1x three-wire connection
(optional)



1x four-wire connection
(optional)



Type / WG1 - Sensor / Output / NL	50 mm	100 mm	150 mm	200 mm	250 mm	300 mm	400 mm
KTF 1 / 01 Pt100	•	•	•	•	•	•	•
KTF 1 / 01 Pt1000	•	•	•	•	•	•	•
KTF 1 / 01 Ni1000	•	•	•	•	•	•	•
KTF 1 / 01 Ni1000 TK5000, LG-Ni1000	•	•	•	•	•	•	•
KTF 1 / 01 NTC 1,8 kOhm	•	•	•	•	•	•	•
KTF 1 / 01 KTY 81-210, NTC 10k 20k, 30k, 50k, 10k Pre	•	•	•	•	•	•	•
KTF 1 / 01 LM235Z (10 mV / K), KP10	•	•	•	•	•	•	•

(GB) General notes

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 head type B:	
Aluminium casting with rubber seal	+100 °C
Aluminium casting with silicone seal	+150 °C
"VA" stainless steel part with Teflon seal	+200 °C
Connecting head made of plastic:	
Connecting cable	+100 °C
PVC, normal (PVC, heat-stabilized)	+70 °C (+105 °C)
Silicone	+180 °C
PTFE	+200 °C
Fibreglass insulation with stainless steel texture	+400 °C

(GB) 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 solely 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!

Notes regarding process connection of built-in sensors:
If possible, select material of protective tube to match the material of piping or tank wall, in which the thermometer will be installed!

Maximum temperatures T_{max} and maximum pressures p_{max} are as follows: for TH-MS brass sleeves T_{max} = +150 °C, p_{max} = 10 bar and for TH-VA stainless steel sleeves (standard) T_{max} = +400 °C, p_{max} = 40 bar.

Screw-in threads:
Ensure appropriate support of the gasket or sealing material when mounting! Permissible tightening torque standard values for screw-in threads, are as follows:

M 18 x 1.5; M 20 x 1.5, pipe thread G 1/2" : 50 Nm
M 27 x 2.0, pipe thread G 3/4" : 100 Nm

Flange mounting:
In case of flange mounting, screws in the flange part must be equally tightened. The lateral pressure screw must clamp securely, otherwise the feeler shaft might slip through.

Welding sleeves:
Specific welding instructions shall be observed.

On principle, unevenness or the like that might influence the system's "CIP ability" must not develop at welds.

For high-pressure lines, pressure test certifications and inspections are required.

(GB) 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
LM 235 ..... 400 µA ... 5 mA

(D) (GB) (F) (RU)

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

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Temp.	Pt100	Pt1000	Ni1000	Ni1000 TK5000	FeT	KTY 81-210	LM 235Z	Temp.
°C	Ω	Ω	Ω	Ω	Ω	kΩ	mV	°C
- 50,0	80,31	803,10	743,00	790,88	-	1 068,65	2 232,00	**- 50,0**
- 40,0	84,27	842,70	791,00	830,83	-	1 158,95	2 332,00	**- 40,0**
- 30,0	88,22	882,20	842,00	871,69	1 934,70	1 269,25	2 432,00	**- 30,0**
- 20,0	92,16	921,60	893,00	913,48	2 030,41	1 385,15	2 532,00	**- 20,0**
- 10,0	96,09	960,90	946,00	956,24	2 127,68	1 508,65	2 632,00	**- 10,0**
0,0	100,00	1 000,00	1 000,00	1 000,00	2 226,53	1 639,60	2 732,00	**0,0**
10,0	103,90	1 039,00	1 056,00	1 044,79	2 327,01	1 778,10	2 832,00	**10,0**
20,0	107,79	1 077,90	1 112,00	1 090,65	2 429,15	1 924,15	2 932,00	**20,0**
25,0	109,74	1 097,40	1 141,00	1 113,99	2 480,86	2 000,00	2 982,00	**25,0**
30,0	111,67	1 116,70	1 171,00	1 137,61	2 533,00	2 077,80	3 032,00	**30,0**
40,0	115,54	1 155,40	1 230,00	1 185,71	2 638,60	2 238,90	3 132,00	**40,0**
50,0	119,40	1 194,00	1 291,00	1 234,97	2 745,99	2 407,60	3 232,00	**50,0**
60,0	123,24	1 232,40	1 353,00	1 285,44	2 855,23	2 583,80	3 332,00	**60,0**
70,0	127,07	1 270,00	1 417,00	1 337,14	2 966,36	2 767,50	3 432,00	**70,0**
80,0	130,89	1 308,90	1 483,00	1 390,12	3 079,42	2 958,80	3 532,00	**80,0**
90,0	134,70	1 347,00	1 549,00	1 444,39	3 194,47	3 152,50	3 632,00	**90,0**
100,0	138,50	1 385,00	1 618,00	1 500,00	3 311,56	3 363,90	3 732,00	**100,0**
110,0	142,29	1 422,00	1 688,00	1 556,98	3 430,75	3 577,75	3 832,00	**110,0**
120,0	146,06	1 460,60	1 760,00	1 615,36	3 552,09	3 799,10	3 932,00	**120,0**
130,0	149,82	1 498,20	1 883,00	1 675,18	3 675,65	4 028,05	4 032,00	**130,0**
140,0	153,58	1 535,80	1 909,00	1 736,47	3 801,48	4 188,10	4 132,00	**140,0**
150,0	157,31	1 573,10	1 987,00	1 799,26	3 929,65	4 397,70	4 232,00	**150,0**

Temp.	NTC 1 kOhm	NTC 1,8 kOhm	NTC 3 kOhm	NTC 5 kOhm	NTC 10 kOhm	NTC 10 k PRE	NTC 20 kOhm	NTC 50 kOhm
°C	Ω	Ω	Ω	Ω	kΩ	kΩ	kΩ	kΩ
- 50,0	32 886,00	-	200 338,00	333 914,00	667,83	441,30	1 667,57	4 168,93
- 40,0	18 641,00	-	100 701,00	167 835,00	335,67	239,80	813,44	2 033,61
- 30,0	10 961,00	-	53 005,00	88 342,00	176,68	135,20	415,48	1 038,70
- 20,0	6 662,00	-	29 092,00	48 487,00	96,97	78,91	221,30	553,24
- 10,0	4 175,00	8 400,00	16 589,00	27 649,00	55,30	47,54	122,47	306,18
0,0	2 961,00	5 200,00	9 795,20	16 325,40	32,65	29,49	70,20	175,51
10,0	1 781,00	3 330,00	5 971,12	9 951,80	19,90	18,79	41,56	103,90
20,0	1 205,00	2 200,00	3 748,10	6 246,80	12,49	12,26	25,35	63,49
25,0	1 000,00	1 800,00	3 000,00	5 000,00	10,00	10,00	20,00	50,00
30,0	834,20	1 480,00	2 416,80	4 028,00	8,06	8,19	15,89	39,71
40,0	589,20	1 040,00	1 597,50	2 662,40	5,32	5,59	10,21	25,53
50,0	424,00	740,00	1 080,30	1 800,49	3,60	3,89	6,72	16,80
60,0	310,40	540,00	746,12	1 243,53	2,49	2,76	4,52	11,30
70,0	231,00	402,00	525,49	875,81	1,75	1,99	3,10	7,75
80,0	174,50	306,00	376,85	628,09	1,26	1,46	2,12	5,42
90,0	133,60	240,00	274,83	458,06	0,92	1,08	1,54	3,85
100,0	103,70	187,00	203,59	339,32	0,68	0,82	1,12	2,79
110,0	81,40	149,00	153,03	255,03	0,51	0,62	0,82	2,05
120,0	64,70	118,00	116,58	194,30	0,39	0,48	0,61	1,52
130,0	51,90	95,00	89,95	149,91	0,30	0,38	0,46	1,15
140,0	42,10	77,00	70,22	117,04	0,23	0,30	0,35	0,88
150,0	34,40	64,00	55,44	92,39	0,18	0,24	0,27	0,68