

## PT06 Digital transmitter for Gauge pressure, Absolute Pressure and Level



### PT06RS has many advantages:

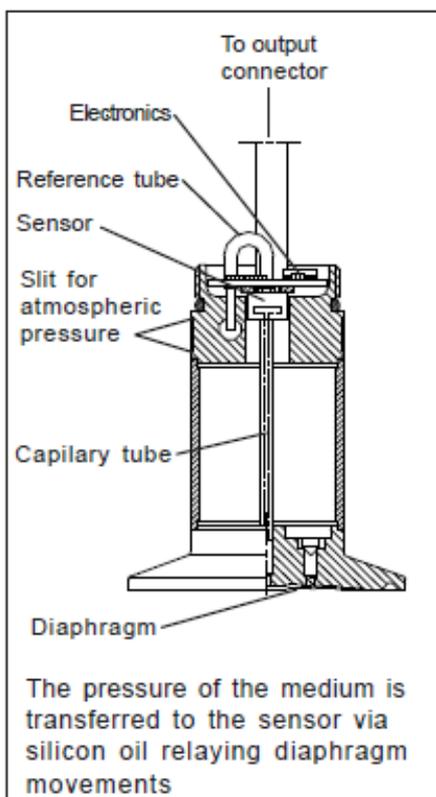
- Modular built to suit different needs. 19 different process connections, different houses, cable connection, M12 connection, display etc.
- Directly connected process connections without pressure intermedia, eliminates temperature influence and provide a robust design.
- Withstands media up to 150 C continuously. Very little effect from temperature due to extremely small oil filling volume. Excellent CIP (Clean In Process) performance.
- Double output/input: 4-20 mA and MODBUS communication.
- High accuracy 0,2% and low temperature drift (total 0,1% of max range for -10 to +70 degrees C).
- Innovative Autozero function. Just press a button, done.
- Range turndown 10:1. One type fits most applications.
- Well tested and approved for CE (EMC and PED), 3A (pending), ATEX (pending), IEC Ex (pending).
- Embossed diaphragm. Insensitive to particles and contact. Easy to clean without deformation.
- Lightning protected (option). Fullfills the demands for Class 1 testing according to IEC 61643-1, 5 kA (10/350 uS). This means that the transmitter can withstand a stroke of lightning close to the supply/signal cables.
- Different stainless steel, IP67, housings protects the electronics and electrical connection from dust and moisture. All housings are designed to hygienic demands, nor dirt collecting gaps or pockets. Easy to clean and minimal risk for corrosion.

## Description:

### Transmitter for pressure and level:

PT06RS has a piezo-resistive pressure sensor which is connected to the pressure of the medium via a capillary tube and a diaphragm. Media pressure applied to the diaphragm is transferred via silicon oil to the pressure sensor. The oil completely fills the cavity in the sensor, the capillary tube and the cavity above the diaphragm. This means that the diaphragm movement is very small at pressure changes. The capillary tube protects the pressure sensor from transient pressure surges.

To ensure that the sensor has the correct reference pressure, the rear side is



connected to ambient atmospheric pressure, via a tube, designed in order that air passes "cold surfaces" closest to the pressure connection of the transmitter. Any humidity in the air will condense on these surfaces. The condensate flows out and the remaining air in the tube stays dry. Additionally, the reference pressure connection is designed to prevent flushing water from entering.

PT06RS has microcomputer-based electronics, which communicate with the outside world with 4 to 20 mA signal as well as MODBUS communication. The electronics measure and converts the output signal from the pressure

dependent sensor bridge to digital values. Furthermore, the total resistance of the sensor bridge is measured and these values are converted to digital temperature values. The electronics perform compensation for temperature drift of the sensor by means of compensation values entered at the factory calibration and at the same time the temperature measurement is also calibrated. Compensation for the non-linearity in the sensor is done in the same manner.

Different kinds of transfer functions, such as linear, square root, curves..., can be selected. The electronics perform the calculation for the selected transfer function and then the digital value is converted to analogue for the 4 to 20 mA current loop. The digital value can also be read via MODBUS communication in optional engineering units, percentage or current. PT06RS can be configured/calibrated via the displays D10RSS and also by means of a PC via MODBUS communication.

### Display

The transmitter can also be equipped with a local display, D10RSS. The display can show the signal in optional engineering units, for example mWc or mH<sub>2</sub>O and a bargraph also with optional units and limits. Unit and limits can be set by customer on the display.

The display can also be used for configuring the transmitter.

### Intrinsic safety, Exia

PT06RS can as an option be delivered in intrinsic safe design, Exia IIC T4, according to ATEX and IEC Ex (pending). The transmitter will then have the code E where E indicates "Exia".

This option can not be combined with the lightning protected option (see below).



### Approvals

PT06RS is CE approved according to the EU directives for pressure equipment, PED, and EMC. PT06RS fulfills all requirements for RoHS, REACH and WEEE directives.

The pressure intermediate oil is a FDA approved silicon oil.

### Lightning protection

As an option PT06RS can be equipped with lightning protection. The transmitter will then have the code L where L indicates "Lightning protected". This option can not be combined with the intrinsic safe option (see below).

The lightning protection is built in at the factory. No external changes or external components are needed.

The protection is designed to withstand a lightning stroke close to the connection cables but can not withstand a direct stroke. The protection is designed to meet the demands for Class 1 testing according to IEC61643-1 5 kA (10/350  $\mu$ S).

This protection is normally enough in most applications. In specially exposed installations, where there is high risk for direct strokes, the protection can be reinforced (for example by using the connection box, BOX100, see separate datasheet).

The lightning protection is built up as a three step protection.

The pulse that enters the transmitter is caught by two varistors, three transient protection diodes and a double surge arrester.

The transmitter shield must be appropriately grounded for the protection to fulfill its purpose.



## MODBUS Communication

MODBUS communication can be used for transfer of measured values, for example the level and the media temperature (etc.). Several units can be connected in parallel and addressed to communicate its values (addresses from 1-255). Standard address at delivery is 10.

The communication can also be used for configuration of all PT06RS parameters direct from a suited control system or from a PC (with appropriate software). The MODBUS communication is fully registry based (see the manual for PT06RS for more information).

Physical interface for MODBUS is RS485, 4 lines. Supply voltage (8-36VDC) use the 4-20 mA lines and the communication use two separate lines A and B.

A standard RS485 dongle can be used (but it is optimal to use an optoisolated RS485 dongle).



## Autozero function

PT06RS has an innovative solution to eliminate the problem of zero shift (due to for example mounting orientation, covering, corrosion or mechanical damage of the diaphragm). Just place PT06RS in correct mounting position with the pressure that shall represent 4 mA on the diaphragm and just press a button or shorten two cables (pin 7-8 in M12-8 pin contact) for ten seconds. This action resets the 4 mA (and also makes the communication to send correct pressure/level in engineering units).

Autozero can also be done via MODBUS communication and from the display D10RSS.

## PI200PS/PSD

PI200PS is a PC package for configuration of MODBUS Pressure, Differential and Level Transmitters.

This battery powered modem box with mA display can be used with optional MODBUS software.

Included in the package is a PC program, MEP7 Modbus Tool, dedicated for configuration of Pondus Instruments pressure, differential and level transmitters.

To PI200PS a low resistance mA meter easily can be connected to show the mA output signal.

PI200PSD has an inbuilt display to show the transmitters mA output signal (see picture).



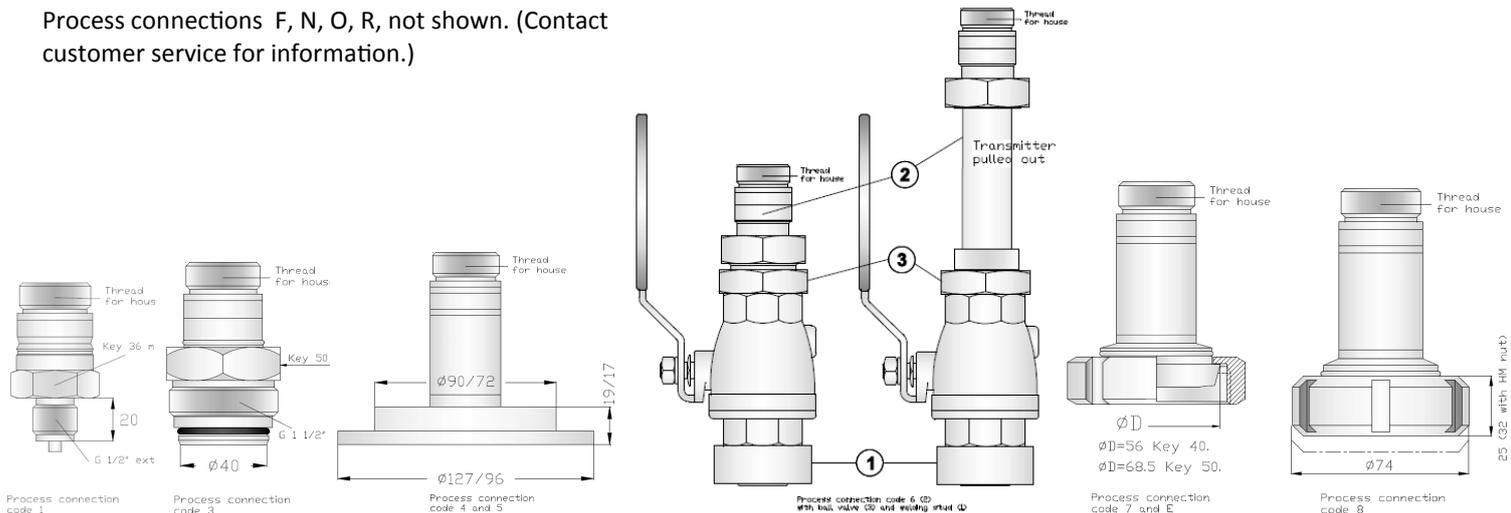
# Code table (code -1234):

Ordering example: Hygienic transmitter, SMS nut, range 200 kPa, gauge pressure, Hastelloy C276 diaphragm, M12-8pin electric connection

PT06RS-ABCD-1234 (for code -ABCD see table on next page)	Code 1 Diaphragm	Code 3 Range	Code 4 Design	G 1/2" External	NPT 1/2" External	G 1 1/2" External	Flange 80/3"	Flange 50/2"	Removable during operation	Hygienic DIN11851/40
	Code 2 Process Connection			1	2	3	4	5	6	7
<b>Diaphragm (code 1)</b>										
Titanium	1			X	X	X				
SAF2205 Duplex	2			X	X	X	X	X	X	
Stainless steel 316L	3			X	X	X	X	X	X	
Hastelloy C276	4			X	X	X	X	X	X	X
Tantalum	5						X	X		
Gold plated	8			X	X	X			X	
<b>Range (code 3)</b>										
0-7 kPa		1		X	X	X	X	X	X	X
0-35 KpA		2		X	X	X	X	X	X	X
0-200 kPa		4		X	X	X	X	X	X	X
0-2 MPa		6		X	X	X	X	X	X	X
0-4 MPa		7								
0-8 MPa		7								
0-15 MPa		8		X						
0-40 MPa		9		X						
<b>Design (code 4)</b>										
Gauge			0	X	X	X	X	X	X	X
Absolute pressure			2	X	X	X	X	X	X	X

## Drawings:

Process connections F, N, O, R, not shown. (Contact customer service for information.)

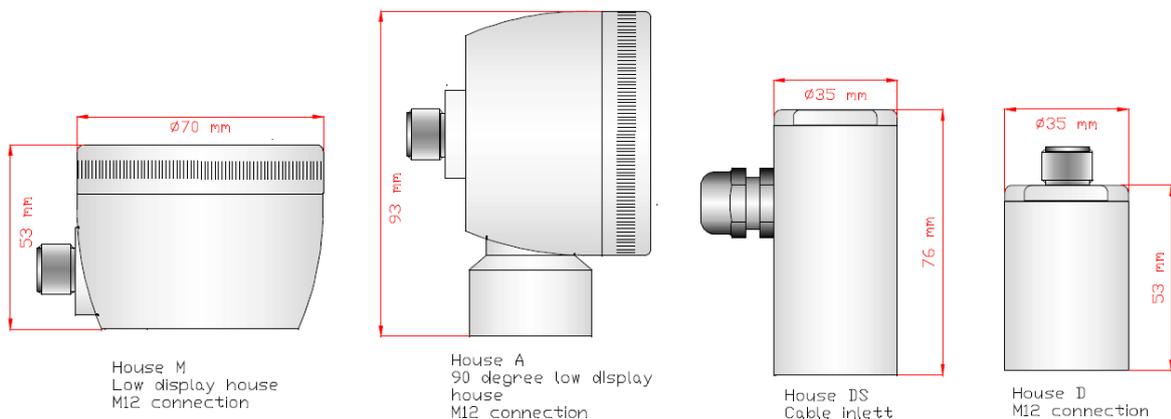




## Code table (code –ABCD):

**Ordering example:** Hygienic transmitter, SMS nut, range 200 kPa, gauge pressure, Hastelloy C276 diaphragm, M12-8pin electric connection, lightening protected, low display house and display D10RS will have the code **PT06RS-MLAD-4840**

	Suffix A Electric connection	Suffix B Protection	Suffix C House type	Suffix D Display type	Comment
<b>PT06RS-ABCD-1234</b> (for code –1234 see table on previous page)					
<b>Electric Connection</b>					
M12-8 pin male connector	M				
M12-4 pin male connector	R				Not with house M, A
Cable connection	S				Only with house DS
<b>Protection</b>					
No protection		x			
Intrinsic safe (pending)		E			Can not be combined with L
Lightning protected		L			
<b>House type</b>					
Low display house			M		Only with M12-8 pin connector
Low display house 90 degrees			A		Only with M12-8 pin connector
Compact house with M12			D		
Compact house with cable gland			DS		
<b>Display type</b>					
No display				x	
D10RSS				D	Not with house D, DS



### House

#### types:

All house types can be used with all process connections to obtain the most suitable combination depending on application. If cable connection is needed only house type S and DS can be used. House type M and A can only be equipped with M12-8 pin connector. House type D can be equipped with M12-8 pin or M12-4 pin connector. All house material is stainless steel, 304 or better.

### Example 1:

Pressure transmitter with process connection G 1/2" external, no protection, cable connection, small house will have the code **PT06RS-SxDSx-4120**. Pressure range for this code (2) is 0,35 bar.



### Example 2:

Pressure transmitter with process connection Removable during operation, gauge pressure, intrinsic safe, M12-8 pin electric connection low display house and display D10 will have the code **PT06RS-MEMD-4640**. Pressure range for this code (4) is 2 bar.



### Example 3:

Pressure transmitter with process connection clamp 51 mm (A), lightning protected, M12-8 pin electric connection, low display-house and display D10 will have the code **PT06RS-MLMD-4A20**. Pressure range for this code (2) is 0,35 bar. Note: The flange showed is an accessorie.



### Example 4:

Pressure transmitter with process connection flange 50 mm (4), intrinsic safe, M12-4 pin electric connection, small house will have the code **PT06RS-REDx-4420**. Pressure range for this code (2) is 0,35 bar. Note: The flange showed is an accessorie.



### Accessories and services:

Different accessories as, flange rings, ball valve, wall mount etc can be delivered on request. Contact customer service for information.

Services like special configuration, TAG numbers etc can be delivered on request. Contact customer service for information.

## Technical data PT06RS

<b>Type:</b>	Electronic process transmitter with digital electronics	<b>Series resistance dependence:</b>	Better than +/- 0,1 %
<b>Function:</b>	Directly process connected without pressure intermedia. Piezoresistive sensor with capillary tube.	<b>Supply voltage dependence:</b>	Better than +/-0,1 %
<b>Operation range:</b>	From 0% to 100% of range.	<b>Temperature dependence:</b>	Better than +/-0,1 % of max range (For -10 C to +70 C)
<b>Span:</b>	Adjustable between upper sensor limit and 1/10 of this.	<b>Long time stability:</b>	Better than 0,08% per year.
<b>Zero:</b>	Adjustable between -100% and 100% of upper sensor limit.	<b>Vibration dependence:</b>	
<b>Overload:</b>	For different process connections there are mechanical limits.	Perpendicular to the diaphragm:	Max 0,3 kPa/G
7 kPa	Max 100 kPa	Parallell to the diaphragm:	Max +0,2 kPa/G
35 kPa	Max 100 kPa	<b>Vibration test:</b>	Test according to IEC770
200 kPa	Max 600 kPa	<b>Repeatability:</b>	Better than +/- 0,1 % of max
4/8/15 MPa	Max 30 MPa	<b>Accuracy:</b> (including non-linearity, hysteresis, repe-	Better than +/-0,2 % of max range.
<b>Material : Diaphragm:</b>	Hastelloy C276 or 316L (certain coatings on request)	<b>Mounting:</b>	Direct on process connection.
Other media touched parts:	Stainless steel SS2353	<b>Electrical connection:</b>	Screw terminal/ M12 8-pin/ M12 4-pin connector.
Housing:	Stainless steel SS2333	<b>Encapsulation:</b>	IP67 (all house types)
<b>Ambient temperature:</b>	-20 to +80 degrees C	<b>Intrinsic safety (option):</b>	Exia IIC T4 Ga according to ATEX
<b>Damping:</b>	0,1 to 10 sec. Adjustable via communication or display.	<b>Electrical safety:</b>	According to EN60204-1
<b>Media temperature:</b>	150 C (short time 200 C). Special types 275 C.	<b>EMC:</b>	According to EN61326-1-2-3
<b>Output:</b>	4-20 mA. Signal proportional to the	<b>PED:</b>	According to 97/23/EC
<b>Supply:</b>	8-36 V DC	<b>Filling oil:</b>	AK100, food approved silicon oil (FDA approval).
<b>Series resistance:</b>	$R_{kohm} = (\text{Supply} - 8) / 20$	<b>Weigth:</b>	300-1000 g depending on pro-

Data for some connection types may differ. Contact customer service for information.