Series D50 Installation, Operations & Maintenance Manual

Safety

Before installing verify compatibility with the process media and temperature in contact with the wetted parts. Incompatible media and/or operation at temperature extremes can cause premature degradation of materials which could result in safety risk to personnel. Verify the selected pressure range (differential pressure and working pressure) are within specification for your application.

Warning! Residual media may result in risk to personnel, environment etc. Use sufficient precautionary measures when removing and transporting the product.

Intended Use

The differential pressure gauges are used for monitoring differential pressures in industrial applications. This manual contains installation, operation, maintenance, and calibration instructions for REOTEMP pressure gauges. American National Standard ANSI B40.1 Gauges, Pressure and Pressure Indicating Dial Type - Elastic Element, contains valuable information including installation, operation, calibration and safe utilization. It is recommended that anyone using, installing or calibrating pressure gauges be familiar with this industry standard.

Personnel

Personnel installing and commissioning this instrumentation into service shall be suitably trained and qualified in accordance with local codes, practices and regulations.

Product Description

The differential pressure gauge models D504 & D506 are used for direct indication of low differential pressures from 0-16 iwcd and above operating at static pressures of 600 psi or optionally 1500 psi. They may be used for measuring fluids or gaseous media, which are compatible with stainless steel 316 Ti, 316 L and Viton. The measuring chambers are flushable, therefore they are insensitive to the accumulation of solid particles. Quantity (2) 1/8" BSP female flush and ventilation connections are standard supply. If the unit is assembled to a diaphragm seal, these vents will become non-removeable rendering the chamber non-flushable.

The measuring system consists of two pressure chambers, each fitted with a measuring diaphragm that are connected via a connecting rod. The space between the two diaphragms is liquid filled to compensate for the static pressure. Under balanced pressure, both measuring diaphragms are in their position of equilibrium. Under differential pressure, a force is created on the diaphragms which causes a deflection in the direction of the lower pressure. The connecting rod transfers this deviation of the measuring diaphragms to the transfer-lever that is mounted on the measuring shaft. The measuring shaft causes a rotation proportional to the differential pressure, which is transmitted by the movement to an analogous pointer, which rotates between 0 and 270°.

Inspection

Before installation, check the nameplate on each instrument against the receiving paperwork. Verify product is suitable for the intended application by cross-referencing part number, materials of construction, working pressure, dial range, etc. If equipped with switches, check electrical rating, type of enclosure, etc. Inspect for shipping damage, and if
found, report it immediately.

NOTE - Before attempting repairs, contact your local Reotemp Representative or our factory. Failure to do so will void any warranty.

Installation

1. Connections

(2) NPT pressure connections are provided on the bottom of the gauge body as standard. Check the paperwork to ensure the proper connections were received. They are identified as "HIGH" and "LOW" for high pressure and low pressure. Be sure that the high gets connected to the high and the low to the low side of your system.

2. Instrument Location

On liquid service the instrument should be located below the process connections to facilitate self-bleeding. On gas service it should be located above the process connections to promote self-draining. If the process contains particulates, "pigtail" loops or drop legs (manometer "U-tube" configuration) in the tubing will minimize the possibility of the particulates migrating into the instrument.

NOTE: ON LIQUID APPLICATIONS, UNEQUAL LIQUID HEADS ON THE HIGH OR LOW SIDE WILL RESULT IN AN INACCURATE DIFFERENTIAL PRESSURE INDICATION.

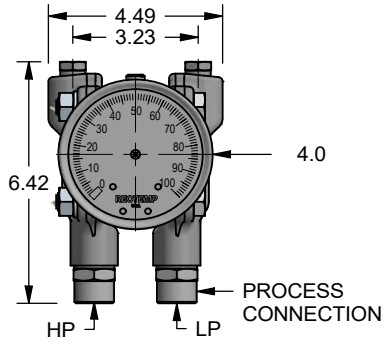
3. Instrument Installation

Recommendation

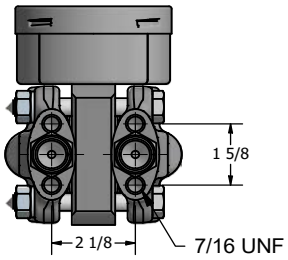
The Model D50 is calibrated and tested prior to shipment and is ready for immediate installation. Use of the following installation procedures should eliminate potential damage and provide optimum trouble-free operation. Rapid pressurization can cause severe damage to the sensing element in pressure instruments. Rapid pressure fluctuations (either increasing or decreasing) can

4 INCH GAUGE

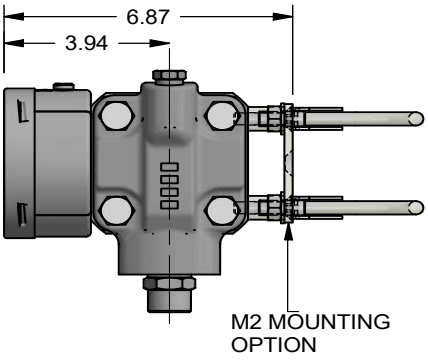
Front View



Bottom View

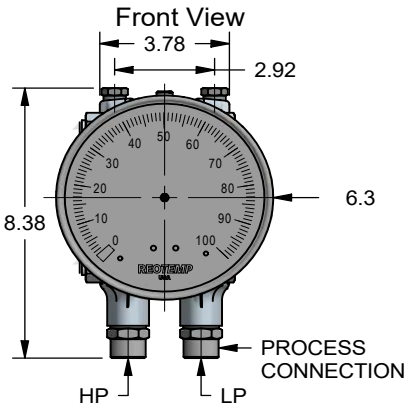


Side View

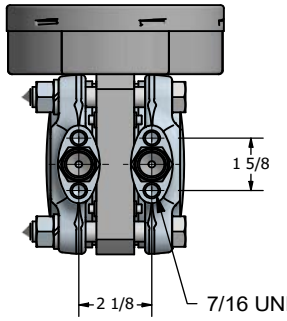


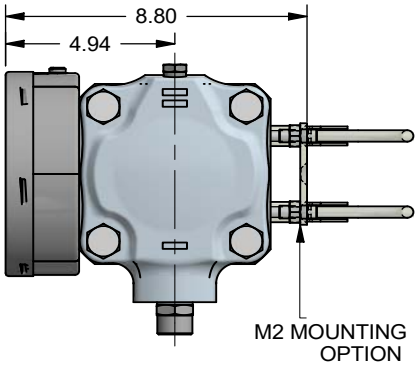
6 INCH GAUGE

Front View



Bottom View

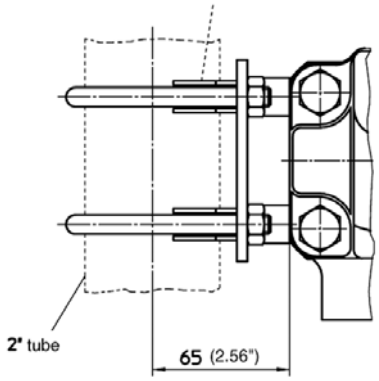




be described as a change in pressure occurring fast enough to drive an instrument full scale in less than one second.
Most quality instruments have over-range protection built-in, but they are mechanical in design and cannot be relied upon to react in time to protect the instrument against a rapid change in pressure.
The simplest way of mitigating this risk is by installing and properly utilizing a 3-valve manifold. Open the equalizer valve prior to opening one or both of the block valves to ensure pressure is applied simultaneously to both sides of the sensing element.

4. Pipe Mounting

If specified, your Model D50 will have a pipe mounting kit included with the unit. This provides for mounting on a 2” vertical or horizontal pipe. See below for details.



5. Wall Mounting

As a standard, the Model D50 will have a wall mounting kit installed. This provides for mounting on a panel or wall. See below for details.

6. Model D50 with Diaphragm Seals

Reotemp Diaphragm Seal Systems are highly accurate and sensitive pressure measuring instruments. Careful handling of these systems is always important, especially during transportation, storage, and installation.

Additional Product Description & Handling

The D50 with diaphragm seals is a sealed system with “hydraulic-like” fluid. Any tampering or adjustments of threaded parts may result in a loss of fill fluid or introduction of air, rendering the unit inoperable. If inspector’s lacquer is broken, please contact your Reotemp representative prior to use since this might damage the sensing diaphragm or void the calibration if the fill volume has been altered.

The seal system is designed to be a rugged but accurate instrument after it is properly installed. During installation, the most critical surfaces are exposed, meaning the utmost care should be taken throughout this handling process.
1. Clear the workspace, where the system is unpackaged, of loose items that could damage the seal.
2. Remove packaging with care – risk of damage is very high if not done carefully.
3. Avoid grabbing at welded joints to prevent unexpected stress on these connections.
4. Lift the complete system as a unit, using two (or four) hands.
5. If the system is connected by capillary tubing:
   a. Lift unit under seals and instrument – do not lift by pulling on capillary.
   b. When unwinding capillary coil, carefully unreel capillary, without kinking it.

Diaphragm Protection

Each diaphragm seal has been shipped with a protective cover to prevent damage to the diaphragm.
1. Do not remove the protective diaphragm cover until just before installation.
2. After removing the diaphragm cover, do not touch the diaphragm with hands or tools. It can be easily damaged with just the slightest contact.

Installation

1. Note the diaphragm seal High and Low side by tracing capillary to the gauge body noted “H” & “L”.
2. Carefully bend capillary to fit installation. Sharp bends can cause cracks or kinks in the capillary.
3. Do not twist the capillary at any time. To install a threaded seal, carefully turn the whole system. For differential threaded seals:
   a. Remove lower flanges.
   b. Screw in place.
   c. Replace lower flanges on seal system, carefully avoiding contact with the diaphragm.
4. Fix capillary in place after seal installation, to minimize movement or vibration.
5. Thoroughly clean pipelines of debris or loose metal particles before installing seals.
6. Use of standard gaskets is recommended, consistent with temperature and chemical compatibility requirements.
7. The gasket should not cover any part of the diaphragm.
8. All screwed joints are sealed to protect integrity of seal fluid. Do not open sealed joints, or the seal will not function properly.
9. Tighten flange bolts to recommended torque only - do not over-tighten.

Troubleshooting

1. Gauge does not indicate differential
   A. Check for proper hook up, high to “HIGH” and low to “LOW”
   B. Make certain block valves are open and, if using a 3-valve manifold, that the equalizer (balance) valve is closed.
   C. If A & B check out correctly, loosen or disconnect the high pressure line to determine if there is pressure to the instrument. Note: Utilize safe alternative methods to verify it is depressurized before disconnecting.
   D. If there is pressure to the instrument, check to

determine that there is differential across the unit being monitored. If so, contact the factory for assistance and/or an “RGA” (return goods authorization) number to return the instrument for repair or replacement

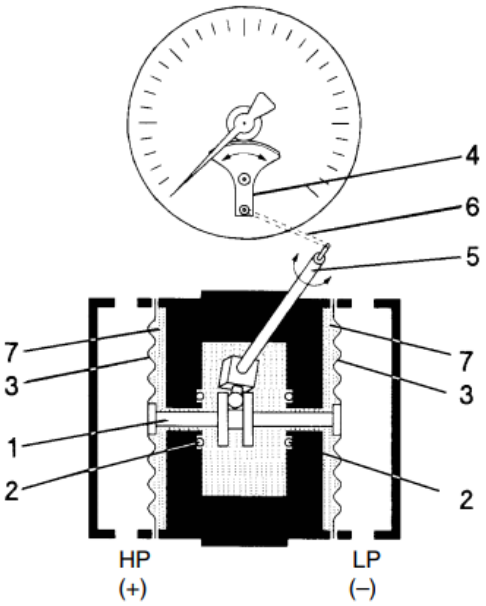
2. Indicating pointer off zero. (With block valves closed, or no system differential)
A. Tap gauge lightly.
B. Make certain block valves are closed and equalizer valve is open.
C. If A & B do not correct the “off zero” condition, use the external adjustment screw located on top of the instrument to perform fine adjustments:

D. If major pointer adjustments are required, use the pointer jack to remove pointer and reinstall in a position that results in the unit being within tolerance.

Recalibration and/or Repair

1. If recalibration or repair is required, secure an “RGA” (returned goods authorization) number from Reotemp Instruments and return instrument to the factory.

2. If (1) is not practical we recommend you discuss your problem with one of our customer service representatives and request a “technical service” manual. Please have both the model and PO numbers available before contacting.



Functional Diagram
1. Connecting rod
2. O-rings, overpressure protection
3. Measuring diaphragms
4. Movement
5. Measuring shaft
6. Transfer lever
7. Liquid for pressure transfer

HP = Higher Pressure
LP = Lower Pressure