# P-BADP / P-BADR

Smart/HART pressure transmitter

825B106B

## Features

| | |
|---|---|
| Differential pressure: | **from 0,1 KPa to 10MPa** |
| Power supply: | **12÷45Vdc** |
| Accuracy: | **±0,075%** |
| Analog output resolution: | **15bits** |
| Conformable with protocol: | **HART** |
| Calibration: | **by on board buttons** |
| Data visualisation: | **backlighted alphanumeric display** |
| Memory: | **EEPROM** |
| Mechanical protection: | **IP67** |
| Certification: | **ATEX II 2 G Exd II C T6** |


HART®
FIELD-COMMUNICATION-PROTOCOL

- **Compact digital system, power supply 12÷45Vdc, suitable for liquid, gas and steam applications.**
- **Ranges from 0,1KPa to 10MPa**
- **Accuracy: ±0.075%**

## General

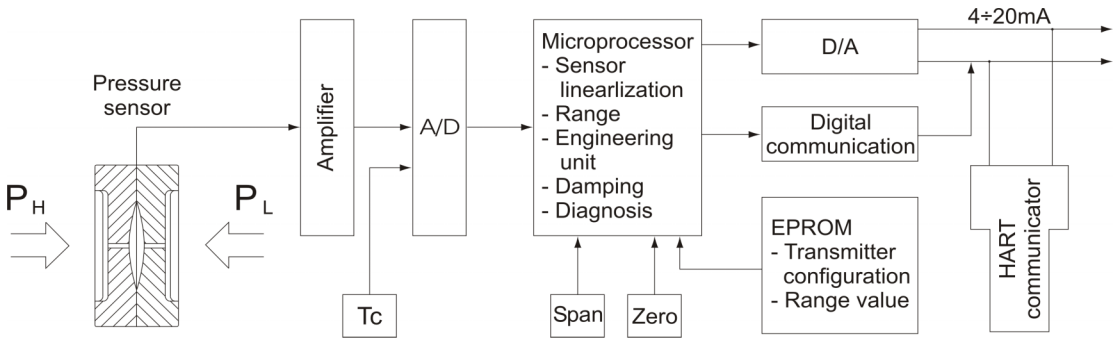
Transmitters (**P-B** Transmitter for short) are more stable in performance with the automatic temperature compensation function. Compact construction, small and light, conformable with **HART** protocol, the **P-B** transmitter are widely used in petrochemical, iron and steel, power plant, chemical, light industry and other industries

The process pressure is transmitted through the isolating diaphram and the oil fill to the sensing diaphram,placed in the middle of the sensor. In the same way the reference pressure is transmitted to the opposite side of the sensing diaphram, which is bended proportionally to the applied pressure. The bending of the sensing diaphram produces a capacity difference between the condensers, which are composed by the same sensing diaphram and by two capacitor metal plates. The capacity difference produced by the sensor, guided by a stable oscillator, is converted into a 2-wire analogic 4÷20mA signal..

## 1. Working principle

This section describes the basic function of P-B Smart Transmitters. The block diagram in Figure 1-1 illustrates the theory of operation of P-B Series Smart Pressure Transmitters, the functions of each part and their relations.

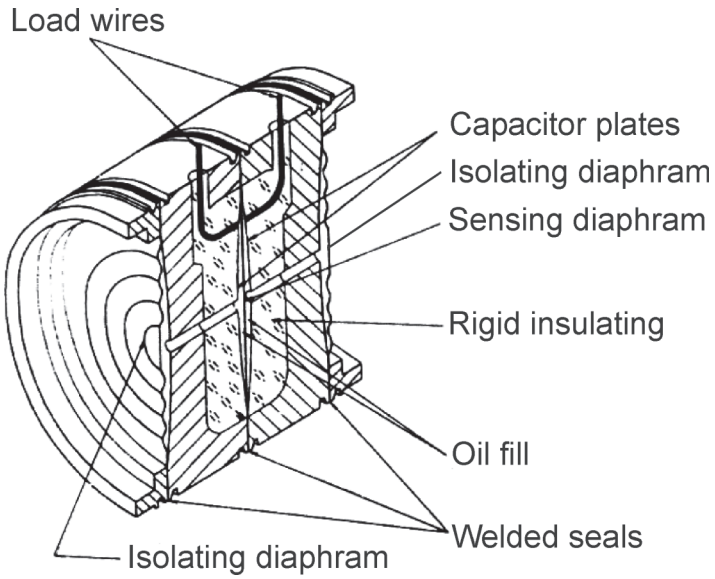
Fig.1-1




### 1.1 - δ-cell sensor

The key part of P-B transmitters is the δ-Cell Sensor, a variable capacitance sensing module. See Figure 1-2.

Fig.1-2




This sensor is a completely sealed module. The process pressure is transmitted through the **Isolating diaphram** and the **Oil fill** to the **Sensing diaphram**, placed in the middle of the **δ-cell** sensor. In the same way the reference pressure is transmitted to the opposite side of the **Sensing diaphram**, which is bended proportionally to the applied pressures. The bending of the **Sensing diaphram** produces a capacity difference (**ΔC**) between the condensers, which are composed by the same **Sensing diaphram** and by two **Capacitor plates**. The capacity difference **ΔC** produced by the **δ-cell** sensor, guided by a stable oscillator, is converted into a 2-wire analogic 4÷20mA signal.

1) $$P = K\frac{C1 - C2}{C1 + C2}$$

Where:

- **P** is the process differential pressure
- **K** is a constant
- **C1** is the capacitance between the high pressure side and the sensing diaphragm
- **C2** is the capacitance between the low pressure side and the sensing diaphragm

2) $f\ Vp\text{-}p = \frac{Iref}{C1 + C2}$

Where:

- **Iref** is the current source
- **Vp - p** is the peak-to-peak oscillation voltage
- **f** is the oscillation frequency

3) **Idiff = f Vp - p (C1 - C2)**

Where:

- **Idiff** is the difference in current between **C1** and **C2**

4) **Isig = K2 x Idiff**

Where:

- **Isig** is the signal current
- **K2** is a constant

Therefore: $Isig = K2\ Iref \frac{C1 - C2}{C1 + C2} = Constant\ x\ P$

### 1.2 - Temperature Compensation

The temperature character of the transmitter is corrected for optimization through a temperature compensation circuit on which the A/D converter converts the temperature signal and sends the signal to the microprocessor to compensate the temperature changes.

### 1.3 - A/D converter

A/C converter converts the analog signal to digital signal, which is then input into the microprocessor.
The resolution is 15 bits

### 1.4 - Microprocessor

The microprocessor of the transmitter controls the conversion of A/D and D/A, provides self-diagnosis and digital communication. It also supports transmitter linearization, range and damping adjustment.

### 1.5 - Memory

The memory ( non-volatile) stores the configuration, characterisation and the parameters of the digital trimming, so that the stored data will not be lost from power off.

### 1.6 - D/A converter

The D/A converter converts the signal from the microprocessor into 4-20 mA analog signal which is then input to the control loop.

### 1.7 - Digital Communication

P-B Transmitters are tested and configurated through a hand held communicator or a host which supports **HART protocol**. The transmitter will be more powerful in function by using P-B' DD issued by **HART Foundation Association**. **HART protocol** applys Industrial Standard and technology. The digital signal in 1200

## 2. Technical data

### 2.1 - Applications

Liquid, gas, and steam applications.

### 2.2 - Ranges

| Code | Range | P-BADR | P-BADP |
|---|---|---|---|
| 2A | 0÷ 0.10...1,6kPa - Max. pressure 1MPa | D | N |
| 2B | 0÷ 0.10...1,6kPa - Max. pressure 2,5MPa | D | N |
| 2C | 0÷ 0.10...1,6kPa - Max. pressure 4MPa | D | N |
| 3 | 0÷ 1... 6kPa - Max. pressure 4MPa | N | D |
| 4 | 0÷6...40kPa - Max. pressure 10MPa | N | D |
| 5 | 0÷40...200kPa - Max. pressure10MPa | N | D |
| 6 | 0÷160...700kPa - Max. pressure 10MPa | N | D |
| 7 | 0÷0.4...2MPa - Max. pressure 10MPa | N | D |
| 8 | 0÷1.6...6.8MPa - Max. pressure10MPa | N | D |

(1bar = 100KPa)

Tab.2-1

*Note*: **D=** available; **N=** not available.

### 2.3 - Output signal

2-wire 4÷20mA dc overlapped with HART digital signal, linear or square-root selectable

### 2.4 - Power supply

Standard 24 Vdc, 12÷45Vdc with the load resistance as shown in fig.2-1.

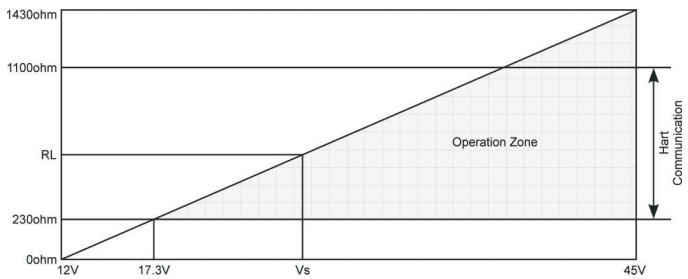
### 2.5 - Load resistence

The maximum load resistence of the output signal is related to the power supplied (fig.2-1) and is expressed by the formula:

**RL = ( Vs - 12V ) / 23mA**

RL=max load Vs=power supply voltage

Fig.2-1



### 2.6 - Display

Field display for 0-100% or with pressure units like bar, mbar, PSI, $mmH_2O$, $mH_2O$, mmHg, Pa, kPa, MPa, cm, m.
A bargrapg can show the output percentage,


### 2.7 - Zero and Span calibration

Local adjustment with the keys on the housing or with HART communicator.

### 2.8 - Positive and negative OFFSET

- Differential pressure transmitter:
  The max. positive OFFSET is the difference between the upper value limit and the measure range > URL (upper range limit)
- Gauge pressure transmitter:
  The max. positive OFFSET is the difference between the URL and the measure range. The max. negative OFFSET is > than 1 Atm
- Absolute pressure transmitter:
  The max. OFFSET i s the difference between the URL and the measured range. The negative OFFSET does not exist.

### 2.9 - Failur alarm

A self-diagnostic program detects a problem when the output signal is higher than 20,8 mA or lower than 3.8 mA.
Both values are configurable by the user through the on-board push buttons or by HART communicator (if available)

### 2.10 - Temperature ranges

Electronics: -40°C ÷ +85°C

Sensor with fill silicon oil: -40°C ÷ +104°C

Sensor with fill inert oil: 0°C ÷ +71°C

### 2.11- Storage temperature

-40°C ÷ +55°C

**2.12 - Start-up time**

2s.max

**2.13 - Damping (DAMP)**

0-65.000s electronic damping, adjustable by 0.1s interval.

**2.14 - Insulating resistance**

The insulating resistance between the electrical connection terminals and “ground” is not less than 20 MOhm.

**2.15- Accuracy**

Best accuracy ± 0,075.

**2.16 - Stability**

The stability of the transmitter guarantees the accuracy within 6 months.

**2.17 - Temperature effect**

Total error = < ± 0,3% maximum range value , change 10 °C at a time

**2.18 - Static pressure effect**

Zzero error for 14Mpa ,under the pipeline pressure , ± 0,25% maximum limited value or ± 0,5% is calibrated through zero adjustment.

**2.19 - Vibration effect**

0.1% maximum limited value of range 10÷55Hz, S=0,15mm is upward on any direction

**2.20 - Power supply effect**

Less than 0,005%V of output range

**2.21 - Mounting position effect**

Zero shift of up to 0.0024bar if the sensing diaphragm is not vertical mounted, which can be calibrated out. No span effect.

**2.22 - Construction materials**

- See the “**Ordering Information**” for selecting the wetted parts: Flange/Adapter, Drain/Vent Valve, and Isolating Diaphragm.
- **Bolts** Stainless-steel.
- **Electronic Housing** Low-copper aluminum.
- **Paint** Epoxy-polyester

**2.23 - Process connections**

1/4 NPT on the Flanges, 1/2 NPT on the Adapters.

**2.24 - Electrical connections**

Two M20×1.5 on the housing for connecting the conduit. Screw terminals and a plat for test to connect the communicator.

**2.25- Weight**

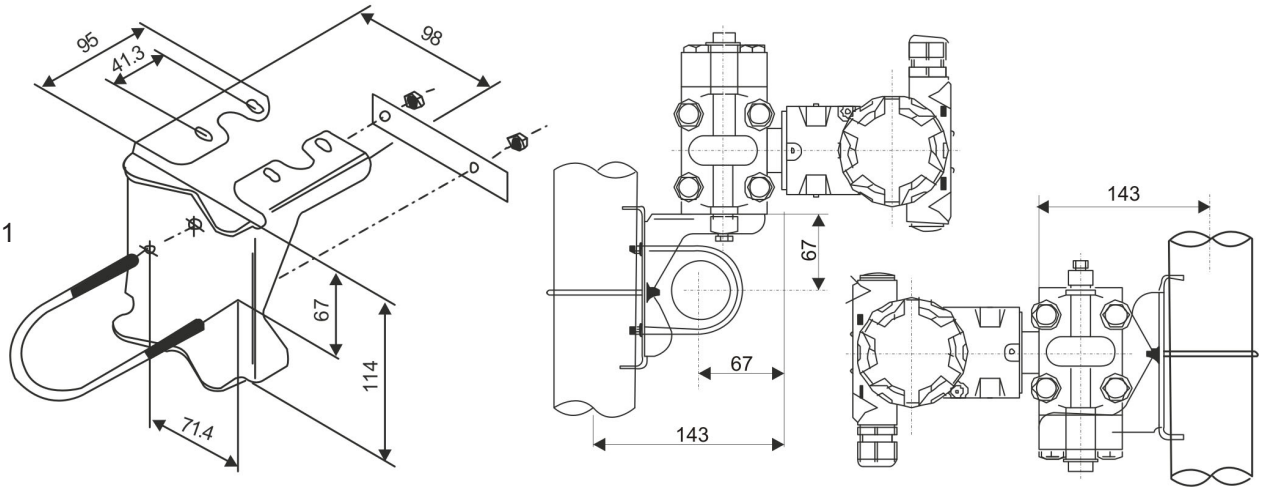
Approximately 4,9 Kg. (doesn’t include accessories)

## 3. Installation

### 3.1 -Mounting Bracket

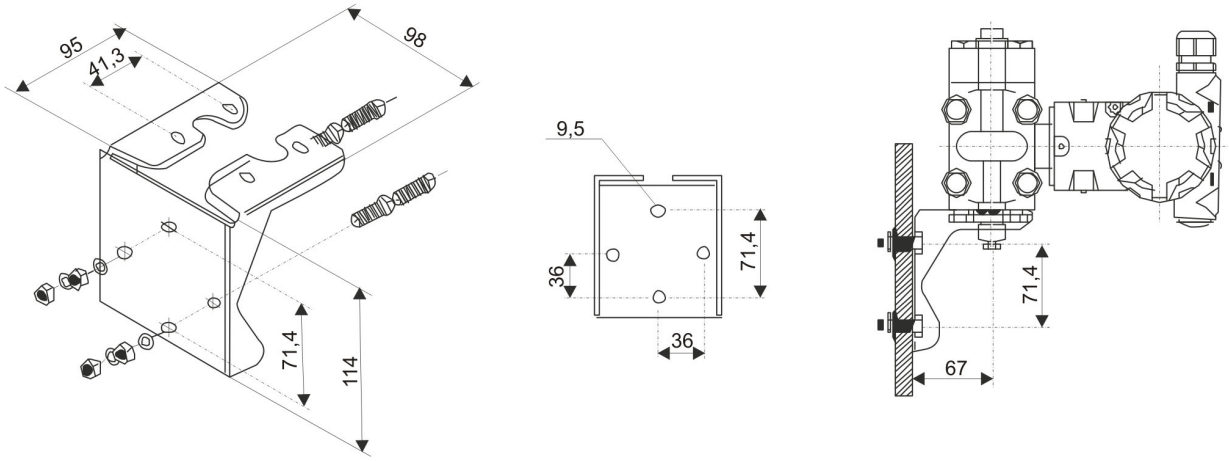
#### 3.1.1 - B1 option- 2” pipe mounting bracket

Fig.3-1



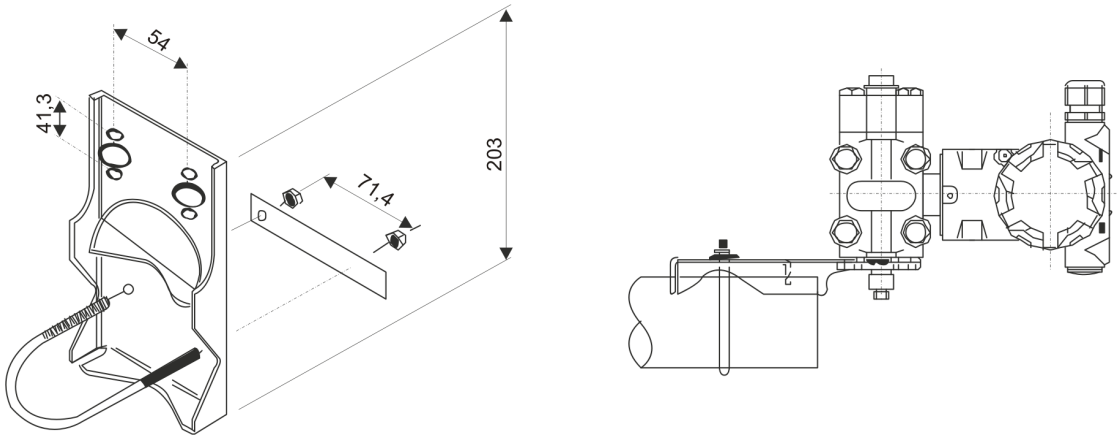

#### 3.1.2 - B2 Option- panel mounting bendig bracket

Fig.3-2




#### 3.1.3 - B3 Option- 2” pipe mounting flat bracket

Fig.3-3



### 3.3 - Outline dimensions

P-B transmitters dimension drawings

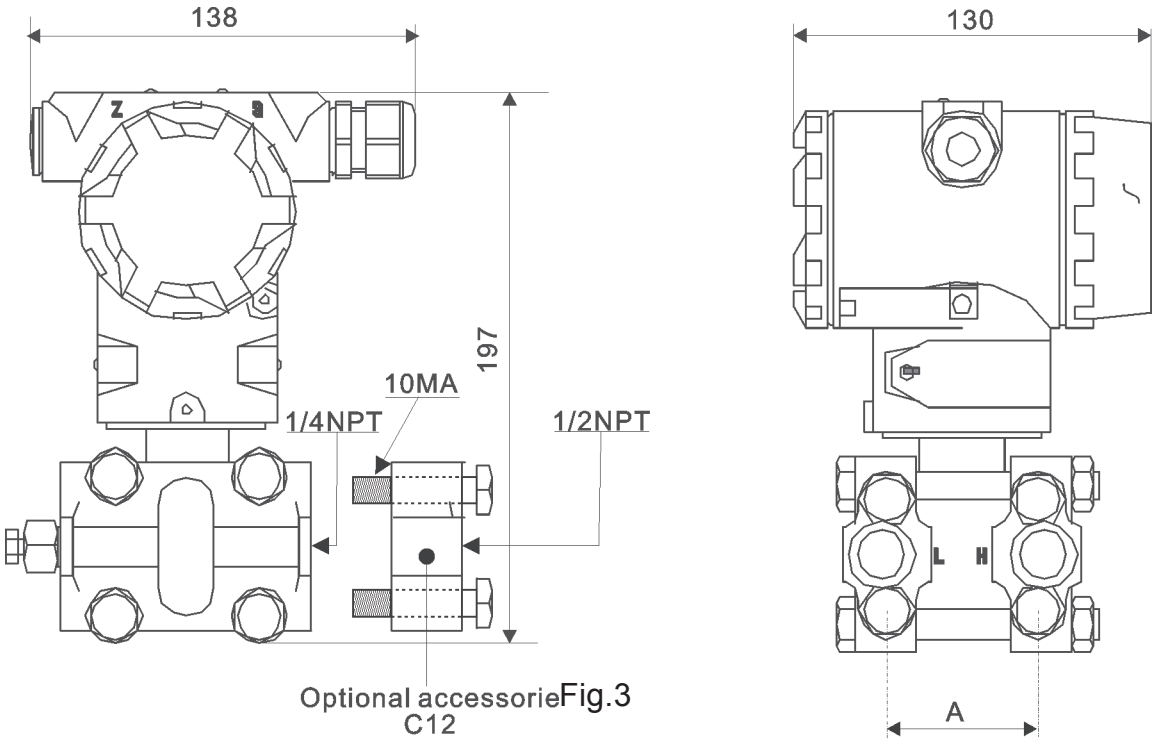



Fig.3

| Range code | 2x - 3 - 4 - 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| A (mm) | 54 | 55.2 | 55.6 | 57.2 |

Tab. 3-1

# 4 - Settings

## 4.1 Calibration

The transmitters are calibrated by the producer. If ther user needs to modify the parameters and has no Hand Held Communicator and/or PC SW, he can operate on the digit buttons of the display referring to the following instructions.

### 4.1.1 Range calibration

Press S+Z buttons for 10 sec., until the display shows “OPEN”.
Apply the minimum pressure, hold the Z button for three seconds until you see (L SET), the current signal is automatically adjusted to 4mA (0%)
Apply the minimum pressure, hold the S button for three seconds until you see (H SET), the current signal is automatically adjusted to 20mA (100%)
Wait for few seconds and the instruments automatically will exit the menu

### 4.1.1 “PV=0” calibration

The mounting position, or the process conditions, may cause a △P (PV = 0) zero point offset
To calibrate the "PV = 0" proceed as follows:

1) instrument mounted in its correct position
2) process condition equivalent to the PV = 0 condition; in some cases the same effect is obtained by disconnecting the process pressure connection
3) Press simultaneously the S+Z buttons, until the display shows “OPEN”
4) Press simultaneously the S+Z buttons, until the display shows “PV=0”
5) Press simultaneously the S+Z buttons to restart the instrument.

## 4.2 Parameters modification

The parameters that can be setted are:unit of measurement, zero, span, current, damping, linear and square root.
During the parameter setting or modification the HART communication and the pressure input reactions are interrupted. In case of specific functions, if there is no action for 3 minutes the trasmitter goes back to measure mode.
By pressing Z and M at the same time the user can go back to normal working status.

The buttons functions are:

**Z** – choose parameter
**S** – confirm parameter
**M** – next page
**Z+S+M** – backup and reset

Press S + M to edit the parameter. The display will show nothing. Then press M and the display will show in sequence:

### 4.2.1 Display mode

Choose option “DISPLAY” and press S to modify the setted measurement unit

### 4.2.2 Zero calibration

Choose option “ZERO”and press Z for 5s and then leave it ( the last digit of the dispaly will light)
Press S to modify the value. Press Z to move to next value you want to modify and press again S (the selection order is from right to left. The last option which is possible to modify is the decimal point).Press M to confirm.

### 4.2.3 Span calibration

Choose option “SPAN” and press Z for 5s and then leave it (the last digit of the display will light).
Refer to previous point 4.2.2 to modify the value and confirm.

### 4.2.4 Damping

Choose the option “DAMP”, which represents the delay expressed in seconds, and press Z for 5s and then leave it ( the last digit of the dispaly will light). Press S to modify the value. Press Z to move to next value you want to modify and press again S (the selection order is from right to left. The last option which is possible to modify is the decimal point).Press M to confirm.

## 4.3 Backup e recovery

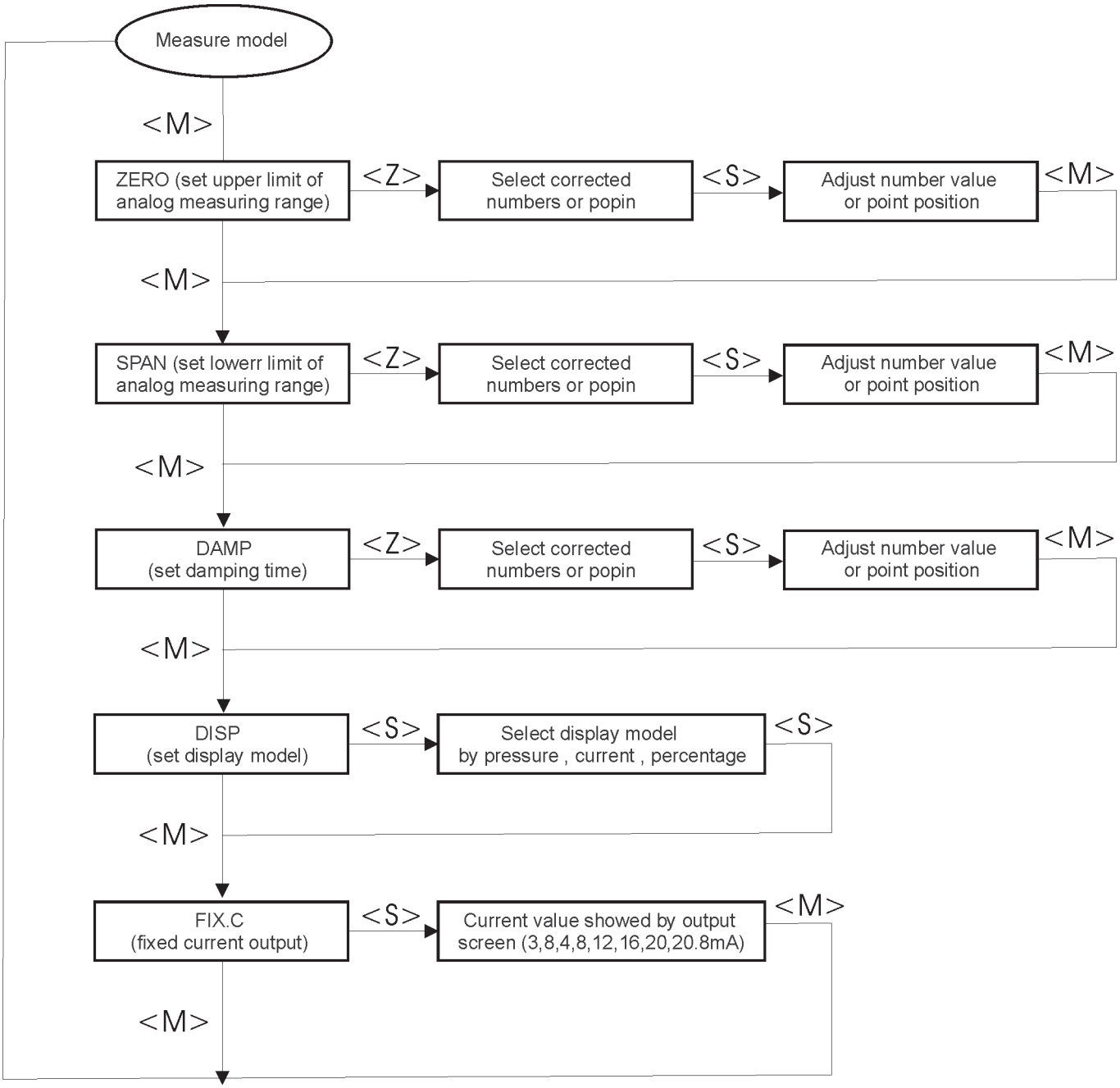
### 4.3.1 Backup

Press S + M and the display will show nothing. Then press Z + S to check the back-up status. If the display will show “ - ” the back-up has not be done and if it will show “8” the back-up has been regularly made. If it is necessary to start a back-up procedure, press Z+S+M at the same time for 5s and the display will show IH and “Kpa” will light for 7 times. Then on the screen will appear all the display, completely setted. When the column “%” will light, the transmitter will be back at normal working status.

### 4.3.2 Recovery

Is it possible to restore damaged data in the following way: press Z+S+M at the same time for 5s and the display will show "0H" and "Kpa" will light for 7 times. Then on the screen will appear all the display, completely setted. When the column "%" will light, the transmitter will be back at normal working status.

### 4.1 Calibration Flow Chart



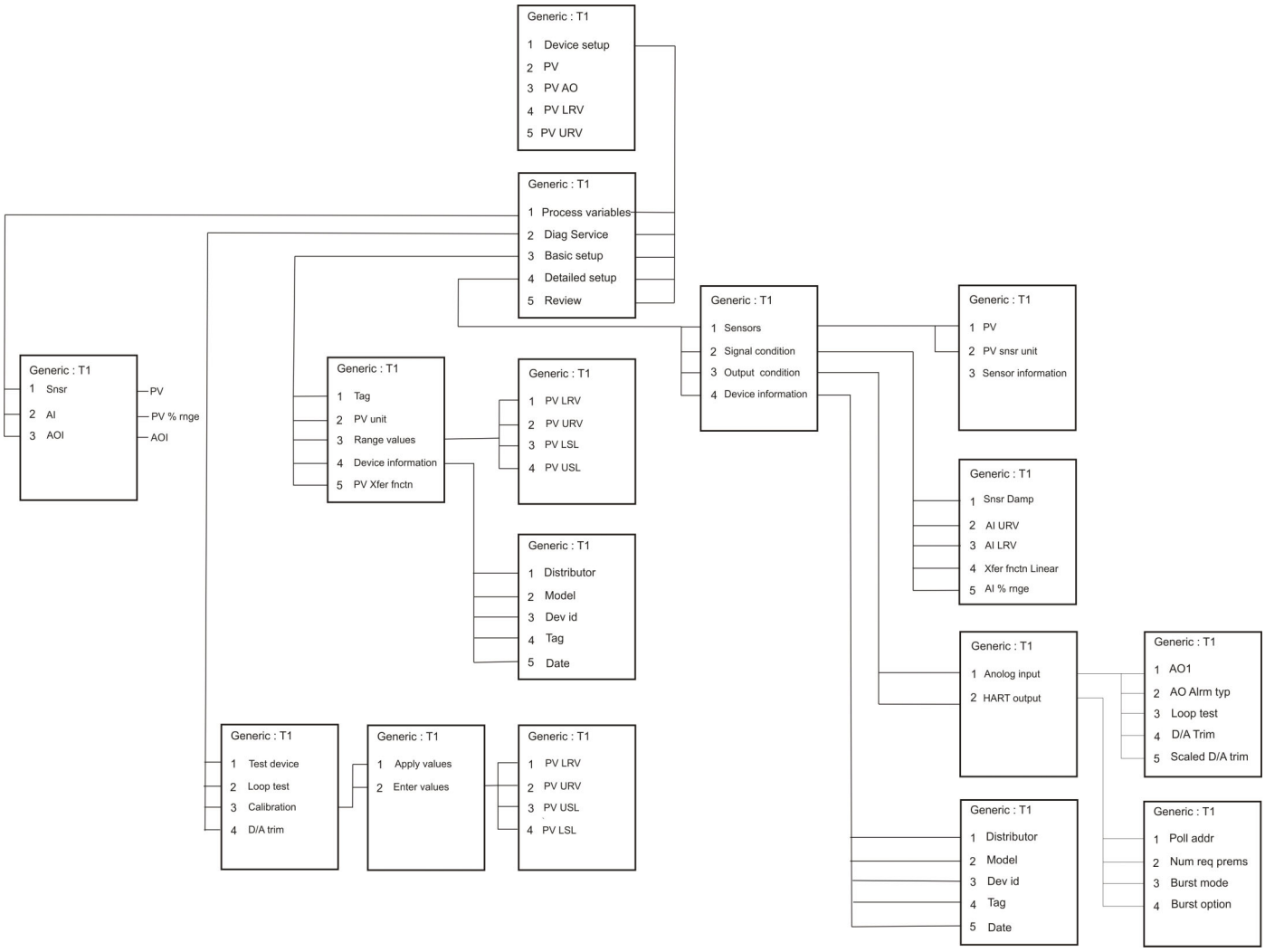
## 5.HHT275 programming menu structure (HART)

### 5.1 - HHT275

HHT 275 is a universal **HART configuration tool** for smart instruments such as the pressure transmitters, temperature transmitters and flow meters etc., which were registered for DD(Device Description) from the HART Foundation Association. When using HHT 275 to communicate with the transmitter, it reads the DD message and search the corresponding DD message from its data base, then communicate with the transmitter.

### 5.2 - Programming menu structure (HART)

The following diagram shows the structure of the menu tree:



## 6. General

P-B transmitters can be used for flow, liquid level, or other applications requiring accurate measurement of differential pressure and pressure. The accuracy of a measurement depends to a great extent on proper installation of the transmitter and impulse piping, so that correct installation is very important. The transmitters are often installed in harsh environments due to process and economic consideration. Thus the transmitters should be located to minimize the effects of temperature gradients and fluctuations and to avoid vibration and mechanical shock.

**! CAUTION !**

**It is not allowed for the medium to ice because it would damage the isolating diaphragm, and destroy the transmitter**

### 6.1 - Connection Piping

The following information is very important for properly mounting a transmitter. Location, steam service, and minimization of errors information follow:

#### 6.1.1 - Location

Proper transmitter location with respect to the process pipe depends on the process material. Consider the following to determine the best location:

a) Keep corrosive of hot process material away from the transmitter

b) Avoid sediment deposit in the impulse piping

c) Keep connection piping as short as possible

d) Balance the liquid head on both legs of the impulse piping

e) Install connection piping at temperature gradients and fluctuations less changing place. Keep connection piping

##### 6.1.1.1 - Liquid Measurement

For liquid flow measurement, tap the side of the line to avoid sediment deposits. Mount transmitter besides or below the taps so gases will vent into the process line

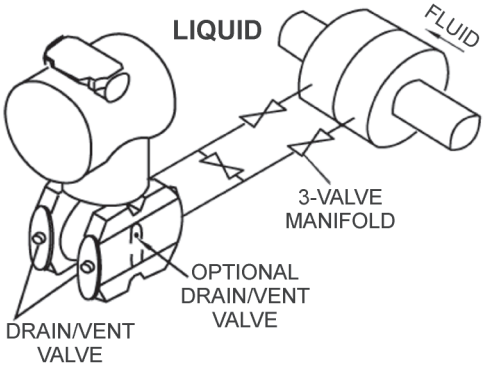



Fig. 6.1.1.1

### 6.1.1.2 - Gas Measurement

For gas flow measurement tap the top or side of the line. Mount transmitter besides or up the taps so accumulated liquid will flow into the process line. Taps should be made to the side of the line for transmitters having side vent/drains. For liquid service the side vent/drain should be mounted upward to allow venting of gases. For gas service, it should be mounted down to allow draining of any accumulated liquid. See Figure 4-1. Side vent/ drains may be changed from top to bottom by rotating the process flange 180°.

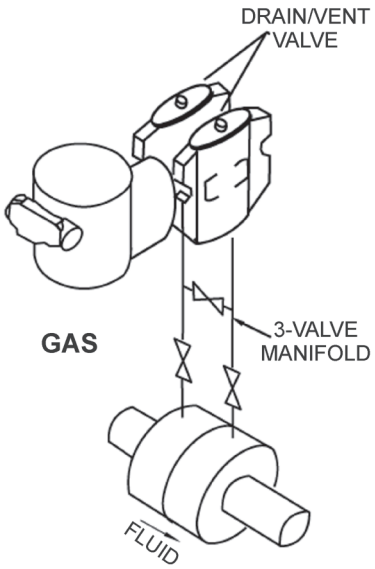



Fig. 6.1.1.2

### 6.1.1.3 - Steam Measurement

For steam flow measurement, tap to the side of the line and mount the transmitter below the taps. This will keep the connection piping filled with condensate. Intention must be tacken that the temperature should not exceeds the transmitter's temperature limit when the transmitter will be serviced for steam or other high temperature medium.To prevent live steam from contacting the transmitter, fill the impulse lines with water. Condensate chambers are not necessary since the volumetric displacement of the transmitter is negligible.

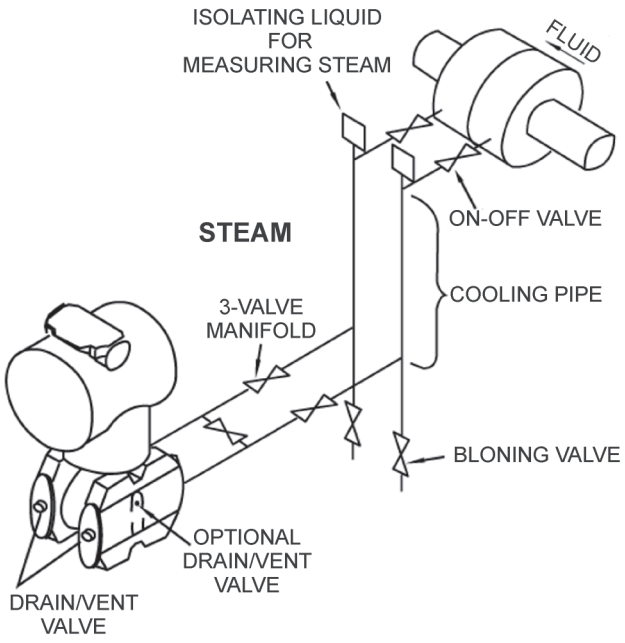



Fig. 6.1.1.3

### 6.1.2 - Minimizing Error

The impulse piping between the process and the transmitter transfers the pressure at the process taps to the transmitter. The following conditions could cause errors in pressure transfer:

1) Leaks
2) Friction loss-particularly if purging is used
3) Trapped gas in a liquid line (a head error )
4) Liquid in gas line ( a head error )
5) Temperature-induced density variation between legs ( a head error )

To minimize the errors by doing:

1) Make impulse piping as short as possible
2) Slope piping at least 1/12 up toward the process connection for liquid and steam service
3) Slope piping at least 1/12 down toward the process connections for gas service
4) Avoid high points in liquid lines and low points in gas lines
5) Keep both impulse legs at the same temperature
6) Use impulse piping of sufficient diameter to avoid friction effects
7) Vent gas from liquid piping legs
8) Fill both piping legs to the same levels when using sealing fluid
9) Avoid purging through the transmitter. Make the purge connection close to the process taps and purge through equal lengths of the same size pipe

### 6.2 - Installation

P-B transmitters can be mounted directly at the point of measurement, can be mounted against a wall, or with the use of a mounting bracket- to a 2'' (about ¦60 mm) pipe.
Process connections on the transmitter flanges are 1/4" NPT. Flange adapter unions supplied have 1/2" NPT connections The flange adapters allow the transmitter to be easily disconnected from the process by removing the flange adapter bolts. By rotating the flange adapters, the transmitter is allowed to be mounted directly on flange or orifice flanges or the pipe by bracket.
To ensure a tight seal on the adapter flange, tighten the bolts as the following: wrench tighten alternatively and equably tighten the bolts. Don't tighten the bolt one time. Finally wrench torque is approximately 40 N·m. The transmitter body may be rotated in the flanges for mounting convenience. Rotating the transmitter body will not cause a shift in the zero setting if only the flanges are vertical. If the flanges are horizontal (for example, to measure flow in a vertical pipe ), the transmitter must be rezeroed to cancel the liquid head effect caused by the process connection height differences.

### 6.3 - Wiring

Signal terminals are located in the electrical housing in a separate compartment. Remove the cover on the nameplate-designated terminal side to make connections. All power to the transmitter is supplied through the signal wiring. There is no additional wiring required.
Signal wiring should be twisted pairs. The shielded wires are to be used and grounded in the environment with heavy electric-magnetic disturbance. Do not run signal and power wiring together or near heavy electrical equipment.
Conduit connections on the transmitter housing should be sealed or plugged (M20×1.5 ) with a sealing compound to avoid accumulation of moisture in the housing. If the connections are not sealed, the hole of connection should be downward for drainning.
Signal wiring may be ungrounded ( floating ) or grounded at any place in the signal loop. The transmitter case may be ungrounded or grounded.
Because the transmitter is capacitance-coupled to ground, insulation resistance should not be checked with high voltage meter. No more than 45 V should be used for circuit check.

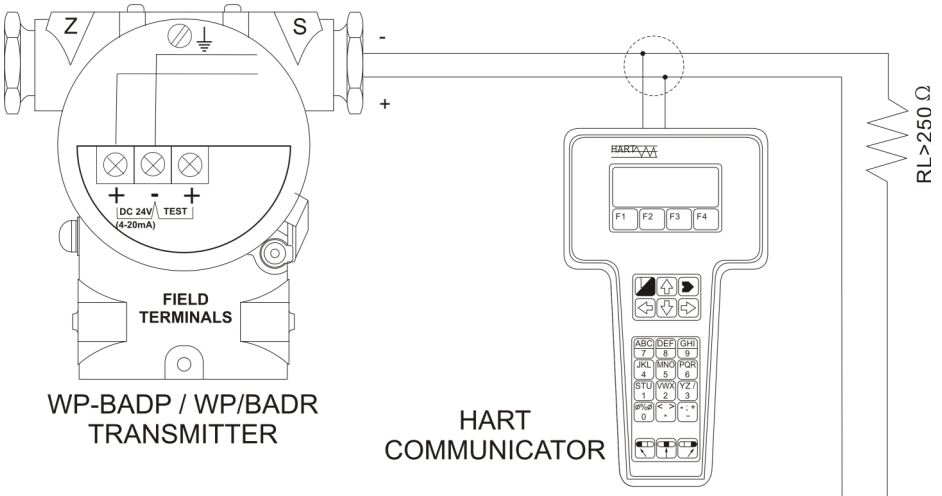
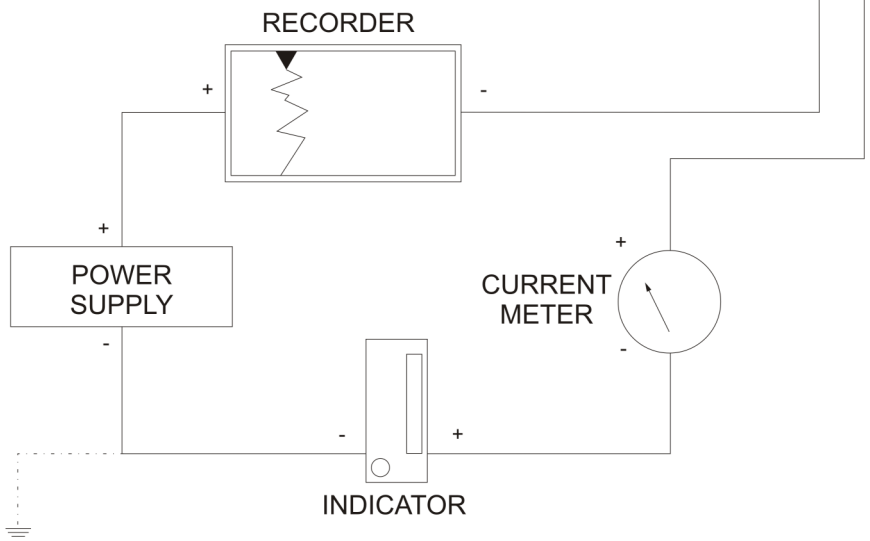



Fig. 6.3



## 7. General

There is no moving parts in P-B Transmitter, so less period maintenance is required. For trimming and calibration, they are described as aforesaid.
This section describes the testing method for the sensor, the procedures of disassembly and reassembly, and trouble shooting. Refer to section 7 for using explosion-proof products.

**! CAUTION !**
**It should be re-characterized if the electronic parts or sensor is replaced for a characterized transmitter**

### 7.1 - Testing the sensor

The sensor cannot be fixed on site and must be sent back to the plant being replaced. If there is leakage or the isolating diaphragm is damaged, then the sensor must be replaced.

### 7.2 - Disassembly Procedure

#### 7.2.1 - Disassembly Sensor Body

1) Dismounting the transmitter, before disassembly the sensor
2) Take off the bolts ( M10×80 ), and thus the flanges. Be careful, not to damage the isolating diaphragm
3) Wash up the isolating diaphragm with a soft rag using mild solution, and clear water rinse. Any chloride or acid solutions is not allowed
4) The adapters and flanges can be reversed for convenience assembly
5) It is necessary for temperature re-cycling testing after reassembly ( same as reassemble the sensor body )

#### 7.2.2 - Electrical Housing

1) Unscrew off the cover of the display side to see the electrical terminals for signal and indicator
2) Unscrew off the cover of the circuit side to see the electronic parts. Be sure to disconnect the power source first and unscrew the cover the second

#### 7.2.3 - Disassembly Sensor and Electric Housing

1) Take off the electronic parts (precautions should be taken for static electricity)
2) Unscrew the nuts
3) Unscrew the sensor module from the electrical housing. Don’t damage the leads on the sensor, and pull out the leads from the housing. Be careful not to damage the isolating diaphragm .
4) The sensing module is a welded assembly as a part which can not be disassembled

## 7.3 - Re-assembly Procedure

### 7.3.1 - Preparation

1) Inspect all “o” rings and replace them if necessary. Lightly grease with silicon oil to ensure a good sealing
2) Inspect threaded connections to make sure 5 undamaged threads will fully engage for explosion-proof requirements

### 7.3.2 - Electrical Housing and Sensor Assembly

1) Insert the leads from the sensor into the electrics housing
2) Use a sealing compound on the threads of the sensor module to ensure a water tight seal on the housing
3) Screw the sensor module into the electrical housing making sure that 5 full threads are engaged. Be careful not to damage or twist the sensor leads
4) Align the sensor module with the high and low pressure sides oriented for convenient installation
5) Tighten the lock nut with the force about 40N·m

### 7.3.3 - Electrical Housing

1) Check the electronic circuit boards to see that they are clean
2) Put in the smart electronic circuit board
3) Make sure that the post connector on the connection board are clean
4) Tighten two screws on the electronic circuit board

### 7.3.4 - Process Sensor Body

1) Carefully place the process O rings around the isolated diaphragm
2) Place the flanges in the desired orientation and finger tighten the bolts
3) Evenly seat the flanges on the sensor housing by the following procedure:
   a) Finger tighten all four bolts
   b) Tighten one bolt until the flanges seat
   c) Torque down the bolts diagonally across
   d) Torque down another bolts diagonally across
   e) Inspect the flange-to-sensor seating to be sure that the flanges are not cocked
   f) Check that all four bolts are tightened to approximately 40N·m
   g) Transmitters for range code 2 and 3 must be tested under the temperature over the temperature limits two temperature circles before calibration

### 7.3.5 - Field indication

1) The indicator may be rotated in several 90° for the convenience of reading
2) For some reasons the cover should be removed, the “O” ring between the cover and electrical housing must be ensured in its correct position before the cover is screwed on. In anytime, the glass on the cover must not be taken off for reliable sealing.

### 7.3.6 - Interchanging of the Parts

Mechanical parts, such as flanges, flange adapters, electrical housing and its covers, and mounting brackets etc. are interchangeable among units without regard to range, calibration or output signal.

## 8. Trouble Shooting

The procedures described below will help you the find the malfunction of the transmitter, and allow you to make decision if it is necessary to disconnect the parts. This information is intended to help you diagnose and repair problems related to three primary malfunction symptoms. Under each symptom, checking procedures are listed for conditions that could be causing the malfunction. To trouble shoot, select the symptom most closely resembling your unit's malfunction and use the information in this manual. Please contact our Customer Service Center if the failure one cannot be fixed.

### 8.1 - High Output

The causes and possible solutions are:

1) Check for restrictions at primary element ( e.g. the orifice )
2) Impulse piping:
   a) Check for leaks or blockage
   b) Check that blocking valves are fully open
   c) Check for entrapped gas in liquid lines and for liquid in dry lines
   d) Check for sediment in transmitter process flanges
   e) Check that density of liquid in impulse lines is unchanged
3) Transmitter Electrics connection:
   a) Make sure the connection point are clean and check the sensor connections
   b) Check the power source voltage is in 12÷45Vdc
4) Transmitter Electrics Failure:
   a) Selecting "Self Test" mode with HART communicator to check out whether or not the electronic parts failed
   b) Replace the faulty electronic elements
5) Sensing module:
   a) Refer to "Sensing Module" described in this Section
6) Power Source:
   a) Check the voltage of the power source whether or not is correct

### 8.2 - Low Output or No Output

Possible cause and solutions:

1) Primary element:
   a) Check installation and condition of primary element
   b) Check any changes in process fluid properties which may affect output
2) Loop Wiring:
   a) Check for adequate voltage to transmitter
   b) Check for short and multiple grounds
   c) Check polarity of connections
   d) Access "Loop Test" mode with the communicator to check out if the loop resistance meets the demand

**! CAUTION !**

**Voltage must never be over 45 V while checking the loop.**

3) Impulse Piping:
   a) Check that pressure connection is correct
   b) Check for leaks or blockage
   c) Check for entrapped gas in liquid lines
   d) Check for sediment in transmitter process flange
   e) Check that blocking valves are fully open and that bypass valves are tightly closed
   f) Check that density of fluid in impulse lines is unchanged
4) Transmitter Electrics Connections:
   a) Check for shorts in sensor leads
   b) Make sure post connections are clean and check the sensor connections
   c) Check for the torque of the bolts in the limitation?
5) Transmitter's Electrical Failure:
   a) Access to "Self Test" mode with the communicator to make sure if the electrical circuit fails?
   b) Replace the faulty electronic elements
6) Sensing Module:
   a) Refer to "Sensing Module" described in this section

**6.3 - Unstable Output**

Possible causes and solutions:

1) Loop Wiring:
   a) Is there intermittent circuit short, opening and multipoint grounding?
   b) Check for the voltage of the power source

**!Caution!**

**Never check the electrical loop with the power supply over 45 V.**

2) The medium fluctuation:
   a) Adjust the damping potential meter
3) Impulse Piping:
   a) Check for entrapped gas in liquid lines and for liquid in dry lines
4) Transmitter Electrics Connections:
   a) Check for intermittent circuit shorts or open circuit
   b) Make sure post connectors are clean and check the grounding of the sensing module
5) Transmitter Electrics Failure:
   a) Access to "**Self Test**" mode with the communicator to make sure if the electrical circuit fails?
   b) Replace fault electronic elements
6) Sensing Module:
   a) Refer to "Sensing Module Testing " described in this section

**8.4- Transmitter communication failure**

Possible causes and solutions:

1) Abnormal Power Source

   Check the voltage of the power source if it meets the demand

2) Load Resistance

   Check the load resistance if it meets the demand, referring to the Load Character in Figure 2-1. The minimum load is 25ohm

3) Electrical Circuit malfunction

   Replace the failed electronic elements

## **P-BADP / P-BADR -** Warranty

Products supplied by SGM LEKTRA are guaranteed for a period of 12 (twelve) months from delivery date according to the conditions specified in our sale conditions document. SGM LEKTRA can choose to repair or replace the Product. If the Product is repaired it will mantein the original term of guarantee, whereas if the Product is replaced it will have 12 (twelve) months of guarantee. The warranty will be null if the Client modifies, repair or uses the Products for other purposes than the normal conditions foreseen by instructions or Contract. In no circumstances shall SGM LEKTRA be liable for direct, indirect or consequiential or other loss or damage whether caused by negligence on the part of the company or its employees or otherwise howsoever arising out of defective goods.

## **P-BADP / P-BADR -** Factory test certificate CE

In conformity to the company and ceck procedure I certify that the equipment:

PB..... part nb. .....

is conform to the technical requirements on Technical Data and it is made in conformity to the SGM-LEKTRA procedure

Quality Control Manager: .....

Production and check date: .....

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