Pressure Transmitter Operating & Installation Instructions

WARNING!

Please read this operating instruction carefully and throughly before operating to ensure correct and efficient usage of this instrument. Failure to read this instruction in its entirety could possible cause instrument failure and lead to possible damage or injury to the operator.

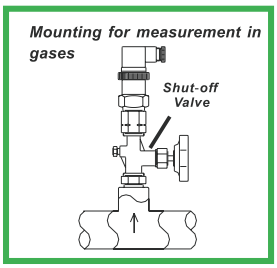
- *The instrument must be installed, removed, operated and maintained by an expert engineer or a trained technician.*
- *All installation shall comply with local installation requirements and local safety regulations.*
- *The actual pressure&temperature occurring must not exceed the values specified for Honeywell Pressure transducers and transmitters.*
- *Never install or remove pressure transducer&transmitter under system pressure or circuit is alive.*
- *For general usage and best results grounding of the shield/case is recommended, Ground the body of pressure transducer and transmitter before linking any electrical connection. When disconnecting, remove ground last.*
- *This pressure transmitter and transducer can not be used in an explosion hazardous area. For such applications, please refer to Winters explosion-proof products.*

Mechanical Installation

Mounting

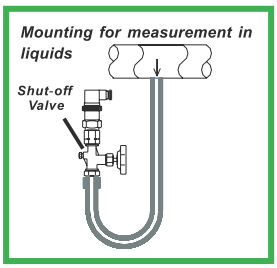
Although the pressure transducers and transmitters can be mounted in any orientation(vertical, horizontal, or inverted), the followings are good practice to mount the units where the performance would be better.

It's recommend to use needle valve to isolate the pressure transmitters and transducers from the pressure medium.

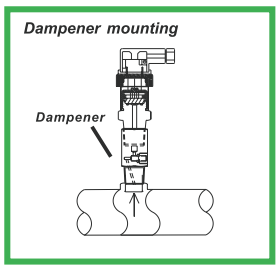


The pressure transducers/transmitters for measurement of static gases should be mounted vertically from the top to avoid liquid and condensate build-up on the diaphragm.

The pressure transducers/transmitters for measurement of static liquids should preferably mounted below or at the same level as the tapping point, except in liquids with large solid content.

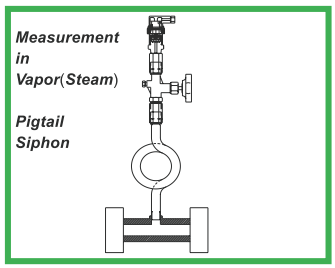


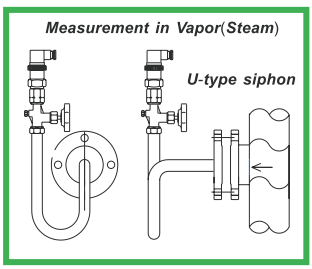
The pressure transducers and transmitters are recommended to mount where the vibration and mechanical shock are minimum in applications. If they must be exposed to vibration or pulsation application , then accessories such as snubber(dampener) and diaphragm seal may provide considerably better performance. Pulsation Dampener should be mounted below the transmitter at the tapping point.



Rapid pressure surge and fluid hammer could possible cause the pressure transducers and transmitters failure and must always be avoided. Pressure surge often occurs when the pipeline is empty and the pump is turn on at full power or the valve is open quickly. Fluid hammer often occurs as the control valve is closed quickly and the liquid flow is suddenly stopped. When installing pressure transducer and transmitter in dynamic processes, a dampener(snubber) should be installed to eliminate the damage from hammer and surge effects. Because of the very short response time of ceramic pressure transmitter also only a very short pressure surge(some micro seconds) will destroy the sensor without destroying the system. The cause of pressure surges is from the closing of valves.

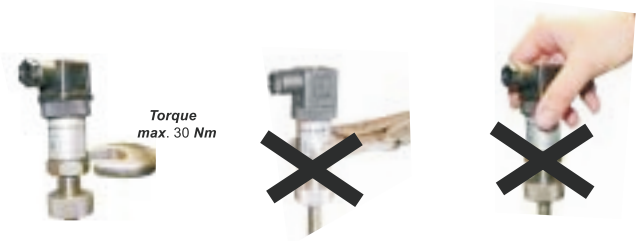
In order to reduce the effect of high temperature steam, a syphon is recommend to mount in front of the pressure transmitter to prevent live steam from directly entering a pressure sensing element. Before start-up, a siphon should be filled with water or any other suitable separating liquid between the transmitter and process line.



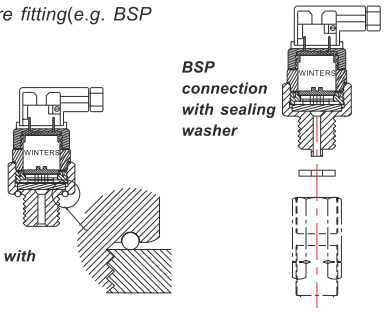


Pressure Fitting

When tighten the pressure transducers and transmitters, please use a spanner on the hexagon wrench flat located above the pressure fitting. Do not tighten by using a pipe wrench on the housing or passing the hand force on the pressure transducers and transmitter through the housing or terminal box.



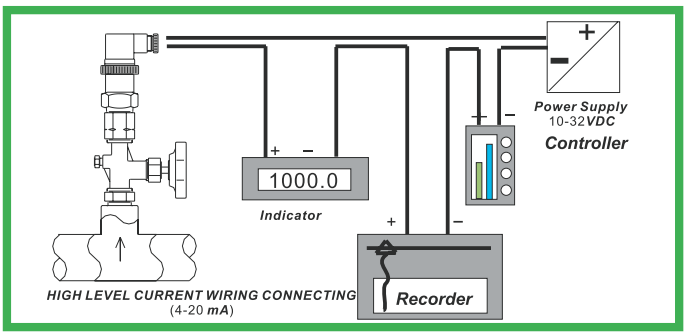
Before installing, selecting a correct sealing of pressure transducer and transmitter is very important. For unit with parallel thread pressure fitting(e.g. BSP threads) shall be applied a appropriate sealing ring or sealing washer. The sealing of tapered thread pressure fitting(e.g. NPT threads) is PTFE tape or an equivalent sealant.



Electrical Installation

Current Output Unit

The pressure transmitter 4-20mA output units are designed to have current flow in one direction only. The maximum supply voltage for 4-20mA current output transmitter is 32VDC. The minimum supply voltage is dependent upon the loop resistance of the circuit. The load limitation chart shows the minimum supply voltage required for given loop resistance. We suggest that the electrical shield should be connected to the system' loop circuit ground to improve electrical noise rejection.

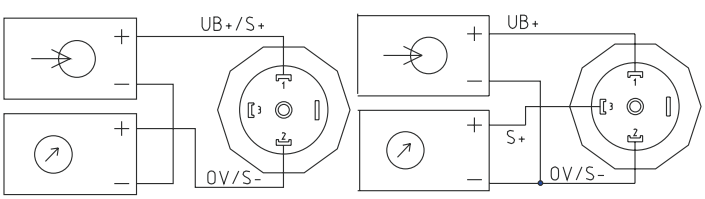


Noise

For minimum noise susceptibility, avoid installing the transducer and transmitter's cable in a conduit that may contains a high current AC power cables. If possible, avoid installing the cable near inductive equipments.

Wire Connecting

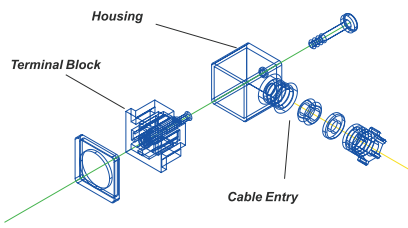
Connecting Diagram of DIN Connection



2 ***wire***, ***Current Output***, 4...20 ***mA***

3 ***wire***, ***Voltage Output***, 0...10, 0...5***VDC***

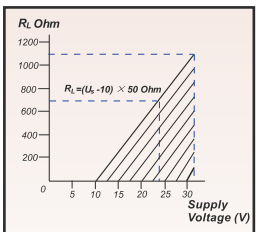
For electrical connector, please use the suitable size cable to avoid the humidity invaded. The overall diameter of the cable should be in 6-8mm. The cable entry should point downwards to avoid humidity ingress.



Connecting Diagram of Cable Connection

1. *Unscrew the housing.*
2. *Insert the cable through the cable entry of the housing.*
3. *Connect the cable cores to the terminal block in accordance with connecting diagram.*
4. *Screw down the housing*

Load Resistance



The diagram shows the optimum ratio between the load and supply voltage of the 4-20mA transmitter.

For a correct use, any combination of load resistance and supply voltage, choose the slant kine area.

Excitation(Power Supply)

The transmitter(current output) is a self-contained unit that is connected to a 10 to 32VDC power supply. For the transducer(voltage output), the proper power excitation is within the range 15 to 32VDC, and low power supply are available on request.

EC- conformity CE in request

The transmitter can meet the requirement of electromagnetic compatibility standard EN 50081and EN 50082 (European directive:89/33/EEC).

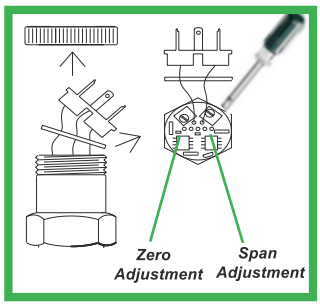
Calibration

Calibration

All Winters Pressure transmitters and transducers are carefully calibrated to the specific input pressure range vs. output voltage or current in the factory. The Winters PT series units are built-in potentiometer to make the zero and span adjustments.

Factory Setting

Voltage output transducers are factory set for 15-25 mV(typical 20mV). Current output transmitters are factory calibrated for 4mA at 0 pressure by using a 250 ohm load at 24VDC power supply.



For potentiometer
clockwise direction to increase
anti-clockwise direction to decrease

Zero and Span Adjustment

Zero point calibration is carried out using the potentiometer for zero-adjustemnt, the output signal(pressure=0, ambient pressure for gauge measurements or vacuum of absolute measurements) can be adjusted by +-10% F.S. However it has a limit of 15mV for Voltage Output.

Enter exactly the pressure required for the measuring span, Turn the span potentiometer until multi-meter reads the exact output signal. The span-adjustment is appropriate +-10% F.S.

Procedure of calibration

3.4.1 *Remove the DIN Connector by unscrew in the plug, pull off the connector to render potentiometers accessible.*

3.4.2 *Carefully remove the connector part from the housing, check that the wires are not damaged or disconnected.*

3.4.3 *Connect the transducer and transmitter to a appropriate standard measuring instrument and a power supply.*

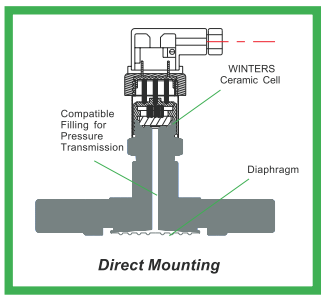
3.4.4 *When pressure=0, adjust the zero point output signal with zero-potentimometer.*

3.4.5 ***Apply desired span pressure and adjust output signal with span-potentimometer by using a pressure standard instrument.***

3.4.6 *Repeat the 5.4.4 to 5.4.5 for several times until the values are within the acceptable tolerance range.*

Diaphragm Seal System

A diaphragm seal system consists of a pressure transmitter/transducer, a diaphragm seal, a fill fluid and either a direct mount or capillary style connection. A diaphragm seal utilizes a elastic thin diaphragm as a protective device which is used to isolate pressure measuring element from the pressure medium. The volume between the diaphragm and the instrument's sensing element is completely filled with a compatible fluid. The diaphragm seal and pressure transmitter form a complex measuring system, Winters Remote capillary tube or direct mount diaphragm seal system can be available in several process connections such as thread, flange, cell, in-lin flow, sanitary and etc.



Direct Mounting

Why use a Diaphragm Seal

The followings are the reasons why diaphragm seals are intended for use:

1.1 *The measuring medium would corrode or attack the material of pressure sensor element.*

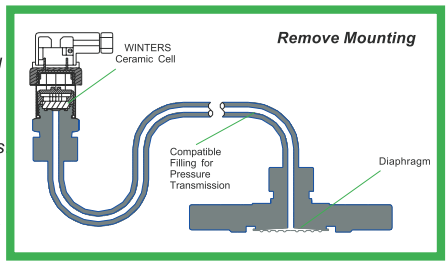
1.2 *The Process medium might freeze or solidify in the pressure connection and the sensing element due to changes in ambient temperatures.*

1.3 *The pressure medium contains suspended solid or is highly viscous to clog he pressure sensing element.*

1.4 *When changing process medium, the system requires flushing to prevent contamination.*

1.5 *The process medium or ambient at measuring point has very high temperature and the temperature and the temperature of the measuring instrument would rise to an undesirable degree.*

1.6 *Hygienic regulations must be considered for the measuring substance, Bacteria can be coursed in corners where cleaning is difficult and absolutely no dead space is allowed.*



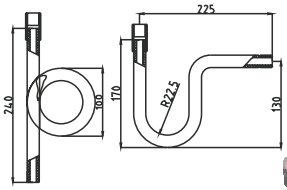
1.7 *The applications require the use of sanitary connections*

1.8 *Due to the space reason, the mounting and reading possibilities at measuring point are very difficult. The pressure transmitter is connected to a diaphragm seal via a capillary tube so the mounting in a appropriate location is possible.*

In order to reduce the temperature effect for the instrument, the cooling tower is recommended for the directly mounted instrument when temperature of the media > 120 C° and capillary remote mounted instrument when temperature of the media > 180 C°.

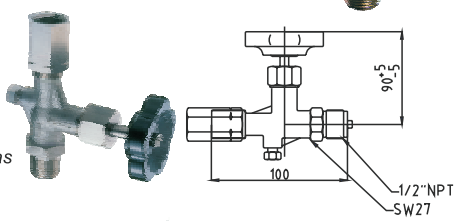
Siphon

In order to reduce the effect of high temperature steam and effect of rapid pressure surges, pressure transmitter syphons are supplied to prevent live steam from directly entering a pressure sensing element.



Shut-off Valve(Needle Valve)

The compact needle valve is designed to isolate the instruments from the pressure medium and is rugged in construction to withstand high temperature and pressure. The valve is rated for pressure as high as 400 bar.



Snubber(Dampener)

Pulsation dampeners are designed to reduce the effect of pressure fluctuation and sudden pressure changes in order to increase life of the instruments at rugged conditions such as pulsations and shock found in compressors, pumps, hydraulic machines, fluid power system and chemical installations etc.