



PSM INSTRUMENTATION LTD

SERIES 500

PRESSURE TRANSMITTERS

USER MANUAL

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Burrell Road Industrial Estate
Haywards Heath, West Sussex RH16 1TW, UK
Tel: +44 (0)1444 410040 Fax: +44 (0)1444 410121
[Http://www.psm-sensors.co.uk](http://www.psm-sensors.co.uk) E-mail: sales@psm-sensors.co.uk

1. INTRODUCTION

Series 500 absolute/gauge pressure transmitters are intended for applications across a wide range of processes from ultra low to medium pressure duties.

Different constructions and materials are available to suit a particular duty. The measurement principle is based on a precision rated diaphragm and linear variable differential transformer (LVDT) combination.

On all models the pressure chamber houses a rated pressure element to which the process pressure is directly applied. Backing plates are provided to protect against pressure overloads.

The pressure element is attached to a ferro magnetic core which is located in the centre (null point) of a high resolution linear variable differential transformer (LVDT). When voltage is applied to the primary coil, any movement of the core due to pressure on the measuring element develops a voltage in the two secondary coils. The output signal from these two coils is then conditioned within the transmitter electronics to provide a standard process control signal output, which, using the adjustments provided, may be set by the user to the process requirements.

2. SPECIFICATIONS - General

Mechanical

Electronics Housing:	Stainless steel to IP65
Pressure housing:	316 St Stl
Diaphragm material:	Hastelloy C, / St Stl./ Inconel (model dependant)
Process connections:	refer to model coding
Electrical connections:	Standard DIN type connector.

Electrical

Maximum error:	+/- 0.25% (including the effects of non-linearity and hysteresis)
Range adjustment:	30 to 100% of nominal input range
Zero adjustment:	+/- 20 % of nominal input range
Signal output:	4 to 20 mA dc 2 wire
Power supply:	9 to 32 V dc

Performance

Operating temperature:	-20 to +100 deg C
Temperature effect:	Better than 0.02% FS per deg C
Humidity:	0-95 deg C RH non-condensing

For Models, Input ranges, overload capabilities and arrangements see the following model code table:

**500G
500A**

**Gauge Pressure Transmitter
Absolute Pressure Transmitter**

T2 DN25 PN16 flange mounting.
T5 Threaded process connection 1/2" BSP male
T6 1" ANSI 150lb flange mounting to BS1560.
T7 Threaded process connection 1/2" NPT male
T11 Hygienic 2" IDF.
T12 Hygienic 2" RJT
T13 Hygienic 2" Triclover.
T14 Hygienic 2" SMS.
T18 DN50 PN16 flange mounting.
T22 Threaded process connection 1" BSP female.
T31 Hygienic DIN 50mm to 11851
T32 Threaded process connection 1/2" BSP female
T33 Threaded process connection 1/4" BSP female.
T36 Threaded process connection 1/4" NPT female.
T38 Threaded process connection 1/2" NPT female.
T39 Threaded process connection 3/4" NPT female
T40 Threaded process connection 1" NPT female
T41 Threaded process connection 1/4" BSP male.
T42 Threaded process connection 1/4" BSP male
T43 Threaded process connection 3/4" BSP female
T44 2" ANSI 150lb flange mounting to BS1560.....

**H
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S**

**Hastelloy C Diaphragm - Ranges 0.5 m Wg to 50 m Wg
Inconel Diaphragm - Range 10 bar G
PH15-4 Stainless Steel Diaphragm - Ranges 30 bar to 400 bar G**

0.5 0.5m H₂O
1 1m H₂O
2 2m H₂O
4 4m H₂O
8 8m H₂O
16 16m H₂O
32 32m H₂O
50 50m H₂O
10b 10 bar G
30b 30 bar G
40b 40 bar G
100b 100 bar G
200b 200 bar G
300b 300 bar G
400b 400 bar G

*Nominal
range*

500G/ T33 / H 4 / 3 m Wg

**THE SERIES 500 IS
NOT APPROVED
FOR USE IN HAZARDOUS AREAS**

3. TRANSMITTER INSTALLATION MECHANICAL

Pre installation checks

The Transmitter is normally manufactured, calibrated and tested in accordance with the users specific requirements. It is recommended that prior to commencing installation, the specification of the instrument as supplied is checked to ensure it is in accordance with actual installation requirements. Checks should include nominal and actual ranges set, signal output, power supply requirements and process connections. The relevant information will be engraved on the transmitter body.

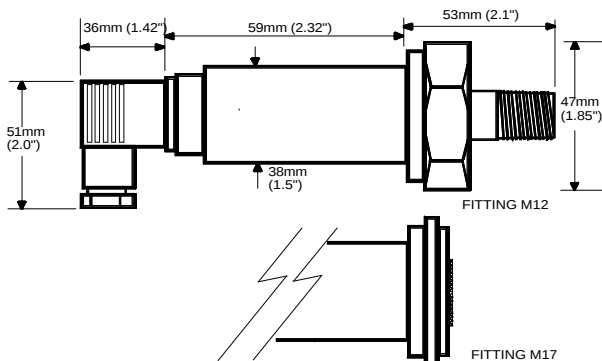
Transmitter Mounting

The Transmitter is generally specified with the appropriate fittings to mount directly to the pipework or process plant. Optional brackets are available if required.

System Piping

The size of the process connection to the pressure chamber will depend on what was specified at the time of manufacture. Do not overtighten the pressure connection or insert any objects through the entry hole since this may result in damage to the sensitive pressure element.

In general it should be ensured that the pipework and valves used are compatible with the process in terms of materials and pressure ratings. For liquid level duties long pipe runs should have a gradient to assist in clearance and line size should be $\frac{1}{4}$ " minimum. Where isolation valves are fitted they should be as close to the transmitter as practical.



4. TRANSMITTER INSTALLATION ELECTRICAL

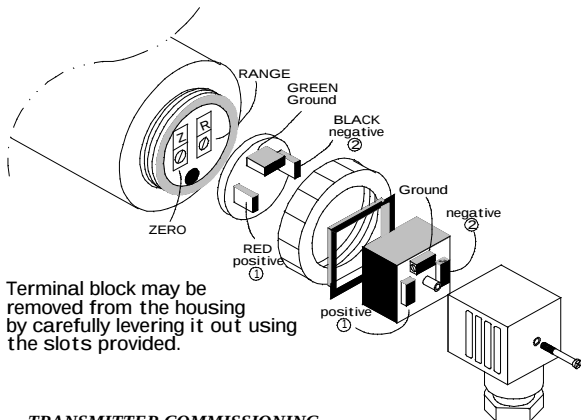
Electrical connections

Connections are made via an industry standard DIN plug. The cabling may be of screened, flexible or mineral insulated type dependant upon the application requirements, maximum conductor size 1.5mm.

Prior to any connection it should be ensured that the supply voltage is correct for the transmitter otherwise damage may result.

Where other devices are to be included in the signal loop for 2 wire 4 to 20mA output transmitters, the total loop impedance may not exceed the figure given by the following equation:-

$$\text{Maximum output load} = \frac{\text{Supply Voltage} - 9}{0.002}$$



5. TRANSMITTER COMMISSIONING

Under normal circumstances the instrument will have been supplied with range and zero controls preset according to the users specifications, so, no adjustment should be necessary. However, it may be when the transmitter is installed, trimming of zero and/or range settings are necessary. It may also be that the transmitter is to be reset for a different application.

Access to the zero and span adjustment potentiometers is provided by undoing the plastic locking ring at the rear of the body.

Where practical all adjustments should be made with the transmitter installed on the process and the range and zero settings validated by measurement of the output signal at 0 and 100% of the process pressure. Where it is not practical to vary the process pressure to suit, an alternative pressure source may be employed, this should be an high accuracy device such as an air driven dead weight tester, laboratory digital pressure standard, water or mercury column.

Range & Zero adjustments

The zero should be adjusted firstly, the instrument is of the 'live zero' type therefore for when no pressure is applied the output signal should be 4.00mA . Once this is achieved the range potentiometer should be adjusted with the required max. pressure applied to the instrument until the output signal is 20mA. It is recommended that the zero be rechecked after range adjustment

Routine Maintenance

The design of these transmitters is such that no routine maintenance is required except for periodic examination of gaskets and security of pressure and electrical connections

6. FAULT FINDING

These transmitters are sensitive and accurate measuring instruments and have no mechanical wearing or contacting parts. If installation procedures have been followed correctly the instrument should give satisfactory operation over a long period.

In cases of failure or poor operation following installation or in normal service the following check list may assist in isolating the cause of any problems.

- 1 Are the range details of the transmitter correct for the duty?
- 2 Fully check impulse piping and wiring installation, have any leaks developed or are there any poor electrical connections?
- 3 Is the transmitter isolation valve (if fitted) fully in the open position?
- 4 Is there pressure in the process and is it of the correct order?
- 5 Is the correct power supply applied to the transmitter and is it actually present at the transmitter terminals?
- 6 Check the output from the transmitter at the receiving instrument.
- 7 If all the foregoing are found to be in order then it will be necessary to isolate the instrument and remove it from process.

Check that no sludge or foreign matter has collected in the transmitter pressure chamber. Any deposits can normally be seen clearly at the entrance to the pressure housing. Do not use any tools or other pointed objects to clean inside the chamber, this should only be done flushing with suitable solvents

**Should the problems persist consult PSM Service department
on 01444 410040 or return to the factory for examination.**