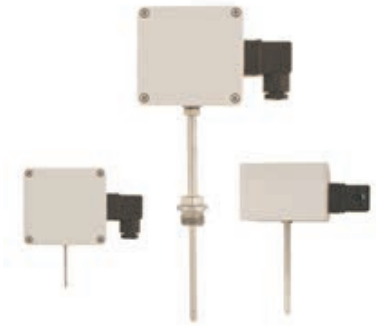
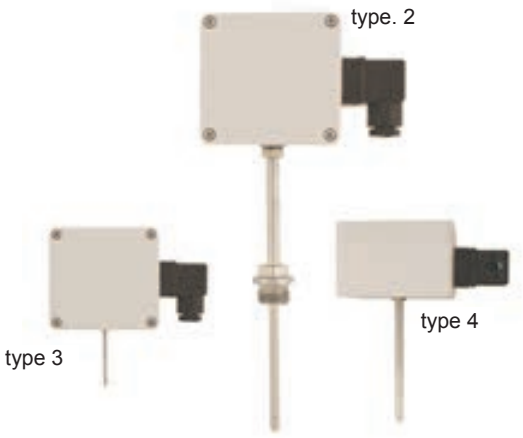
Датчики температуры с измерительным преобразователем GHM MESSTECHNIK



Технические характеристики

Temperature probes with integrated transmitter	Description	Measuring element / measuring technology						Page
		Pt100	Pt1000	Type K NiCr-Ni	Radio	Infrared	Others	
GTMU	Temperature probe with transmitter	●		●				**38**
GTMU-MP	Temperature probe with transmitter		●					**40**
GTMU-IF	Compact temperature transmitter		●					**42**
ETS	Temperature transmitter		●					**43**
ETK12-I/U/F	Temperature transmitter						●	**45**
ETK12-S	Temperature switch						●	**48**
FLEX-T	Temperature transmitter / switch		●				●	**51**
OMNI-T	Temperature transmitter / switch (with display)		●				●	**55**
ETSD	Temperature difference transmitter	●						**59**
RF1-T	Radio temperature transmitter / switch		●		●			**62**
IR-CT 20	Infrared thermometer					●		**64**

Temperature Probe with Transmitter GTMU



- **Optimal adaptability due to 4 different design types**
- **PT100 or NiCr-Ni probe incl. transmitter**
- **Ready for assembly**

Characteristics

The GTMU is a temperature probe with integrated transmitter. There are 4 basic design types and 2 sensor types. This ensures optimal adaptability to different conditions like higher temperatures, outdoor usage or wall mounting.

The measurement is done by means of a resistive temperature sensor (Pt100, 2- or 3- wire) or thermocouple (NiCr-Ni). The transmitter outputs linear current or voltage signals.

The transmitter is completely customized according to customer requirements.

Technical data

Sensor element	:	Pt100 NiCr-Ni
Standard measuring range		
Pt100	:	0..100 °C, 0..200 °C, -50..+50 °C, -50..+150 °C
NiCr-Ni	:	0..100 °C, -50..+150 °C, -200..+300 °C, 0..600 °C, 0..1150 °C other measuring ranges upon request
Max. possible measuring range		
Pt100	:	-200..+800 °C
NiCr-Ni	:	-200..1150 °C
Accuracy		
Pt100	:	DIN class B
NiCr-Ni	:	class 1
Output signal	:	standard 4..20 mA (2-wire) optional 0..1 V, 0..2 V, 0..5 V, 0..10V (3- or 4-wire)
Power supply Uv	:	12..30 V DC (at 0..10 V: 18..30 V DC)
Permissible burden R_A	:	(at 4..20 mA) $R_A = (U_V - 12\ V) / 0{,}02\ A$
Permissible load R_L	:	(at … V) $R_L > 3000\ \Omega$
Working temperature	:	0..70 °C (-40..+85 °C at option RT420 / GITT)
Housing material	:	ABS
Probe material	:	stainless steel

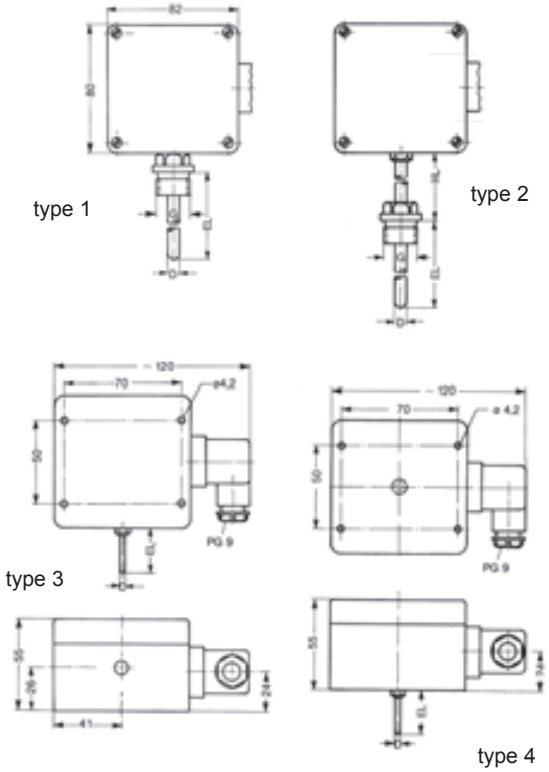
Protection class	:	IP65
Sensor installation	:	sensors are isolated
Mounting	:	with fastening holes for wall mounting
Electrical connection	:	elbow-type plug (EN 175301-803/A)

	type 1	type 2	type 3	type 4
Process connection (standard)	G½		—	—
Fitting length (standard)	EL = 100 mm	EL = 100 mm	EL = 50 mm	EL = 100 mm
Neck tube length (standard)	—	HL = 50 mm	—	—
Diameter (standard)	D = 6 mm	D = 6 mm	D = 3 mm	D = 6 mm

Design types

Type 1	with process connection G ½ for screw-in
Type 2	for higher temperatures, process connection G ½ in distance to housing, HL = length of neck tube
Type 3	indoor / outdoor probe for wall mounting *(potting of electronics necessary for outdoor application)*
Type 4	duct probe with centrally mounted sensor tube pointing downwards

Dimensions



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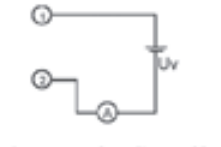
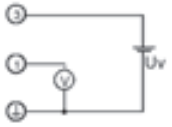
Connection diagram

2-wire connection (4..20 mA)



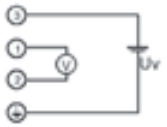
1 = supply voltage +Uv
2 = GND / signal

3-wire connection (.. V DC)



1 = signal +
3 = supply voltage +Uv
⏚ = supply voltage -Uv
signal -

4-wire connection (.. V DC)



1 = signal +
2 = signal -
3 = supply voltage +Uv
⏚ = supply voltage -Uv

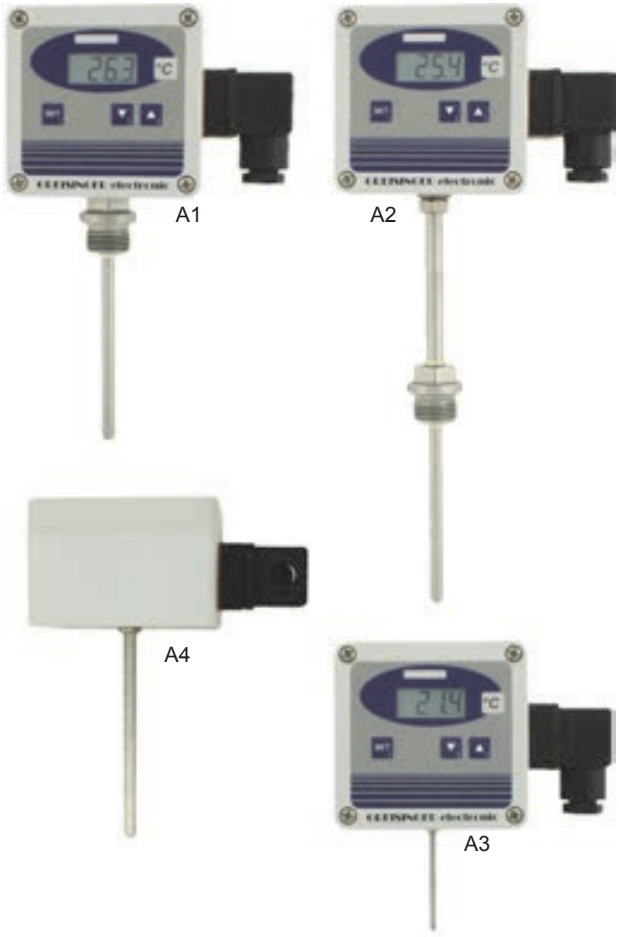
Ordering code

	1.	2.	3.	4.	5.	6.	7.	8.	9.
GTMU	-	-	-	-	-	-	-		

1.	**Design type**		
	A1	duct / wall design with thread	
	A2	duct design for higher temperatures	
	A3	indoor / outdoor probe	
	A4	duct design without thread	
2.	**Sensor element**		
	P	resistance thermometer Pt100	
	K	thermocouple NiCr-Ni	
3.	**Measuring range (MB)**		
	MB1	0..100 °C	*Pt100 / NiCr-Ni*
	MB2	-50..+150 °C	*Pt100 / NiCr-Ni*
	MB3	0..200 °C	*only Pt100*
	MB4	-50..+50 °C	*only Pt100*
	MB5	-200..+300 °C	*only NiCr-Ni*
	MB6	0..600 °C	*only NiCr-Ni*
	MB7	0..1150 °C	*only NiCr-Ni*
	MBx	desired measuring range (e.g. -50..+400 °C) max. possible measuring range: Pt100: -200..+800 °C / NiCr-Ni: -200..+1150 °C	
4.	**Output signal**		
	A1	4..20 mA (2-wire) (standard)	
	V1	0..1 V (3-/ 4-wire)	
	V3	0..2 V (3-/ 4-wire)	
	V4	0..5 V (3-/ 4-wire)	
	V2	0..10 V (3-/ 4-wire)	
5.	**Fitting length EL**		
	050	50 mm (standard A3)	
	100	100 mm (standard A1, A2, A3)	
	xxx	any EL in mm (e.g.: 200 = 200 mm)	

6.	**Probe diameter D**	
	3	Ø 3 mm (standard A3)
	4	Ø 4 mm
	5	Ø 5 mm
	6	Ø 6 mm (standard A1, A2, A4)
	8	Ø 8 mm
7.	**Process connection G (only at design type A1 and A2)**	
	G1	G ½ (V4A) (standard)
	G2	G ¼ (V4A)
	G3	G ⅜ (V4A)
	M5	M5 (V4A)
	M6	M6 (V4A)
	M8	M8 (V4A)
	M0	M10 (V4A)
	M2	M12 (V4A)
8.	**Length of neck tube HL (only at design type A2)**	
	050	50 mm (standard)
	xxx	any HL in mm (e.g.: 200 = 200 mm)
9.	**Options** (combination of multiple options upon request)	
	00	without Option
	VO	on-site display (display and control panel)
	LACK	board varnished on both sides (for outdoor usage)
	GITT	transmitter with electrical isolation (only output 4..20 mA possible)
	RT420	transmitter particular for outdoor usage (only with sensor element Pt100 and output 4..20 mA possible)

Temperature Probe with Transmitter GTMU-MP



- **Optimal adaptability due to 4 different design types**
- **Freely scalable measuring range**
- **With display by default**

Characteristics

The GTMU-MP is a temperature probe with integrated transmitter. There are 4 basic design types. This ensures optimal adaptability to different conditions like higher temperatures, outdoor usage or wall mounting.

The measurement is done by means of a resistive temperature sensor (Pt1000, 2- wire). The measuring range is freely scalable via buttons. The transmitter outputs linearized current or voltage signals.

The GMTU-MP has a display by default and is completely customized according to customer requirements.

Technical data

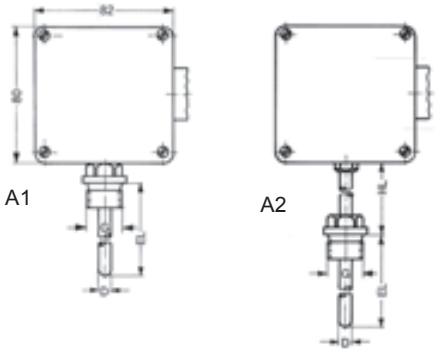
Sensor element	:	Pt1000 (2-wire)
Measuring range	:	-50.0..+400.0 °C, freely scalable
Accuracy	:	
Temperature display	:	±0.4 % of m.v. ±0.2 °C
Output signal	:	±0.2 % FS
Output signal	:	standard 4..20 mA (2-wire) optional 0..1 V, 0..10V (3- / 4- wire)
Power supply Uv	:	12..30 V DC (standard), 18..30 V DC at output signal .. V
Permissible burden R_A	:	(at 4..20 mA) $R_A = (U_V - 12\ V) / 0.02\ A$
Permissible load R_L	:	(at … V) $R_L > 3000\ \Omega$
Working temperature	:	-25..+70 °C (electronics)
Housing material	:	ABS
Probe material	:	stainless steel
Protection class	:	IP65
Mounting	:	with fastening holes for wall mounting or with tube support made of plastic for duct mounting
Electrical connection	:	elbow-type plug (EN 175301-803/A)
Display		
Display	:	LCD-display
Height	:	10 mm
Display range	:	4 digit
Functions	:	Min-/max- value memory Zero point / slope digitally adjustable output signal freely scalable

	A1	A2	A3	A4
Process connection (standard)	G ½		—	—
Fitting length (standard)	EL = 100 mm	EL = 100 mm	EL = 50 mm	EL = 100 mm
Neck tube length (standard)	—	HL = 100 mm	—	—
Diameter (standard)	D = 6 mm	D = 6 mm	D = 3 mm	D = 6 mm

Design types

A1	with process connection G ½ for screw-in
A2	for higher temperatures, process connection G ½ in distance to housing, HL = length of neck tube
A3	indoor / outdoor probe for wall mounting *(potting of electronics necessary for outdoor application)*
A4	duct probe with centrally mounted sensor tube pointing downwards

Dimensions



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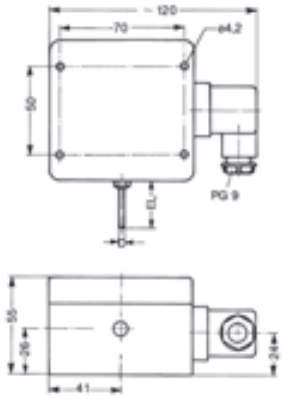
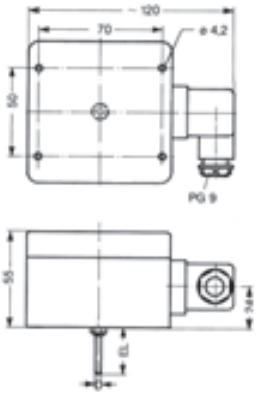


A3



A4

Ordering code

GTMU-MP - 1. - 2. - 3. - 4. - 5. - 6. - 7.

1.	**Design type**		
	A1	as per description	
	A2	as per description	
	A3	as per description	
	A4	as per description	
2.	**Output signal**		
	A1	4..20 mA (2-wire) (standard)	
	V1	0..1 V (3-/ 4-wire)	
	V2	0..10 V (3-/ 4-wire)	
3.	**Fitting length EL**		
	050	50 mm (standard A3)	
	100	100 mm (standard A1, A2, A3)	
	xxx	any EL in mm (e.g.: 200 = 200 mm)	
4.	**Probe diameter D**		
	D03	Ø 3 mm (standard A3)	
	D04	Ø 4 mm	
	D05	Ø 5 mm	
	D06	Ø 6 mm (standard A1, A2 and A4)	
	D08	Ø 8 mm	
5.	**Thread (only at design type A1 and A2)**		
	G1	G ½, V4A (standard)	
	G2	G ¼,V4A	
	G3	G ¾,V4A	
	G5	G ⅜, V4A	
	M5	M5, V4A	*only D = 3 mm possible*
	M6	M6, V4A	*only D = 3 mm possible*
	M8	M8, V4A	*max. D = 5mm possible*
	M0	M10, V4A	*max. D = 6mm possible*
	M2	M12, V4A	
6.	**Length of neck tube HL (only at design type A2)**		
	100	100 mm (standard)	
	xxx	any HL in mm (e.g.: 500 = 500 mm)	
7.	**Options** (combination of multiple options upon request)		
	000	without Option	
	LACK	board varnished on both sides (for outdoor usage)	
	DSG	Double sensor accuracy	

Temperature Transmitter GTMU - IF

GTMU - IF1

GTMU - IF2

GTMU - IF3

- **Internal Pt1000**
- **Housing made of stainless steel**
- **Long-term temperature monitoring**

Characteristics

The GTMU-IF is designed for long-term monitoring of temperatures. It is particularly suitable for narrow and difficult to access measuring points due to its compact design.

The temperature transmitter GTMU-IF has an internal Pt1000 sensor that measures the temperature. The measured values are output via linearized 4..20 mA signal.

The housing of the sensor module is made of stainless steel and is therefore optimally protected against corrosion. The modules can be modified according to customer requirements.

Technical data

	GTMU - IF1	GTMU - IF2	GTMU - IF3
Measuring range	-30.0.. +100.0 °C	-30.0.. +100.0 °C	-70.0.. +400.0 °C
Sensor element	Pt1000 sensor		
Accuracy	electronics: ±0.2 % of m.v. ±0.2 °C sensor element: DIN class B		
Working temperature	-25..+70 °C (electronics in cable sleeve)		
Process connection (standard)	—	thread G ½	thread G ½
Fitting length (standard)	EL = 100 mm	EL = 100 mm	EL = 50 mm
Neck tube length (standard)	—	—	HL = 100 mm
Probe diameter (standard)	Ø 6 mm	Ø 6 mm	Ø 6 mm
Housing	stainless steel V4A (potted)		

Dimensions

Cable sleeve : Ø 15 x 35 mm (without threaded connection)

Ordering code

GTMU - 1. - 2. - 3. - 4. - 5. - 6.

1.	**Design type**	
	IF1	without thread
	IF2	with tread G ½
	IF3	with tread G ½ and neck tube
2.	**Measuring range**	
	MB1	-30.0..+100.0 °C (standard IF1 and IF2)
	MB2	-70.0..+400.0 °C (standard IF3)
	MBx	other ranges upon request, indicate measuring range separately) (max. possible meas. range: -200..+500 °C)
3.	**Fitting length EL**	
	0050	50 mm (standard IF3)
	0100	100 mm (standard IF1 and IF2)
	xxxx	any EL in mm (e.g.: 0700 = 700 mm)
4.	**Probe diameter D**	
	D4	Ø 4 mm
	D5	Ø 5 mm
	D6	Ø 6 mm (Standard)
	D8	Ø 8 mm
5.	**Process connection (only at design IF2 and IF3)**	
	G1	G ½ (standard)
	G2	G ¼
	G3	G ¾
	G4	G ⅛
	G5	G ⅜
	M8	M8x1
	M0	M10x1
	M4	M14x1,5
6.	**Length of neck tube HL (only at design IF3)**	
	100	100 mm (standard)
	xxx	any HL in mm (e.g.: 200 = 200 mm)

Accessories

Programming tool for GTMU-IF

The programming tool contains
- a multilingual configuration software
- USB interface adapter for GTMU-IF

Option

Sensor element 1/3 DIN class B or class A on requirement.

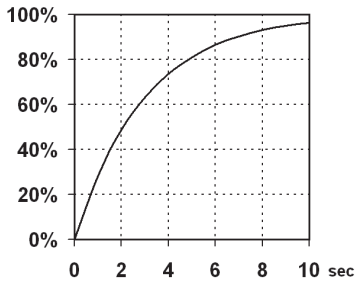
Temperature Transmitter ETS

- **4..20 mA two-wire temperature transmitter**
- **Lance-shaped with small bulk**
- **Compact construction available**
- **Short response time**
- **Infinitely adjustably rotatable cable outlet for clean alignment**

Characteristics

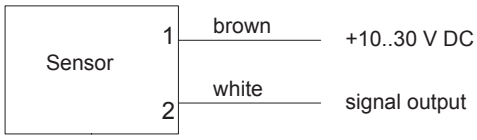
The temperature sensor consists of a PT1000 resistance sensor, which has very good dynamic behaviour. The temperature-dependent change in resistance is linearised by the downstream electronics, and converted into a temperature-proportional 4..20 mA signal. The sensor is supplied with < 4 mA, so it was possible to implement a two-wire connection. At the same time, this process connection allows monitoring for wire breaks. Because the complete upper part of the housing can be turned, it is possible to simply and infinitely adjust the cable outlet.

Technical data

Sensor	platinum resistance sensor	
Process connection	male thread G 1/4 A.. G 1/2 A, union nut G 3/4 or Tri-clamp connection	
Metering range	0..100 °C	standard range
	0..200 °C	extended range for lance shape with gooseneck
	range -20..+200 °C or partial ranges available on request	
Measurement accuracy	±1 K	
Repeatability	±0.1 K	
Dynamic (t)	3 s 	
Pressure	Lance shape	PN 25
	Compact construction	PN 100
Medium	as metering range	

temperature	
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Media	water, viscous media, gases
Materials medium-contact	1.4571
Materials, non-medium-contact	FKM, CW614N nickelled, PP
Supply voltage	10..30 V DC
Analog output	4..20 mA two-wire
Load	800 Ω at 24 V (100 Ω at 10 V – 1.1 k Ω at 30 V, linear at operating voltage)
Electrical connection	for round plug connector M12x1, 4-pole or plug DIN 43650-A
Ingress protection	IP 67 (round plug connector) IP 65 (plug DIN 43650-A)
Weight	approx. 0.2 kg
Conformity	CE

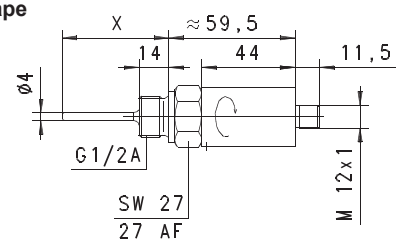
Wiring

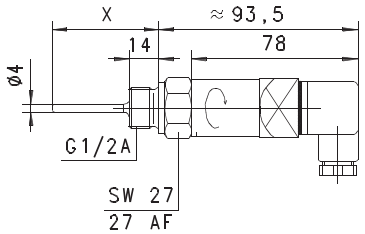


Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.

Dimensions

Lance shape

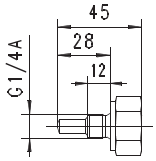




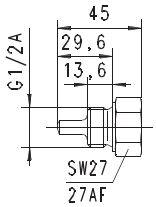
Lance type	Length X	Screw-in thread
..050..	50	G 1/2 A
..100..	100	G 1/2 A
..150..	150	G 1/2 A
..200..	200	G 1/2 A

Product information

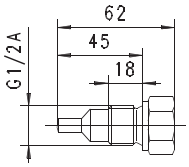
Compact sensor



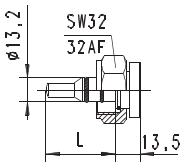
Screw-in sensor G $^1/_4$ A
Type ..028..



Screw-in sensor G $^1/_2$ A
Type ..029..

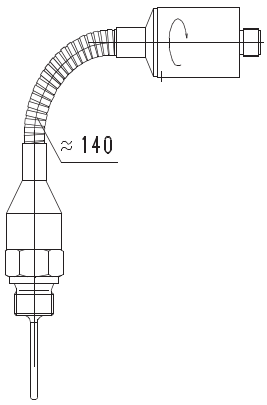


Screw-in sensor G $^1/_2$ A
Type ..045..



Sensor with union nut for
T-piece G $^3/_8$..G $^1/_2$
Type ..031.. (L = 31 mm)
or
T-piece G $^3/_4$..G 2
Type ..037.. (L = 37 mm)

"Gooseneck" option for higher temperatures



Handling and operation

Installation

Sensors with screw-in threads are screwed into a T-piece or a nozzle in the pipework, using a suitable flat seal (e.g. Klingerit). Sensors with a union nut are mounted in a T-piece (see separate product information). Use only a hexagonal spanner to tighten!
It should be ensured that the sensor tip is located fully in the medium, and does not push against the wall of the pipe. The upper part of the sensor with the connector output can be turned steplessly in order to align the cable outlet.

Ordering code

ETS

	1.	2.	3.	4.	5.	6.
ETS -		**K**				

Option = ❍

1.	**Metering range**				
	100	range 0..100 °C			
	200 ❍	range 0..200 °C			
2.	**Connection material**				
	K	stainless steel 1.4571			
3.	**Connection size**				
	008	connection G $^1/_4$ A			
	013	connection for T-piece			
	015	connection for G $^1/_2$A			
4.	**Electrical connection**				
	S	for round plug connector M12x1			
	B	DIN 43650-A plug			
5.	**Process connection**				
	050	lance length	50 mm Ø 4 mm	●	●
	100		100 mm Ø 4 mm	●	●
	150		150 mm Ø 4 mm	●	●
	200		200 mm Ø 4 mm	●	●
	028	sensor length	28 mm (G $^1/_4$ A)	●	
	029		29.6 mm (G $^1/_2$ A)	●	
	045		45 mm (G $^1/_2$ A)	●	
	031	sensor for	T-piece G $^3/_8$..G $^1/_2$	●	
	037		T-piece G $^3/_4$..G 2	●	
6.	**Option**				
	H ❍	model with gooseneck for metering range 0..200 °C		❍	●

Options

- ● Range -20..+200 °C

Accessories

- ● T-piece type TS-2... Thread G $^3/_8$..G 2
- ● Cable/round plug connector (KB...)
  see additional information “Accessories”
- ● Evaluation electronics OMNI-TA

HONSBERG
Member of GHM GROUP

Produktinformation

Temperature Transmitter ETK12-I / U / F

- **Complete transmitter in 12 mm housing**
- **Analog output 4..20 mA (ETK12-I)**
- **Analog output 0..10 V (ETK12-U)**
- **Frequency output (ETK12-F)**
- **The same transmitter for various piping widths**
- **User-configurable via plug pin (teaching)**
- **Same mechanical design available, whether temperature switch, flow transmitter / switch or level switch**

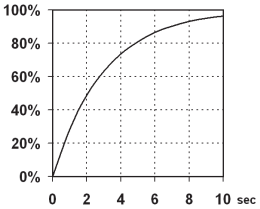
Characteristics

The sensors of the ETK12 family can be used for measuring and monitoring temperatures in flowing media. They require little space, yet offer a variable sensor length, as well as various fastening options. The 16-bit processor provides linearisation of the PT2000 characteristic curve, and emits the standardised output signal.

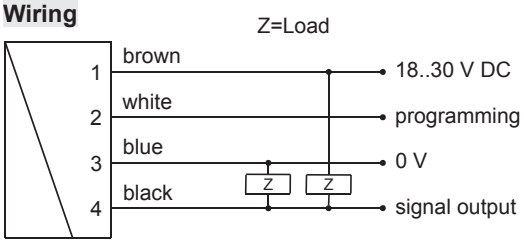
The ETK12 electronics transmit the result as
- Analog 0/4..20 mA signal (ETK12-I)
- Analog 0/2..10 V signal (ETK12-U)
- Frequency signal (ETK12-F)

If desired, the full scale value can be set to the currently existing temperature using "teaching".

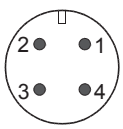
Technical data

Sensor	platinum resistance sensor	
Process connection	stainless steel threaded connection G $^1/_2$ A or plastic threaded connection M12x1.5	
Nominal width	for DN 15..300, others available on request	
Metering range	0..100 °C	standard range
	-20..+100 °C (or parts of it)	available on request
Measurement accuracy	±1 °C	
Reproducibility	±0.5 °C	
Dynamic (t)	3 s 	
Pressure	PN 63 (with stainless steel threaded connection) PN 4 (with plastic threaded connection)	
Medium temperature	-20..+100 °C	
Ambient temperature	0..60 °C	
Storage temperature	-20..+70 °C	
Media	fluids and gases	
Materials medium-contact	Housing	1.4571
Materials non-medium-contact	Plug	PA
	Contacts	gold-plated
Supply voltage	18..30 V DC (regulated)	
Current requirement at rest	< 60 mA	
Output	ETK12-I	4..20 mA Max. load 500 Ohm
	ETK12-U	0..10 V Load min. 1 kOhm
	ETK12-F	Frequency output "Push-pull" (resistant to short circuits, and reversed polarity protected) I_{out} = 100 mA max. Selectable output frequency, max. 2 kHz
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	approx. 0.05 kg (excluding screwed connection)	
Conformity	CE	

Wiring

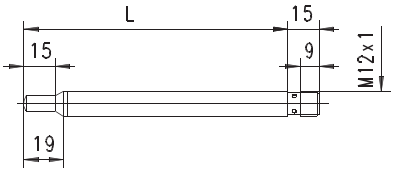


Connection example: PNP NPN



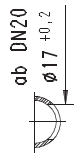
The use of shielded cabling is recommended.

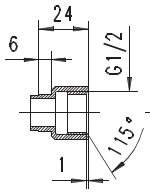
Dimensions



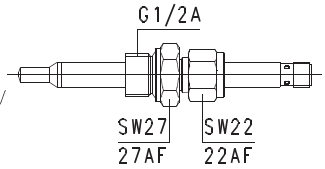
Optional accessories

Weld-on adapter



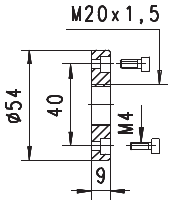


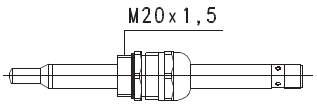
Crimp screw joint



Flange mounting
plastic

Stainless steel





Compression fitting
plastic

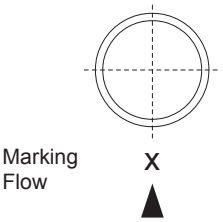
Handling and operation

Note

The full scale value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed.
The ECI-1 interface with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

Installation

Wherever possible, the sensor tip should be positioned in the middle of the pipe. When a flow is present, it should impinge onto the X, in order to achieve the lowest possible response time.



Avoid bubbles or deposits on the sensor. It is therefore best to install at the side. The stainless steel threaded connection is first tightened by hand, and then by $^1/_4$ of a turn, using a spanner. The connection ring of the threaded connection can then no longer be removed from the sensor, and the immersion depth can therefore not be changed further!

Operation and programming

If desired, the metering range end can be set by the user by means of teaching.
For this, proceed as follows:

- The temperature which is to be set is applied to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The devices have a yellow LED which flashes during the programming pulse. During operation, the LED acts as a display for the operating voltage.
In order to avoid the need to transit to an undesired operating status during the teach-in, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving.

Example: The end of the metering range should be set to 80 °C. However, only 60 °C can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 °C. At 60 °C in the process, a value of 80 °C would then be stored during "teaching".

Ordering code

	1.	2.	3.	4.
ETK12 -			K1	

❍=Option

1.	**Analog output**		
	I		current output 4..20 mA
	U		voltage output 0..10 V
	F		frequency output
2.	**Sensor length L =**		
	100		123 mm
	150		173 mm
	200		223 mm
3.	**Connection material**		
	K1		stainless steel 1.4571
4.	**Programming**		
	N		cannot be programmed (no teaching)
	P	❍	programmable (teaching possible)

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”

Options

For ETK12-I and ETK12-U

Special range for analog output:

Start of metering range (4 mA or 0 V) at ☐☐☐ °C
Standard = 0 °C

End of metering range (20 mA or 10 V) at ☐☐☐ °C
Standard = 100 °C

Teach-offset (-100..+100 °C) ☐☐☐☐ °C
Standard = 0 °C

For ETK12-F

End frequency (max. 2000 Hz) ☐☐☐☐ Hz
Standard = 2000 Hz

Special range for frequency output:

Start of metering range (0 Hz) at ☐☐☐ °C
Standard = 0 °C

End of metering range (end frequency) at ☐☐☐ °C
Standard = 100 °C

Teach-offset (-100..+100 °C) ☐☐☐☐ °C
Standard = 0 °C

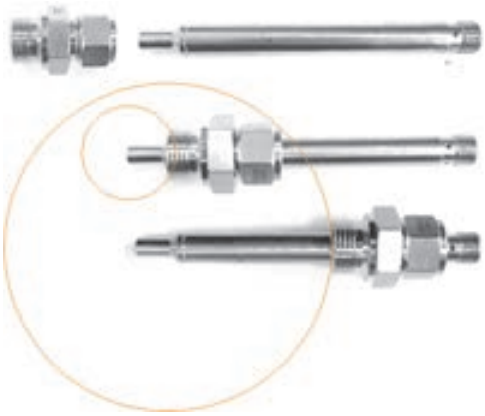
Further options available on request.

Accessories

- Screwed connections
- Weld-on adapter
- Round plug connector
- Device configurator ECI-1

Produktinformation

Temperature Switch ETK12-S



- **Temperature sensor with limit switch in 12 mm housing**
- **The same transmitter for various piping widths**
- **User-configurable via plug pin (teaching)**
- **Same mechanical design available, whether temperature transmitter, flow transmitter / switch or level switch**

Characteristics

The sensors of the ETK12 family can be used for measuring and monitoring temperatures in flowing media. They require little space, yet offer a variable sensor length, as well as various fastening options.

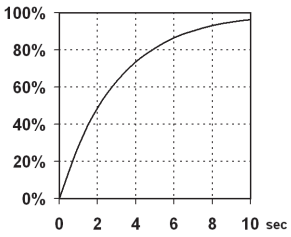
The electronics of the ETK12-S are a flexibly configurable limit switch.

The switching value can be set by the user via teaching (see Handling and Operation). All other values have been preset at the factory, but can be modified by the user with the aid of the optionally available ECI-1 device configurator and a PC.

The adjustable parameters are:

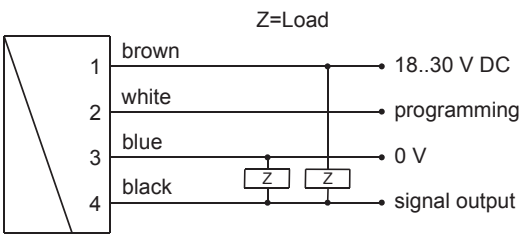
- Switching value
- Hysteresis
- Minimum/maximum monitoring
- Switching delay
- Switchback delay
- Power-On delay
- Teach-Offset

Technical data

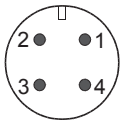
Sensor	platinum resistance sensor	
Process connection	stainless steel threaded connection G $^1/_2$ A or plastic threaded connection M12x1.5	
Nominal width	for DN 15..300, others available on request	
Switching range	-20..+100 °C	
Measurement accuracy	±1 °C	
Reproducibility	±0.5 °C	
Dynamic (t)	3 s 	
Pressure	PN 63 (with stainless steel threaded connection) PN 4 (with plastic threaded connection)	
Medium temperature	-20..+100 °C	
Ambient temperature	0..60 °C	
Storage temperature	-20..+70 °C	
Media	fluids and gases	
Materials medium-contact	Housing	1.4571
Materials non-medium-contact	Plug Contacts	PA gold-plated
Supply voltage	18..30 V DC (regulated)	
Current consumption	< 60 mA	
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	approx. 0.05 kg (excluding screwed connection)	
Conformity	CE	

Wiring

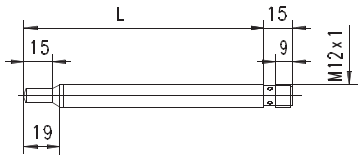
The use of shielded cabling is recommended.



Connection example: PNP NPN

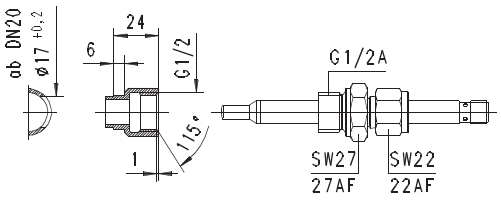


Dimensions



Optional accessories

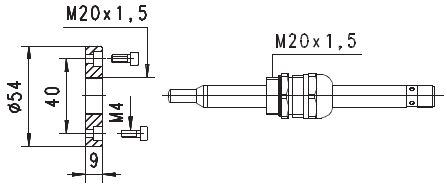
Weld-on adapter



stainless steel

Crimp screw joint

Flange mounting
plastic

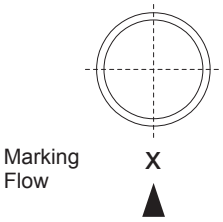


Compression fitting
plastic

Handling and operation

Installation

Wherever possible, the sensor tip should be positioned in the middle of the pipe. When a flow is present, it should impinge onto the X, in order to achieve the lowest possible response time.



Avoid bubbles or deposits on the sensor. It is therefore best to install at the side. The stainless steel threaded connection is first tightened by hand, and then by 1/4 of a turn, using a spanner. The connection ring of the threaded connection can then no longer be removed from the sensor, and the immersion depth can therefore not be changed further.

Operation and programming

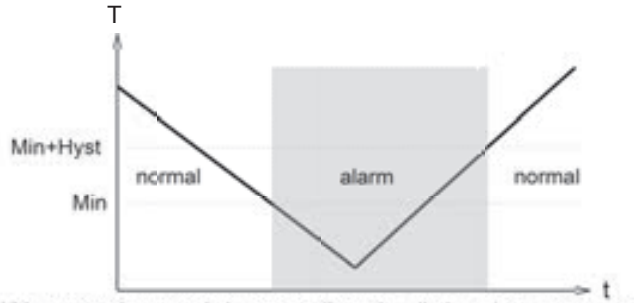
The switching value can be set by the user by means of teaching. For this, proceed as follows:

- The temperature which is to be set is applied to the device.
- Apply a pulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

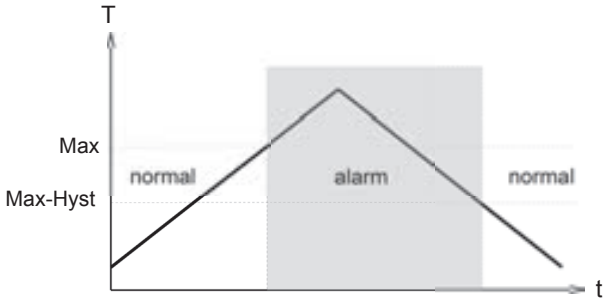
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an undesired operating status during the teach-in, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving.

Example: The switching value is to be set to 80 °C, because at this temperature a critical process status is to be notified. However, only 60 °C can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 °C. At 60 °C in the process, a switching value of 80 °C would then be stored during "teaching".

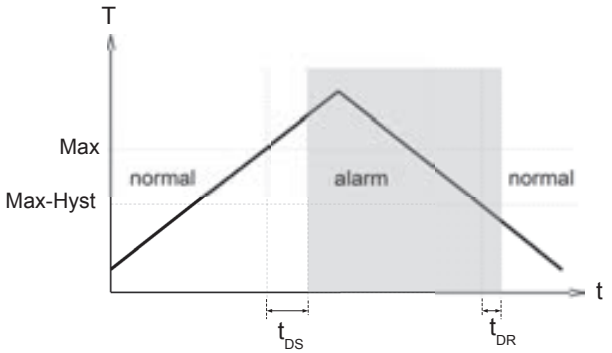
The ETK12-S limit switch can be used to monitor minima or minima or maxima.
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

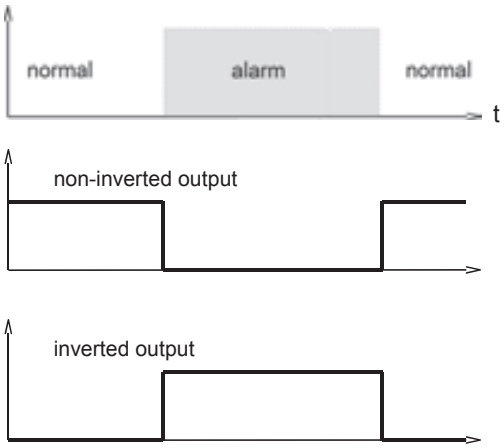


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On-Delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Ordering code

	1.	2.	3.	4.	5.	6
ETK12 -	S		K1			

❍=Option

1.	**Switch**		
	S		push-pull switch (compatible with PNP and NPN)
2.	**Sensor length L =**		
	100		123 mm
	150		173 mm
	200		223 mm
3.	**Connection material**		
	K1		stainless steel 1.4571
4.	**Programming**		
	N		cannot be programmed (no teaching)
	P	❍	programmable (teaching possible)
5.	**Switch type**		
	L		minimum-switch
	H		maximum-switch
6.	**Output**		
	O		non-inverted output
	I	❍	inverted output

Options

Switching delay period (0.0..99.9 s) . s
(from Normal to Alarm)
Switch-back delay period (0.0..99.9 s) . s
(from Alarm to Normal)
Power-On delay period (0..99 s) s
Switching output fixed at °C
Switching hysteresis %
Standard = 2 % of the metering range
Teach-offset (-100..+100 °C) °C
Standard = 0 °C

Further options available on request.

Accessories

- Screwed connections
- Weld-on adapter
- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1
- Connection cable

Produktinformation

Temperature Transmitter / Switch FLEX-T

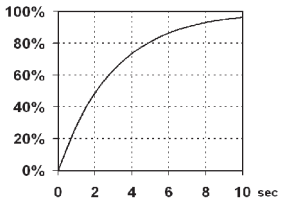
- **Analog 4..20 mA or 0..10 V output signal**
- **Programmable switching output (push-pull) or alternatively frequency output**
- **Switching point or full scale can be set via a magnet clip**
- **Programming protection by removal of the clip**
- **All metal housing**
- **Rotatable electronic head for alignment of the 90° cable outlet**
- **LED for switching status display**
- **Oil-filled tropical model**
- **High temperature model (200 °C) optionally available**
- **IP 67**

Characteristics

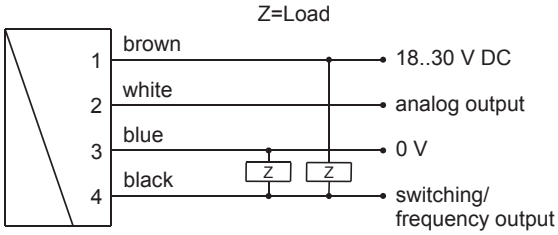
The temperature sensor consists of a platinum resistance sensor and the downstream evaluation electronics.
The sensors work with a 16-bit processor, a 12-bit A/D and a 12-bit D/A converter. Linearisations and calibrations are carried out automatically. The flash memory guarantees the exchangeability of all programs.
An analog output (4..20 mA or 0..10 V) and a switching output (transistor output "push-pull") are available as output. The switching output can be configured either as a limit switch (minimum / maximum monitoring) or as a frequency output (max. 2 kHz).

Options allow:
- Variable ranges for the analog outputs
- Variable hysteresis
- Minimum or maximum switches
- Inversion of the outputs
- Power-On delay
- Switching delays

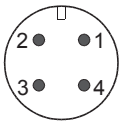
Technical data

Sensor	platinum resistance sensor	
Process connection	male thread G 1/4 A.. G 1/2 A, union nut G 3/4 or Tri-clamp connection	
Metering range	0..100 °C	standard range
	0..200 °C	extended range for lance shape with gooseneck
	range -20..+200 °C or partial ranges available on request	
Measurement accuracy	±1 % FS	
Reproducibility	±0.1 % FS	
Dynamic (t)	3 s 	
Pressure	Lance shape	PN 25
	Compact construction	PN 100
Medium temperature	as metering range	
Ambient temperature	0..70 °C	
Storage temperature	-20..+80 °C	
Materials medium-contact	1.4571	
Materials, non-medium-contact	1.4305, PP	
Supply voltage	18..30 V DC	
Analog output	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
Switching output	Push-pull (can be connected as PNP or NPN), optionally NPN o.c., configurable as limit switch or frequency output (max. 2 kHz)	
Output current	max. 100 mA	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	approx. 0.25 kg	
Conformity	CE	

Wiring

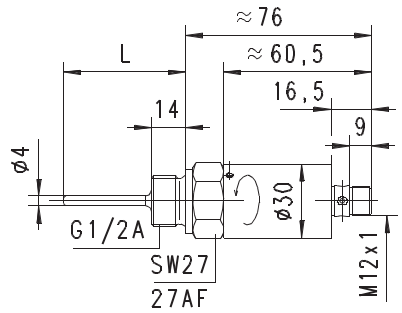


Connection example: PNP NPN



The use of shielded cabling is recommended.

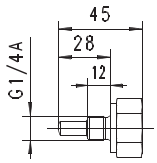
Dimensions



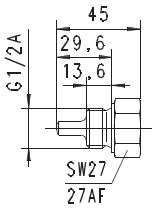
Lance shape

Lance type	Length X	Screw-in thread
..050..	50	G 1/2 A
..100..	100	G 1/2 A
..150..	150	G 1/2 A
..200..	200	G 1/2 A

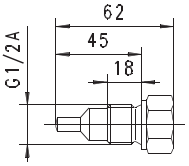
Compact sensor



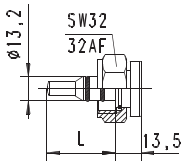
Screw-in sensor G 1/4 A
Type ..028..



Screw-in sensor G 1/2 A
Type ..029..

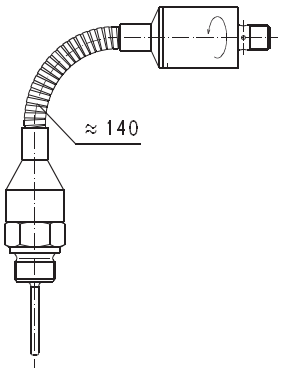


Screw-in sensor G 1/2 A
Type ..045..



Sensor with union nut for
T-piece G 3/8..G 1/2
Type ..031.. (L = 31 mm)
or
T-piece G 3/4..G 2
Type ..037.. (L = 37 mm)

"Gooseneck" option for higher temperatures
(available for lance and compact shape)



Handling and operation

Note

The sensors are fully preconfigured at HONSBERG to customer wishes. However, as an option, the setting of one or more parameters using a magnetic clip through the enclosed housing (IP 67) is fully possible.
The parameters available are:

- Switching temperature of the limit switch
- Temperature at full scale analog output
- Temperature at full scale frequency output

The parameter to be programmed must be specified when ordering.

Installation

Sensors with screw-in threads are screwed into a T-piece or a nozzle in the pipework, using a suitable flat seal (e.g. Klingerit). Sensors with a union nut are mounted in a T-piece (see separate product information). Use only a hexagonal spanner to tighten.
It should be ensured that the sensor tip is located fully in the medium, and does not push against the wall of the pipe. The upper part of the sensor with the connector outputs can be turned steplessly in order to align the cable outlet.

Operation and programming

The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).

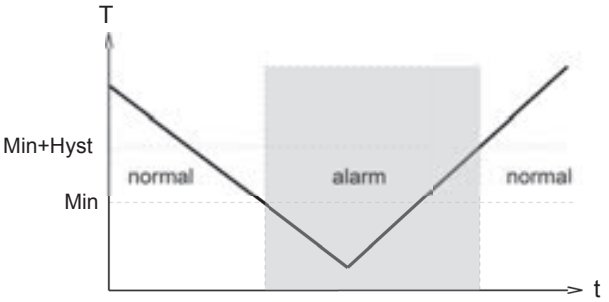
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

Example: The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".

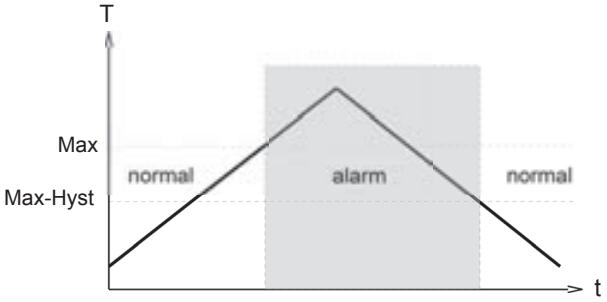
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minima or maxima.

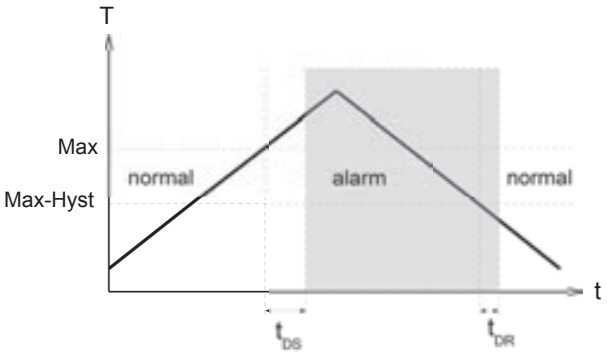
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



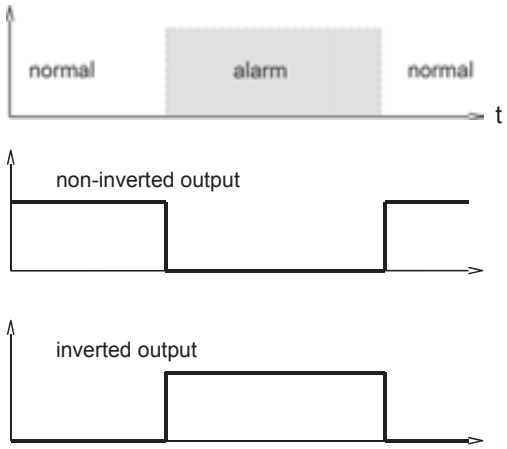
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.
In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Ordering code

	1.	2.	3.	4.	5.	6.	7.
FLEX-T -	K						

Option = ❍

1.	**Connection material**		
	K	stainless steel 1.4571	
2.	**Connection size**		
	008 ❍	connection G 1/4 A	
	013	connection for T-piece	
	015	connection for G 1/2 A	
3.	**Process connection**		
	050	lance length	50 mm Ø 4 mm
	100		100 mm Ø 4 mm
	150		150 mm Ø 4 mm
	200		200 mm Ø 4 mm
	028	sensor length	28 mm (G 1/4 A)
	029		29.6 mm (G 1/2 A)
	045		45 mm (G 1/2 A)
	031	sensor for	T-piece G 3/8..G 1/2
	037		T-piece G 3/4..G 2
4.	**Analog output**		
	I	current output 4..20 mA	
	U	voltage output 0..10 V	
	K	no analog output	
5.	**Switching output**		
	T	switching output push-pull	
	M ❍	switching output NPN (open collector)	
	K	no switching output	
6.	**Switching function**		
	L	minimum-switch	
	H	maximum-switch	
	R	frequency output	
	K	no switching output	
7.	**Switching signal**		
	O	standard output	
	I	inverted output	

Options

For analog output:
Special range for analog output:
Start of metering range (4 mA or 0 V) at ___ °C
Standard = 0 °C
End of metering range (20 mA or 10 V) at ___ °C

For frequency output:
End frequency (max. 2000 Hz) ____ Hz
Standard = 2000 Hz
Special range for frequency output:
Start of metering range (0 Hz) at ___ °C
Standard = 0 °C
End of metering range (end frequency) at ___ °C
Standard = 100 °C

For switching output:
Switching delay period (0.0..99.9 s) __.__ s
(from Normal to Alarm)
Switch-back delay period (0.0..99.9 s) __.__ s
(from Alarm to Normal)
Switching output fixed at ___ °C
Switching hysteresis __ %
Standard = 2 % of the metering range

General:

Power-On delay period (0..99 s) __ s
Teach-offset (-20..+200 °C) ____ °C
Standard = 0 °C
High temperature model ☐
(Gooseneck)
Tropical model (oil filled) ☐

Accessories

- T-piece type TS-2... Thread G 3/8..G 2
- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Evaluation electronics OMNI-TA
- Device configurator ECI-1

HONSBERG
Member of GHM GROUP

Produktinformation

Temperature Transmitter / Switch OMNI-T

- **Analog output 4..20 mA or 0..10 V**
- **Two programmable switches (push-pull)**
- **Backlit graphical LCD-Display (transreflective), can be read in sunlight and in the dark**
- **Programmable parameters via rotatable, removable ring (programming protection)**
- **Full metal housing with non-scratch, chemically resistant glass**
- **Physical unit in the display (selectable)**
- **Rotatable electronic head for best reading position**
- **Tropical model optionally available**
- **High temperature model (200 °C) optionally available**
- **Connection to USB interface for setting parameters**
- **IP 67**

Characteristics

The primary sensor consists of a platinum resistance sensor using thin film technology, which provides a very good response time, thanks to the lance diameter of 4 mm.

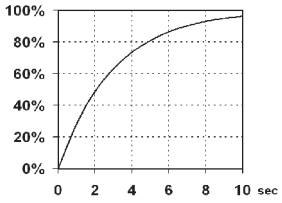
With these sensors, switching points can be set on the spot for where process values are exceeded or fallen short of. This setting can be carried out via the display, even without the process. The present values, or error messages from the measuring point, are visible at all times, and all important parameters can be displayed locally (this saves time during installation, commissioning, and troubleshooting during the process). The analog current signal can be evaluated from large distances, and the present values can be made available there. The sensor is configured to your requirements. It is therefore ready for immediate use, without programming. If you wish to change parameters, you can set the device directly at the sensor, by means of the programming ring.

The entire family of OMNI sensors is made up in a modular way, by means of a building-block system (hardware and software). A 16-bit microcontroller with a 12-bit A/D converter and a 12-bit D/A converter ensures the necessary processing speed and accuracy. The signal is displayed with the unit of measure by a backlit LCD graphical display, and is converted into a 0/4..20 mA signal. Two switching points with push-pull output can be programmed across the whole range. The hysteresis of the switching points can be set separately in value and direction (min., max. switching value).
Exceeding or falling short of switching points, and error messages, are indicated by a flashing red LED visible from a long distance, together with a message in the display.

Further parameters can be modified by means of a code:
- Signal filter
- Unit (°C, °F ...) incl. automatic conversion of the values
- Output 0 or 4..20 mA
- Value assignment of 0/4 and 20 mA (setting of zero point and range).

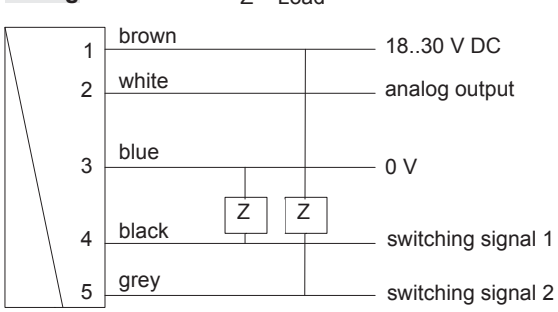
By turning the programming ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 ° and replaced, or completely removed.

Technical data

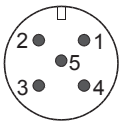
Sensor	platinum resistance sensor	
Process connection	male thread G $^1/_4$ A.. G$^1/_2$ A, union nut G $^3/_4$ or Tri-clamp connection	
Metering range	0..100 °C	standard range
	0..200 °C	extended range for lance shape with gooseneck
Measurement accuracy	±1 % FS	
Reproducibility	±0.1 % FS	
Dynamics	measuring cycle 31.25 ms, display cycle 0.5 sec.	
Dynamic (t)	3 s 	
Operating pressure	Lance shape	PN 25
	Compact construction	PN 100
Medium temperature	same as metering range	
Ambient temperature	-20..+70 °C	
Storage temperature	-20..+80 °C	
Materials medium-contact	1.4571	
Materials, non-medium-contact	1.4305, hardened mineral glass, samarium-Cobalt,	
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Analog output	0/4..20 mA 0/2..10 V via a 500 Ohm resistance to 0 V	
Switching outputs S1 and S2	transistor output "push-pull" (short circuit proof and reverse polarity protected) I_{out} = 100 mA max. per output	

Display	backlit graphical LCD-Display (transreflective), extended temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display.
Ingress protection	IP 67
Weight	approx. 0.35 kg
Conformity	CE

Wiring



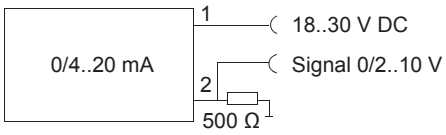
connection example PNP NPN



Round plug connector M12x1

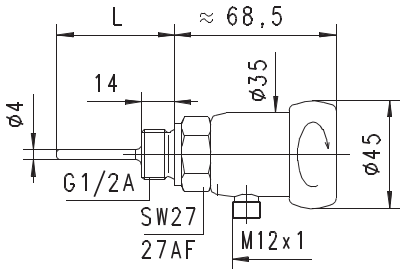
The switching outputs are self-configuring, depending on whether they are connected as PNP or NPN switches (push-pull).

It is recommended to use shielded wiring.
Conversion of a 0/4..20 mA output into a 0/2..10 V output:



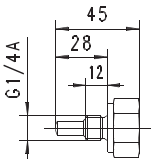
True 0..10 V output can also be ordered.

Dimensions

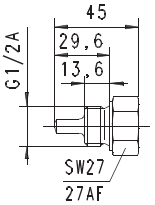


Lance type	Length X	Screw-in thread
..050..	50	G ½ A
..100..	100	G ½ A
..150..	150	G ½ A
..200..	200	G ½ A

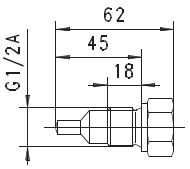
Compact sensor



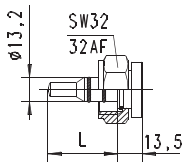
Screw-in sensor G ¼
Type ..028..



Screw-in sensor G ½
Type ..029..



Screw-in sensor G ½
Type ..045..



Sensor with union nut for
T-piece G ⅜..G ½
Type ..031.. (L = 31 mm)
or
T-piece G ¾..G 2
Type ..037.. (L = 37 mm)

"Gooseneck" option for higher temperatures
(available for lance and compact shape)

Handling and operation

Installation

Sensors with screw-in threads are screwed into a T-piece or a nozzle in the pipework, using a suitable flat seal (e.g. Klingerit). Sensors with a union nut are mounted in a T-piece (see separate product information). Use only a hexagonal spanner to tighten.
It should be ensured that the sensor tip is located fully in the medium, and does not push against the wall of the pipe. The upper part of the sensor with the connector outputs can be turned steplessly in order to align the cable outlet.

Operation and programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:

Set to 1 = continue (STEP)
Set to 2 = modify (PROG)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180 ° and replaced to create a programming protector.
Operation is by dialog with the display messages, which makes its use very simple.
Starting from the normal display (currently measured value with unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

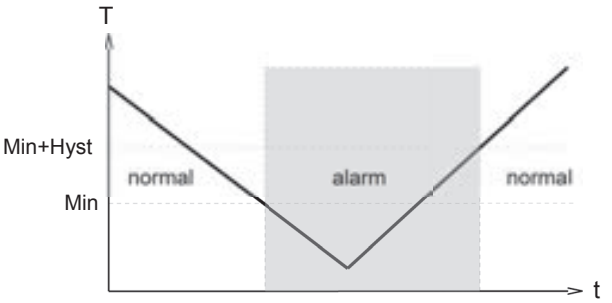
Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
  (MIN = monitoring of minimum value, hysteresis greater than switching value,
  MAX = monitoring of maximum value, hysteresis less than switching value)
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code:
- After entering the code 111, further parameters can be defined:
- Filter (settling time of the display and output)
- Units: e.g. ° C or ° F
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (temperature corresponding to 0/4 mA)
- 20 mA (temperature corresponding to 20 mA)

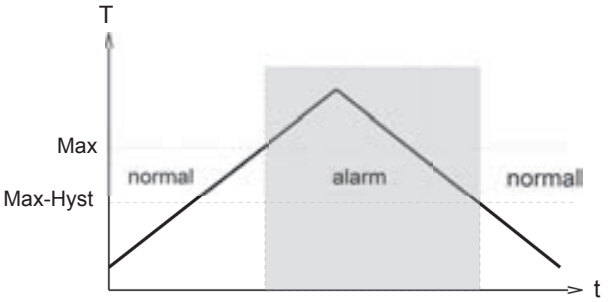
Edit, using position 2

If the currently visible parameter is to be modified:
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is then reached.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.
- Leaving the parameter by turning to position 1 means that the modification is accepted

The limit switches S1 and S2 can be used to monitor minima or minima or maxima.
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.
While in the normal state, the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also be displayed as an alarm state at the signal receiver.

Simulation mode
To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26.0 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This mode is accessed by means of **Code 311**.

Zero point alignment
Zero point alignment by customer: Immerse the lance completely into ice/water at 0 °C; after 5 minutes use **Code 211** to carry out the automatic zero point correction. The sensor shifts the complete characteristic curve, based on the new zero point.

Overload display
Overload of the switching outputs, e.g. because of a short circuit, is detected, indicated on the display, and the affected switching output is set to high impedance. After the short circuit has been corrected, the switching output continues to function.

Default setting
After setting the configuration parameters, they can be reset to factory values at any time, by means of **Code 989.**

Ordering code

	1.	2.	3.	4.	5.	6.	7.
OMNI-T -		**K**		**S**			

Option = ❍

1.	**Metering range**				
	100	range 0..100 °C			
	200	range 0..200 °C			
2.	**Connection material**				
	K	stainless steel 1.4571			
3.	**Connection size**				
	008	connection G $^1/_4$ A			
	013	connection for T-piece			
	015	connection for G $^1/_2$A			
4.	**Signaloutput**				
	I	0/4..20 mA current output			
	U	0/2..10 V voltage output			
5.	**Electronic connection**				
	S	for round plug connector M12x1, 5-pole			
6.	**Process connection**				
	050	lance length	50 mm Ø 4 mm	●	●
	100		100 mm Ø 4 mm	●	●
	150		150 mm Ø 4 mm	●	●
	200		200 mm Ø 4 mm	●	●
	028	sensor length	28 mm (G $^1/_4$ A)		●
	029		29.6 mm (G $^1/_2$ A)		●
	045		45 mm (G $^1/_2$ A)		●
	031	sensor for	T-piece G $^3/_8$..G $^1/_2$		●
	037		T-piece G $^3/_4$..G 2		●
7.	**Option**				
	H	model with gooseneck for metering range 0..200 °C (only for lance legth)		❍	●

Options

- 10 V output
- Range -20..+200 °C

Accessories

- T-piece type TS-2... Thread G $^3/_8$..G 2
- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1

Produktinformation

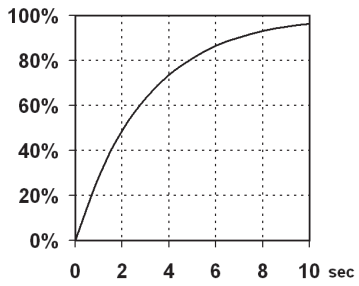
Temperature Difference Transmitter ETSD

- **Simple measurement of temperature differences**
- **Self-built plug including**
- **large distance between the two sensors is possible (4-wire connection)**
- **Infinitely adjustably rotatable cable outlet for clean alignment**
- **Different characteristic curves are possible**

Characteristics

Temperature difference measuring at two process locations, with very low installation effort and compliant 4..20 mA 2-wire system.
The ETSD1 und ETSD2 sensors measure temperatures T1 and T2 at the respective process locations, each using a platinum resistance sensor. In addition to the sensor, ETSD1 contains a microcontroller circuit which calculates the difference between the two temperatures (T1-T2), and outputs it via an amplifier as a 4..20 mA signal. Two outputs with different characteristic curves are available as standard.
Altogether the circuit requires < 4 mA, and so it was possible to implement a 2-wire system (including wire break recognition).

Technical data

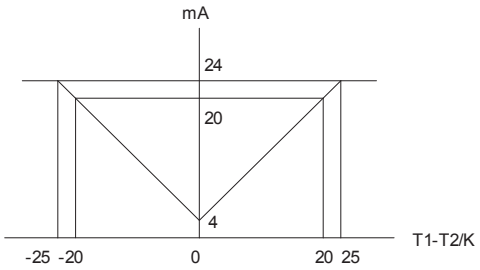
Sensor	platinum resistance sensor	
Process connection	male thread G 1/4 A.. G 1/2 A, union nut G 3/4 or 3-clamp connection	
Metering range	0..20 K, 0..50 K	
Measurement accuracy	±1 K	
Reproducibility	±0.1 K	
Pressure	Lance shape	PN 25
	Compact construction	PN 100
Media temperature T1	Lance shape	-20..+80 °C optionally -20..+100 °C with gooseneck
	Compact construction	-20..+80 °C optionally -20..+100 °C with gooseneck
Media temperature T2	Lance shape	-20..+120 °C
	Compact construction	-20..+100 °C
Ambient temperature	-20..+70 °C	
Dynamic (t)	3 s 	
Supply voltage	15..30 V DC	
Materials medium-contact	1.4571	
Materials, non-medium-contact	CW614N plated, PP	
Analog output	4..20 mA (two-wire)	
Reversal polarity protected	yes	
Electrical connection	plug DIN 43650-A / ISO 4400	
Ingress protection	IP 65	
Weight	0.45 kg	
Conformity	CE	

Ranges

Metering ranges of 20 Kelvin difference and 50 Kelvin difference are available as standard. Any other required differences are available on request.
Every temperature difference range is available with two different characteristic curves:
Characteristic curve A: The absolute value of the difference T1-T2 is output, i.e. it cannot be recognised from the signal which of the two temperatures is the higher. Difference 0 corresponds to 4 mA. If the maximum difference is exceeded, the output signal can show larger values than 20 mA (max. 24 mA).

Example:
Characteristic curve A for metering range 20 Kelvin difference

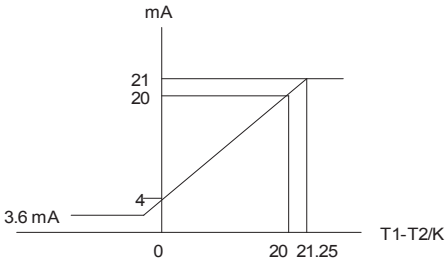
Typ A



Characteristic curve B: The output signal is proportional to the difference T1-T2. The difference 0 Kelvin can be assigned to any desired current value in the range 4..20 mA, so that negative differences can also be represented.
If the intended metering range is left, the output signal can show smaller values than 4 mA (min. 3.6 mA) or larger values than 20 mA (max. 21 mA).

Example:
Characteristic curve B for metering range 20 Kelvin difference
Difference of 0 Kelvin corresponds to 4 mA

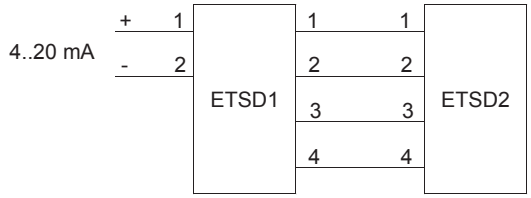
Typ B



Wiring

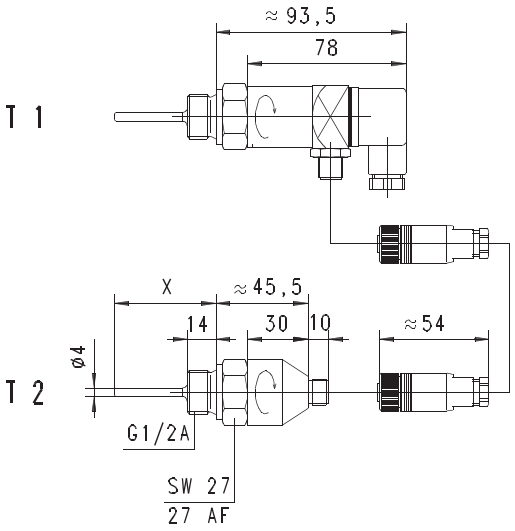
plug DIN 43650-A / ISO 440

round plug connector M12x1



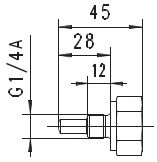
Dimensions

Lance shape

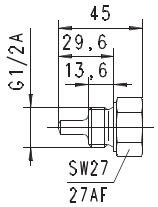


Lance type	Length X	Screw-in thread
..050..	50	G ½ A
..100..	100	G ½ A
..150..	150	G ½ A
..200..	200	G ½ A

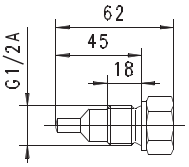
Compact sensor



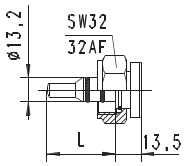
Screw-in sensor G 1/4 A
Type ..028..



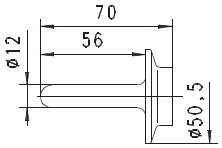
Screw-in sensor G 1/2 A
Type ..029..



Screw-in sensor G 1/2 A
Type ..045..

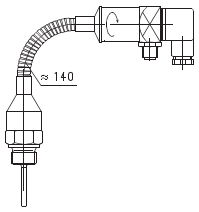


Sensor with union nut for
T-piece G 3/8..G 1/2
Type ..031.. (L = 31 mm)
or
T-piece G 3/4..G 2
Type ..037.. (L = 37 mm)



Sensor for Tri-clamp connection
Type ..056..

"Gooseneck" option for higher temperatures
(available for lance and compact shape)



Handling and Operation

Installation

Sensors with screw-in threads are screwed into a T-piece or a nozzle in the pipework, using a suitable flat seal (e.g. Klingerit). Sensors with a union nut are mounted in a T-piece (see separate product information). Use only a hexagonal spanner to tighten.
It should be ensured that the sensor tip is located fully in the medium flow, and does not push against the wall of the pipe. After this, the upper part of the sensor with the connector output can be turned steplessly in order to align the cable outlet.

Ordering code

Sensors ETSD1 and ETSD2 are what you should order for a complete temperature difference measuring point!

ETSD1

	1.	2.	3.	4.	5.	6.
ETSD1 -			**K**			

Option = ❍

1.	**Zero point**		
	00-	T1-T2= 0 Kelvin corresponds to 4 mA (relevant only for characteristic curve B)	
2.	**Difference**		
	020	T1-T2= 20 Kelvin corresponds to 20 mA	
	050	T1-T2= 50 Kelvin corresponds to 50 mA	
3.	**Connection material**		
	K	Stainless steel 1.4571	
4.	**Process connection**		
	050	lance length	50 mm Ø 4 mm
	100		100 mm Ø 4 mm
	150		150 mm Ø 4 mm
	200		200 mm Ø 4 mm
	028	sensor length	28 mm (G 1/4 A)
	029		29.6 mm (G 1/2 A)
	045		45 mm (G 1/2 A)
	031	sensor for	T-piece G 3/8..G 1/2
	037		T-piece G 3/4..G 2
5.	**Characteristic curve**		
	A	A	
	B	B	
6.	**Option**		
	H ❍	gooseneck model	

ETSD2

	1.	2.
ETSD2 -	**K**	

1.	**Connection material**		
	K	stainless steel 1.4571	
2.	**Process connection**		
	050	lance length	50 mm Ø 4 mm
	100		100 mm Ø 4 mm
	150		150 mm Ø 4 mm
	200		200 mm Ø 4 mm
	028	sensor length	28 mm (G 1/4 A)
	029		29.6 mm (G 1/2 A)
	045		45 mm (G 1/2 A)
	031	sensor for	T-piece G 3/8..G 1/2
	037		T-piece G 3/4..G 2

Accessories

- T-piece type TS-2... Thread G 3/8..G 2
- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Evaluation electronics OMNI-TA
- Device configurator ECI-2

Produktinformation

Radio Temperature Transmitter / Switch RF1-T

- **Temperature sensor with integrated radio interface for the HONSBERG RF1 radio system**
- **PT1000 sensor**
- **Energy-saving battery operation**
- **Robust stainless steel housing**
- **Operation without registration or fees (ISM band 868 MHz)**
- **Ingress protection IP 67**

Characteristics

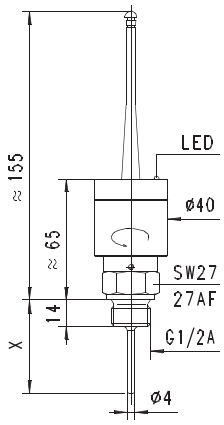
The temperature sensors in this range measure temperatures in liquids and gases. The measured value is polled using a radio connection. If set limit values are exceeded, this can be actively notified by the sensor. To operate one or more sensors, at least one send/receive station (access point RF1-ETH or RF1-USB) is required.
The robust solid metal construction makes the sensors suitable for universal industrial use.

Technical data

Sensor	platinum resistance sensor	
Process connection	male thread G 1/4 A.. G 1/2 A, union nut G 3/4 or Tri-clamp connection	
Metering ranges	0..100 °C	standard range
	0..200 °C	extended range for lance shape with gooseneck
Measurement accuracy	±0.5 K	
Reproducibility	±0.1 K	
Pressure	lance shape	PN 25
	compact construction	PN 100
Ambient temperature	-20..+70 °C	
Storage temperature	-20..+80 °C	
Materials medium-contact	stainless steel 1.4571	
Materials, non-medium-contact	stainless steel 1.4305	
Voltage supply	lithium battery 1/2 AA 3.6 V (e.g. Tadiran SL-750/S)	
Power consumption	depending on parameter settings and operating status, minimum 70 µW	
Battery life	depending on parameter settings, usually > 1 year	
Radio frequency	868.9 MHz; < 10 mW (ISM band, no registration or fees)	
Vibration resistance	max. 20 g	
Ingress protection	IP 67	
Conformity	CE (FTEG and directive 1999 / 5 / EC)	

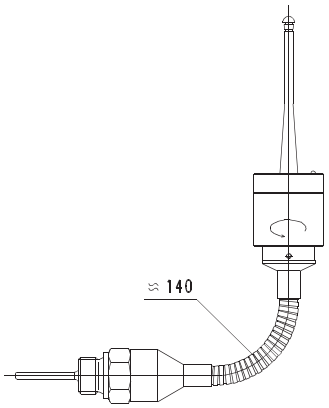
Dimensions

Lance shape

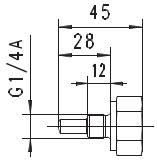


Lance type	Length X	Screw-in thread
..050..	50	G 1/2 A
..100..	100	G 1/2 A
..150..	150	G 1/2 A
..200..	200	G 1/2 A

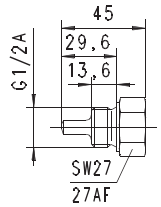
"Gooseneck" option for higher temperatures



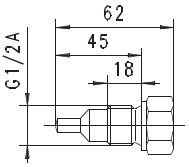
Compact sensor



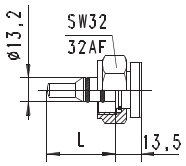
Screw-in sensor G $^1/_4$ A
Type ..028..



Screw-in sensor G $^1/_2$ A
Type ..029..



Screw-in sensor G $^1/_2$ A
Type ..045..



Sensor with union nut for
T-piece G $^3/_8$..G $^1/_2$
Type ..031.. (L = 31 mm)
or
T-piece G $^3/_4$..G 2
Type ..037.. (L = 37 mm)

Handling and operation

Note

The sensor is fitted with a yellow LED, which briefly flashes every 10 s if the battery is operational.

Installation

Sensors with screw-in threads are screwed into a T-piece or a nozzle in the pipework, using a suitable flat seal (e.g. Klingerit). Sensors with a union nut are mounted in a T-piece (see separate product information). Use only a hexagonal spanner to tighten.
It should be ensured that the sensor tip is located fully in the medium, and does not push against the wall of the pipe.

Operation and programming

If the customer desires, the sensor can be preconfigured and made ready for use, with the battery inserted. Configuration before commissioning is then unnecessary.
However, all parameters can be modified by radio using the optionally available software RF1-Control.
Modifiable parameters include:

- Measurement cycle time
- Limit values for alarm warnings
- Metering range

Thanks to the flash memory used, the firmware can also be updated by radio if necessary. Software modules can be made available by HONSBERG for customer applications; this allows the use of the whole range of functionality.
Detailed information available on request.

Changing battery

The cover of the housing is unscrewed to change the battery. The battery can be replaced without the need for additional tools. Take care when removing the lid: Do not tear off the wiring! Remove the battery from the battery holder, and replace it with a suitable battery (e.g. Tadiran Lithium SL-750/S). If the battery is connected with reversed polarity, it will be discharged, but the device will not be damaged.

Ordering code

	1.	2.	3.	4.	5.
RF1-T -		**K**			

Option = ❍

1.	**Metering range**							
	100		metering range 0..100 °C					
	200	❍	metering range 0..200 °C					
2.	**Connection material**							
	K		stainless steel 1.4571					
3.	**Connection size**							
	008		connection G $^1/_4$ A					
	013		connection for T-piece					
	015		connection for G $^1/_2$A					
4.	**Process connection**							
	050		lance length	50 mm Ø 4 mm	●		●	●
	100			100 mm Ø 4 mm	●		●	●
	150			150 mm Ø 4 mm	●		●	●
	200			200 mm Ø 4 mm	●		●	●
	028		sensor length	28 mm (G $^1/_4$ A)		●		●
	029			29.6 mm (G $^1/_2$ A)	●			●
	045			45 mm (G $^1/_2$ A)	●			●
	031		sensor for	T-piece G $^3/_8$..G $^1/_2$		●		●
	037			T-piece G $^3/_4$..G 2		●		●
5.	**Option**							
	H	❍	model with gooseneck for metering range 0..200 °C				❍	●

Accessories

- T-piece type TS-2... Thread G $^3/_8$..G 2
- Cable/round plug connector (KB...)
  see additional information “Accessories”
- USB adapter RF1-USB
- Ethernet adapter RF1-ETH

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