PERMA-CAL® INDUSTRIES, INC.
DIRECT DRIVE PRESSURE GAUGES

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

Installation

Upon receipt of Perma-Cal® gauges, the gauge connection will have a cap over the threads. This cap acts to protect the threads and keep debris and/or contamination out of the gauge fitting and elastic element. Therefore, the protector should be left on until immediately prior to installation. This is especially true for gauges that are cleaned for oxygen use.

Perma-Cal® recommends installation with teflon thread sealant tape if it is compatible with the pressure fluid. Every gauge stem (fitting) has an integral wrench flat hex to help facilitate tightening the gauge onto the system connection. DO NOT USE THE GAUGE CASE AS A HAND HOLD TO TIGHTEN. This may cause serious damage to the gauge.

Perma-Cal® gauges are typically calibrated in a vertical plane and should be mounted vertically in the system to assure best accuracy. Gauges calibrated for mounting in other positions are available if specified when ordered.

The following serve as additional considerations based upon your system configuration:

1. If the gauge is installed in a non-vertical position or the dial is upside down, consult the factory.
2. For excessive system pulsations and vibrations, a filter snubber (standard equipment on most Perma-Cal gauges) and dampening of the elastic element should be considered.
3. With corrosive fluids, consider isolating the gauge from system chemicals or particulates by adding an isolator (Perma-Cal® accessory) or a diaphragm seal.
4. For oxygen service, special system cleaning to remove hydrocarbons (oil and grease) is recommended.
5. If used in ambient temperatures above 200°F (95°C) or lower than 30°F (0°C). Consult the factory for special considerations or configurations.
6. If used in systems containing fluid temperatures greater than 250°F consult the factory for special considerations or configurations.
7. Where pressure surges greater than 150% of span are possible, consider employing a pressure relief device set at a pressure approximately equivalent to 135% of full scale.
8. Perma-Cal® gauges are accurate throughout their entire range and may be subjected to the full scale pressure indefinitely without degradation. However, it is recommended that in most applications, the gauge be ‘sized’ so the anticipated monitored pressure equals approximately 75% to 80% of full scale keeping in mind that pressures in excess of the full scale cannot be accurately read.

Operation

Since operation consists of merely reading the pressure indication on the dial, gauge operation is simple.

The ideal position for accurate readings is at eye level and at a 90° angle to the dial face.

Gauges featuring a mirror band should be read by aligning the pointer with its reflection on the mirror band. This eliminates potential parallax error.

Maintenance

The only user adjustment on a Perma-Cal® gauge is the ability to zero the gauge. Normally no adjustment is necessary, but occasionally pointer shift from zero occurs during shipment.

There are two ways to zero the gauge:

1. External Zero Adjust: This option features a screw at the 6 o'clock position on the dial face. As the screw is turned the dial responds. This adjustment allows the user to zero the gauge with no disassembly requirement. This should be done with the gauge in the position for which it was calibrated (typically vertical).
2. Adjust the Pointer (perform at your own risk): If the gauge does not contain an external zero adjust, Perma-Cal® recommends returning the gauge to the factory for adjustment. However, if you must perform this task in the field. Use the following instructions:
    a. Remove the retaining ring and lens from the front of the gauge.
    b. Fix a ¼" nut driver to the center of the pointer.
    c. Gently press the pointer against the dial face near the hub while making slight adjustments to the nut in order to zero the gauge.

    If the pointer is damaged during this procedure, it will not be repaired under warranty.

If adjustment or repair is required, return the gauge along with a completed Return Material Authorization (RMA) form. The form can be downloaded at http://www.perma-cal.net/pdfs/rma.pdf.

NOTE: Do not remove the back cover from the gauge. There are no user adjustments located within. Any direct contact with the elastic element may damage it. Tampering with the mechanism inside the back cover will void the warranty.

Safety

"The history of safety with respect to the use of pressure gauges has been excellent. Injury to personnel and damage to property has been minimal. In most instances, the cause of failure has been misuse or misapplication." The preceding excerpt and other text from ASME's American National Standard on pressure gauges emphasizes the need to minimize hazards through careful selection, installation and use of pressure gauges.

In especially hazardous systems careful evaluation and/or consultation with the manufacturer is recommended. However, the ultimate responsibility for proper selection, installation and safety rests with the user.

The following systems are representative of some, but not all, potentially hazardous installations:

1. Compressed gas systems.
2. Oxygen systems.
3. Systems containing hydrogen or free hydrogen atoms.
4. Corrosive fluid[1] systems.
5. Pressure systems containing any explosive or flammable fluids[1].
6. Steam systems.
7. Non-steady (pulsating) pressure systems.
8. Systems with potential pressure in excess of 150%[2] of full scale (even momentarily).
9. Systems where an interchangeability of gauges could result in hazardous internal contamination.
10. Systems where lower pressure gauges could be installed in higher pressure areas.
11. Systems containing radioactive or toxic fluids[1].
12. Systems installed in a hazardous environment.

Note:

1. 'fluid(s)' means a liquid or gas.
2. Some pressure ranges have lower overpressure limits.

For a more complete discussion of safety and application considerations, consult ASME B40.100 as amended.