Technical manual BA 0610

Temperature

PTX

resistance thermometer Pt100

for measuring of process temperatures
in gases, steam, liquids and dusts

For process temperatures from – 200 °C to +600 °C

Various selection of process connections

Process pressures from -1...60 bar

Long term stable temperature sensor platinum Pt100 acc. to EN/IEC 60751
- in 2-, 3,- or 4-wire-connection
- in double type in 2-wire-connection for redundancy function
- in accuracy classes AA (formerly 1/3 B), A or B

Changeable measuring insert

ATEX II 1 G Ex ia IIC T6…T1 resp. ATEX II 1 D Ex iaD 20 Tx°C
Certificated for the use in explosion hazardous areas

Integrated temperature head transmitter
- 2-wire-technology with current signal 4...20 mA, fix adjusted
- 2-wire-technology with current signal 4...20 mA, programmable
- Profibus PA®

ACS-CONTROL-SYSTEM
know how mit system

Lauterbachstr. 57 – 84307 Eggenfelden – Germany
Tel: +49 8721/9668-0 – Fax: +49 8721/9668-30
info@acs-controlsystem.de – www.acs-controlsystem.de

Index

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

Application

The device **PTX**, optional with integrated temperature head transmitter, is a Pt100 resistance thermometer for continuous measuring of temperatures from –200°C to +600°C in gases, steams, liquids and dusts, also in explosion hazardous areas, at process pressures of up to 60 bar.

The use of a long-term stable resistance temperature sensor Pt100 and various process connections allows the use in nearly all industrial application fields, especially also in hygienic applications.

Function

The device **PTX** is used for temperature measurement by recording the ohmic resistance of a resistance temperature sensor Pt100.

The Pt100 resistance thermometer **PTX** consists of a changeable measuring insert in a protection tube, the process connection, optionally a neck tube and a connection housing.
The protection tube is fixed at the process connection. Process connection and connection housing can be separated from each other by a neck tube. A temperature head transmitter or a terminal socket can be mounted on the measuring insert.

By using a neck tube of a corresponding length between the respective process connection and the connection housing at high medium temperatures it can be achieved that the temperature in the area of the connection housing does not exceed the permitted environmental temperatures.

The protection tube of the resistance thermometer is the junction point with the applied medium and is in direct contact with it.

The connection housing is used for the connection of the temperature sensor resp. sensors Pt100 with an evaluation electronic and is suitable for the installation of head transmitters.

Inside the resistance thermometer the changeable measuring insert is installed. This measuring insert is the real temperature sensor. In the installed state the tip of the measuring insert is pushed against the lower end of the protection tube and by this an optimal heat transfer is guaranteed.
In the tip of the measuring insert the temperature sensor resp. the two temperature sensors Pt100 are installed. The resistance temperature sensor Pt100, dependent on the requirements for accuracy up to class AA, ensures a precise and long-term stable temperature measurement.

Connection housing sided optionally a temperature head transmitter or a terminal socket is mounted.

General basics

The temperature measuring sensor of resistance thermometers Pt100 consists of an electrical resistor of the material platinum (element symbol Pt), whose resistance value is ideally 100Ω at a temperature of 0°C.
This results according to the norm EN/IEC 60751 in the expression „Pt100“.
The resistance value increases at higher temperatures corresponding to a resistor material characteristic coefficient and decreases correspondingly at lower temperatures.
For industrial thermometers that meets the standard EN/IEC 60751, the ideal resistance values of a resistor Pt100 can be calculated according to the following equation:

Temperature range from T = -200°C...0°C

$R_T = 1000 \times [1 + (3.90802 \times 10^{-3} \times T) – (0.5802 \times 10^{-6} \times T^2) – (4.27350 \times 10^{-12} \times (T – 100) \times T^3)]$

Temperature range from T = 0°C...+600°C

$R_T = 1000 \times [1 + (3.90802 \times 10^{-3} \times T) – (0.5802 \times 10^{-6} \times T^2)]$

In the equation the term R_T describes the resistance in Ω of an ideal Pt-100 at the temperature T in °C

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

Measurement accuracy - tolerances

Different specification accuracy sortings are available for temperature resistors Pt100.
The accuracy classes defines at first the maximum permitted temperature deviation against 0°C, when the temperature resistor Pt100 has a resistance of 100Ω.
Secondary the maximum permitted temperature deviation from the calculated value at an arbitrary resistance value different from 100Ω is determined.

Deviation Pt100 class AA:	0°C	+/- 0,10 K	
	[t]°C	+/- (0,10 K + 0,0017 K * [t])	[t] without sign, in K
Deviation Pt100 class A:	0°C	+/- 0,15 K	
	[t]°C	+/- (0,15 K + 0,002 K * [t])	[t] without sign, in K
Deviation Pt100 class B:	0°C	+/- 0,30 K	
	[t]°C	+/- (0,30 K + 0,005 K * [t])	[t] without sign, in K
Deviation PTX:	depends on accuracy class Pt100 and installation situation		

Measurement methods – measurement error

For capturing the resistor value of the Pt100 commonly a constant current in the range from 0,1mA to 6mA is used. This current produces at the resistor a processible voltage drop.

The used constant current however causes due to the self-heating through the current flow in the resistor Pt100 an increasing of the temperature that distort the measuring result. By this the constant current should be logically kept as low as possible. Contrary a too low current also can cause problems because on the one hand the susceptibility against electromagnetic interferences increases and on the other hand the measured voltage signal decreases and this leads to higher requirements to the evaluation electronic.

Because the measured voltage signal is very small, the resistance of the Pt100 leads can cause an error source that may not be neglected. The constant current produces in the resistance of the leads a voltage drop and according to the requirements of the measurement it must be tried to neutralize this measurement error. Using a Pt100 in 3-wire or 4-wire connection-technique it is possible to completely eliminate the influence of the lead resistance, if a suitable evaluation electronic is connected.

Safety notes

Each person that is engaged with inauguration and operation of this device, must have read and understood this technical manual and especially the safety notes.

Installation, electrical connection, inauguration and operation of the device must be made by a qualified employee according to the informations in this technical manual and the relevant standards and rules.

The device may only be used within the permitted operation limits that are listed in this technical manual. Every use besides these limits as agreed can lead to serious dangers.

The materials of the device must be chosen resp. checked for suitability to the respective application requirements (contacting substances, process temperature).
An unsuitable material can lead to damage, abnormal behavior or destruction of the device and to the resulting dangers.

The sensors may not used as sole device for prevention of dangerous conditions in machines and plants.

This device meets article 3 (3) of the EC directive 97/23/EC (pressure equipment device directive) and is designed and produced in good engineer practice.

The device meets the legal requirements of all relevant EC directives. CE **0158**

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

Safety notes for electrical operating supplies for explosive hazardous areas

If a device is installed and operated in explosive hazardous areas, the general Ex construction standards (EN/IEC 60079-14, VDE 0165, EN/IEC 61241-14), this safety notes and the enclosed EC conformity certificate must be observed.
For installed head transmitters also those technical instructions, safety notes and the EC conformity certificate must be observed.
The installation of explosive hazardous systems must be carried out principally by specialist staff.

The device meets the classification

II 1 G Ex ia IIC T6	**resp.**	**II 1 D Ex iaD 20 Tx°C**
II 1/2 G Ex ib IIC T6	**resp.**	**II 1/2 D Ex ibD 20/21 Tx°C**
II 2 G Ex ib IIC T6	**resp.**	**II 2 D Ex ibD 21 Tx°C**

The temperatures Tx°C can be found in the tables of the EC conformity certificate.

The devices are conceived for measurement of temperatures in explosive hazardous areas.
The measured medium may also be combustible gases, vapors, liquids and dusts.

The permitted operating temperatures and pressures are type and variant dependent and can be found in this technical manual.

For applications, which require devices of category 1 or category 1/2, the process pressure and temperature range of the media has to be between 0,8 bar and 1,1 bar and between -20 °C and 60 °C.
If the thermometer is operated beyond these atmospheric conditions, this approval can be used as a guide. Additional tests for the special application conditions are recommend.

For specifying the permitted environmental temperature in the area of the connection housing when using a temperature head transmitter that is built into the connection housing the permitted environmental temperature of the transmitter must also be observed.

In explosion hazardous areas with dust-air-atmosphere only the connection housing in steel or aluminum are permitted.

A built-in temperature head transmitter must be certified for II G Ex ia IIC resp. II D Ex iaD 20. For the use in zone 1 resp. 21 the certification II G Ex ib IIC resp. II D Ex ibD 21 is also sufficient.
The installation of a temperature head transmitter with lower temperature class resp. maximum surface temperature reduces the temperature class resp. maximum surface temperature of the whole device.
The maximum permitted supply voltage of the device PTX is 30V. The installation of a temperature head transmitter with a lower maximum permitted supply voltage than 30V reduces the maximum permitted supply voltage to those value.

For the use in explosion hazardous areas with dust-air-atmosphere only the temperature head transmitter ExKTM-_A0 or another therefore specially proofed device is permitted.
The maximum surface temperature of the built-in temperature head transmitter Ex-KTM-_A0 is 15K higher than the environmental temperature of the temperature head transmitter. This results e.g. in T55 at T_a = 40°C, T75 at T_a = 60°C and T95 at T_a = 80°C in the area of the temperature head transmitter ExKTM-_A0.

For PROFIBUS® transmitter, where the electrical output values towards measuring insert are defined, the determined input values for U_i, I_i and P_i, that are described in the EC conformity certificate may be exceeded, if the safety specifications for the installation and the application of the PROFIBUS® devices are observed (see also the safety instructions of the used PROFIBUS® transmitter).

If the thermometer is mounted in the separation wall to the hazardous area that requires devices of category 1, the process connections have to be designed in such a way, that they are sufficiently tight according to EN/IEC 60079-26 section 4.6.

Using a connection housing in aluminum there is a danger of ignition by sparks caused by impact or friction.
Operational conditioned friction or pushes with device parts in iron/steel are not permissible.
The operator has to ascertain the suitability of this device for his application.

At variants of the devices with chargeable plastic parts (e.g. connection housing), a warning marking points out to the safety measures, that must be applied because of the electrostatic charging in operation and especially in the case of maintenance activities.
avoid friction no dry cleaning no assembling in pneumatic conveying stream

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

Installation

Drive the system pressure free prior installation resp. deinstallation of the device.
Be also sure that no medium is flowing in the system.
At extreme system or medium temperatures there could exist serious dangers.

The tightening of the process connection with screw-in thread may only be done at the hexagon by a suitable spanner.
The maximum permitted torque strength is 50 Nm.
The screw in of the process connection by using the connection housing is not permitted.

The correct function of the device within the specific technical data can only be guaranteed, if the permitted temperature in the area of the connection housing will not be exceeded.

material connection housing	**environmental temperature explosive-free area**		**environmental temperature gas-explosive-area**		**environmental temperature dust-explosive-area**	
	without transmitter	with transmitter KTM	without transmitter	with transmitter ExKTM-_A0	without transmitter	with transmitter ExKTM-_A0
steel, aluminum	-40°C..+130°C	-40°C..+85°C	-20°C..+100°C cat. 1 -20...+60°C	-20°C..+85°C cat. 1...+60°C cat. 1 / T6 ...+49°C	-20°C..+80°C cat. 1 -20...+60°C	-20°C..+80°C cat. 1...+60°C
POM (Delrin®)	-25°C..+100°C	-25°C..+85°C	-20°C..+100°C cat. 1 -20...+60°C	-20°C..+85°C cat. 1...+60°C cat. 1 / T6 ...+49°C	inadmissible	inadmissible
PP	-15°C..+100°C	-15°C..+85°C	-15°C..+100°C cat. 1 -15...+60°C	-15°C..+85°C cat 1...+60°C cat 1 / T6 ...+49°C	inadmissible	inadmissible

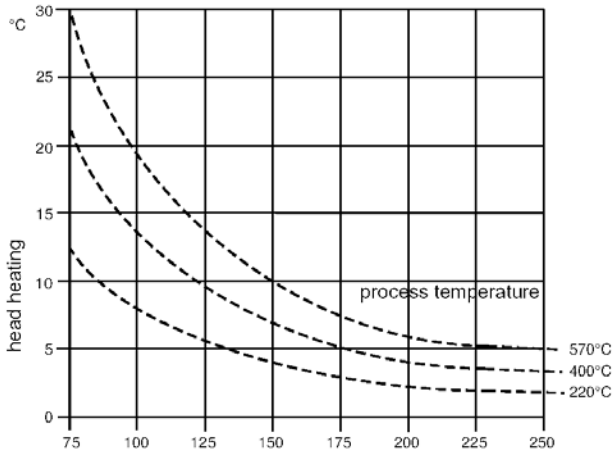
This can be achieved by the using of a neck tube or also by isolation of the medium carrying part of the plant or by other constructive measures to reduce the transferring of a higher temperature to the connection housing.

Maximum permitted process temperature dependent of the environmental temperature

environmental temperature in the area of the connection housing	maximum permitted process temperature without using a neck tube
up to +25°C	+150°C
up to +40°C	+135°C
up to +60°C	+120°C
up to +85°C	+100°C

Neck tube

The neck tube is used to decouple the temperatures between medium and connection housing in order to reduce the temperature at the connection housing.



By using a neck tube at extreme process temperatures it can be achieved, that the permitted environmental temperature range in the area of the connection housing will not be exceeded.
The length of the needed neck tube depends on the height of the process temperature and the respective installation situation.
Like shown in the graphic besides, the length of the neck tube can considerably influence the temperature at the connection housing.
The graphic is only a approximately guide, because the real heating of the connection housing can be influenced by additional factors, e.g. a system isolation or also the position of the connection housing.

At strong vibrations at the place of installation it can be necessary, due to stability reasons, to use stronger neck tube.

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

Installation

Installation position

The choosing of the place of installation of the sensor and the length of the protection tube are of considerably importance for the quality and the reliability of the measurement results.

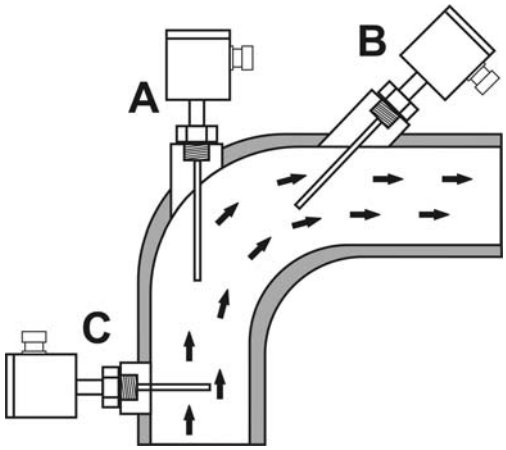
The signal recording sensor element is mounted in the tip of the measuring insert and pushes against the tip of the protection tube. Due to this an optimized heat transfer is ensured.

If the sensor isn't installed deeply enough, an error in the measured temperature can occur because of the different process flow temperature at the pipe wall and the heat transfer along the sensor tube.
The appearance of the error should not be ignored if a considerable difference between process temperature and environmental temperature exists. To avoid measurement errors of this kind, it is suggested to use protection tube length of at least 80...100 mm.
The shorter the installation depth is chosen, the greater is the deviation against the real medium temperature caused by the heat transfer.

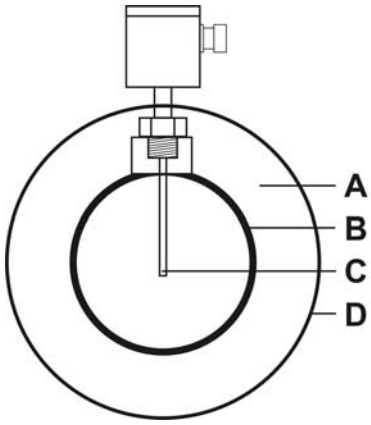
The following general suggestions can be applied as approximately guideline:

- In liquids, the sensor tube length should be 5...6 times greater then the diameter of the sensor tube plus the sensitive length of 50 mm.
- In steam, air and gases, the sensor tube length should be 10...15 times greater then the diameter of the sensor tube plus the sensitive length of 50 mm.

In pipes with small diameter the tip of the protection tube should reach the axis line, that means the middle of the pipe, and if possible additionally a little more. By isolating the external parts of the sensor, the effect caused by too low installation depth, can be reduced. An additional solution for optimizing the measurement quality of small formatted tubes could be the installation of the sensor tube diagonal to the pipe longitudinal axis or the installation of the sensor tube in the pipe arc (see illustration).



A) In the pipe arc against the flow direction
B) In small pipes diagonal against the flow direction
C) Vertical to the flow direction



A) Isolation
B) Pipe
C) Sensor tube
D) External cover

At a horizontal installation the device should be installed at an angel with the sensor tube tip below (approx. 20...30°), to allow an easier flow-off of filling material residues.

Installation position

It the temperature sensor is applied to a temperature variation, a defined time goes by until the sensor has take over this new temperature. This time depends on the style of the thermometer and the environmental conditions (like e.g. flow speed, medium, etc.).

The following specifications refers to measurement in Water with 0,4 m/s, temperature step 23 to 33°C acc. to EN/IEC 60751. The response times for other medias can be determined by using the thermal exchange constant acc. to VDI/VDE 3522.

Protection tube diameter 8 mm ➔ response time t_{50} = 18 s ➔ response time t_{90} = 55 s
Protection tube diameter 10 mm ➔ response time t_{50} = 28 s ➔ response time t_{90} = 90 s
Protection tube diameter 12 mm ➔ response time t_{50} = 38 s ➔ response time t_{90} = 125 s
At the protection tube diameter 10 mm / 12 mm by using a reduced tip the response times are shortened to the response time of the protection tube diameter 8 mm.

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

Maintenance

The device is free of maintenance.

Repair

A repair may only be carried out by the manufacturer.

If the device must be sent back for repair, the following informations must be enclosed:

- An exact description of the application.
- The chemical and physical characteristics of the product.
- A short description of the occurred error.

Before returning the device for repair, the following measures must be proceeded:

- All stick product residues must be removed. This is especially important, if the product is unhealthily, e.g. caustic, toxic, carcinogenic, radioactive etc.
- A returning must be refrained, if it is not possible by 100% to remove the unhealthily product completely, because e.g. it is penetrate into cracks or is diffused through plastic.

Electrical connection

The electrical connection of the device must be carried out according to the respective country specific standards. Incorrect installation or adjustment could cause applicationally conditioned risks.

Use only twisted shielded signal and measurement wires and install these wires separated from power leading wires. Connect the cable shield only at one side to earth, ideally at the installation place of the device.

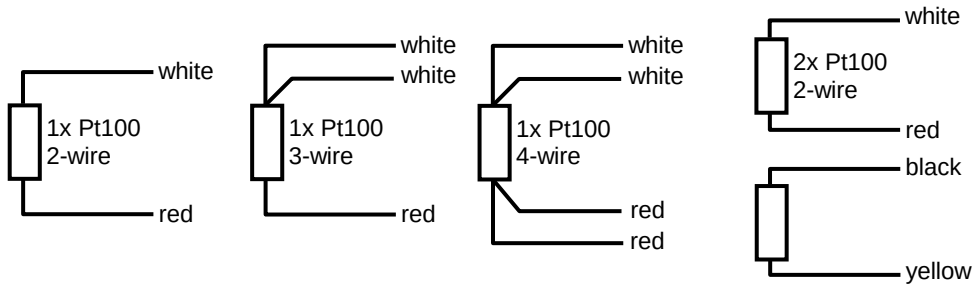
The cable gland is suited for the following cable diameter:

- Housing type B / 2 / 5 from 4,5 to 10 mm
- Housing type 4 from 7 to 13 mm

After the installation of the cable the cable gland must be firmly screwed to ensure the tightness of the connection housing. The same is valid for the screw cap of the housing.

The resistance thermometer **PTX** can be equipped with various connection variants.

- Loose wires, for the connection of own temperature head transmitters for housing acc. to EN 50446 (formerly DIN 43729) style B with the following assignment:



- Terminal socket, for connection of external Pt100 signal converters, see above assignment.
- Installed temperature head transmitters, for recording and processing of the temperature dependent Pt100 resistance value:

o Ex KTM-_A0 for 2-/3-wire Pt100	Signal 4...20mA in 2-wire-technology	fix adjusted
o UTN-500-B _ _ _S for 2-/3-/4-wire Pt100	Signal 4...20mA in 2-wire-technology	adjustable per PC
o PTN-600-B_ _ _ _ _S for 2-/3-/4-wire Pt100	Profibus-PA® in 2-wire-technology	adjustable per PC

Die maximum permitted supply voltage for the compliance to intrinsically safety equals to

- PTX 30V
- PTX with ExKTM-_A0 27,3V
- PTX with UTN-500-B... 30V
- PTX with PTN-600-B... 17,5V

Further detailed informations to the temperature head transmitters can be found in the technical instructions, safety notes and EC conformity certificate.

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

Technical data

Measuring accuracy

Deviation Pt100 Class AA:	0°C	+/- 0,10 K	
	[t]°C	+/- (0,10 K + 0,0017 K * [t])	with [t] without sign, in K
Deviation Pt100 Class A:	0°C	+/- 0,15 K	
	[t]°C	+/- (0,15 K + 0,002 K * [t])	with [t] without sign, in K
Deviation Pt100 Class B:	0°C	+/- 0,30 K	
	[t]°C	+/- (0,30 K + 0,005 K * [t])	with [t] without sign, in K
Deviation PTX:	depends on accuracy class Pt100 and installation situation		

Materials

Protection tube: (medium contact)	Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)	
	Wall thickness ≥ 1mm	surface roughness R_a < 0,8µm
Process connection: (medium contact)	Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)	
Neck tube:	CrNi-steel	
Connection housing:	CrNi-steel / aluminum lacquered / PP – polypropylene / POM – polyoxymethylene (Delrin®)	
Cable gland:	CrNi-steel	at connection housing CrNi-steel
	PA – polyamide	at connection housing POM / PP / aluminum
	Gaskets CR / NBR	
Gaskets:	FPM – fluorelastomere (Viton®) / silicone	

Environmental conditions

Environmental temperature: – 40°C...+130°C

additional limitation by material	Environmental temperature range
connection housing PP	-15...+100°C
connection housing POM	-25...+100°C
additional limitation by type	**Environmental temperature range**
type PTX1	-20...+100°C
type PTX2...	-20...+80°C
additional limitation by application	**Environmental temperature range**
category 1	-20...+60°C
additional limitation by head transmitter	**Environmental temperature range**
ExKTM / UTN-500 / PTN-600	-40...+85°C
ExKTM category 1 / temperature class T6	-20...+49°C
UTN-500 temperature class T4	-40...+85°C
UTN-500 temperature class T5	-40...+70°C
UTN-500 temperature class T6	-40...+55°C
PTN-600 temperature class T4	-20...+85°C
PTN-600 category 1 / temperature class T5	-20...+50°C
PTN-600 category 2 / temperature class T5	-40...+65°C
PTN-600 category 1 / temperature class T6	-20...+40°C
PTN-600 category 2 / temperature class T6	-40...+50°C

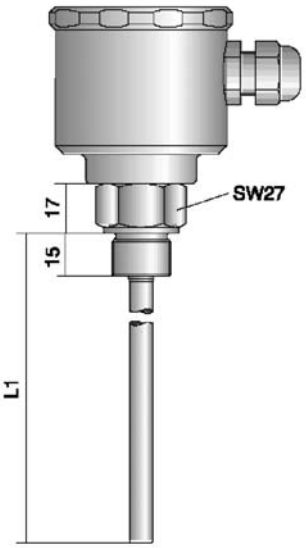
Process temperature:	Limitation by category / temperature class/ electrical power see EC conformity certificate – 50°C...+400°C / high temperature variant – 200°C...+600°C		
Process pressure ranges:	depends on variant process connection, maximum -1 bar ...60 bar		
Weight:	depends on variant		
Torque strength:	≤ 50 Nm	at process connections with screw-in thread	
Protection classification:	type PTX1...	IP67	EN/IEC 60529
	type PTX2...	IP67	EN/IEC 60529
Vibration classification:	4 g	5 - 100 Hz	
Dielectric strength:	≥ 500 V_{AC}	Pt100 to Pt100 / Pt100 to protection tube	
Reference conditions:	EN/IEC 60770-1	T = 15...35 °C, relative humidity 45...75 %, environmental air pressure 860...1060 kPa	

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

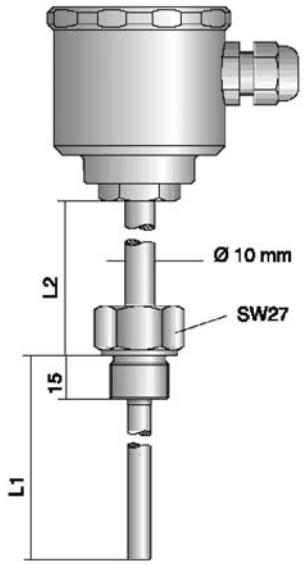
Dimension drawings

Process connection screw-in thread G1/2“ resp. 1“

without neck tube

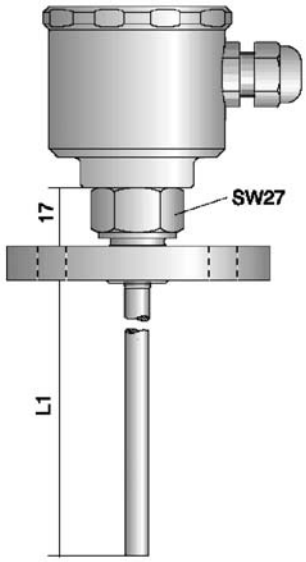


with neck tube

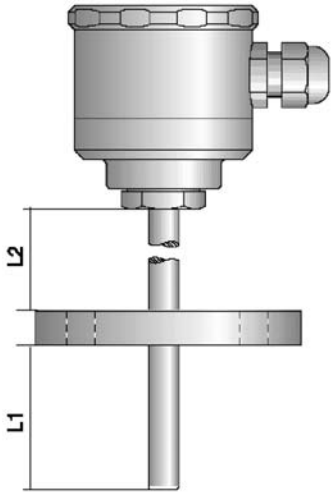


Process connection flange DN 25 resp. DN 50

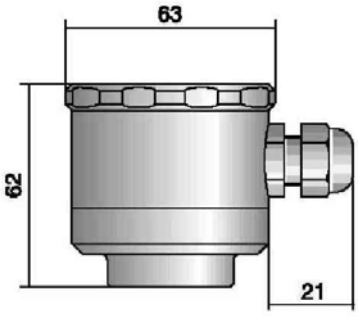
without neck tube



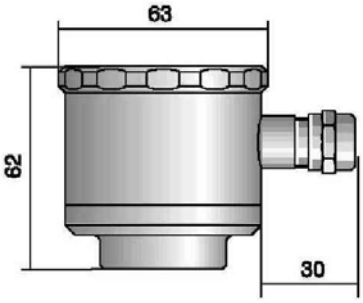
with neck tube



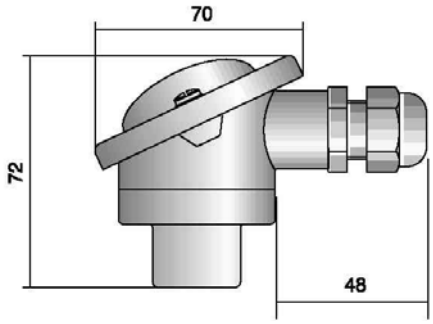
connection housing POM (2), PP (B)



connection housing steel (5)



connection housing aluminum style B acc. to EN 50446 (4)



Sliding sleeves with press ring in high-grade steel 1.4404 (AISI 316L) resp. 1.4571 (AISI 316Ti), pressure resistant up to 20 bar

Type	Process connection
SEM-50	screw-in thread G ½“ acc. to ISO 228-1 for sensor diameter 8 mm
SEM-51	screw-in thread G ½“ acc. to ISO 228-1 for sensor diameter 10 mm
SEM-56	ball weld-in sleeve for sensor diameter 8 mm
SEM-57	ball weld-in sleeve for sensor diameter 10 mm
SEM-60	screw-on sleeve for sensor diameter 8 mm
SEM-61	screw-on sleeve for sensor diameter 10 mm

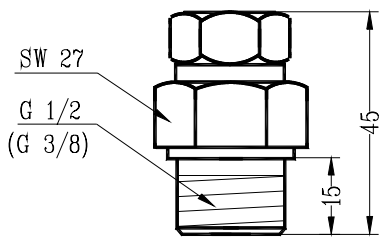
other variants on request

Sliding sleeves with press ring in PTFE (Teflon), adjustable, not pressure tight

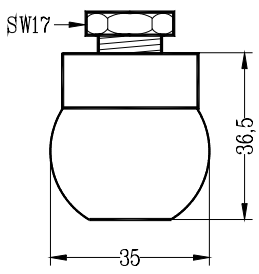
Type	Process connection
SEMT-50	screw-in thread G ½“ acc. to ISO 228-1 for sensor diameter 8 mm
SEMT-51	screw-in thread G ½“ acc. to ISO 228-1 for sensor diameter 10 mm
SEMT-56	ball weld-in sleeve for sensor diameter 8 mm
SEMT-57	ball weld-in sleeve for sensor diameter 10 mm
SEMT-60	screw-on sleeve for sensor diameter 8 mm
SEMT-61	screw-on sleeve for sensor diameter 10 mm

other variants on request

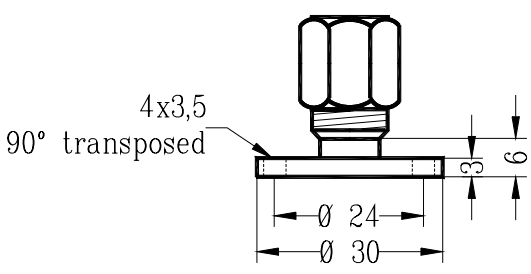
SEM(T) 50 / 51



SEM(T) 56 / 57



SEM(T) 60 / 61



Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de

Order code overview

Type:

1	ATEX II 1 G Ex ia IIC T6…T1	
2	ATEX II 1 D Ex iaD 20 Tx°C / II 1 G Ex ia IIC T6…T1	only with terminal socket or temperature head transmitter type M only with connection housing type 4 (aluminum) or connection housing type 5 (steel)

Sensor type:

1	1x Pt100	2-wire-connection
2	1x Pt100	3-wire-connection
3	1x Pt100	4-wire-connection
4	2x Pt100	2-wire-connection

Accuracy class Pt100 – temperature range:

B	class B	-50°C…+400°C
A	class A	-50°C…+400°C
C	class AA (formerly 1/3 B)	-50°C…+400°C
Y	others on request	(e.g. high temperature variant -200…+600°C, not for 2x Pt100)

Process connection material steel 1.4404 (AISI316L) / 1.4571 (AISI316Ti) (medium contact):

1	G ½“ B		ISO 228-1
2	G 1“ B		ISO 228-1
E	milk tube	DN 25, PN 40	DIN 11851
F	milk tube	DN 50, PN 40	DIN 11851
0	without process connection		for sliding sleeve
S	others on request		

Protection tube – diameter / material (medium contact):

N	∅ 8 mm		steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)
L	∅ 10 mm		steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)
W	∅ 12 mm		steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)
A	∅ 10 mm	reduced tip ∅ 8mm / L 40mm	steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)
B	∅ 12 mm	reduced tip ∅ 8mm / L 40mm	steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)
S	others on request		

Neck tube: (diameter for strong vibrations also available in 16mm ➔ note separately)

A	without neck tube
B	with neck tube ∅ 10 mm, L2 = 100mm
S	with neck tube ∅ 10 mm, L2 by separate specification

Material connection housing:

B	PP – polypropylene	not for type PTX2...
2	POM – polyoxymethylene (Delrin®)	not for type PTX2...
4	aluminum form B acc. to EN 50446 (formerly DIN 43729)	
5	CrNi-steel	
S	others on request	

Measuring insert:

W	changeable

Connection / temperature head transmitter:

K	terminal socket		
M	Ex KTM-_A0	2-wire-technology 4...20 mA	spec. measuring range
X	UTN-500-B...	2-wire-technology 4...20 mA	freely programmable
T	PTN-600-B...	Profibus-PA®	
D	loose wires		
S	others on request		

Length L1 – sensor in mm:

Length L2 – neck tube in mm:

PTX _ _ _ _ _ _ _ W _ _ _

Lauterbachstr.57 - 84307 Eggenfelden - Germany
Tel: +49 8721/ 9668-0 - Fax: +49 8721/ 9668-30
info@acs-controlsystem.de - www.acs-controlsystem.de