INSTRUCTIONS

Series 1201, 1203, 1206, 1303, 1306

DIFFERENTIAL PRESSURE INSTRUMENTS

Piston Sensor

Orange Research
140 Cascade Boulevard, Milford, Connecticut 06460
203 877-5657 800 989-5657 Fax: 203 783-9546
www.orangeresearch.com

Your new Orange Research Differential Pressure Instrument is a rugged instrument featuring simplicity of design to provide dependable and efficient service. Because it is an instrument it should be handled with care. Read all instructions carefully before attempting to install the instrument.

***CAUTION**: Do not exceed maximum operating pressure listed on instrument label. Use only fluids compatible with wetted parts, including seals.*

HOW IT WORKS

The instrument operates on the difference between two pressures (delta-P). The sensing element is a spring biased piston which moves linearly in proportion to the difference between two basic pressures. A magnet on the **HI** pressure side of the piston assembly moves with the piston and rotates a follower magnet located adjacent to the pressure cavity. The gauge pointer is located at the end of the rotary magnet shaft and rotates with the magnet to provide gauge readings proportional to differential pressure. This is accomplished by the coupling forces between two adjacent magnets through a solid wall.

SWITCH UNITS: On switch and indicating switch models, reed switches are located adjacent to the pressure chamber and are actuated when the piston magnet field interacts at a preset point with the reed switch. Reed switch set points are adjustable.

INSTALLATION

Check instrument and identify the **HI** and **LO** markings. **HI** identifies the high pressure port; **LO** the low pressure port. If instrument is installed backwards, it will neither operate nor be damaged.

***Mounting Options:**

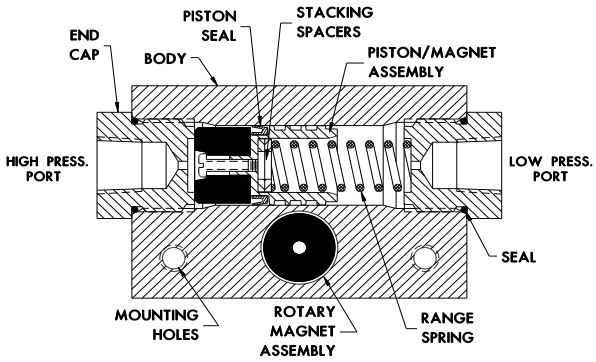
1. Piping support: sometimes the piping supports our instruments with no additional mounting required
2. Mounting holes: each unit has mounting holes to support our instrument
3. Flanged “F-style” mounting case: contains holes around the outside edge for panel mounting, order as an option
4. C-clamp: C-shaped clamp for mating “B-style” dial cases to panel, order as an option
5. Mounting kit: multiple configurations for mating instrument to flat surfaces or to pipes, order as an option

* See our website for complete details on mounting our instruments.

Installation Notes:

- These piston sensor instruments are designed for liquid service only…use in gas systems will result in erroneous readings due to excessive piston bypass
- Do not mount directly to steel surfaces…this could affect the magnetic sensors…mounting at least 1” from ferrous metals is recommended
- If there is particulate in the line, insert a screen (approx. 100 micron) to block the particulate from becoming lodged in the instrument
- Do not install on systems for highly viscous fluids or where the fluid may become hardened over time
- Do not install on systems with iron in the fluid…the iron can become attached to the magnetic sensors
- Install the unit above the process lines to prevent particulate from settling in the instrument
- Before installation, refer to our Specification Sheets (on our website) to identify instrument component materials & double check for chemical compatibility

IMPORTANT: Because of the magnetic movement, this instrument should never be mounted in direct contact with a steel surface; otherwise, a calibration shift will occur. Mount the instrument so that the pressure body is at least 1” away from metal surfaces with non-magnetic spacers or an aluminum mounting bracket. Flush panel mounted instruments will not be affected by contact with aluminum panels. However, 2½” gauges flush mounted in a steel panel may require resetting of the pointer at zero. This should be done at time of manufacture.



1201 Shown – images vary by model

MAINTENANCE

Other than replacing broken lens, there is only one area where this instrument may need attention. Erratic pointer or switch action may indicate that cleaning is required. For cleaning:

1. Remove the unit from service.
2. Remove both end caps with a 1” spanner wrench.
3. Remove the range spring and the piston/magnet assembly. BE CAREFUL NOT TO LOSE STACKING SPACERS.
4. Clean parts in a solvent solution after removing O-Ring seals from the end caps since some solvents will attack the seal material.
5. It is good practice to replace the O-Ring seals while the instrument is dismantled. DO NOT ATTEMPT TO MOVE THE TEFLON PISTON SEAL FROM THE PISTON. If piston seal is damaged order a new piston/magnet assembly.

To reassemble:

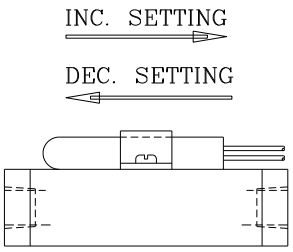
1. Lubricate the piston bore lightly with light oil or silicone grease.
2. Install the **HI** end cap first and tighten.
3. Install the piston/magnet assembly (magnet facing **HI** pressure port).
4. Insert stacking spacers in bottom of piston spring pocket and insert range spring.
5. Reassemble **LO** end cap making certain that spring is seated in the end cap spring pocket.
6. Tighten **LO** end cap and the instrument is now ready for service.

Switch Adjustment – No Enclosure

Reed switch set points are field adjustable. The reed switches can be adjusted over the top 80% of the range ascending, or bottom 80% descending.

To change the reed switch setting, a source of pressure will be needed with the instrument. Loosen the screw holding the reed switch. To increase the set point, slide the switch tube toward the **LO** port. To decrease the set point, slide the switch tube toward the **HI** port. Repeat as required until new setting is reached. Tighten the screw holding the switch tube in place and recheck the new actuation point. In some cases, it might be necessary to reverse the switch tube end for end to locate the new actuation point. This is normal procedure. **CAUTION:** Do not over tighten the switch holding screw.

Note: See switch adjustment video on Orange website.



SWITCH WIRE COLOR
-A SPST white and white
-B SPST green(N/C); blue(common)
-C SPDT green(N/C); red(N/O); blue(common)

Switch Adjustment – With Enclosure

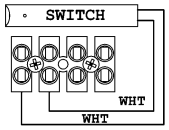
Reed switch set points are field adjustable. The reed switches can be adjusted over the top 80% of the range ascending, or bottom 80% descending.

To change the reed switch setting, a source of pressure will be needed with the instrument. Remove the switch enclosure and loosen the set screw on the switch bracket. To increase the set point, slide the switch tube toward the **LO** port. To decrease the set point, slide the switch tube toward the **HI** port. Repeat as required until new setting is reached. Recheck the new actuation point. Re-tighten set screw. **CAUTION:** Do not over tighten the set screw to avoid damaging the switch.

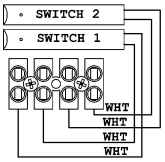
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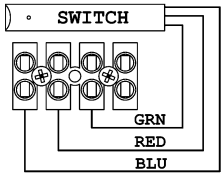
1 SWITCH
-A or –B



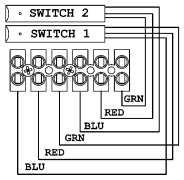
2 SWITCHES
-A or –B



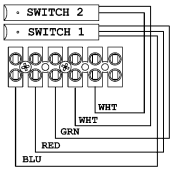
1 SWITCH
-C



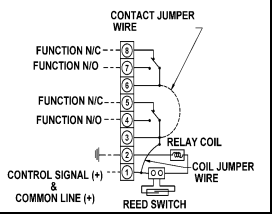
2 SWITCHES
-C & -C



1 -C SW. & 1
-A or –B SW.



RELAY DPDT -R2



IMPORTANT: Magnet end of piston/magnet assembly MUST be facing the **HI** pressure port of the instrument; otherwise, the instrument will not operate.

LENS REPLACEMENT:

1. Insert pressure body into vise, protecting the body from damage, with dial facing upwards.
2. Remove bezel or ring:
   - Bezel: twist off SS bezel with strap wrench or similar device
   - Snap-ring or threaded ring: use small screwdriver to loosen ring and remove by hand
3. Remove lens and gasket.
4. Remove gauge from vise and turn upside down to remove any debris that may be present.
5. Re-install in vise and reassemble with new lens, make sure gasket is located under the lens.

POINTER REPLACEMENT:

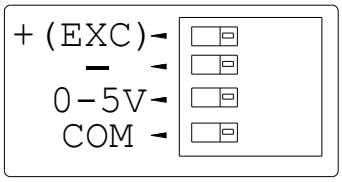
1. Remove lens and gasket, using above instructions – with pressure body in vise & gauge pointed upward.
2. Note exact position of pointer with small pencil mark.
3. Remove old pointer with pointer puller or screwdriver, take care not to bend the pointer or the pointer pin as they are sensitive components.
4. Install new pointer by hand, to line up with the pencil mark.
5. Rap the center of the pointer hub sharply, to set the pointer into the pin.
6. Erase small pencil mark & remove any debris.
7. Re-install lens, gasket and bezel.

Transmitters

HOW IT WORKS: Orange Research Differential Pressure Transmitters provide a proportional electronic output from a magnetically activated Hall Effect sensor. Pressure moves a magnetic piston inducing a polar bias in the sensor which causes a voltage change. Microprocessor amplifies, conditions and buffers the input analog signal.

Remove Transmitter cover and refer to wiring connections diagrams. These instruments are reverse polarity protected to protect the board.

ELECTRICAL CONNECTIONS:

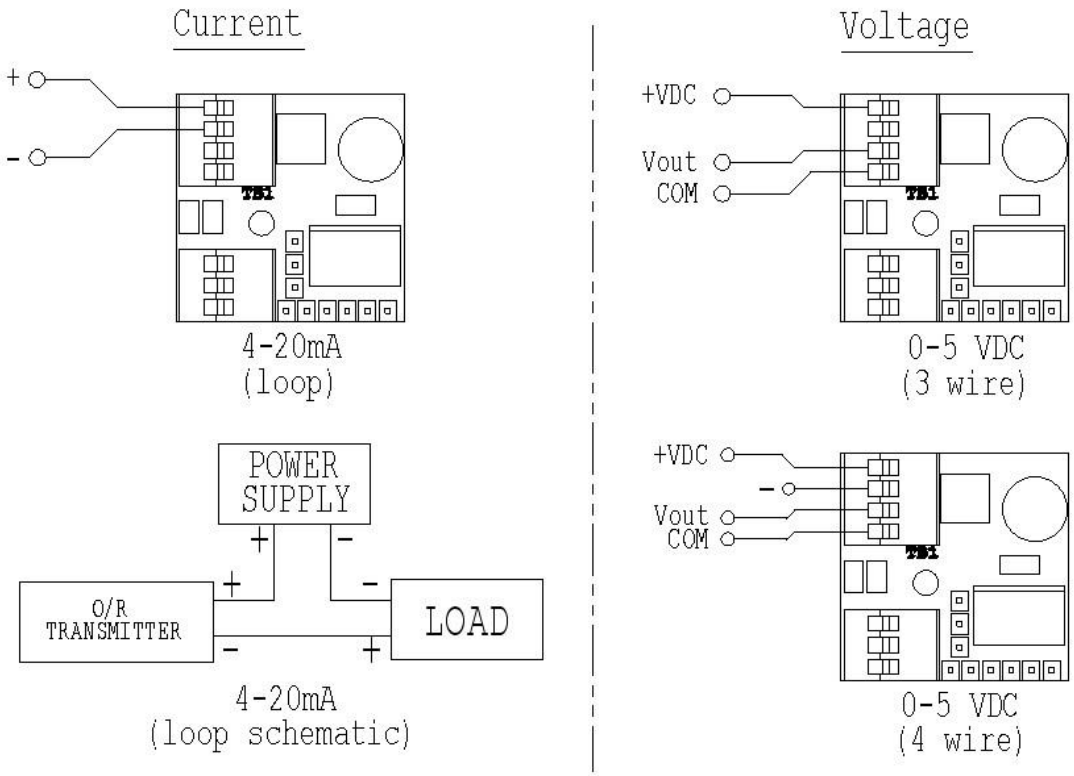


Supply Voltage: 9-35 VDC (reverse polarity protected)

Wire size: 20-26 AWG

Conduit connection: ½" trade size

Wiring Options:



WARNING: This product contains Nickel, a chemical known to the State of California to cause cancer. For more information go to: www.p65warnings.ca.gov