GHM Messtechnik GmbH
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Temperature

Characteristics

System	Temperature probes / - switches, hygienic design, without media contact
Process connection	M12, G ½, G ½ (flush mounted), G ⅜ union nut, without tread, versatile connectors for mounting in pipes and tanks, via clamp-on adapter
Temperature range	-40..+200 °C CIP- / SIP- capable
High flexibility	Modular design, probe length acc. to customer specification
Accuracy	Class A or better
Programming tool	Parameters freely programmable via software GTL - Configuration tool

Applications

- **Food and beverage industry**
- **Breweries**
- **Dairies**
- **Chemical industry**
- **Pharmaceutical industry**
- **Cosmetics industry**
- **Biotechnology**

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Product Information

Hygienic Design

System features

Our products largely meet the specific requirements of the food, beverage and pharmaceutical industry.

- “Hygienic Design” for cleaning and sterilization processes
- CIP- / SIP- capable
- Probes made of stainless steel
- FDA conform materials
- EHEDG certificate (in preparation)
- Measurement without media contact

Advantages

- Temperature range -40..+200 °C
- Several design types
- Optional with integrated transmitter and on-site display
- Short response time
- High accuracy (class A, class AA, others upon request)
- Certificate of calibration available
- Variable fitting length
- Protection class IP67 / IP69K

Measuring probes

- Process connection M12, G ½ , G ½ flush mounted, G⅜ union nut, or without thread but with compression fitting
- Compact design
- Design types with neck tube available
- Electric connection via M12-plug or cable (PG)
- Several probe lengths and diameters
- Process connection and protection tube made of stainless steel 1.4404
- Clamp-on temperature sensors **without media contact**

Accuracy:

Pt100 / Pt1000:

Sensor accuracy according to EN 60751:2008

DIN class	Scope	Accuracy
DIN cl. A	-30..+300 °C	±0.15 °C at 0 °C
DIN cl. AA = 1/3 DIN cl. B	0..150 °C	±0.1 °C at 0 °C

Transmitter

- Fast reaction to small changes
- High resolution and stability
- High accuracy
- Transmitter can be configured by customer using the programming tool

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Device Overview

Type	Process connection						Design	Electric connection	Page
	M12	G ½	G ½ flush mounted	Without thread	G ¾ union nut	Clamp-on			
Temperature probes (*optionally with transmitter / integrated on-site display)									
GTL142	●						Ø 59 mm probe head *	M12 or PG	**4**
GTL152	●						Ø 59 mm probe head with neck tube *	M12 or PG	
GTL162	●						Ø 18 mm probe head	M12	**7**
GTL162M	●						Ø 18 mm probe head incl. transmitter	M12	
GTL182	●						Ø 18 mm probe head	PG	
GTL182M	●						Ø 18 mm probe head incl. transmitter	PG	
GTL241		●					Ø 59 mm probe head *	M12 or PG	**10**
GTL251		●					Ø 59 mm probe head with neck tube *	M12 or PG	
GTL261		●					Ø 18 mm probe head	M12	**13**
GTL261M		●					Ø 18 mm probe head incl. transmitter	M12	
GTL281		●					Ø 18 mm probe head	PG	
GTL281M		●					Ø 18 mm probe head incl. transmitter	PG	
GTL244			●				Ø 59 mm probe head *	M12 or PG	**16**
GTL264			●				Ø 18 mm probe head	M12	**18**
GTL264M			●				Ø 18 mm probe head incl. transmitter	M12	
GTL284			●				Ø 18 mm probe head	PG	
GTL284M			●				Ø 18 mm probe head incl. transmitter	PG	
GTL349				●			Ø 59 mm probe head *	M12 or PG	**20**
GTL369				●			Ø 18 mm probe head	M12	**22**
GTL369M				●			Ø 18 mm probe head incl. transmitter	M12	
GTL389				●			Ø 18 mm probe head	PG	
GTL389M				●			Ø 18 mm probe head incl. transmitter	PG	
GTL459					●		Ø 59 mm probe head *	M12 or PG	**25**
GTL479					●		Ø 18 mm probe head	M12	**27**
GTL479M					●		Ø 18 mm probe head incl. transmitter	M12	
GTL499					●		Ø 18 mm probe head	PG	
GTL499M					●		Ø 18 mm probe head incl. transmitter	PG	
GTL720						●	Ø 18 mm probe head	M12	**30**
GTL723						●	Ø 18 mm probe head incl. transmitter	M12	
GTL737						●	Ø 59 probe head incl. transmitter	M12	**33**
Thermometers / temperature switches									
HTK12-I/U/F		●					M 12 mm – housing	M12	**36**
HTK12-S		●					M 12 mm – housing	M12	**38**
HTK30		●					Ø 30 mm probe head	M12	**41**
HTK35		●					Ø 45 mm probe head, with integrated on-site display	M12	**44**
Accessories	● GTL - Configuration tool ● ECI-1 ● GKEV-25/76 ● GEMK-25/76 ● APHG12 ● APHK25 ● APHZ18 ● WLP10S ● KH						Suitable for all GTL Device configurator for HTK Welding sleeve Welding sleeve Thermowell (adapter sleeve) Thermowell (weld-in sleeve) Thermowell (weld-in sleeve) Thermal compound Hygienic connection cable for HTK		**47**

- Additional accessories: p.r.t. product information “GHM*adapt* / Accessories” at register: Process Instrumentation “Hygienic Design”

Mistakes reserved, technical specifications subject to change without notice.

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Temperature Probe GTL 142 / 152


GTL 142


GTL 152

- **M12 process connection**
- **Hygienic design and easy-to-sterilize measuring point**
- **Sensor completely made of stainless steel**

Characteristics

The temperature probes GTL 142 and GTL 152 are designed for temperature measurements in pipes or thin-walled tanks.

They can be used for example for process monitoring at tube curvatures, temperature measurements in pressure pipes or at measurements of pasty media in pipes

The probes can be provided with different electric connections and with or without integrated head transmitter. The probes of design type “with neck tube” are applicable at permanent ambient temperatures up to 200 °C.

Technical data

Temperature ranges	: ambiance	:	-40..+80 °C
	probe tip	:	-40..+200 °C
	CIP- / SIP-Temp.	:	140 °C < 30 min.
Measuring resistor	: Pt100		
Accuracy	: class A, class AA		
Electric connection	: cable screwing M16x1.5 (PG)		
	cable connection M12-plug (1.4305)		
Process connection	: M12		
Clamping torque	: 5..10 Nm		
Fitting length	: 50, 100, 150, 250 mm		
Probe head	: Ø 59 mm		

Protection tube and probe tip:

Ø 6 mm, Ø 4 mm	protection tube without taper
Ø 3 mm	protection tube Ø 6 mm and tapered probe tip Ø 3 mm

Response time	: FS Ø 3 mm: T_{90} ≤ 1.5 s
	FS Ø 4 mm: T_{90} ≤ 3.6 s
	FS Ø 6 mm: T_{90} ≤ 7.4 s
Working pressure	: max. 10 bar

Material

Probe head	: 1.4305 (V2A)
Neck tube	: 1.4305 (V2A)
Protection tube and tip	: 1.4404 (V4A)
Protection class	: IP67 / IP69K
CE-conformity	: EN 61326-1:2006 / -2-3:2006

Design types

	GTL 142	GTL 152
Neck tube	without neck tube	with neck tube length: 100 mm

Transmitter GTML1

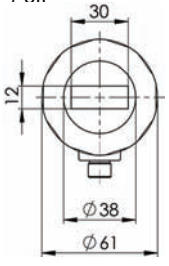
Integrated head transmitter

Measuring range	: -10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C * / 0..200 °C * or freely in the range -20..200 °C **
Power supply	: 10..30 V DC
Measuring output	: analog, 4..20 mA, 2-wire
Output signal in case of error	: **< 3,75 mA** or > 21.5 mA, selectable
Filter	: integrated low-pass filter, 4-stage *
Response time	: < 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Working temperature	: -40..+70 °C
Measurement accuracy	: < 0.2 % FS
Temperature drift	: < 0.01 % FS / K

Transmitter option VO

Integrated on-site display (LCD)
only combined with electric connection: M12-plug

Display	: 4 digit LCD
Display unit	: **°C** or °F, adjustable *
Accuracy	: **0,1 °C** or 1 °C, adjustable *
Background illumination	: can be switched **on-** / off *
Working temperature	: -20..+60 °C



* programmable via GTL - Configurations tool (Accessories) or via Buttons (only with option VO)

** programmable via GTL - Configurations tool (Accessories)

Note: the default setting is marked in **bold**

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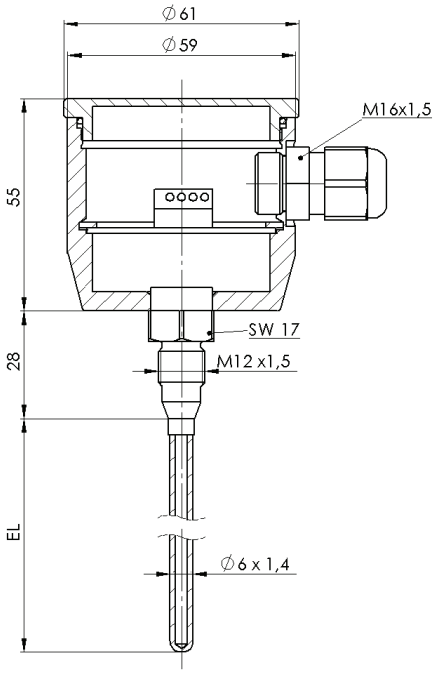
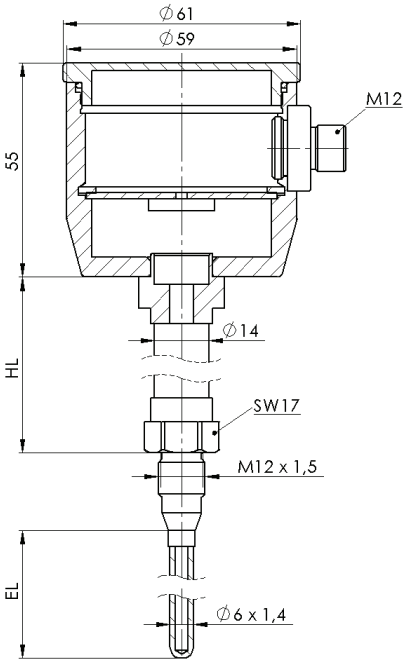
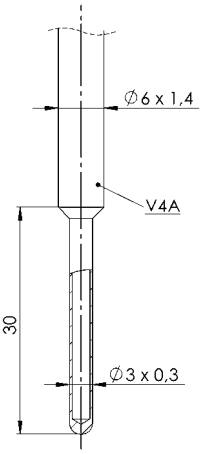
Dimensions

GTL 142



GTL 152

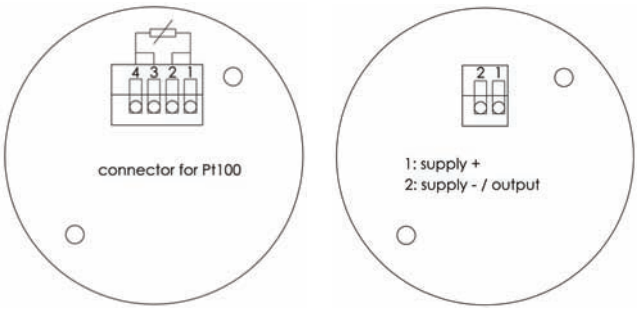




Connection

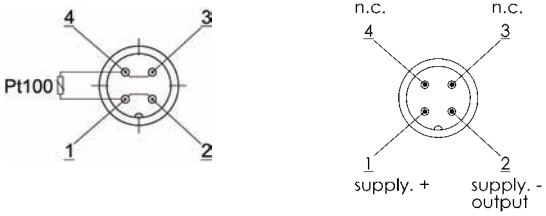
Desired electric connection: cable screwing M16x1.5 (PG)

without transmitter (4-wire): with transmitter (2-wire):



Desired electric connection: cable connection M12-plug (1.4305)

without transmitter (4-wire): with transmitter (2-wire):



Option

VO	integrated **on-site display (LCD)** only combined with electric connection: cable connection M12-plug and integrated transmitter (further Information see “Transmitter GTML1”)

continued on next page

Ordering code

GTL 1. - 2. - 3. - 4. - 5. - 6. - 7.

1.	**Design type**	
	142	without neck tube
	152	with neck tube (100 mm)
2.	**Electric connection**	
	P	cable screwing M16x1.5 (PG)
	M	cable connection M12-plug
3.	**Fitting length EL**	
	0020	20 mm
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	xxxx	any EL in mm (e.g. 320 = 320 mm) Ø 6: max. 1000 mm Ø 4: max. 500 mm
4.	**Diameter protection tube and probe tip**	
	6	Ø 6 mm, without taper
	4	Ø 4 mm, without taper
	3	Ø 6 mm, with tapered probe tip Ø 3 mm
5.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
6.	**Transmitter GTML1 (programmable)**	
	00	without transmitter
	M1	with transmitter: measuring range -10..+40 °C
	M2	with transmitter: measuring range 0..50 °C
	M3	with transmitter: measuring range 0..100 °C
	M4	with transmitter: measuring range 0..150 °C
	M5	with transmitter: measuring range 0..200 °C
	MB	transmitter with special measuring range in °C (state special measuring range separately e.g.: 0..75 °C or -20..+30 °C) keep a minimum range of 50 °C
7.	**Option**	
	00	without option
	VO	**with integrated on-site display (LCD)** (only combined with electric connection: cable connection M12-plug and integrated transmitter)

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Temperature Probe GTL 162 / 162M GTL 182 / 182M


GTL 162

GTL 162M


GTL 182


GTL 182M

- **M12 process connection**
- **Hygienic design and easy-to-sterilize measuring point**
- **Sensor completely made of stainless steel**

Characteristics

The temperature probes GTL 162 / 162M and GTL 182 / 182M are designed for temperature measurements in pipes or thin-walled tanks.

They can be used for example for process monitoring at tube curvatures, temperature measurements in pressure pipes or at measurements of pasty media in pipes

The probes can be provided with different electric connections and with or without integrated head transmitter.

Technical data

Temperature ranges	: ambiance	:	-40..+80 °C
	probe tip	:	-40..+200 °C
	CIP- / SIP-Temp.	:	140 °C < 30 min.
Measuring resistor	: Pt100		
Accuracy	: class A, class AA		
Process connection	: M12		
Clamping torque	: 5..10 Nm		
Fitting length	: 50, 100, 150 or 250 mm		
Probe head	: Ø 18 mm		

Protection tube and probe tip:

Ø 6 mm, Ø 4 mm	protection tube without taper
Ø 3 mm	protection tube Ø 6 mm and tapered probe tip Ø 3 mm
Response time	: FS Ø 3 mm: T_{90} ≤ 1.5 s FS Ø 4 mm: T_{90} ≤ 3.6 s FS Ø 6 mm: T_{90} ≤ 7.4 s
Working pressure	: max. 10 bar

Material

Probe head	: 1.4305 (V2A)
Protection tube and tip	: 1.4404 (V4A)
Protection class	: IP67 / IP69K
CE-conformity	: EN 61326-1:2006 / -2-3:2006

Design types

	GTL 162 / 162M	GTL 182 / 182M
Electric connection	cable connection M12-plug, 4-pin (1.4305)	fixed cable 2.5 m, PVC LIYY 182: 4 x 0.25 mm² 182M: 2 x 0.25 mm²

Transmitter GTML2 (only for GTL 162M / GTL 182M)

Integrated head transmitter

Measuring range	: -10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C * / 0..200 °C * or freely in the range -20..200 °C *
Power supply	: 10..30 V DC
Measuring output	: analog, 4..20 mA, 2-wire
Output signal in case of error	: **< 3,75 mA** or > 21.5 mA, selectable
Filter	: integrated low-pass filter, 4-stage *
Response time	: < 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Working temperature	: -40..+70 °C
Measurement accuracy	: < 0.2 % FS
Temperature drift	: < 0.01 % FS / K

* programmable via GTL - Configurations tool (Accessories)

Note: the default setting is marked in **bold**

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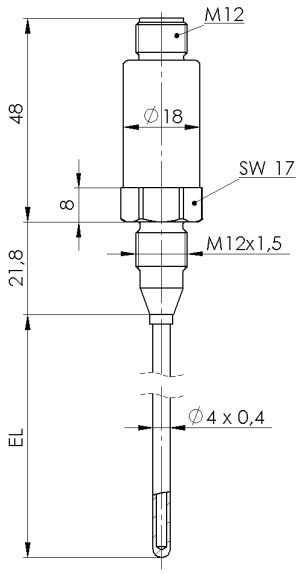
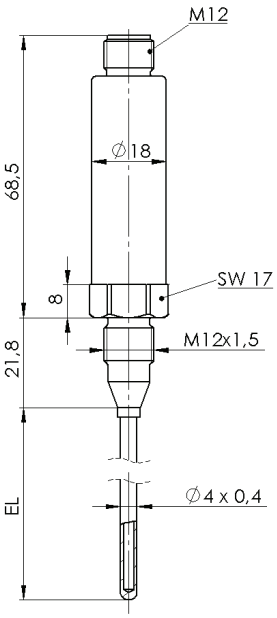
Dimensions

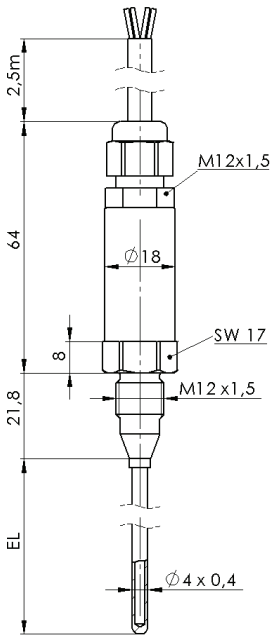
GTL 162



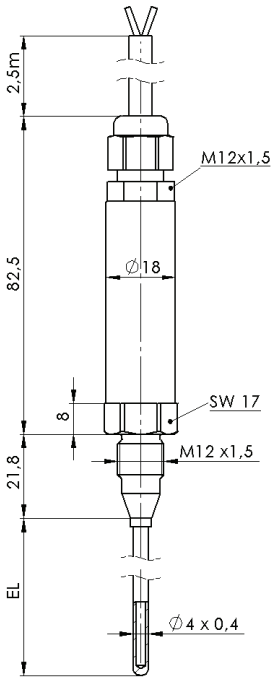
GTL 162M

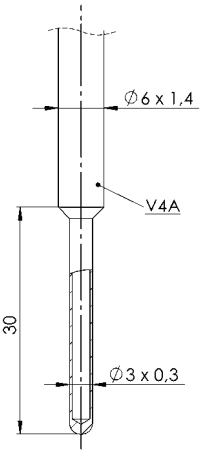


GTL 182



GTL 182M

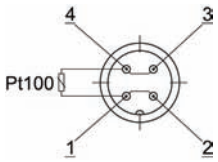




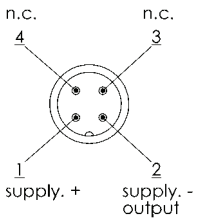
Connection

For design type GTL 162 or GTL 162M:

without transmitter (4-wire):

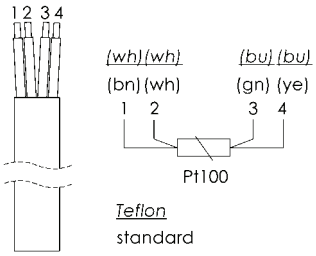


with transmitter (2-wire):

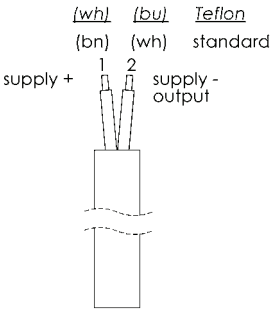


For design type GTL 182 or GTL 182M:

without transmitter (4-wire):



with transmitter (2-wire):



Option

TK	Design type GTL 182 and GTL 182M with **Teflon cable** GTL 182: 4 x 0.14 mm² GTL 182M: 2 x 0.14 mm² Teflon cable up to 200 °C

continued on next page

Ordering code

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

1.	**Design type**	
	162	cable connection M12-plug
	162M	cable connection M12-plug with integrated transmitter
	182	fixed cable 2.5 m
	182M	fixed cable 2.5 m with integrated transmitter
2.	**Fitting length EL**	
	0020	20 mm
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	xxxx	any EL in mm (e.g. 320 = 320 mm) Ø 6: max. 1000 mm Ø 4: max. 500 mm
3.	**Diameter protection tube and probe tip**	
	6	Ø 6 mm, without taper
	4	Ø 4 mm, without taper
	3	Ø 6 mm, with tapered probe tip Ø 3 mm
4.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
5.	**Transmitter GTML2 (programmable)** **ONLY for design types 162M and 182M**	
	00	without transmitter (design types 162 / 182)
	M1	with transmitter: measuring range -10..+40 °C
	M2	with transmitter: measuring range 0..50 °C
	M3	with transmitter: measuring range 0..100 °C
	M4	with transmitter: measuring range 0..150 °C
	M5	with transmitter: measuring range 0..200 °C
	MB	transmitter with special measuring range in °C (state special measuring range separately e.g.: 0..75 °C or -20..+30 °C) keep a minimum range of 50 °C
6.	**Option**	
	00	without option
	TK	Teflon cable for connection via fixed cable (only available for GTL 182 / 182M)

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Temperature Probe GTL 241 / 251

- **G ½ process connection**
- **Hygienic design and easy-to-sterilize measuring point**
- **Sensor completely made of stainless steel**

Characteristics

The temperature probes GTL 142 and GTL 152 are designed for temperature measurements in pipes or tanks.

They can be used for example for monitoring the CIP / SIP procedures or temperature measurements in milk tanks.

The probes can be provided with different electric connections and with or without integrated head transmitter. The probes of design type “with neck tube” are applicable at permanent ambient temperatures up to 200 °C.

Technical data

Temperature ranges	: ambiance	:	-40..+80 °C
	probe tip	:	-40..+200 °C
	CIP- / SIP-Temp.	:	140 °C < 30 min.
Measuring resistor	: Pt100		
Accuracy	: class A, class AA		
Electric connection	: cable screwing M16x1.5 (PG)		
	cable connection M12-plug (1.4305)		
Process connection	: G ½		
Clamping torque	: 5..20 Nm		
Fitting length	: 50, 100, 150, 250 mm		
Probe head	: Ø 59 mm		

Protection tube and probe tip:

Ø 6 mm	protection tube Ø 6 mm without taper
Ø 3 mm	protection tube Ø 6 mm and tapered probe tip Ø 3 mm

Response time	: FS Ø 3 mm: T_{90} ≤ 1.5 s FS Ø 6 mm: T_{90} ≤ 7.4 s
Working pressure	: max. 10 bar

Material

Probe head	: 1.4305 (V2A)
Neck tube	: 1.4305 (V2A)
Protection tube and tip	: 1.4404 (V4A)
Protection class	: IP67 / IP69K
CE-conformity	: EN 61326-1:2006 / -2-3:2006

Design types

	GTL 241	GTL 251
Neck tube	without neck tube	with neck tube length: 100 mm

Transmitter GTML1

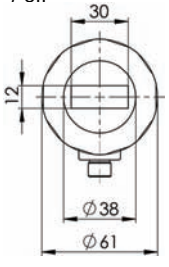
Integrated head transmitter

Measuring range	: -10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C * / 0..200 °C * or freely in the range -20..200 °C **
Power supply	: 10..30 V DC
Measuring output	: analog, 4..20 mA, 2-wire
Output signal in case of error	: **< 3,75 mA** or > 21.5 mA, selectable
Filter	: integrated low-pass filter, 4-stage *
Response time	: < 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Working temperature	: -40..+70 °C
Measurement accuracy	: < 0.2 % FS
Temperature drift	: < 0.01 % FS / K

Transmitter option VO

Integrated on-site display (LCD)
only combined with electric connection: M12-plug

Display	: 4 digit LCD
Display unit	: **°C** or °F, adjustable *
Accuracy	: **0,1 °C** or 1 °C, adjustable *
Background illumination	: can be switched **on-** / off *
Working temperature	: -20..+60 °C



* programmable via GTL - Configurations tool (Accessories) or via Buttons (only with option VO)

** programmable via GTL - Configurations tool (Accessories)

Note: the default setting is marked in **bold**

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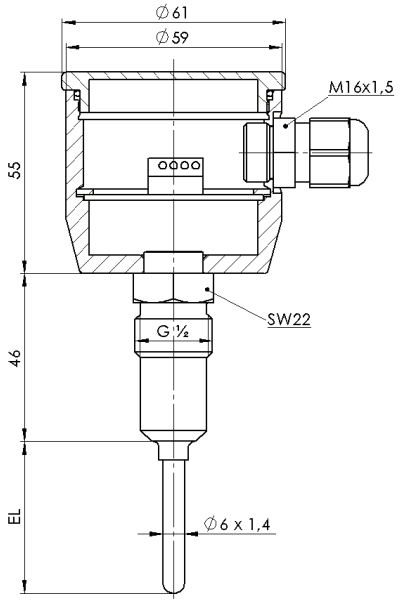
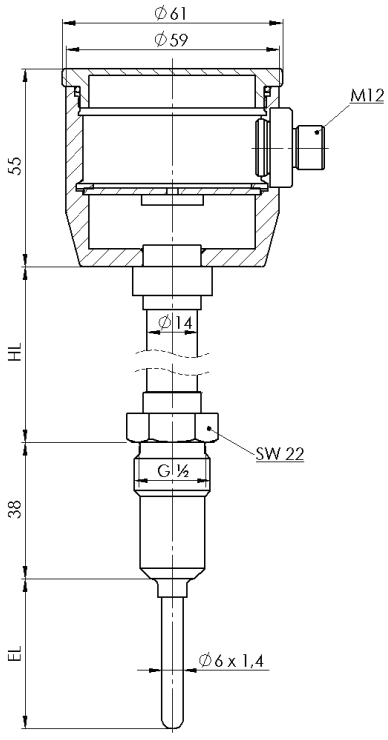
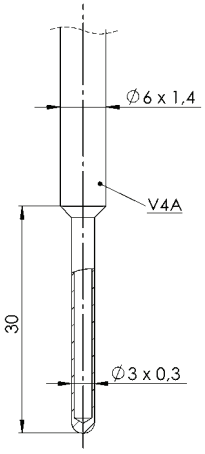
Dimensions

GTL 241



GTL 251

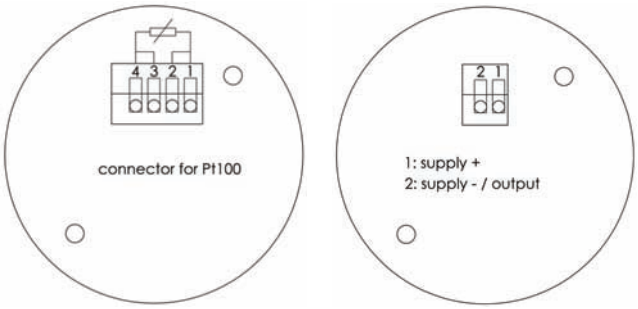




Connection

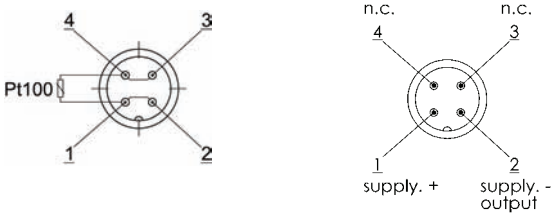
Desired electric connection: cable screwing M16x1.5 (PG)

without transmitter (4-wire): with transmitter (2-wire):



Desired electric connection: cable connection M12-plug (1.4305)

without transmitter (4-wire): with transmitter (2-wire):



Option

VO	iintegrated **on-site display (LCD)** only combined with electric connection: cable connection M12-plug and integrated transmitter (further Information see “Transmitter GTML1”)

continued on next page

Ordering code

GTL 1. [ ] - 2. [ ] - 3. [ ] - 4. [ ] - 5. [ ] - 6. [ ] - 7. [ ]

1.	**Design type**	
	241	without neck tube
	251	with neck tube (100 mm)
2.	**Electric connection**	
	P	cable screwing M16x1.5 (PG)
	M	cable connection M12-plug
3.	**Fitting length EL**	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	xxxx	any EL in mm (e.g. 320 = 320 mm) Ø 6: max. 1000 mm
4.	**Diameter protection tube and probe tip**	
	6	Ø 6 mm, without taper
	3	Ø 6 mm, with tapered probe tip Ø 3 mm
5.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
6.	**Transmitter GTML1 (programmable)**	
	00	without transmitter
	M1	with transmitter: measuring range -10..+40 °C
	M2	with transmitter: measuring range 0..50 °C
	M3	with transmitter: measuring range 0..100 °C
	M4	with transmitter: measuring range 0..150 °C
	M5	with transmitter: measuring range 0..200 °C
	MB	transmitter with special measuring range in °C (state special measuring range separately e.g.: 0..75 °C or -20..+30 °C) keep a minimum range of 50 °C
7.	**Option**	
	00	without option
	VO	**with integrated on-site display (LCD)** (only combined with electric connection: cable connection M12-plug and integrated transmitter)

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Temperature Probe GTL 261 / 261M GTL 281 / 281M

GTL 261 GTL 261M GTL 281 GTL 281M

- **G ½ process connection**
- **Hygienic design and easy-to-sterilize measuring point**
- **Sensor completely made of stainless steel**

Characteristics

The temperature probes GTL 142 and GTL 152 are designed for temperature measurements in pipes or tanks.

They can be used for example for monitoring the CIP / SIP procedures or temperature measurements in milk tanks.

The probes can be provided with different electric connections and with or without integrated head transmitter.

Technical data

Temperature ranges	: ambiance	:	-40..+80 °C
	probe tip	:	-40..+200 °C
	CIP- / SIP-Temp.	:	140 °C < 30 min.
Measuring resistor	: Pt100		
Accuracy	: class A, class AA		
Process connection	: G ½		
Clamping torque	: 5..20 Nm		
Fitting length	: 50, 100, 150, 250 mm		
Probe head	: Ø 18 mm		

Protection tube and probe tip:

Ø 6 mm	protection tube Ø 6 mm without taper
Ø 3 mm	protection tube Ø 6 mm and tapered probe tip Ø 3 mm
Response time	: FS Ø 3 mm: T_{90} ≤ 1.5 s
	FS Ø 6 mm: T_{90} ≤ 7.4 s
Working pressure	: max. 10 bar

Material

Probe head	: 1.4305 (V2A)
Protection tube and tip	: 1.4404 (V4A)
Protection class	: IP67 / IP69K
CE-conformity	: EN 61326-1:2006 / -2-3:2006

Design types

	GTL 261 / 261M	GTL 281 / 281M
Electric connection	cable connection M12-plug, 4-pin (1.4305)	fixed cable 2.5 m, PVC LIYY 281: 4 x 0.25 mm² 281M: 2 x 0.25 mm²

Transmitter GTML2 (only for GTL 261M / GTL 281M)

Integrated head transmitter

Measuring range	: -10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C * / 0..200 °C * or freely in the range -20..200 °C *
Power supply	: 10..30 V DC
Measuring output	: analog, 4..20 mA, 2-wire
Output signal in case of error	: **< 3,75 mA** or > 21.5 mA, selectable
Filter	: integrated low-pass filter, 4-stage *
Response time	: < 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Working temperature	: -40..+70 °C
Measurement accuracy	: < 0.2 % FS
Temperature drift	: < 0.01 % FS / K

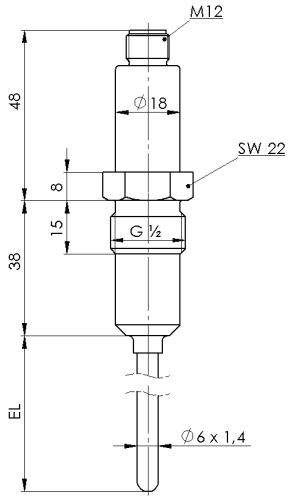
* programmable via GTL - Configurations tool (Accessories)

Note: the default setting is marked in **bold**

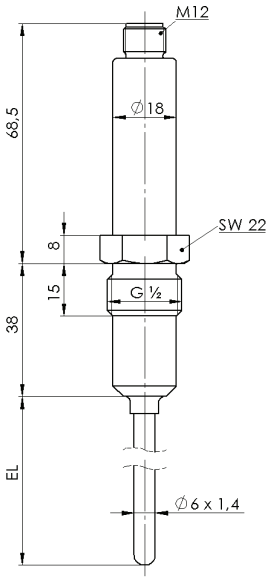
continued on next page

Dimensions

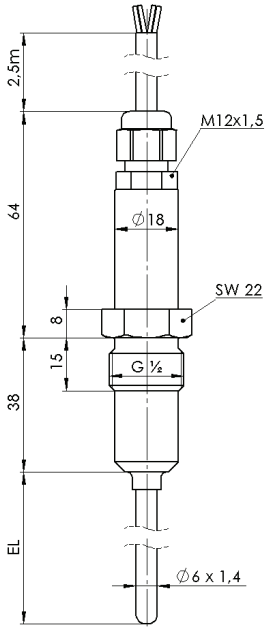
GTL 261



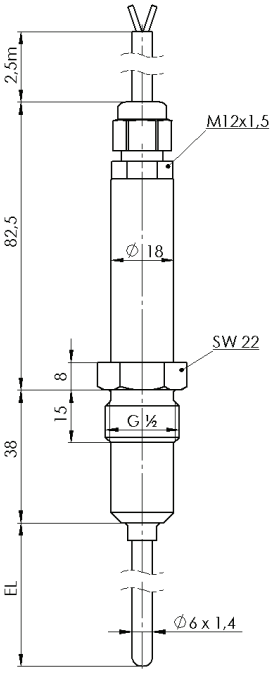
GTL 261M

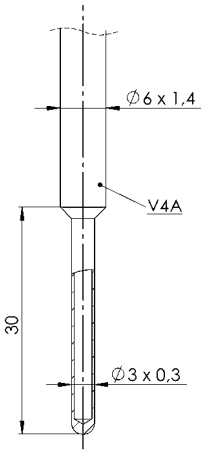


GTL 281



GTL 281M

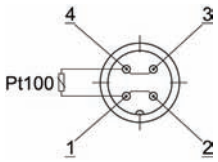




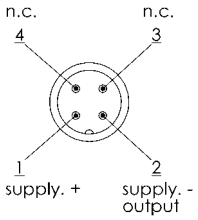
Connection

For design type GTL 261 or GTL 261M:

without transmitter (4-wire):

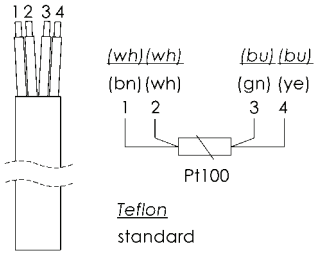


with transmitter (2-wire):

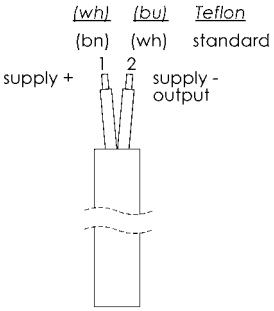


For design type GTL 281 or GTL 281M:

without transmitter (4-wire):



with transmitter (2-wire):



Options

TK	Design type GTL 281 and GTL 281M with **Teflon calbe** GTL 281: 4 x 0.14 mm² GTL 281M: 2 x 0.14 mm² Teflon cable up to 200 °C

continued on next page

Ordering code

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

1.	**Design type**	
	261	cable connection M12-plug
	261M	cable connection M12-plug with integrated transmitter
	281	fixed cable 2.5 m
	281M	fixed cable 2.5 m with integrated transmitter
2.	**Fitting length EL**	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	xxxx	any EL in mm (e.g. 320 = 320 mm) Ø 6: max. 1000 mm
3.	**Diameter protection tube and probe tip**	
	6	Ø 6 mm, without taper
	3	Ø 6 mm, with tapered probe tip Ø 3 mm
4.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
5.	**Transmitter GTML2 (programmable) ONLY for design types 261M and 281M**	
	00	without transmitter (design types 261 / 281)
	M1	with transmitter: measuring range -10..+40 °C
	M2	with transmitter: measuring range 0..50 °C
	M3	with transmitter: measuring range 0..100 °C
	M4	with transmitter: measuring range 0..150 °C
	M5	with transmitter: measuring range 0..200 °C
	MB	transmitter with special measuring range in °C (state special measuring range separately e.g.: 0..75 °C or -20..+30 °C) keep a minimum range of 50 °C
6.	**Option**	
	00	without option
	TK	Teflon cable for connection via fixed cable (only available for GTL 281 / 281M)

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Temperature Probe GTL 244

- **G ½ process connection, flush mounted**
- **Hygienic and sterilizable measuring spot**
- **Sensor made of stainless steel and PEEK**
- **Thermally isolated**

Characteristic

The temperature probes are used for temperature measurements or monitoring of CIP / SIP procedures in tanks with agitator or milk tanks.

Several different electric connections are possible. The probes are available with and without integrated head transmitter.

Technical data

Temperature range	:	Ambiance:	-40..+80 °C
		Probe tip:	-40..+150 °C
		CIP- /SIP-temperature:	140 °C < 30 min.
Measuring resistance	:	Pt100	
Accuracy	:	Class A, class AA	
Electric connection	:	Cable gland M16x1.5 (PG)	
		Cable junction M12-plug (1.4305)	
Process connection	:	G ½	
Tightening torque	:	5..10 Nm	
Probe head	:	Ø 59 mm	
Probe tip	:	Ø 10 mm	
Response time	:	T_{90} ≤ 15 s	
Working pressure	:	max. 10 bar	

Material

Probe head	:	1.4305 (V2A)
Tip	:	1.4404 (V4A), PEEK
Protection class	:	IP67 / IP69K
CE-conformity	:	EN 61326-1:2006 / -2-3:2006

Transmitter GTML1

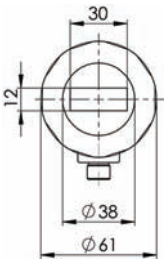
Integrated head transmitter

Measuring range	:	-10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C * or freely within -20..150 °C **
Auxiliary voltage	:	10..30 V DC
Measuring output	:	analog, 4..20 mA, 2-wire
Output signal in error case	:	**< 3.75 mA** or > 21.5 mA, adjustable *
Filter	:	integrated low-pass filter, 4-step *
Response time	:	< 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Ambient temperature	:	-40..+70 °C
Accuracy	:	< 0.2 % FS
Temperature drift	:	< 0.01 % FS / K

Transmitter option VO

Integrated **on-site-display (LCD)**
only in combination with cable junction M12-plug

Display	:	4-digit LCD
Display unit	:	**°C** or °F, selectable *
Resolution	:	**0.1 °C** or 1 °C, selectable *
Background illumination	:	**on**, off switchable *
Ambient temperature	:	-20..+60 °C



* programmable via GTL - Configurations tool (accessories) or via buttons (only at option VO)
** programmable via GTL - Configurations tool (accessories)

Note: Bolt details indicate delivery status.

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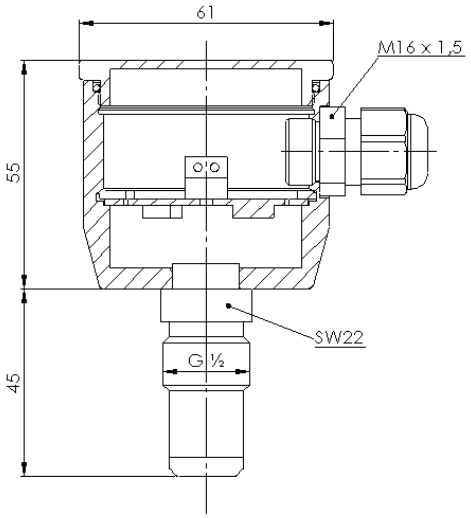
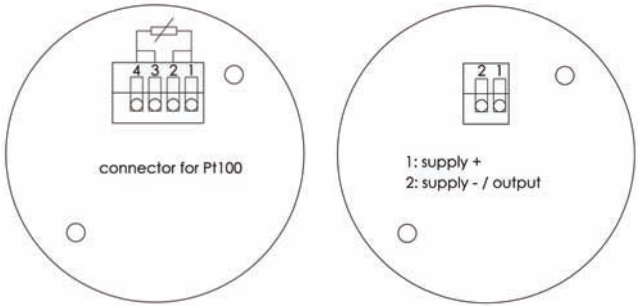
Dimensions



Connection

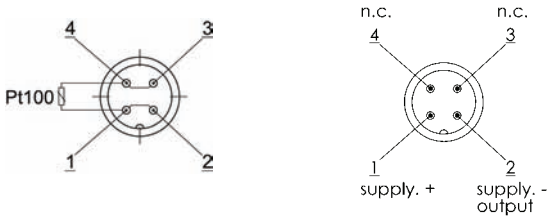
For electric connection: cable gland M16x1.5 (PG)

without transmitter (4-wire): with transmitter (2-wire):



Desired electric connection: cable connection M12-plug (1.4305)

Without transmitter (4-wire): With transmitter (2-wire):



Option

VO	**Transmitter with integrated on-site-display (LCD)** only in combination with electric connection: cable junction M12-plug and integrated transmitter (for further information p.r.t. GTML1) 

Ordering code

GTL 1. [ ] - 2. [ ] - 3. [ ] - 4. [ ] - 5. [ ]

1.	**Design type**	
	244	G ½ flush mounted
2.	**Electric connection**	
	P	cable gland M16x1.5 (PG)
	M	cable junction M12-plug
3.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
4.	**Transmitter GTML1 (programmable)**	
	00	without transmitter
	M1	with transmitter: measuring range -10..+40 °C
	M2	with transmitter: measuring range 0..50 °C
	M3	with transmitter: measuring range 0..100 °C
	M4	with transmitter: measuring range 0..150 °C
	MB	transmitter with special measuring range in °C, max. range: -20..150 °C, minimum range: 50 °C (state range separately, e.g.: 0..75 °C or -20..+30 °C)
5.	**Option**	
	00	without option
	VO	**with integrated on-site-display (LCD)** (only in combination with electric connection: cable junction M12-plug and transmitter)

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Temperature Probe GTL 264 / 264M GTL 284 / 284M

GTL 264 GTL 264M GTL 284 GTL 284M

- **G ½ process connection, flush mounted**
- **hygienic and sterilizable measuring spot**
- **Sensor made of stainless steel and PEEK**
- **Thermally isolated**

Characteristic

The temperature probes are used for temperature measurements or monitoring of CIP / SIP procedures in tanks with agitator or milk tanks.

Several different electric connections are possible. The probes are available with and without integrated head transmitter.

Technical data

Temperature range	:	Ambiance:	-40..+80 °C
		Probe tip:	-40..+150 °C
		CIP- /SIP-temperature:	140 °C < 30 min.
Measuring resistance	:	Pt100	
Accuracy	:	Class A, class AA	
Process connection	:	G ½	
Tightening torque	:	5..10 Nm	
Probe head	:	Ø 18 mm	
Probe tip	:	Ø 10 mm	
Response time	:	T_{90} ≤ 15 s	
Working pressure	:	max. 10 bar	

Material

Probe head	:	1.4305 (V2A)
Tip	:	1.4404 (V4A), PEEK
Protection class	:	IP67 / IP69K
CE-conformity	:	EN 61326-1:2006 / -2-3:2006

Design types

	GTL 264 / 264M	GTL 284 / 284M
Electric connection	cable junction M12-plug, 4-pole (1.4305)	fixed cable 2.5 m, PVC LIYY 281: 4 x 0.25 mm² 281M: 2 x 0.25 mm²

Transmitter GTML2 (only for GTL 264M / GTL 284M)

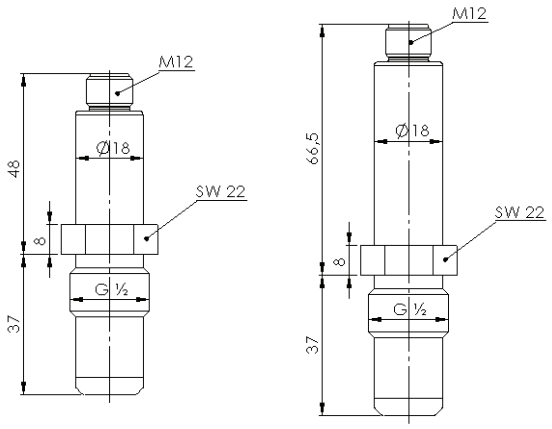
Integrated head transmitter

Measuring range	:	-10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C * or freely within -20..150 °C *
Auxiliary voltage	:	10..30 V DC
Measuring output	:	analog, 4..20 mA, 2-wire
Output signal in error case	:	**< 3.75 mA** or > 21.5 mA, adjustable *
Filter	:	integrated low-pass filter, 4-step *
Response time	:	< 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Ambient temperature	:	-40..+70 °C
Accuracy	:	< 0.2 % FS
Temperature drift	:	< 0.01 % FS / K

* programmable via GTL - Configurations tool (accessories)

Note: Bolt details indicate delivery status.

Dimensions



GTL 264 GTL 264M

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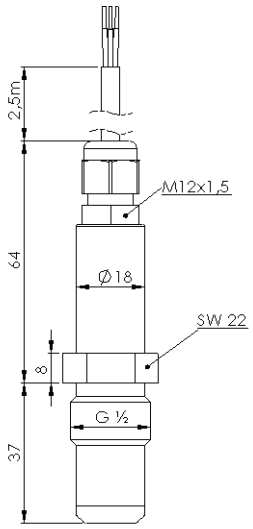
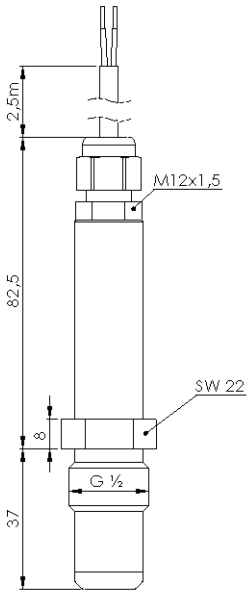


GTL 284

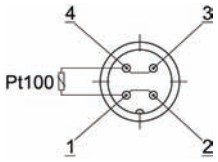


GTL 284M

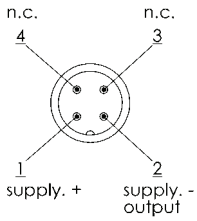
Connection

For design types GTL 264 or GTL 264M:

Without transmitter (4-wire):

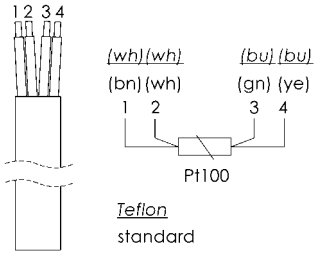


With transmitter (2-wire):

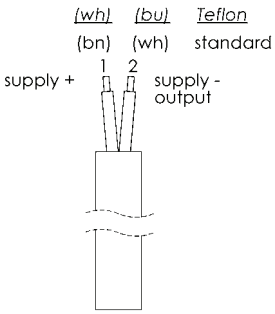


For design types GTL 284 or GTL 284M:

Without transmitter (4-wire):



With transmitter (2-wire):



Option

TK	Design type GTL 284 and GTL 284M with **Teflon cable** GTL 284: 4 x 0.14 mm² GTL 284M: 2 x 0.14 mm² Teflon cable up to 200 °C

Ordering code

	1.		2.		3.		4.
GTL	☐	-	☐	-	☐	-	☐

1.	**Design type (electric connection)**	
	264	connection via cable junction junction M12-plug
	264M	connection via cable junction junction M12-plug, with integrated transmitter
	284	connection via fixed cable 2.5 m
	284M	connection via fixed cable 2.5 m, with integrated transmitter
2.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
3.	**Transmitter GTML2 (programmable) ONLY for design types 264M and 284M**	
	00	without transmitter (types 264 / 284)
	M1	measuring range -10..+40 °C
	M2	measuring range 0..50 °C
	M3	measuring range 0..100 °C
	M4	measuring range 0..150 °C
	MB	transmitter with special measuring range in °C, max. range: -20..150 °C, minimum range: 50 °C (state range separately, e.g.: 0..75 °C or -20..+30 °C)
4.	**Option**	
	00	without option
	TK	Teflon cable for fixed cable connection (only for types 284 and 284M)

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Temperature Probe GTL 349

- **Without thread**
- **Hygienic design and easy-to-sterilize measuring point**
- **Sensor completely made of stainless steel**

Characteristics

The temperature probes GTL 142 and GTL 152 are designed for temperature measurements in pipes of different nominal diameters or thin-walled tubes and tanks.

They can be used for example for process monitoring at tube curvatures, temperature measurements in pressure pipes or at measurements of pasty media in pipes

The fitting length can be varied by use of compression fitting. The probes can be provided with different electric connections and with or without integrated head transmitter.

Technical data

Temperature ranges	: ambiance	:	-40..+80 °C
	probe tip	:	-40..+200 °C
	CIP- / SIP-Temp.	:	140 °C < 30 min.
Measuring resistor	: Pt100		
Accuracy	: class A, class AA		
Electric connection	: cable screwing M16x1.5 (PG)		
	cable connection M12-plug (1.4305)		

Process connection	:	no thread suitable welding sleeves: e.g. GKEV-25/76, GEMK-25/76 (Accessories)

Fitting length	:	50, 100, 150, 250 mm
Probe head	:	Ø 59 mm
Protection tube and probe tip:		
Ø 6 mm		protection tube Ø 6 mm without taper
Ø 3 mm		protection tube Ø 6 mm and tapered probe tip Ø 3 mm
Response time	:	FS Ø 3 mm: $T_{90} \leq 1.5$ s FS Ø 6 mm: $T_{90} \leq 7.4$ s
Working pressure	:	max. 10 bar
Material		
Probe head	:	1.4305 (V2A)
Protection tube and tip	:	1.4404 (V4A)
Protection class	:	IP67 / IP69K
CE-conformity	:	EN 61326-1:2006 / -2-3:2006

Transmitter GTML1

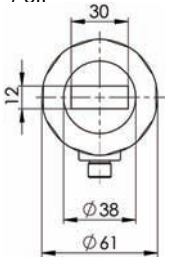
Integrated head transmitter

Measuring range	:	-10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C * / 0..200 °C * or freely in the range -20..200 °C **
Power supply	:	10..30 V DC
Measuring output	:	analog, 4..20 mA, 2-wire
Output signal in case of error	:	**< 3,75 mA** or > 21.5 mA, selectable
Filter	:	integrated low-pass filter, 4-stage *
Response time	:	< 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Working temperature	:	-40..+70 °C
Measurement accuracy	:	< 0.2 % FS
Temperature drift	:	< 0.01 % FS / K

Transmitter option VO

Integrated on-site display (LCD)
only combined with electric connection: M12-plug

Display	:	4 digit LCD
Display unit	:	**°C** or °F, adjustable *
Accuracy	:	**0,1 °C** or 1 °C, adjustable *
Background illumination	:	can be switched **on-** / off *
Working temperature	:	-20..+60 °C



* programmable via GTL - Configurations tool (Accessories) or via Buttons (only with option VO)
** programmable via GTL - Configurations tool (Accessories)

Note: the default setting is marked in **bold**

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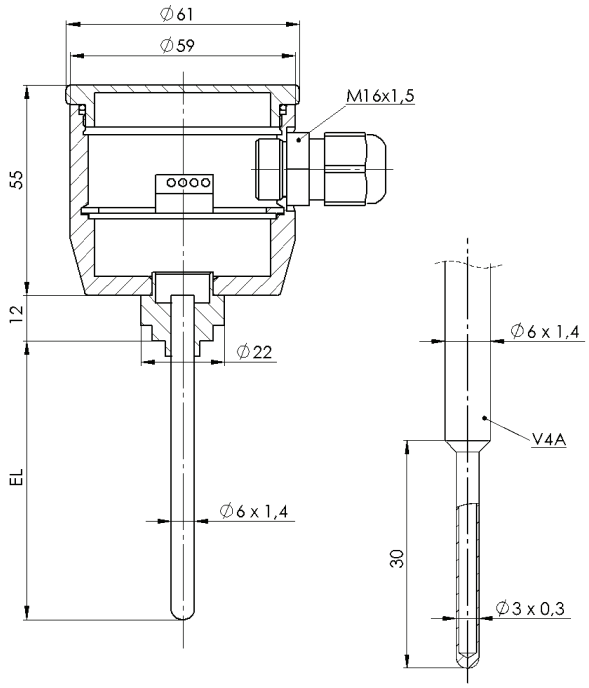
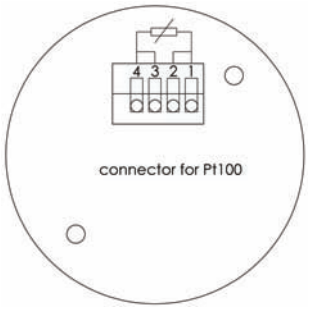
Dimensions



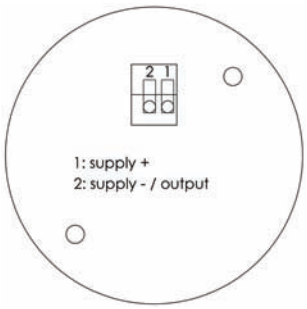
Connection

Desired electric connection: cable screwing M16x1.5 (PG)

without transmitter (4-wire):

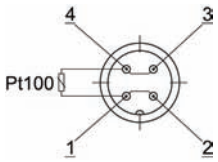


with transmitter (2-wire):

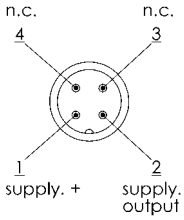


Desired electric connection: cable connection M12-plug (1.4305)

without transmitter (4-wire):



with transmitter (2-wire):



Option

VO	integrated **on-site display (LCD)** only combined with electric connection: cable connection M12-plug and integrated transmitter (further Information see “Transmitter GTML1”) 

Ordering code

GTL 1. 2. 3. 4. 5. 6. 7.

1.	**Design type**	
	349	without thread
2.	**Electric connection**	
	P	cable screwing M16x1.5 (PG)
	M	cable connection M12-plug
3.	**Fitting length EL**	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	xxxx	any EL in mm (e.g. 320 = 320 mm) Ø 6: max. 1000 mm
4.	**Diameter protection tube and probe tip**	
	6	Ø 6 mm, without taper
	3	Ø 6 mm, with tapered probe tip Ø 3 mm
5.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
6.	**Transmitter GTML1 (programmable)**	
	00	without transmitter
	M1	with transmitter: measuring range -10..+40 °C
	M2	with transmitter: measuring range 0..50 °C
	M3	with transmitter: measuring range 0..100 °C
	M4	with transmitter: measuring range 0..150 °C
	M5	with transmitter: measuring range 0..200 °C
	MB	transmitter with special measuring range in °C (state special measuring range separately e.g.: 0..75 °C or -20..+30 °C) keep a minimum range of 50 °C
7.	**Option**	
	00	without option
	VO	**with integrated on-site display (LCD)** (only combined with electric connection: cable connection M12-plug and integrated transmitter)

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Temperature Probe GTL 369 / 369M GTL 389 / 389M


GTL 369


GTL 369M


GTL 389


GTL 389M

- **Without tread**
- **Hygienic design and easy-to-sterilize measuring point**
- **Sensor completely made of stainless steel**

Characteristics

The temperature probes GTL 142 and GTL 152 are designed for temperature measurements in pipes of different nominal diameters or thin-walled tubes and tanks.

They can be used for example for process monitoring at tube curvatures, temperature measurements in pressure pipes or at measurements of pasty media in pipes

The fitting length can be varied by use of compression fitting. The probes can be provided with different electric connections and with or without integrated head transmitter.

Technical data

Temperature ranges	: ambiance	:	-40..+80 °C
	probe tip	:	-40..+200 °C
	CIP- / SIP-Temp.	:	140 °C < 30 min.
Measuring resistor	: Pt100		
Accuracy	: class A, class AA		

Process connection : no thread
suitable welding sleeves:
e.g. GKEV-25/76, GEMK-25/76

Fitting length : 50, 100, 150, 250 mm
Probe head : Ø 18 mm

Protection tube and probe tip:
Ø 6 mm protection tube Ø 6 mm without taper
Ø 3 mm protection tube Ø 6 mm and tapered probe tip Ø 3 mm
Response time : FS Ø 3 mm: T_{90} ≤ 1.5 s
FS Ø 6 mm: T_{90} ≤ 7.4 s
Working pressure : max. 10 bar

Material
Probe head : 1.4305 (V2A)
Protection tube and tip : 1.4404 (V4A)

Protection class : IP67 / IP69K
CE-conformity : EN 61326-1:2006 / -2-3:2006

Design types

	GTL 369	GTL 389
Electric connection	cable connection M12-plug, 4-pin (1.4305)	fixed cable 2.5 m, PVC LIYY 389: 4 x 0.25 mm² 389M: 2 x 0.25 mm²

Transmitter (only for GTL 369M and GTL 389M)

Integrated head transmitter
Measuring range : -10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C * / 0..200 °C *
or freely in the range -20..200 °C *
Power supply : 10..30 V DC
Measuring output : analog, 4..20 mA, 2-wire
Output signal in case of error : **< 3,75 mA** or > 21.5 mA, selectable
Filter : integrated low-pass filter, 4-stage *
Response time : < 150 ms (filter 0), **< 300 ms (filter 1)**
< 800 ms (filter 2), < 3 s (filter 3)
Working temperature : -40..+70 °C
Measurement accuracy : < 0.2 % FS
Temperature drift : < 0.01 % FS / K

* programmable via GTL - Configurations tool (Accessories)

Note: the default setting is marked in **bold**

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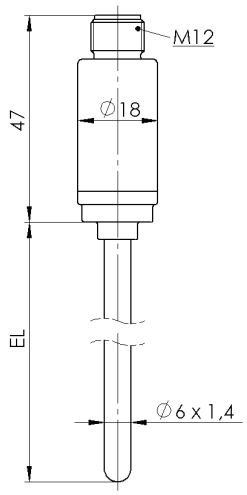
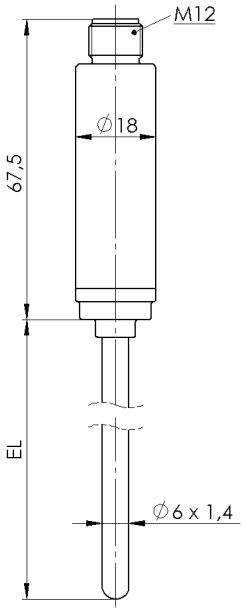
Dimensions

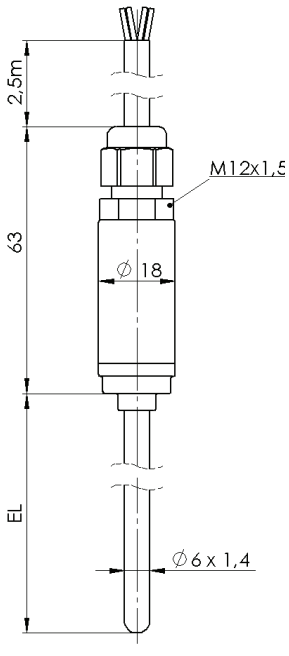
GTL 369



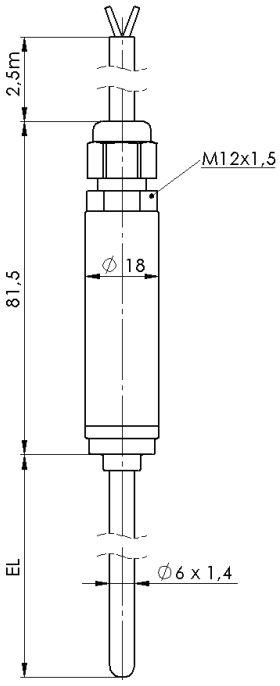
GTL 369M

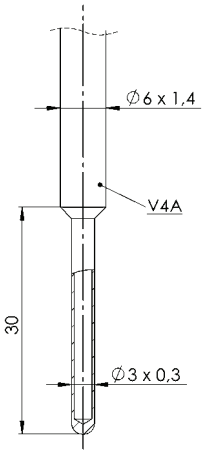


GTL 389



GTL 389M

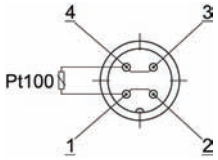




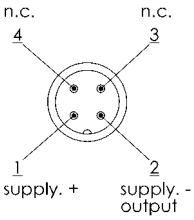
Connection

For design type GTL 369 or GTL 369M:

without transmitter (4-wire):

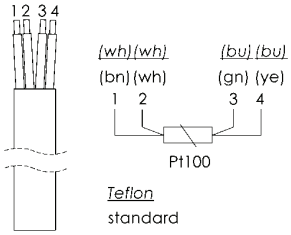


with transmitter (2-wire):

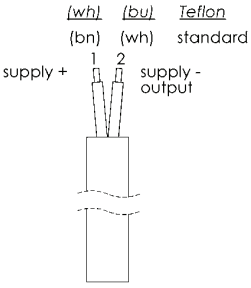


For design type GTL 369 or GTL 389M:

without transmitter (4-wire):



with transmitter (2-wire):



Option

TK	Design type GTL 389 and GTL 389M with **Teflon calbe** GTL 389: 4 x 0.14 mm² GTL 389M: 2 x 0.14 mm² **Teflon cable up to 200 °C**

continued on next page

Ordering code

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

1.	**Design type**	
	369	cable connection M12-plug
	369M	cable connection M12-plug with integrated transmitter
	389	fixed cable 2.5 m
	389M	fixed cable 2.5 m with integrated transmitter
2.	**Fitting length EL**	
	0050	50 mm
	0100	100 mm
	0150	150 mm
	0250	250 mm
	xxxx	any EL in mm (e.g. 320 = 320 mm) Ø 6: max. 1000 mm
3.	**Diameter protection tube and probe tip**	
	6	Ø 6 mm, without taper
	3	Ø 6 mm, with tapered probe tip Ø 3 mm
4.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
5.	**Transmitter GTML2 (programmable) ONLY for design types 369M and 389M**	
	00	without transmitter (design types 369 / 389)
	M1	with transmitter: measuring range -10..+40 °C
	M2	with transmitter: measuring range 0..50 °C
	M3	with transmitter: measuring range 0..100 °C
	M4	with transmitter: measuring range 0..150 °C
	M5	with transmitter: measuring range 0..200 °C
	MB	transmitter with special measuring range in °C (state special measuring range separately e.g.: 0..75 °C or -20..+30 °C) keep a minimum range of 50 °C
6.	**Option**	
	00	without option
	TK	Teflon cable for connection via fixed cable (only available for GTL 389 / 389M)

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Temperature Probe GTL 459

Together with APHG12

- **G 3/8 union nut**
- **hygienic and sterilizable measuring spot**
- **sensor completely made of stainless steel**

Characteristic

The temperature probes are used for temperature monitoring in tubes and tanks, temperature measurement in superheated steam and pressure pipes (closed process) as well as for monitoring of CIP / SIP procedures.

Several different electric connections are possible. The probes are available with and without integrated head transmitter.

Technical data

Temperature range	: Ambiance:	-40..+80 °C
	Probe tip:	-40..+200 °C
	CIP- /SIP-temperature:	140 °C < 30 min.
Measuring resistance	: Pt100	
Accuracy	: Class A, class AA	
Electric connection	: Cable gland M16x1.5 (PG)	
	Cable junction M12-plug (1.4305)	
Process connection	: Immersion sleeve, G 3/8 male threat suitable adapter and weld-in sleeves APHG12, APHK25, APHZ18 (p.r.t. accessories)	

Tightening torque	:	5..20 Nm
Immersion length	:	37, 83, 97, 160 mm
Probe head	:	Ø 59 mm

Shield tube and probe tip:

Ø 3 mm	:	Shield tube Ø 3 mm
Response time	:	T_{90} ≤ 1.5 s (without immersion sleeve) T_{90} ≤ 21 s (with immersion sleeve: *Use of heat transfer paste is recommended. This can reduce the stated response time up to 50%.)*
Working pressure	:	max. 10 bar

Material

Probe head	:	1.4305 (V2A)
Shield tube and tip	:	1.4404 (V4A)
Union nut	:	1.4408 (V4A)

Protection class	:	IP67 / IP69K
CE-conformity	:	EN 61326-1:2006 / -2-3:2006

Transmitter GMTL1

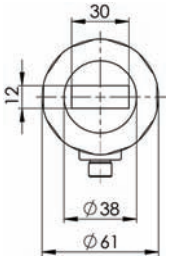
Integrated head transmitter

Measuring range	:	-10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C / 0..200 ° * or freely within -20..200 °C **
Auxiliary voltage	:	10..30 V DC
Measuring output	:	analog, 4..20 mA, 2-wire
Output signal in error case	:	**< 3.75 mA** or > 21.5 mA, adjustable *
Filter	:	integrated low-pass filter, 4-step *
Response time	:	< 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Ambient temperature	:	-40..+70 °C
Accuracy	:	< 0.2 % FS
Temperature drift	:	< 0.01 % FS / K

Transmitter option VO

Integrated **on-site-display (LCD)**
only in combination with cable junction M12-plug

Display	:	4-digit LCD
Display unit	:	**°C** or °F, selectable *
Resolution	:	**0.1 °C** or 1 °C, selectable *
Background illumination	:	**on**, off switchable *
Ambient temperature	:	-20..+60 °C



* programmable via GTL - Configurations tool (accessories) or via buttons (only at option VO)
** programmable via GTL - Configurations tool (accessories)

Note: Bolt details indicate delivery status.

continued on next page

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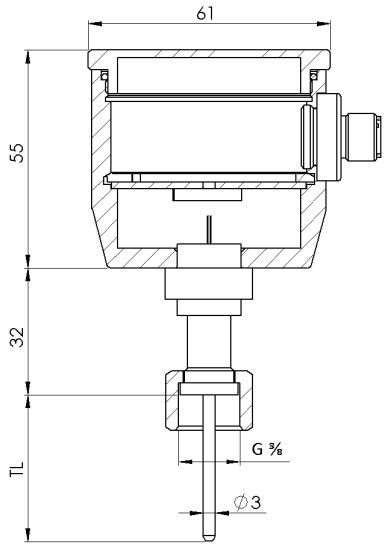
Dimensions



Option

VO	**Transmitter with integrated on-site-display (LCD)** only in combination with electric connection: cable junction M12-plug and integrated transmitter (for further information p.r.t. GTML1)

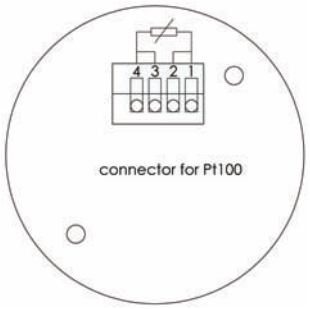
Ordering code

GTL459 1. 2. 3. 4. 5. 6.

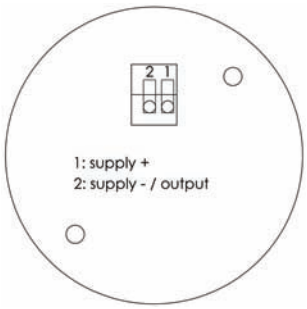
Connection

For electric connection: cable gland M16x1.5 (PG)

without transmitter (4-wire):

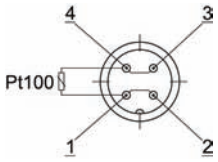


with transmitter (2-wire):

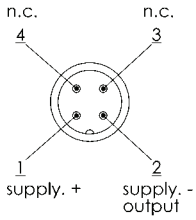


Desired electric connection: cable connection M12-plug (1.4305)

Without transmitter (4-wire):



With transmitter (2-wire):



1.	**Design type**	
	459	G 3/8 union nut
1.	**Electric connection**	
	P	cable gland M16x1.5 (PG)
	M	cable junction M12-plug
2.	**Immersion length TL**	
	037	37 mm
	083	83 mm
	097	97 mm
	160	160 mm
	xxx	any immersion length in mm: from 200 mm to max. 500 mm (e.g. 320 = 320 mm)
3.	**Diameter shield tube and probe tip**	
	3	Ø 3 mm
4.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
5.	**Transmitter GTML1 (programmable)**	
	00	without transmitter
	M1	with transmitter: measuring range -10..+40 °C
	M2	with transmitter: measuring range 0..50 °C
	M3	with transmitter: measuring range 0..100 °C
	M4	with transmitter: measuring range 0..150 °C
	M5	with transmitter: measuring range 0..200 °C
	MB	transmitter with special measuring range in °C, max. range: -20..150 °C, minimum range: 50 °C (state range separately, e.g.: 0..75 °C or -20..+30 °C)
6.	**Option**	
	00	without option
	VO	**with integrated on-site-display (LCD)** (only in combination with electric connection: cable junction M12-plug and transmitter)

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Temperature Probe GTL 479 / 479M GTL 499 / 499M

GTL 479 GTL 479M GTL 499 GTL 499M

Together with APHG12

- **G 3/8 union nut**
- **hygienic and sterilizable measuring spot**
- **sensor completely made of stainless steel**

Characteristic

The temperature probes are used for temperature monitoring in tubes and tanks, temperature measurement in superheated steam and pressure pipes (closed process) as well as for monitoring of CIP / SIP procedures.

Several different electric connections are possible. The probes are available with and without integrated head transmitter.

Technical data

Temperature range	:	Ambiance:	-40..+80 °C
		Probe tip:	-40..+200 °C
		CIP- /SIP-temperature:	140 °C < 30 min.
Measuring resistance	:	Pt100	
Accuracy	:	Class A, class AA	
Process connection	:	Immersion sleeve, G 3/8 male threat suitable adapter and weld-in sleeves APHG12, APHK25, APHZ18 (p.r.t. accessories)	

Tightening torque	:	5..20 Nm
Immersion length	:	37, 83, 97, 160 mm
Probe head	:	Ø 18 mm

Shield tube and probe tip:

Ø 3 mm	:	Shield tube Ø 3 mm
Response time	:	T_{90} ≤ 1.5 s (without immersion sleeve) *T_{90} ≤ 21 s (with immersion sleeve: Use of heat transfer paste is recommended. This can reduce the stated response time up to 50%.)*
Working pressure	:	max. 10 bar
Material		
Probe head	:	1.4305 (V2A)
Shield tube and tip	:	1.4404 (V4A)
Union nut	:	1.4408 (V4A)
Protection class	:	IP67 / IP69K
CE-conformity	:	EN 61326-1:2006 / -2-3:2006

Design types

	GTL 479 / 479M	GTL 499 / 499M
Electric connection	cable junction M12-plug, 4-pole (1.4305)	fixed cable 2.5 m LIYY 499: 4 x 0.25 mm² 499M: 2 x 0.25 mm²

Transmitter GTML2 (only for GTL 479M / GTL 499M)

Integrated head transmitter

Measuring range	:	-10..+40 °C * / 0..50 °C * / 0..100 °C * 0..150 °C / 0..200 °C * or freely within -20..200 °C *
Auxiliary voltage	:	10..30 V DC
Measuring output	:	analog, 4..20 mA, 2-wire
Output signal in error case	:	**< 3.75 mA** or > 21.5 mA, adjustable *
Filter	:	integrated low-pass filter, 4-step *
Response time	:	< 150 ms (filter 0), **< 300 ms (filter 1)** < 800 ms (filter 2), < 3 s (filter 3)
Ambient temperature	:	-40..+70 °C
Accuracy	:	< 0.2 % FS
Temperature drift	:	< 0.01 % FS / K

* programmable via GTL - Configurations tool (accessories)

Note: Bolt details indicate delivery status.

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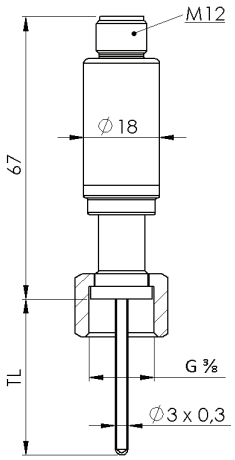
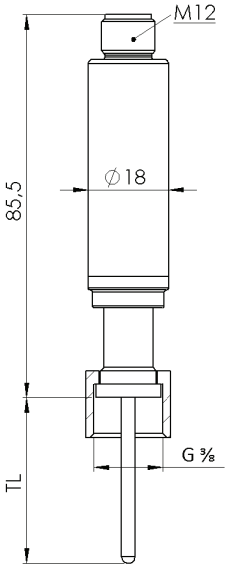
Dimensions

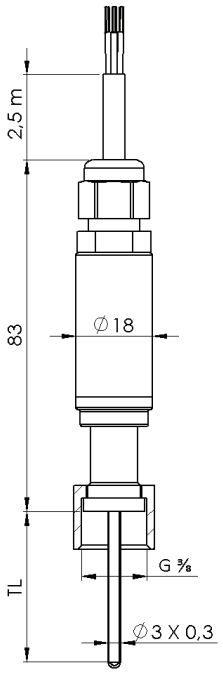
GTL 479



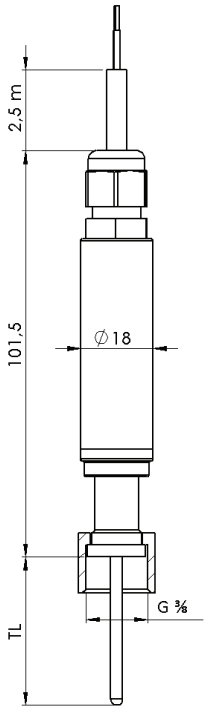
GTL 479M



GTL 499

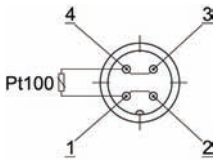


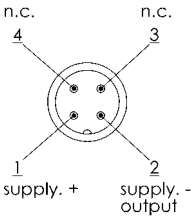
GTL 499M



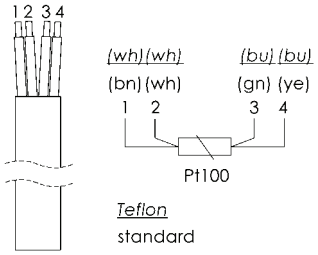
Connection

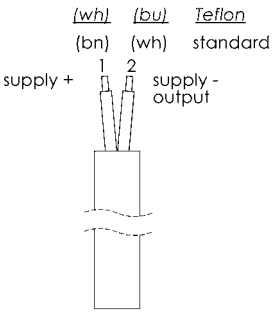
For design types GTL 479 or GTL 479M:
Without transmitter (4-wire): With transmitter (2-wire):





For design types GTL 499 or GTL 499M:
Without transmitter (4-wire): With transmitter (2-wire):





Option

TK	Design type GTL 499 and GTL 499M **with Teflon cable** GTL 499: 4 x 0.14 mm² / GTL 499M: 2 x 0.14 mm² Teflon cable up to 200 °C

continued on next page

Ordering code

GTL 1. [ ] - 2. [ ] - 3. [ ] - 4. [ ] - 5. [ ] - 6. [ ]

1.	**Design type (electric connection)**	
	479	connection via cable junction junction M12-plug
	479M	connection via cable junction junction M12-plug, with integrated transmitter
	499	connection via fixed cable 2.5 m
	499M	connection via fixed cable 2.5 m, with integrated transmitter
2.	**Immersion length TL**	
	037	37 mm
	083	83 mm
	097	97 mm
	160	160 mm
	xxx	any immersion length in mm: from 200 mm to max. 500 mm (e.g. 320 = 320 mm)
3.	**Diameter shield tube and probe tip**	
	3	Ø 3 mm
4.	**Accuracy class**	
	A	class A
	D	class AA (1/3 class B)
5.	**Transmitter GTML2 (programmable) ONLY for design types 479M and 499M**	
	00	without transmitter (types 479 / 499)
	M1	measuring range -10..+40 °C
	M2	measuring range 0..50 °C
	M3	measuring range 0..100 °C
	M4	measuring range 0..150 °C
	M5	measuring range 0..200 °C
	MB	transmitter with special measuring range in °C, max. range: -20..150 °C, minimum range: 50 °C (state range separately, e.g.: 0..75 °C or -20..+30 °C)
6.	**Option**	
	00	without option
	TK	Teflon cable for fixed cable connection (only for types 499 and 499M)

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Clamp-on Temperature Sensor GTL720/GTL723

- **Simple mounting via clamp-on adapter without media contact**
- **High accuracy even without thermal compound**
- **Fast response time**
- **Replacing/cleaning of the sensor without process interruption**
- **Pt100 sensor 3-wire connection or transmitter 4..20 mA, 2-wire connection**
- **Transmitter programmable via GTL-Configuration tool or 1-key operation**

Characteristics

Clamp-on temperature sensors GTL720 and GTL723 are specified to measure temperatures without media contact.
The measuring tip is directly located at the pipe wall and will be fixed by the clamp-on adapter on the pipe. This measuring process provides a high accuracy and a fast response time, which is often better than a measuring principle with media contact.

Technical data

Temperature sensor : Pt100, class A acc. to DIN EN 60751

GTL720 without transmitter
Measuring range : -20..+160 °C
Ambient temperature : -20..+85 °C

GTL723 with transmitter
Measuring range : -20..+100 °C, short time 160 °C < 30 min, programmable, minimal measuring span 50 °C
Ambient temperature : -20..+60 °C
Protection class : IP67

Electrical connection
Round plug : 4-pole M12x1
GTL720
Pt100 sensor current : max. 10 mA (recommended 0.3..1 mA)
GTL723
Supply voltage : 10..28 V DC, loop powered
Error indication : programmable
-break of sensor : I > 22 mA (factory setting)
-short circuit : I < 3.7 mA

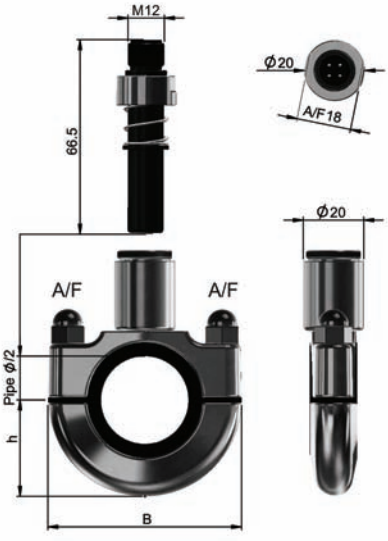
Response time/accuracy [1)]
Data without thermal compound, medium temperature 120 °C
Rise time T_{90} : approx. 10 s
Accuracy : up to 2.5 % of f.s. without pipe wall adjustment
: up to 0.6 % of f.s. with pipe wall adjustment [2)]
Data with thermal compound, medium temperature 120 °C
Response time T_{90} : approx. 3 s
Accuracy : up to 1 % of f.s. without pipe wall adjustment
: up to 0.3 % of f.s. with pipe wall adjustment [2)]
Temperature coefficient : 0.02 %/°C

[1)] Measurement results depending to the mounting situation. See next page
[2)] Measuring values are valid only for GTL723

Output : 4..20 mA
Material

Temperature sensor
Spring : 1.4310
Sensor usage : PEEK
Sensor tip : 935er silver
Lid : 1.4305
M12 plug : PA/gold plated contacts
Clamp-on adapter
Adapter : 1.4405
Case : 1.4305
Adapter insertion : Silicone HTV
Weight
Frame size (Bg) 1 : 137 g
Frame size (Bg) 2 : 187 g
Frame size (Bg) 3 : 412 g

Dimensions



Frame size (Bg)	Pipe Ø [mm]	B [mm]	h [mm]	A/F [mm]
1	12.0..19.9	51	26	11
2	20.0..33.9	64	32	11
3	34.0..53.0	92	46	14

Continue next page

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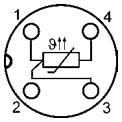
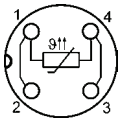
Connection diagrams

GTL720 passive sensor

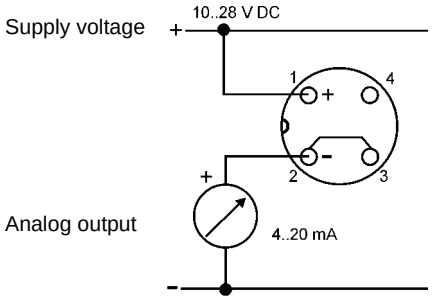
Connection variation 1 (standard)



Connection variation 2 (customized)



GTL723 Transmitter



Ordering code

Note:
In place of order please specify the clamp-on sensor and the clamp-on adapter.
Order example:
Temperature sensor **GTL** without transmitter,
with clamp-on adapter **RLA** DN32:
GTL720-0-00-0-00 + RLA424-00

Clamp-on Temperature Sensor

GTL 1. ☐ - 2. ☐ - 3. ☐ - 4. ☐ - 5. ☐

1.	**Design / input**	
	720	Pt100 with M12 plug
	723	Transmitter 4..20 mA with M12 plug
2.	**Electrical connection**	
	0	GTL720 variation 1 (standard)
	1	GTL720 variation 2 (customized)
	2	GTL723 2-wire, 4..20 mA
3.	**Transmitter GTL723, default ranges** (programming with GTL – Configuration tool via PC or frontside key)	
	00	without transmitter (only GTL720)
	M1	measuring range -10..+40 °C
	M2	measuring range 0..50 °C
	M3	measuring range 0..100 °C
	M4	measuring range 0..150 °C temperatures > 100 °C max. 30 min
	MB	transmitter with customized range [°C] (please state in clear text e.g. 20..130 °C)
4.	**Pipe wall adjustment for SS-type pipes (only GTL723)**	
	0	not active
	1	without thermal compound
	2	with thermal compound
5.	**Options**	
	00	without option

Clamp-on Adapter

RLA 1. ☐ - 2. ☐

1.	**Pipe diameter**		
Bg.1	130	13.0 mm: DN10 12.7 mm: ½“	DIN11850 r2 DIN11866 rC / ASME-BPE
	190	19.0 mm: DN15 19.0 mm: ¾“	DIN11850 r2 DIN11866 rC / ASME-BPE
Bg.2	213	21.3 mm: DN15	DIN11866 rB
	254	25.4 mm: 1“	DIN11866 rC / ASME-BPE
	269	26.9 mm: DN20	DIN11866 rB
	290	29.0 mm: DN25	DIN11850 r2
	337	33.7 mm: DN25	DIN11866 rB
Bg.3	381	38.1 mm: 1 ½“	DIN11866 rC / ASME-BPE
	424	42.4 mm: DN32	DIN11866 rB
	483	48.3 mm: DN40	DIN11866 rB
	508	50.8 mm: 2“	DIN11866 rC / ASME-BPE
	530	53.0 mm: DN50	DIN11850 r2
	999	customized diameter on request	
2.	**Options**		
	00	without option	

Accessories:

Thermal compound
Type
WLP10S, containing silicone
- high thermal conductivity of 10.0 W/mK
- not drying out, silicone parts not fleeting
- Storage time up to 12 months at normal ambient conditions
- Syringe containing 3ml + pipette
  color silver-gray

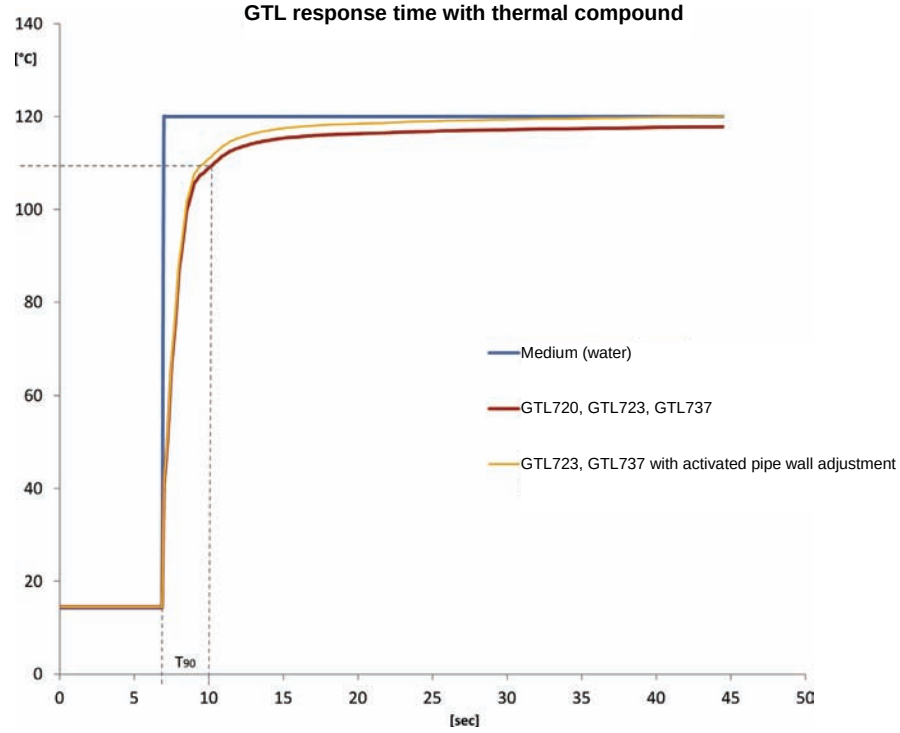
Type:
GTL - Configuration tool
Programming of the GTL7XX via PC

Temperature curves see next page

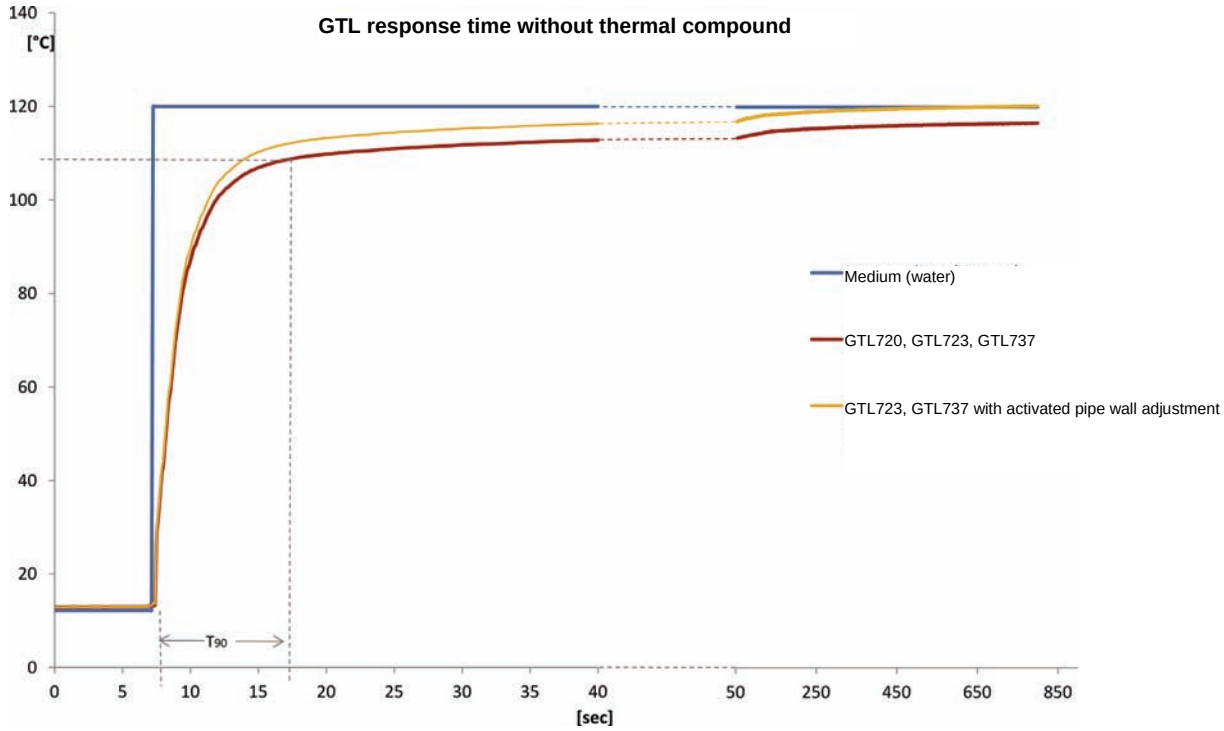
Response time at different conditions

Note: reference SS-type pipeline with 1.5 mm pipe wall

GTL response time with thermal compound



GTL response time without thermal compound



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Clamp-on Temperature Sensor GTL737

- **Simple mounting via clamp-on adapter**
- **Process connection without media contact**
- **High accuracy even without thermal compound**
- **Fast response time**
- **Replacing/cleaning of the sensor without process interruption**
- **Pt100 sensor with integrated transmitter 4..20 mA**
- **Transmitter programmable via GTL-Configuration tool or 1-key operation**
- **LCD on-site display, background lightning**
- **Output 4..20 mA loop powered**

Characteristics

Clamp-on temperature sensor GTL737 is specified to measure temperatures without media contact.
The measuring tip is directly located at the pipe wall and will be fixed by the clamp-on adapter on the pipe. This measuring process provides a high accuracy and a fast response time, which is often better than a measuring principle with media contact.

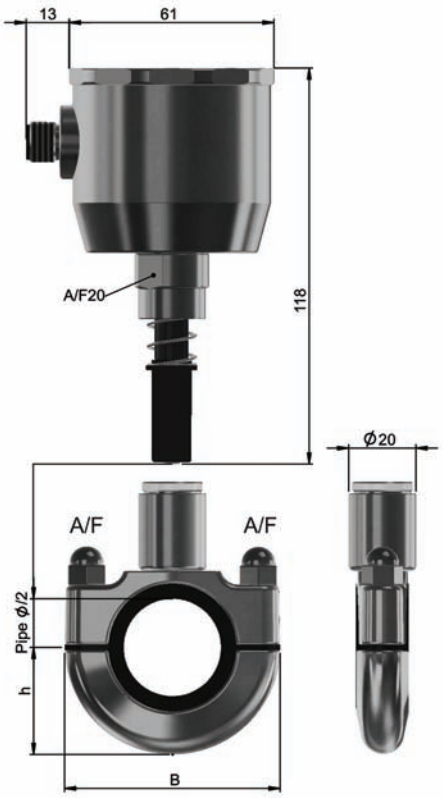
Techncal data

Temperature sensor	: Pt100, class A acc. to DIN EN 60751
Measuring range	: -20..+160 °C, programmable, minimal measuring span 50 °C
Ambient temperature	: -20..+60 °C
Protection class	: IP67
Display	: LCD, 3 ½ -digit background lightning
Electrical connection	
Round plug	: 4-pole, M12x1
Supply voltage	: 10..28 V DC, loop powered
Error indication	: programmable
-break of sensor	: I > 22 mA (factory setting)
-short circuit	: I < 3.7 mA
Response time/accuracy [1]	
Data without thermal compound, medium temperature 120 °C	
Response time T_{90}	: approx. 10 s
Accuracy	: up to 2.5 % of f.s. without pipe wall adjustment
	: up to 0.6 % of f.s. with pipe wall adjustment [2]
Data with thermal compound, medium temperature 120 °C	
Response time T_{90}	: approx. 3 s
Accuracy	: up to 1 % of f.s. without pipe wall adjustment
	: up to 0.3 % of f.s. with pipe wall adjustment [2]
Temperature coefficient	: 0.02 %/°C

[1] Measurement results depending to the mounting situation.

Output	: 4..20 mA
Material	
Temperature sensor	
Spring	: 1.4310
Sensor usage	: PEEK
Sensor tip	: 935er silver
Lid	: 1.4305
M12 plug	: PA/gold plated contacts
Clamp-on adapter	
Adapter	: 1.4405
Case	: 1.4305
Adapter insertion	: Silicone HTV
Weight	
Frame size (Bg) 1	: not available
Frame size (Bg) 2	: 770 g
Frame size (Bg) 3	: 1000 g

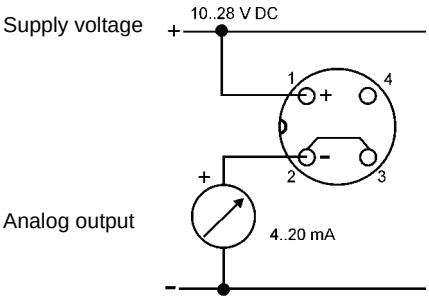
Dimensions



Frame size (Bg)	Pipe Ø [mm]	B [mm]	h [mm]	A/F [mm]
1	not available			
2	20.0..33.9	64	32	11
3	34.0..53.0	92	46	14

Continue next page

Connection diagram



Ordering code

Note:
In place of order of the system are the clamp-on sensor and clamp-on adapter necessary.
Order example:
Transmitter, **GTL** measuring range 0..100 °C
with clamp-on adapter **RLA** DN32
GTL737-0-M3-00 + RLA424-00

Pipeline sensor

GTL 1. ☐ - 2. ☐ - 3. ☐ - 4. ☐

1.	**Design**	
	737	Transmitter 4..20 mA with M12 plug
2.	**Electrical connection**	
	0	loop powered
3.	**Transmitter GTL737, default ranges** (programming possible with GTL – Configuration tool via PC)	
	M1	measuring range -10..+40 °C
	M2	measuring range 0..50 °C
	M3	measuring range 0..100 °C
	M4	measuring range 0..150 °C (standard)
	MB	transmitter with customized range [°C] (please state in clear text e.g. 20..130 °C)
4.	**Options**	
	00	without option

Clamp-on adapter

RLA 1. ☐ - 2. ☐

1.	**Pipe diameter**		
Bg.2	213	21.3 mm: DN15	DIN11866 rB
	254	25.4 mm: 1“	DIN11866 rC / ASME-BPE
	269	26.9 mm: DN20	DIN11866 rB
	290	29.0 mm: DN25	DIN11850 r2
	337	33.7 mm: DN25	DIN11866 rB
Bg.3	381	38.1 mm: 1 ½“	DIN11866 rC / ASME-BPE
	424	42.4 mm: DN32	DIN11866 rB
	483	48.3 mm: DN40	DIN11866 rB
	508	50.8 mm: 2“	DIN11866 rC / ASME-BPE
	530	53.0 mm: DN50	DIN11850 r2
	999	customized diameter on request	
2.	**Options**		
	00	without option	

Accessories:

Thermal compound
Type
WLP10S, containing silicone
- high thermal conductivity of 10.0 W/mK
- not drying out, silicone parts not fleeting
- Storage time up to 12 month at normal ambient conditions
- Syringe containing 3ml + pipette
  color silver-gray

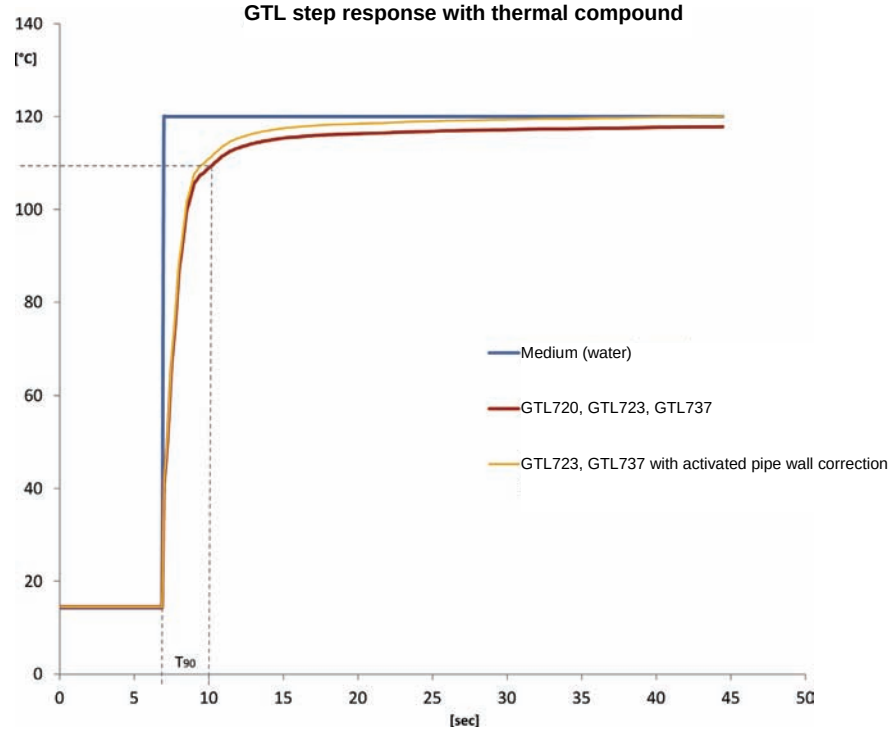
Type:
GTL - Configuration tool
Programming of the GTL7XX via PC

Temperature curves see next page

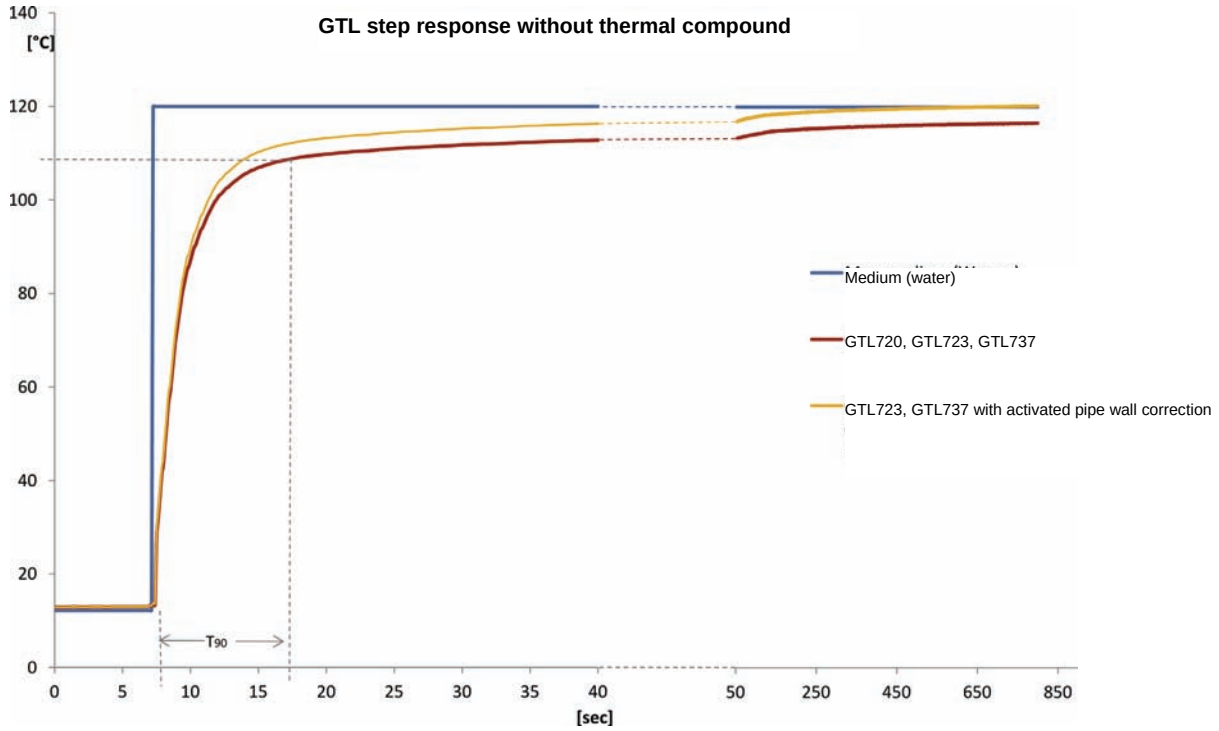
Response time at different conditions

Note: reference SS-type pipeline with 1.5 mm pipe wall

GTL step response with thermal compound



GTL step response without thermal compound



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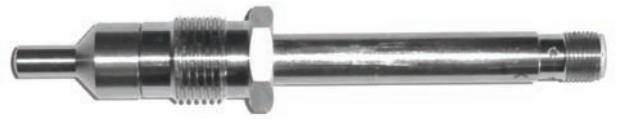
Temperature Transmitter HTK12-I / U / F



- **Complete temperature transmitter for the foodstuffs industry, in 12 mm housing!**
- **Analog output 4..20 mA (HTK12-I)**
- **Analog output 0..10 V (HTK12-U)**
- **Frequency output (HTK12-F)**
- **User-configurable via plug pin (teaching)**
- **Same mechanical design available, whether temperature switch, flow transmitter / switch or level switch!**

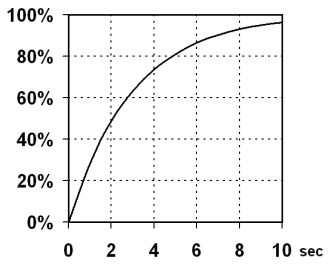
Characteristics

The sensors in the HTK12 family can be used for the measurement and monitoring of temperatures in flowing media, and are specially designed for use in the foodstuffs industry. The 16-bit processor provides linearisation of the PT2000 characteristic curve, and emits the standardised output signal.
The HTK12 electronics transmit the result as

- Analog 0/4..20 mA signal (HTK12-I)
- Analog 0/2..10 V signal (HTK12-U)
- Frequency signal (HTK12-F)

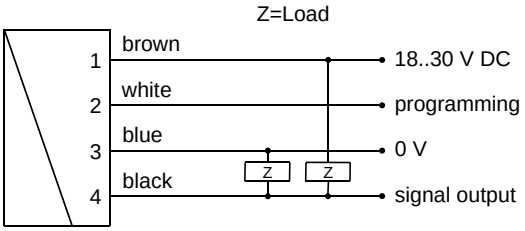
If desired, the range end value can be set to the presently existing temperature using teaching (see Handling and Operation).

Technical data

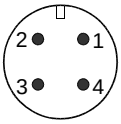
Metering range	Standard: 0..100 °C Optional: -20..+100 °C or parts of this
Process connection	Sealing cone screw fitting compatible with G $^1/_2$ GHM*adapt*
Medium temperature	-20..+100 °C
Ambient temperature	0..60 °C
CIP- / SIP Temperature	130 °C, 45 min. max. (Version H)
Dynamic (τ)	3 sec. 
Process pressure	PN 50
Measurement accuracy	±1 °C
Repeatability	±0.5 °C
Supply voltage	18..30 V DC (controlled)

Current consumption at rest	< 60 mA	
Output	HTK12-I: 4..20 mA / Max. load 500 Ohm	
	HTK12-U: 0..10 V / min. load 1 kOhm	
	HTK12-F: Frequency output "push-pull" (resistant to short circuits and reversed polarity protected) I_{out} = 100 mA max. selectable output frequency, max. 2 kHz	
Ingress protection	IP 67	
Connection	for round plug connector M12x1, 4-pole	
Materials medium-contact	Sensor tip	1.4435, FDA-compliant
Non-medium-contact materials	Housing	1.4571
	Pressure screw	1.4404
	Plug	PA
	Contacts	gold-plated
Weight	approx. 100 g incl. pressure screw	
Conformity	CE, EHEDG	

Wiring

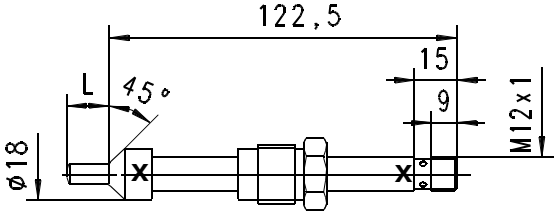


Connection example: PNP NPN



The use of shielded cabling is recommended!

Dimensions



For compatible T-pieces and weld-on sockets in the GHMadapt series, see "Accessories".

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Handling and Operation

Note

The metering range end 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.

Operation and programming

If desired, the metering range end can be set by the user by means of teaching.

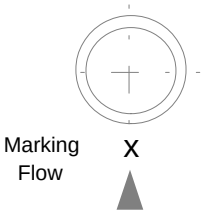
For this, proceed as follows:

- The temperature which is to be set is applied to the device.
- Apply a pulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the auxiliary 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.

Installation

The sensor is inserted into the boring with a sealing cone, oriented, and fastened in place with a pressure screw.
When a flow is present, this should impinge on the side of the sensor marked with an X, in order to achieve a short response time.



The torque on the pressure screw should be between 5..10 Nm.

Avoid bubbles or deposits on the sensor. It is therefore best to install at the side.

Ordering code

	1.	2.	3.	4.
HTK12-		**015**		

Option = ❍

1.	**Analog output**	
	I	current output 4..20 mA
	U	voltage output 0..10 V
	F	frequency output
2.	**Sensor tip length**	
	015	L = 15 mm
3.	**Programming**	
	N	cannot be programmed (no teaching)
	P ❍	programmable (teaching possible)
4.	**Option**	
	H	CIP- / SIP version, 130 °C, 45 minutes max.

Options

For HTK12-I and HTK12-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

For HTK12-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

Further options available on request.

Accessories

- ECI-1 device configurator (USB programming adapter)
- Process adapter
- Cable/round plug connector (KH...)
see additional information “Accessories”

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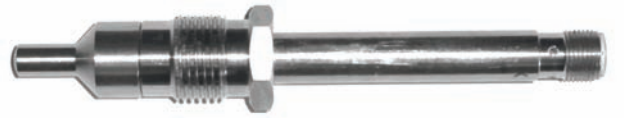
Temperature Switch HTK12-S



- **Temperature sensor with limit switch for the foodstuffs industry, in 12 mm housing!**
- **User-configurable via plug pin (teaching)**
- **Same mechanical design available, whether temperature transmitter, flow transmitter / switch or level switch!**

Characteristics

The sensors of the HTK12 family can be used for measuring and monitoring temperatures in flowing media. They provide multiple configuration options combined with low space requirements. The mechanical construction makes them suitable for use in the foodstuffs industry.

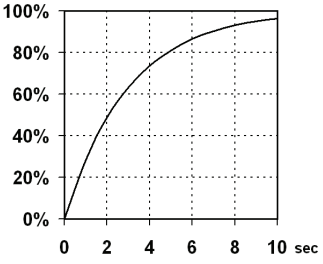
The electronics of the HTK12-S are a flexibly configurable limit switch.

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 ECI1 interface and a PC.

The adjustable parameters are:

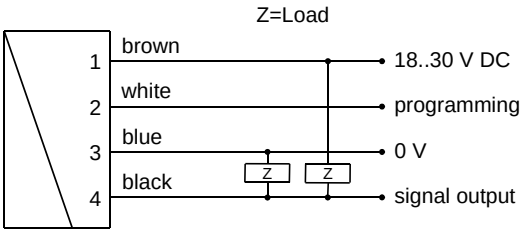
- Switching value
- Hysteresis
- Minimum/maximum monitoring
- Switching delay
- Switchback delay
- Power-On delay
- Teach-Offset

Technical data

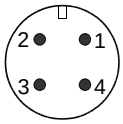
Switching range	-20..+100 °C
Process connection	sealing cone screw fitting, compatible with G $^1/_2$ GHM*adapt*
Medium temperature	-20..+100 °C
Ambient temperature	0..60 °C
CIP- / SIP Temperature	130 °C, 45 min. max. (version H)
Dynamic (τ)	3 sec. 
Process pressure	PN 50

Measurement accuracy	±1 °C	
Repeatability	±0.5 °C	
Supply voltage	18..30 V DC (controlled)	
Current consumption at rest	< 60 mA	
Switching output	transistor output "push-pull", compatible with PNP and NPN, (resistant to short circuits and reversed polarity protected) I_{out} = 100 mA max.	
Ingress protection	IP 67	
Connection	for round plug connector M12x1, 4-pole	
Materials medium-contact	Sensor tip	1.4435, FDA-compliant
Non-medium-contact materials	Housing	1.4571
	Pressure screw	1.4404
	Plug	PA
	Contacts	gold-plated
Weight	approx. 100 g incl. pressure screw	
Conformity	CE, EHEDG FDA CERTIFIED EHEDG TYPE EL - CLASS I	

Wiring

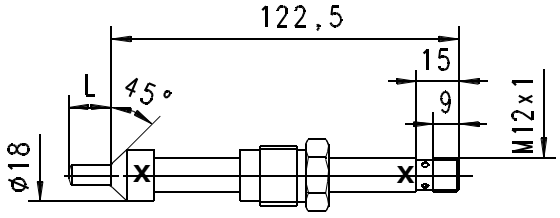


Connection example: PNP NPN



The use of shielded cabling is recommended.

Dimensions



For compatible T-pieces and weld-on sockets in the GHMadapt series, see "Accessories".

Handling and Operation

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 auxiliary 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.

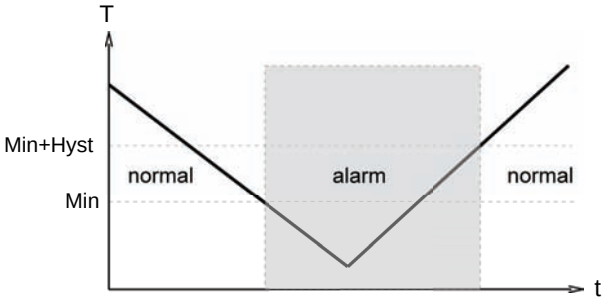
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

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.

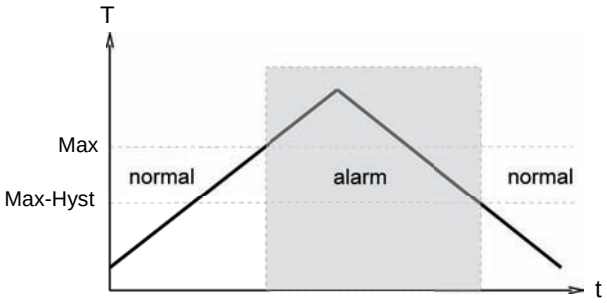
Example: The switching value is to be set to 80 °C, because at this temperature a critical process status is to be notified. However, only 60 °C can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 °C. At 60 °C in the process, a switching value of 80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

The HTK12-S limit switch can be used to monitor minima or maxima.

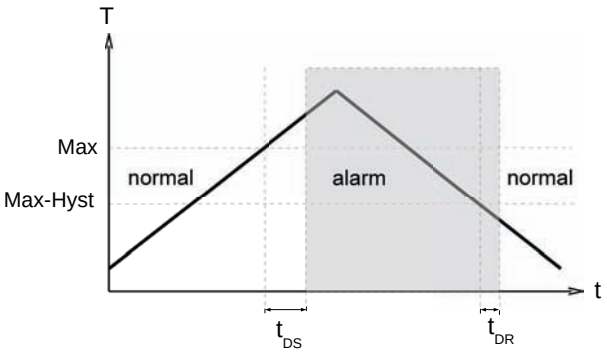
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



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.

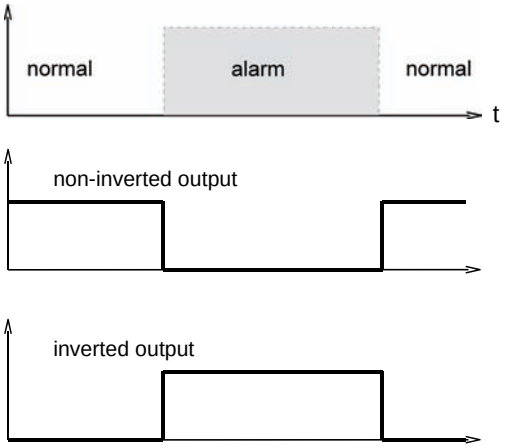


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



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 auxiliary voltage.

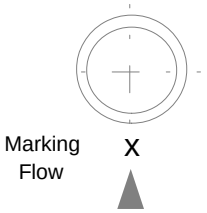
In the non-inverted (standard) model, while in the normal state the switching output is at the level of the auxiliary voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided,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

Installation

The sensor is inserted into the boring with a sealing cone, oriented, and fastened in place with a pressure screw.



When a flow is present, this should impinge on the side of the sensor marked with an X, in order to achieve a short response time.

The torque on the pressure screw should be between 5..10 Nm.

Avoid bubbles or deposits on the sensor! It is therefore best to install at the side.

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Ordering code

	1.	2.	3.	4.	5.	6.
HTK12-	**S**	**015**				**H**

Option = ❍

1.	**Switching output**	
	S	transistor output "push-pull"
2.	**Sensor tip length**	
	015	L = 15 mm
3.	**Programming**	
	N	cannot be programmed (no teaching)
	P ❍	programmable (teaching possible)
4.	**Functioning of the switching output**	
	L	minimum-switch
	H	maximum-switch
5.	**Switching signal**	
	O	non-inverted output
	I ❍	inverted output
6.	**Option**	
	H	CIP- / SIP version, 130 °C, 45 minutes max.

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)

Switch-On delay period (0..99 s) ☐☐ s
(Time after power on, turing which the outputs are not actuated)

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

- ECI-1 device configurator (USB programming adapter)
- Process adapter
- Cable/round plug connector (KH...)
  see additional information “Accessories”

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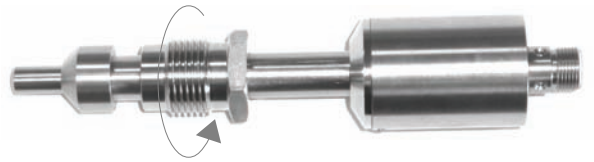
Temperature Transmitter / Switch HT-K30



- **Compact robust temperature switch/transmitter for foodstuffs use**
- **No Moving parts in the medium**
- **Only one medium-contact material**
- **Simple to use**
- **Very low pressure loss**
- **Cable outlet infinitely rotatable**
- **Very small installation width, therefore very narrow pipework is possible**

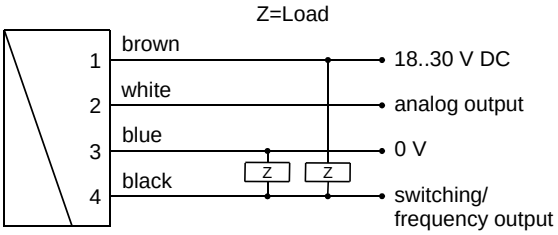
Characteristics

The HTK30 temperature sensor monitors fluid media. Its compact form combines the built-in sensor and the evaluation electronics. The integrated transducer has an analog output (4..20 mA or 0..10 V) and one switching output, which can be configured as a limit switch for monitoring minima or maxima, or as a frequency output.
The switching output is designed as a push-pull driver, and can therefore be used both as a PNP or an NPN output. The state of the switching output is signalled with a yellow LED in the switching outlet; the LED has all-round visibility.
The sensor is configured in the factory, or alternatively this can be done with the aid of the optionally available ECI-1 device configurator (USB interface for PC). A selectable parameter can be modified on the device, with the aid of the magnet clip provided. In this case, the current measured value is saved as the parameter value. Examples of these parameters are the switching value or the fullscale value.
The stainless steel electronics housing is rotatable, so it is possible to orient the cable outlet after installation.

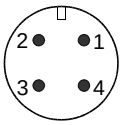
Technical data

Metering range	0..100 °C (0..130 °C available on request)
Accuracy	±1 % FS
Reproducibility	±0.1 % FS
Process pressure	PN 50
CIP- / SIP-Temperature	130 °C, 45 minutes max.
Ambient temperature	-20..+70 °C
Storage temperature	-20..+80 °C
Teaching / settings	by means of magnet
Weight	approx. 200 kg (standard version)
Supply voltage	10..30 V DC
Current Consumption	max. 100 mA
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.
Switching hysteresis	2 °C (others available on request)
Display (only with switching output)	yellow LED (On = OK / Off = Alarm)
Analog output	4..20 mA / Load 500 Ohm max. or 0..10 V / Load min. 1 kOhm
Connection	for round plug connector M12x1, 4-pole
Materials medium-contact	Sensor 1.4435, FDA-compliant
Materials, non-medium-contact	Housing 1.4305 Plug PA6.6 Clip PA6.6
Ingress protection	IP 67
Conformity	CE, EHEDG

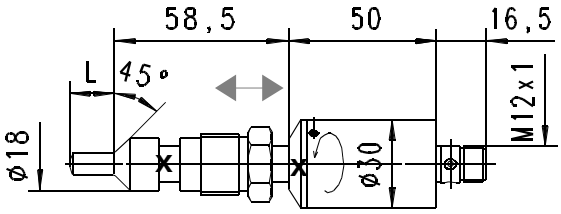
Wiring



Connection example: PNP NPN



Dimensions

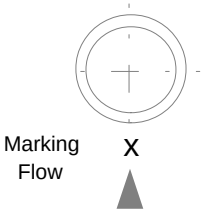


For compatible T-pieces and weld-on sockets in the GHMadapt series, see "Accessories".

Handling and Operation

Installation

The sensor is inserted into the boring with sealing cone, oriented, and fastened in place with a pressure screw.
When a flow is present, this should impinge on the side of the sensor marked with an X, in order to achieve a short response time.



The torque on the pressure screw should be between 5..10 Nm.

Avoid bubbles or deposits on the sensor! It is therefore best to install at the side.
For T-pieces or welded-on nozzles, see Accessories.

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).

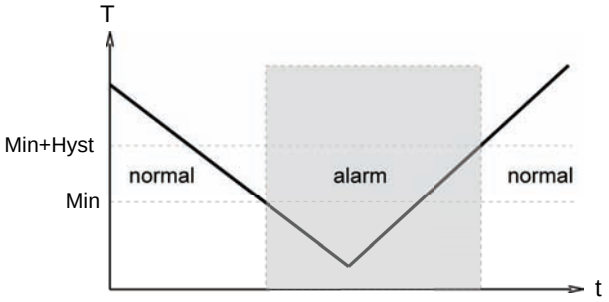
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an 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".

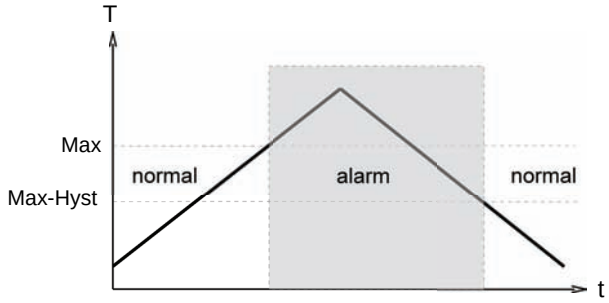
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

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

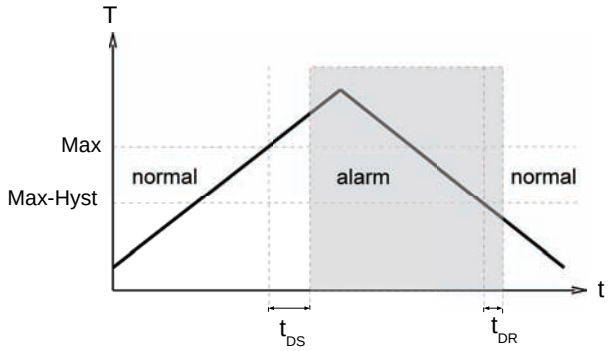
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



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.

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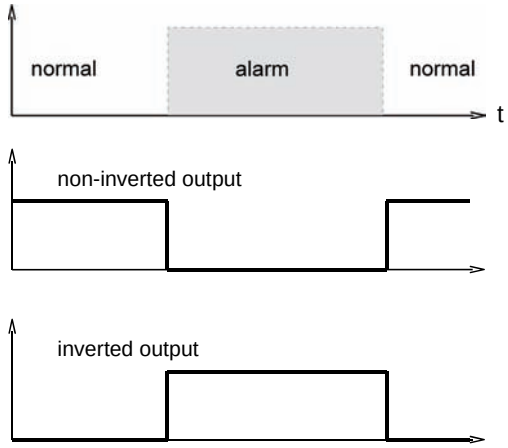

A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Ordering code

	1.	2.	3.	4.	5.	6.
HTK30 -	**015**	**K1**				

❍=Option

1.	**Sensor tip length**	
	015	L = 15 mm
2.	**Materials**	
	K1	stainless steel 1.4571
3.	**Analog output**	
	I	current output 4..20 mA
	U	voltage output 0..10 V
	K	no analog output
4.	**Switching output**	
	T	transistor output "push-pull"
	M ❍	NPN (open collector)
	K	no switching output
5.	**Functioning of the switching output**	
	L	minimum-switch
	H	maximum-switch
	R	frequency output
	K	no switching output
6.	**Switching signal**	
	O	standard output
	I ❍	inverted output

Options

Special measuring range for temperature:

maximum 130 °C (standard = 100 °C) ☐☐☐ °C

minimum -20 °C (standard = 0 °C) ☐☐☐ °C

Special range for analog output: ☐☐☐ °C

<= metering range (standard = metering range)

Special range for frequency output: ☐☐☐ °C

<= metering range (standard = metering range)

End frequency (max. 2000 Hz) ☐☐☐☐ Hz

Switch-on delay (from Alarm to OK) ☐☐ s

Switch-off-delay (from OK to Alarm) ☐☐ s

Power-On delay (0..99 s) ☐☐ s

(Time after power on, during which the outputs are not actuated)

Switching output fixed ☐☐☐ °C

Special hysteresis ☐☐ °C

If the field is not completed, the standard setting is selected automatically.

Accessories

- ECI-1 device configurator (USB programming adapter)
- Process adapter
- Cable/round plug connector (KH...)
  see additional information “Accessories”

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Temperature Transmitter / Switch HTK35

- **Temperature transmitter for foodstuffs use**
- **Only one medium-contact material**
- **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**
- **Rotatable electronic head for best reading position**
- **Small, compact construction**
- **Simple installation**

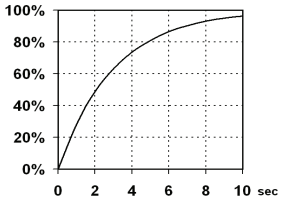
Characteristics

The sensors of the HTK35 range can be used for measuring and monitoring temperatures in flowing media, and are specially designed for use in the foodstuffs industry.

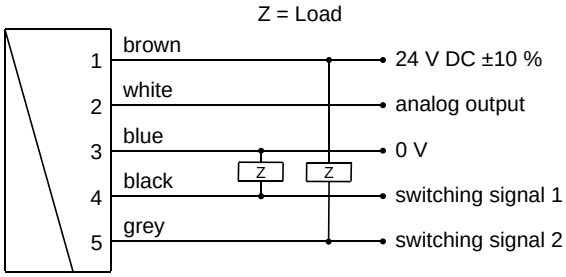
The integrated transducer has a backlit graphics LCD display which is very easy to read both in the dark and in bright sunlight. The graphics display allows the presentation of measured values and parameters in a clearly understandable form. The measured values are displayed to 4 places, together with their physical unit, which may also be modified by the user. The electronics have an analog output (4..20 mA or 0..10 V) and two switching outputs, which can be used as limit switches for monitoring minima or maxima, or as two-point controllers. The switching outputs are designed as push-pull drivers, and can therefore be used both as PNP and NPN outputs. Exceeding limit values is signalled by a red LED which is visible over a long distance, and by a cleartext in the display. The stainless steel case has a hardened non-scratch mineral glass pane. It is operated by a programming ring fitted with a magnet, so there is no need to open the operating controls housing, and its leakproofness is permanently ensured.

By turning the 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, thus acting as a key.

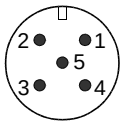
Technical data

Metering range	0..100 °C 0..130 °C available on request	
Measurement accuracy	±1 % FS	
Reproducibility	±0.1 % FS	
Process pressure	PN 50	
Ambient temperature	-20..+70 °C	
Storage temperature	-20..+80 °C	
CIP- / SIP-Temperature	130 °C, 45 minutes max.	
Auxiliary voltage	18..30 V DC	
Power consumption	< 1 W	
Dynamic (τ)	3 sec. 	
Analog output	4..20 mA or 0..10 V	
Switching outputs S 1 and S 2	transistor output "push-pull", compatible with PNP and NPN, (resistant to short circuits and reversed polarity protected) I_{out} = 100 mA max.	
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum switching value	
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.	
Connection	for round plug connector M12x1, 5-pole	
Ingress protection	IP 67	
Materials		
Medium-contact	Sensor	1.4435, FDA-compliant
Electronics housing	Housing	Stainless steel 1.4305
	Glass	Mineral glass, hardened
	Magnet	Samarium-Cobalt
	Ring	POM
Conformity	CE, EHEDG	

Wiring



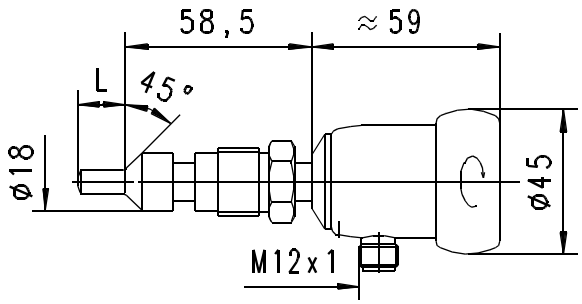
Connection example: PNP NPN



Before the electrical installation, it must be ensured that the auxiliary voltage corresponds to the data sheet.

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.

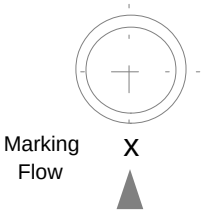
Dimensions



Handling and operation

Installation

The sensor is inserted into the boring together with a sealing cone, oriented, and fastened in place with a pressure screw.
When a flow is present, this should impinge on the side of the sensor marked with an X, in order to achieve as small a response time as possible.



The torque on the pressure screw should be between 5..10 Nm.

Avoid bubbles or deposits on the sensor. It is therefore best to install at the side.
For T-pieces or welded-on nozzles, see Accessories.

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 (EDIT)

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 (present value and 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 S 1 (switching point 1 in the selected unit)
- Switching characteristic of S 1
  MIN = Monitoring of minimum value
  MAX = Monitoring of maximum value
- Hysteresis 1 (hysteresis value of S 1 in the set unit)
- Switching value S 2
- Switching characteristic of S 2
- Hysteresis 2
- Code
  After entering the **code 111**, further parameters can be defined:
- Filter (settling time of the display and output)
- Physical unit (Units)
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (measured value corresponding to 0/4 mA)
- 20 mA (measured value corresponding to 20 mA)

For models with a voltage output, replace 20 mA accordingly with 10 V.

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 cursor moves to the next digit.
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S 1 and S 2 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 once more exceeded.

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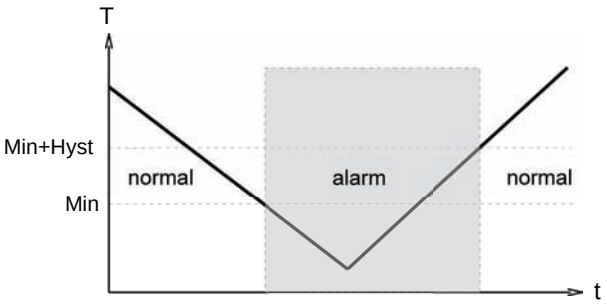
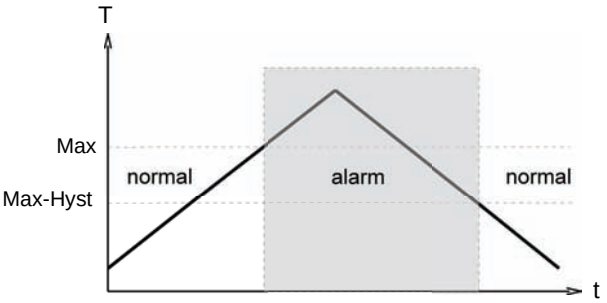


With a maximum-switch, exceeding the limit value causes a swit-chover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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 display as an alarm state at the signal receiver.

Overload display
Overload of a switching output is detected and indicated on the display ("Check S 1 / S 2"), and the switching output is switched off.

Simulation mode
To simplify commissioning, the sensor provides 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**.

Factory settings
After modifying the configuration parameters, it is possible to reset them to the factory settings at any time using **Code 989**.

Ordering code

	1.	2.	3.	4.
HTK35-	**015**	**K1**		**S**

❍=Option

1.	**Sensor tip length**	
	015	L = 15 mm
2.	**Medium-contact material**	
	K1	stainless steel 1.4435
3.	**Analog output**	
	I	4..20 mA
	U ❍	0..10 V
4.	**Electrical connection**	
	S	for round plug connector M12x1, 5-pole

Accessories

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

Accessories

GTL - Configuration tool

Suitable for all GTL with integrated transmitter

The programming tool contains:

- **Software GTL - Configurator**
  Setting of unit, resolution, measuring range, filter, output in case of error, etc.

- **GTL - Configuration adapter**
- **Connection cable with M12-plug**
- **Connection cable with loose ends**
- **Connection cable with alligator clips**
- **GKK 252 case**
  with burl foams size: 235 x 185 x 48 mm (W x H x D)
- **Manual**

Device Configurator ECI-1

- **Can be used on site for:**
  - parameter modification
  - firmware update
  - adjustment of inputs and outputs
- **Can be connected via USB**

Characteristics

The device configurator ECI-1 is an interface which allows the connection of microcontroller-managed HONSBERG sensors to the USB port of a computer.
Together with the Windows software "HONSBERG Device Configurator" it enables

- the modification of all the sensor's configuration settings
- the reading of measured values
- the adjustment of inputs and outputs
- firmware updates

Technical data

Supply voltage	12..30 V DC (depending on the connected sensor) and via USB
Power consumption	< 1 W
Connection	
Sensor	cable bushing M12x1, 5-pole, straight length approx. 50 cm
Lead	device connector M12x1, 5-pole
USB	USB bushing type B
Operating temperature	0..50 °C
Storage temperature	-20..+80 °C
Dimensions of housing	98 mm (L) x 64 mm (W) x 38 mm (H)
Housing material	ABS
Ingress protection	IP 40

continued on next page

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Handling and operation

Connection

The device configurator is intended for temporary connection to the application. It is connected between the the existing sensor lead and the sensor. Power supply is via the supply to the sensor and the computer's USB port. When inactive (no communication), the configurator behaves completely neutrally; all signals from the sensor remain available to the application. During communication between computer and sensor, the signal wirings are separated in the configurator, so that in this state the sensor's output signals are not available.

To connect 4-pole leads without a middle hole to the installed 5-pole device connector, adapter K04-05 is included. 4-pole leads with a middle hole can be used without an adapter.

Ordering code

Device configurator (for scope of delivery, see the diagram below)	**ECI-1**

Scope of delivery

1. Device configurator ECI-1
2. USB cable
3. Adapter K04-05
4. Plug KB05G
5. Cable K05PU-02SG
6. Carrying case

Incl. software

Accessories:

Mains connector 24 V DC (with fitted round plug connector, 5-pole, incl. international plug set)		**EPWR24-1**

Replacement parts:

M12x1 adapter 4- / 5-pole	**K04-05**
PUR cable, 5-pole, shielded with round plug connector M12x1	**K05PU-02SG**
Round plug connector M12x1, 5-pole (without cable)	**KB05G**

Welding sleeve for GTL

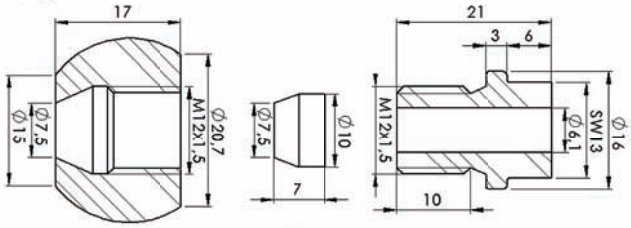
GKEV-25/76

Spherical welding sleeve for inclined mounting consisting of welding sleeve, PEEK clamping ring and clamping screw.

Specifications:

Material	:	V4A (1.4404)
Type of installation	:	PEEK clamping ring, thread M12x1.5
Clamping torque	:	max. 10 Nm
Working pressure	:	max. 10 bar
Application	:	for mounting of temperature probes of series: GTL 349, GTL 369 / M, GTL 389 / M

Design:



Spare parts:
Clamping screw KS-M12
PEEK clamping ring PKR-6

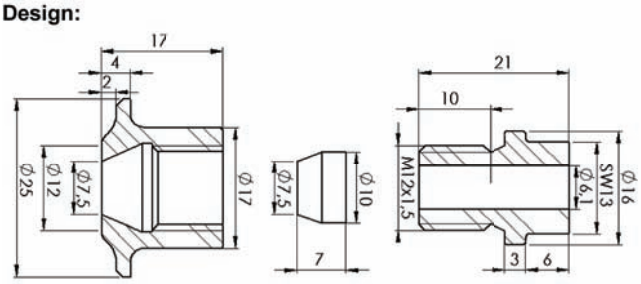
GEMK-25/76

Collar welding sleeve for tanks thick / thin consisting of welding sleeve, PEEK clamping ring and clamping screw.

Specifications

Material	:	V4A (1.4404)
Type of installation	:	PEEK clamping ring, thread M12x1.5
Clamping torque	:	max. 10 Nm
Working pressure	:	max. 10 bar
Application	:	for mounting of temperature probes of series: GTL 349, GTL 369 / M, GTL 389 / M

Design:



Spare parts:
Clamping screw KS-M12
PEEK clamping ring PKR-6

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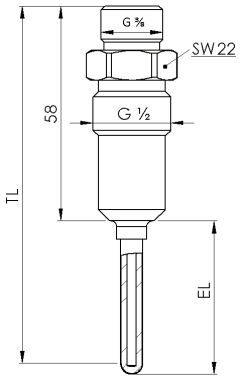
Thermowells for GTL

APHG12



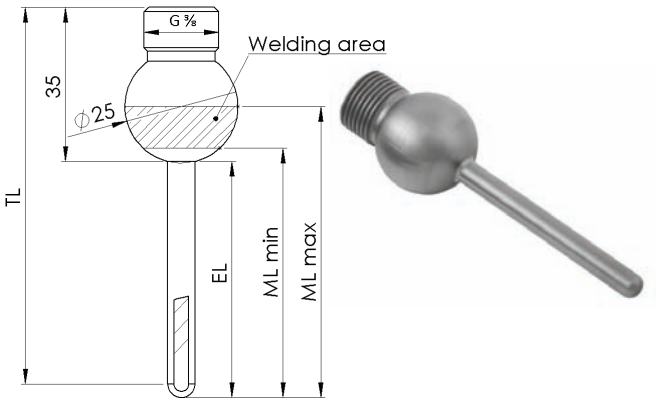
Adapter sleeve, suitable for GHMadapt thread G 1/2 (e.g. APH112) to thread G 3/8.

Product key

	1.	
APHG12	-	☐

1.	Immersion length TL		
	083	TL = 83 mm	*fitting length EL = 27 mm*
	097	TL = 97 mm	*fitting length EL = 41 mm*
	160	TL = 160 mm	*fitting length EL = 104 mm*
	xxx	any immersion length in mm: from 200 mm to max.: 500 mm (e.g. 320 = 320 mm)	

APHK25



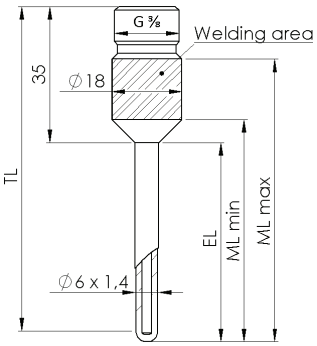
Ball weld-in sleeve to thread G 3/8, for mounting in pipe bends or tanks.

Product key

	1.	
APHK25	-	☐

1.	Immersion length TL		
	083	TL = 83 mm	*fitting length EL = 50 mm installation length ML: 56..63 mm*
	160	TL = 160 mm	*fitting length EL = 127 mm inst. length ML: 133..140 mm*
	xxx	any immersion length in mm: from 200 mm to max.: 500 mm (e.g. 320 = 320 mm)	

APHZ18



Cylindric weld-in sleeve to thread G 3/8, for mounting to an existing compression fitting (GKEV-25/76 or GEMK-25/76) or for weld in tubes or tanks.

Product key

	1.	
APHZ18	-	☐

1.	Immersion length TL		
	083	TL = 83 mm	*fitting length EL = 50 mm installation length ML: 56..71 mm*
	160	TL = 160 mm	*fitting length EL = 127 mm inst. length ML: 133..148 mm*
	xxx	any immersion length in mm: from 200 mm to max.: 500 mm (e.g. 320 = 320 mm)	

Thermal compound

WLP10S

- Syringe containing 3 ml silicone + pipette, color silver-gray
- high thermal conductivity of 10.0 W/mK
- not drying out, silicone parts not fleeting
- Storage time up to 12 months at normal ambient conditions

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Hygienic Connection Cable Shielded Series KH

- Connection M12x1
- PVC cable flexcord grey shielded
- Straight or angled model
- 4- or 5-pole, cable end made up with end sleeves for wires
- Union nut made from V4A
- IP67 as per IEC 60529
- IP 69K protected against water during high pressure and steam jet cleaning as per IEC 60529
- Resistant to heat and cold, range of use -25..+70 °C
- Vibration protection
- Colour coding as per industry standards

Characteristics

The connection cable is suitable for moderate mechanical stress Good resistance to acids and alkalis. Therefore aimed mainly at food and drink industries. Restricted abrasion behaviour, and limited oil and chemical resistance. The shielding increases the shear strength, and also improves the protection from external radiation interference.

Technical data

Connector	connection M12x1
Grip body	plastic, PVC
Union nut	stainless steel 1.4404
Contact block / Cable	grey plastic PVC
Contacts	metal, CuZn, gold-plated
Seal	plastic, FPM, FKM
Current carrying capacity	4 A
Rated voltage	max. 250 V
Insulation resistance	≥ 10^9 MΩ
Degree of contamination	3/2, as per DIN VDE 0110
Ambient temperature	-25..+70 °C
Ingress protection	IP 67 / IP 69K (only when screwed together)
Mechanical working life	min. 100 mating cycles

Cable colours:

1 = brown, 2 = white, 3 = blue, 4 = black, 5 = grey

Ordering code

	1.	2.		3.	4.	5.	6.
KH -	**PV**		**-**	**1**			**00**

1.	**Cable material**	
	PV	PVC
2.	**Cable length**	
	002	2 metres
	005	5 metres
	010	10 metres
3.	**Shielding**	
	1	shielding (not applied to union nut)
4.	**Number of poles**	
	04	4-pole
	05	5-pole
5.	**Connector output**	
	G	straight
	W	angled 90 °
6.	**Option**	
	00	none

Other products

„Industrial Sensors and Instrumentation“

Temperature
Flow
Point Level / Continuous Level
Analysis
Humidity
Pressure
Weighing Instruments

„Process Instrumentation Hygienic Design“

GHMadapt
Temperature
Flow
Point Level / Continuous Level
Analysis

“Laboratory Instrumentation”

„Industrial Electronics“

Displays / Controller
Transmitters / Signal Conditioning
Isolating Converters
Safety and Monitoring Devices
Power Electronics
Calibration and Testing

„Measurement Data Acquisition“

Data Logger and Monitoring
Test Bench Measurement Technology
Renewable Energies