

INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS FOR GLASS-TRAC LEVEL GAUGES

I. RECEIPT AND STORAGE

Upon receipt of gauge, check all components carefully for damage incurred in shipping. If damage is evident or suspected, do not attempt installation. Notify carrier immediately and request damage inspection.

The equipment should be stored indoors until ready for installation.

The user should confirm:

1. That the gauge model and pressure temperature rating stamped on nameplate conforms to the description on the user's purchase order.
2. That the operating conditions described in the purchase order agree with the actual operating conditions at the installation site.

Level Gauges should be stored indoors, in a dry location, until ready to install.

II. INSTALLATION

Installation should only be undertaken by qualified experienced personnel who are familiar with this equipment and have read and understood all the instructions in this manual.

Quest-Tec recommends that all level gauge installations be provided with gauge valve sets designed for the specific service. Ball checks are not recommended in steam service, but are strongly recommended for service wherein the contents of the vessel are flammable. An additional set of straight-through blocking valves should be installed between the gauge valves and the vessel.

The gauge should be mounted and connected so that it does not support the piping weight. Piping not properly supported, independent of the gauge, may subject gages to stresses that can cause leaks or glass breakage.

High mechanical loads may be imposed on a gauge by the expansion or contraction of pipes due to temperature fluctuation. Such mechanical loads on the gauge can be minimized by the use of an expansion loop and/or a tie bar or bridle.

Gauges over 100 lbs. in weight should be supported with brackets to avoid imposing high mechanical loads on the connecting valves, and piping, and to prevent damage from vibration.

Bolt torque is vital to the proper operation of a level gauge because gaskets take compression set under initial bolt pressure at assembly. Tightening of nuts before installation, to proper values (Table 1) and in the sequence specified (Figure 1) is necessary to assure pressure retaining capability of a steam-water gauge to specific design ratings.

Note: The following procedure is to be done on only one side of the gauge.

Using a torque wrench, tighten nuts in five foot-pound increments, following the sequence in Figure 1.

Gage Model	Ft/lbs	Nm
RL, TL	20	27
RM, TM	32	43
RH, TH	40	54

Figure 1—Bolt Tightening Sequence



Note: This document should be reviewed in its entirety prior to installation of equipment.

III. OPERATION:

Assure that all installation procedures have been completed.

Check to determine that all connections are pressure tight.

Assure that nuts have been re-torqued to their proper values as specified in Table 1.

Inspect to be sure that glass is clean and free of any damage such as cracks, scratches, pits, and chips.

Gauges should be brought into service slowly. To avoid excessive thermal shock or mechanical stress on the glass or chambers, the connecting valves must open slightly, and the gage temperature and pressure allowed to slowly equalize with the vessel.

If the gauge is equipped with valves which have a ball check, the valves must be opened all the way after pressure and temperature have equalized to permit operation of the ball check in the event of gauge failure. Valves equipped with automatic ball checks may cause misreading of the gage where the liquid level fluctuates rapidly causing the ball checks to accidentally seat.

IV. MAINTENANCE

Maintenance should only be undertaken by qualified experienced personnel who are familiar with this equipment and have read and understood all the instructions in this manual.

During system shutdown, the gauge valves should be left open to permit the gage to lose pressure and cool with the rest of the system. Failure to leave the valves open during system shutdown will trap high pressure fluid in the gauge.

The user must determine upon evaluation of his or her own operating experience an appropriate maintenance schedule necessary for the specific application. Realistic maintenance schedules can only be determined with full knowledge of the services and application situation involved.

Maintenance Inspection

Glass

Regular and careful attention must be given to the cleaning and inspection of glass. Glass that is etched or even slightly scratched is weakened and may break under pressure.

Cleaning of Glass

Keep glass clean using a commercial glass cleaner. DO NOT use wire brushes, metal scraper, or any device which could scratch the glass.

Inspect the surface of the glass for any signs of clouding, etching, scratching or deep physical damage such as bruises, checks, or corrosion that extends through the outer surface of the glass into the interior. Shining a light at approximately a 45°

angle will aid in detecting some of these conditions, which will glisten more brightly than the surrounding glass when reflecting light. Detection of any such problem areas or any surface wear is sufficient evidence of damage. Immediately take the gauge out of service. Do not proceed with operation of gauge until glass has been replaced.

Shields

Mica Shields which show any signs of clouding, wear, or deterioration are an indication that the gauge glass has been exposed, or could soon become exposed to the contained fluid. Immediately take gauge out of service. Do not proceed with operation of gauge until shields and glass have been replaced.

Gaskets

A gauge which leaks at the gasket must be immediately taken out of service. Do not proceed with operation of gauge until glass, gaskets, and cushions have been replaced.

Connections

A gauge which leaks at the connections should be taken out of service, and its connections should be remade using a good grade of high temperature pipe sealant.

Removal

Do not attempt to remove the gauge from connecting piping, unless the gage has been relieved of all pressure, has been allowed to reach ambient temperature, and has been drained of all fluid.

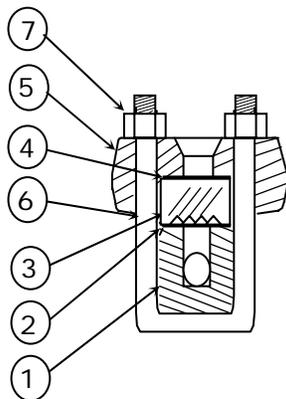
Disassembly

1. Lay gauge on bench.
2. Hold gauge firmly, and loosen nuts starting at both ends of each section and then proceeding from both ends to the center of each section (reverse order of Figure 1).
3. Remove nuts and any washers.
4. Tap covers with rubber hammer as needed to loosen, and remove.
5. Remove cushions, glass, shields (if used), and gaskets.
6. Tap chamber or remaining covers as necessary with rubber hammer to break loose, and remove remaining components.
7. All removed glass, cushions, gaskets, and shields must be disposed of, and under no circumstances should be re-used and installed on a gauge.
8. Clean the glass seating surfaces on the chamber and cover with a soft metal scraper (preferably brass). Make sure that all burrs, rust, and bits of old gasket are removed.
9. Extreme care must be taken to avoid gouging or scoring seating surfaces. Failure to properly clean

gasket surfaces may result in gasket leaks and high stress points which may cause glass breakage.

Reflex Reassembly

1. Clean threads U-bolts, and nuts to remove all paint, rust, and scale. Apply a light coat of oil to threads.
2. Place the U-Bolts, under the chamber with vision slot up.
3. Install one sealing gasket, one glass, and one cushion over the vision slot. Verify that the molded prism side of the glass is facing down towards the chamber vision slot.
4. Carefully work the gauge cover onto the U-bolts, being sure to keep the gasket/glass/cushion stack in position.
5. Install nuts. Using a torque wrench, tighten nuts in five foot-pound increments, following the sequence in Figure 1 until the torque value Table 1 for the specific gauge is reached.
6. Carefully inspect the vision slots on the reassembled gauge to verify that the gaskets have remained in position.

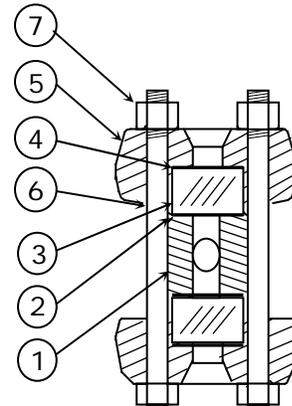


REFLEX CROSS SECTION

Item	Part
1	Chamber
2	Gasket
3	Glass
4	Cushion
5	Cover
6	Bolt
7	Nut

Transparent Reassembly

1. Clean threads on cap screws, and nuts to remove all paint, rust, and scale. Apply a light coat of oil to threads.
2. Insert cap screw through bottom cover and lay out covers on bench, side by side, with the chamber. Use chamber to space covers and line them up with vision slots.
3. Install one cushion, one glass, one shield (if used) and finally sealing gasket inside the cover. (Note: HQ Mica shields are often supplied in one or more pieces. The thicker of two pieces should be placed on the process side.)
4. Carefully work the gauge chamber onto the cap screws, being sure to keep the cushion/glass/shield/gasket stack in position.
5. Place gasket, shield, glass and cushion on to the remaining vision slot.
6. Install cover in place being careful to maintain components aligned inside.
7. Install nuts. Using a torque wrench, tighten nuts in five foot-pound increments, following the sequence in Figure 1 until the torque value shown in Table 1 for the specific gauge is reached.



TRANSPARENT CROSS SECTION

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