Pressure and differential pressure transmitter PT60

Additional datasheet for process connection T.

Electronic transmitter with a wide range of process connections. Stainless steel housing with hygienic design.

PT60 type T is a hygienic differential pressure transmitter.
This type of transmitter is mainly intended to be used for level measurement on pressurised tanks (with low or medium static pressure) and similar applications.
Type T can be manufactured with different types of process connections for example hygienic nut SMS Rd60-6 or clamp 38/51 (see the selection guide for possible choices).
This type has been developed as a complement to existing products in the PT60 series. For example this type can replace two transmitters and a subtraction modul with much better result.
Type T can also replace a traditional differential pressure transmitter in applications with low or medium static pressures.

PT60 type T has all the other advantages that the PT60 series has, for example:

- Stainless steel IP67-housing protects from dust and moisture.
- The transmitter is directly connected to the process media without any need for pressure intermedia, this eliminates temperature drift and gives a rugged design.
- Withstands media temperatures up to 150 °C continuously.
- Configuration can be performed direct on the transmitter with buttons, standard Hart hand terminal, or the PC program PI2000.

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Desciption

PT60 type T is designed to measure differential pressure, that is the difference between the pressure on the two separate diaphragms, plus and minus.
The plus diaphragm is mounted directly on the transmitter and the minus is connected to the transmitter with a cappilary tube. Both sides are connected to the media with the selected process connection for example hygienic nuts, SMS Rd60-6.
PT60 type T is designed to correspond to the highest hygienic demands. The transmitter is constructed completely in stainless steel and plastics. (see technical data). The housing is designed without dirt collecting corners, easy to clean.
The housing is also built for cleaning with high pressure water cleaners without any risk for water entering .

Function

PT60 type T works in a similar way as an ordinary differential pressure transmitter.
Type T uses a piezo-resistive pressure sensor which is connected to the pressure of the media via capillary tubes and the plus and minus diaphragms .
Media pressure applied to the both diaphragms is transferred via silicon oil to the pressure sensor. The oil completely fills the cavities in the sensor, the capillary tubes and the cavities above the diaphragms. This means that the diaphragm movement is very small at pressure changes.
The transmitter has as standard a 2,5 m capillary tube to the minus connection (other lenghts on request max lenght 6 m).
The sensor measures the difference between the plus and minus pressure.
The output signal is 4-20 mA and HART-communication. (Also available with Profibus PA communication.)

To consider

Thermal influence from capillary tube:
The transmitter is temperature compensated with both the transmitter and the capillary tube with connection at the same temperature. When the transmitter is installed the capillary tube and the minus connection can be exposed to a different temperature than the transmitter. This can for example happen if there are fast changes in the ambient temperature. The transmitter and the capillary tube has a very big difference in temperature constant. This means that the temperature influence from the capillary tube can effect the measurement under these circumstances. The influence for a change in ambient temperature will for example be approximately 0,2 kPa for a change of 10 degrees C if the capillary tube is 2,5 m long. For longer capillary tubes this influence will increase.

Selection table

Type												
Process connection	R 11/2"	Flange 80	Flange 50	DIN11851 40 mm	SMS Rd 60-6	Clamp 38	Clamp 51	RJT nut	DRD Flange	DIN11851 50 mm	Varivent	Hygienic front connection
Figure 6 (see next page)	3	4	5	7	8	9	A	C	D	E	V	P
Diaphragm												
Stainless steel 1.44621	X	X	X	-	-	-	-	-	-	-	-	-
Hastelloy C-276	X	X	X	X	X	X	X	X	X	X	X	X
Tantalum	X	X	X	-	-	-	-	-	-	-	-	-
Span min.-max.												
1,2-35 kPa	X	X	X	X	X	X	X	X	X	X	X	X
6,7-200 kPa	X	X	X	X	X	X	X	X	X	X	X	X
0,067-2 MPa	X	X	X	X	X	X	X	X	X	X	X	X
0,5-15 MPa	X (3)	X (3)	X (3)		X (1)	X (3)	X (3)		X (3)			X (3)
Filling liquid												
Silicon oil (4)	X	X	X	X	X	X	X	X	X	X	X	X
Accessories												
Longer/shorter cap.tube	On request 105555	On request 105555	On request 105555	On request 105555	On request 105555	On request 105555	On request 105555	On request 105555	On request 105555	On request 105555	On request 105555	On request 105555
Display	P130501	P130501	P130501	P130501	P130501	P130501	P130501	P130501	P130501	P130501	P130501	P130501

(1) Max pressure 80 bar with HM nut.
(2) Max pressure 2 MPa.
(3) Max pressure 4 MPa, dependent on type of flange ring or clamp ring.
(4) Silicon oil aproved for use in contact with food (FDA-aproval).

Ordering codes: (See selection table for code description and possible combinations)

PT60H-XTX0-0X00

Material in diaphragm and wet parts:

3= Stainless steel 1.4462/ 1.4435
4= Hastelloy C-276/ stainless steel 316L, 1.4435
5= Tantalum/stainless steel 316L, 1.4435

Measuring range min-max:

2= 1,2-35 kPa
3= 3,4-100 kPa
4= 6,7-200 kPa
6= 0,067-2 MPa
7= 0,27-8 MPa

Process connection (figure 6):

3= R 11/2" external
4= Flange 80/3"
5= Flange 50/2"
7= 40mm/DIN11851 nut
8= SMS Rd 60-6 nut
9= Clamp 38
A= Clamp 51
C= 1 1/2" RJT nut
D= DRD flange
E= 50mm/DIN11851nut
V= Varivent
P= Hygienic front connection

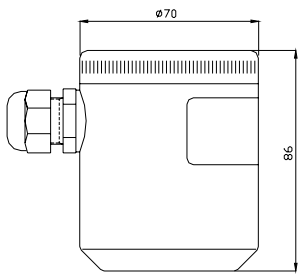
Ordering exampel:
Hygienic differential pressure transmitter with hygienic nut SMS Rd60-6, measuring range -50 kPa to +50 kPa will have ordering code PT60H-4T30-0800 and calibrated measuring range -50 to +50 kPa.

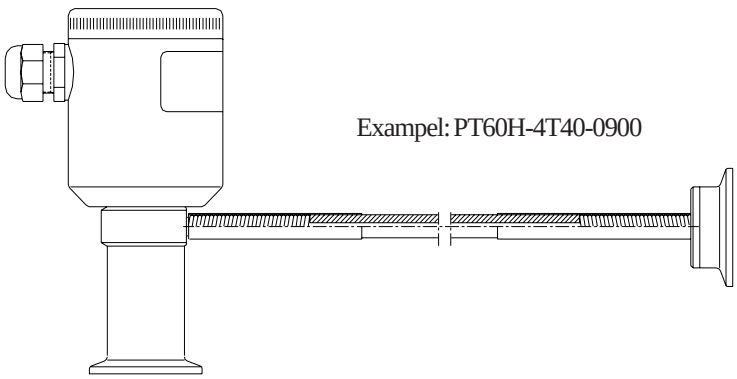
To solve this problem the best is if the complete transmitter (including capillary tube and minus connection) has the same temperature. Therefore it is advisable to insulate the complete unit as well as possible.
It is also advisable to fix the capillary tube to avoid vibrations that can influence the measurement.

Static pressure dependence:
The static pressure is the pressure that both plus and minus are exposed to at the same time (NOTE The transmitter must only be exposed to double sided static pressure. Single sided static pressure over the overload pressure (for respective pressure range) will damage the sensor.)
Because the minus pressure connection is connected to the transmitter with a capillary tube the time constant for pressure changes on that side will be longer than for pressure changes on the plus side. This will influence the measuement during the static pressure change. For a capillary tube of 2,5 m this influence will be approximately 0,4 kPa per 100 kP change of the static pressure.
This influence will disappear when the static pressure is stable again after a change.
NOTE This also implies that a fast change in static pressure can damage the sensor (if the change is higher than the overload pressure, for respective pressure range). This is because the static pressure will drop or rise faster on the plus side than on the minus side.

Mounting dependence:
At delivery the transmitter is calibrated and set to zero with both connections at the same level.
When mounted on, for example a tank with the transmitter under the tank and the minus connection (on the capillary tube) on top of the tank, the output signal will show a negative differential pressure (size depends on the distance between the two connections) This means that the transmitter has a mounting dependance that is due to the placement of the plus and minus connections. After mounting the transmitter must be zeroed in the ordinary way with the buttons on the transmitter or via the communication. (See PT60 manual.)

Dimensions, transmitter housing. (mm)





Exampel: PT60H-4T40-0900

Technical data.

Type:	Electronic pressure transmitter with microcomputer based electronics.	**External series resistance:**	R kohm = (Supply voltage-11/20. For HART communication min 250 ohm
Function:	Directly connected transmitter with no pressure intermedium. Piezo resistive sensor with capillary tube.	**Series resistance dependent:**	Less than +/- 0,1%
Operating range:	From -100% to 100% of max pressure range.	**Supply voltage dependent:**	Less than 0,1 %
Measuring span:	Adjustable from the maximum pressure range to 1/30 of this.	**Temperature tolerance:**	Less than +/- 0,2% of max span.
Zero point:	Adjustable from -100% to 100% of max pressure range.	**Working pressure influence:**	Max 0,1 % at max measuring range (see text on page 3)
Working pressure:	Max 8 MPa (static pressure, NOTE only single sided)	**Long time stability:**	Less than 0,08 % per year.
Overload:*1		**Vibration tolerance: (see page 3)**	
14/35 kPa:	Max 250 kPa	Perpendicular to diaphragm:	Max +0,3 kPa/G
100/200 kPa:	Max 500 kPa	Parallel to diaphragm:	Max +0,02 kPa/G
1/2 MPa:	Max 3 MPa	**Vibration test:**	Meets tests according to IEC770 and DNV class B
10/15 MPa:	Max 30 MPa	**Repeatability:**	Less than +/- 0,1 % of measuring range.
Material: Diaphragm:	Stainless steel/Hastelloy/Tantalum (special coatings on request)	**Accuracy:**	Less than +/- 0,1 % of adjusted span (includes linearity, hysteresis and repeatability).
Other wet parts:	RF SS2343/SS2353	**Installation:**	Direct on processconnection.
Housing:	PPS plastic/RF SS2333	**Electrical connection:**	Internal terminal block.
Ambient temperature:	-20 to +80 degrees C	Max wire area:	2,5 mm2
Time constant:	Interchangeable between 0,1-10 s (As delivered 0,1 s.)	Cable entry:	Pg11 for round cable 5-12 mm. Others on request.
Media temperature:	150 degrees C*2	**Protection class:**	IP67
Output:	4-20 mA, two wire connection signal proportional to pressure. Max current vid at overload 22,5 mA . HART, Profibus PA eller FF communication.	**Electrical safety:**	Meets the EN60204-1
Supply voltage:	11-55 V DC	**Electrical interference:**	Meets the EN50081-2 and EN50082-2
Filling liquid:	AK100, food and drug approved silicon oil (FDA approval).	**Mounting dependance:**	See text page 2.
Weight:	ca 1300-1800 g depending on process connection	**PED**:	According to 97/23/EG

For PT60 with Profibus PA some data differs, contact your distributor for information
*1 Max sensor overload. Different process connections have other limitations.
*2 Short time up to 200 degrees C.

For further information, installing and commissioning instructions, drawings, accesories, etc refere to the PT60 Manual.

See also the products home page www.pt60.se

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