

READ THESE WARNINGS AND INSTRUCTIONS BEFORE INSTALLING OR REPLACING GAGE GLASS. ONLY PROPERLY TRAINED AND EXPERIENCED PERSONNEL SHOULD PERFORM INSTALLATION, OPERATION, AND MAINTENANCE ON TUBULAR GAGE VALVE ASSEMBLIES.

Warnings

- Improper installation or maintenance of tubular glass can cause immediate or delayed glass breakage resulting in bodily injury as well as property damage. To avoid breakage observe the following **Do's** and **Do Not's** and use and care Instructions.
- If a gage glass breaks, contained substances can be released and glass can be blown out of the unit with great force. **Always wear safety glasses** when looking toward a gage or working on a gage glass assembly during installation, operation and maintenance. Guard against the possibility of physical injury and property damage.
- Protect glass from impact, scratches, other surface damage and sudden temperature changes. These can weaken or stress the glass and lead to breakage.
- Always install a **gage glass protector** and make sure that **guard rods** are installed.

FAILURE TO OBSERVE THE FOLLOWING **Do's** AND **Do Not's** CAN RESULT IN GLASS BREAKAGE AND ITS EXPLOSIVE RELEASE OF PRESSURIZED SYSTEM CONTENTS AND FLYING GLASS PARTICLES.

Do Not's

- Do not** work on any gage until you have carefully read these warnings and instructions.
- Do not** exceed the glass or gage recommended working pressures or maximum recommended gage glass length.
- Do not** bump, impact, or scratch the glass.
- Do not** tighten the gland nut and packing beyond the manufacturer's recommendations.
- Do not** operate gages unless gage valve sets are equipped with drain vent and safety ball checks.*

***Note:** There are some situations where a system experiences surges that could be responsible for the ball checks seating, which can result in an incorrect level indication in the gage glass. It is up to the user to determine whether or not automatic ball checks are required for their specific service.

- Do not** attempt to clean glass while the unit is in operation.
- Do not** attempt to
 - inspect the glass.
 - adjust guard rods, packing nuts, or glands.
 - inspect or tighten other components.

without first shutting down the operating system so that the vessel and the level gage are relieved of all pressure or vacuum and are at ambient temperature.

- Do not** weld, impact, or sandblast in the gage glass area without first protecting the glass.
- Do not** have glass-to-metal contact.
- Do not** subject gage glass to bending or twisting stresses.

Do's

- Do** inspect the gage glass daily, keep maintenance records, and conduct routine replacements cycles.
- Do** install guard rods and gage glass protectors for safety.
- Do** protect the outside of the gage glass from sudden temperature changes, such as drafts, water spray, etc.
- Do** remove all deposits from
 - the seal areas.
 - the gland nuts.
 - glands (where used).

and use new packing before installing a tubular gage glass.

- Do** examine gage glass for damage and seals for hard deposits and tears.
- Do** verify that the tubular gage glass, gland, nuts, packing, etc. are the correct size and type for your service requirements before installing.

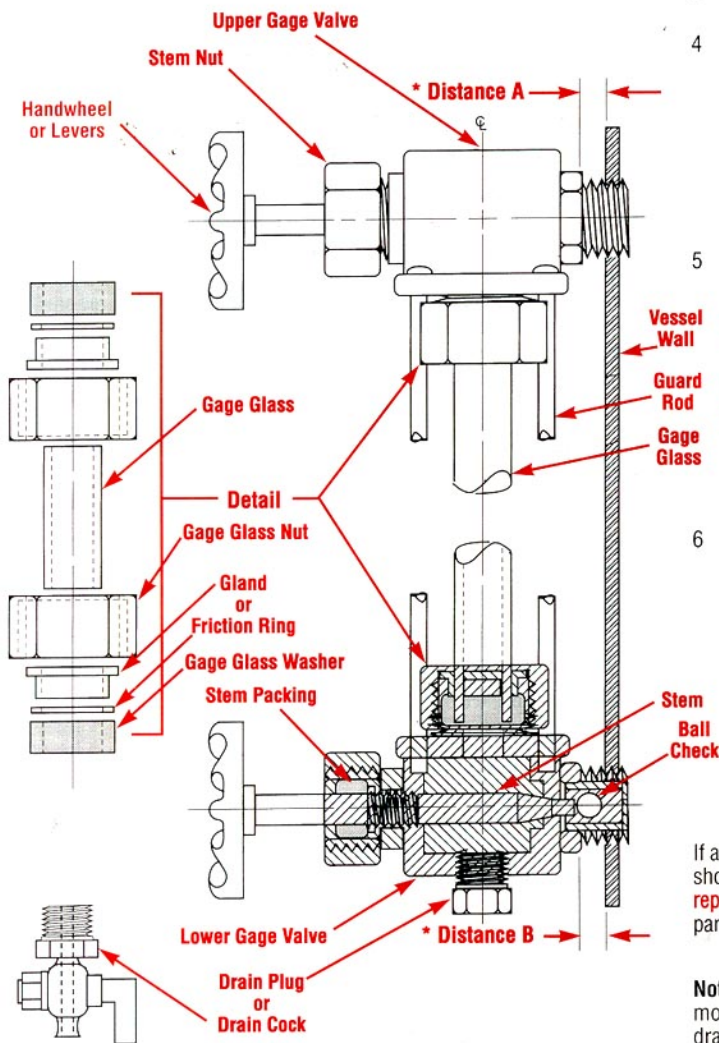


Fig. 2

* Note: **Distance A** must equal **Distance B**

- 1 During the operating system shut down, make sure that the **gage valve handles or levers are opened** so that trapped pressure or vacuum is lost.
- 2 When system operations are shut down, allow the gage valves and gage glass to cool down and drop in pressure with the rest operating system.
- 3 To drain liquid from the gage glass, open the drain valve or remove the drain plug.
- 4 The gage glass can be removed for replacement by:
 - a backing off the gage glass nuts, friction rings (or glands), and sealing washers.
 - b lifting the gage glass up from the lower valve then lowering it down from the upper valve.
- 5 **Once a gage glass has been removed** from its mounting, *regardless* of the reason for its removal, **discard the glass and washers and replace them with new ones. Used gage glass and washers may contain hidden damage.** **Always use new gage glass washers when replacing a tubular gage glass.** Used packing seals will not properly support the gage glass or provide the proper pressure seal without stressing the glass. Used packing seals **may contain hidden damage.**
- 6 Inspect the gage valves for the following:
 - evidence of leakage around valve stems.
 - evidence of leakage around vessel connections.
 - evidence of leakage around the gage glass nuts.
 - evidence of leakage at drain cock or drain plug.
 - signs of corrosion of any internal or external areas.

If any component parts of the liquid level gage valves show signs of wear or damage, **they must be replaced.** Contact Ernst® for the correct replacement parts for your model level gage.

Note: Detailed sectional drawings are available for most Ernst® liquid level gage valve sets. These drawings can help to identify necessary spare and replacement parts. Contact Ernst® for availability.

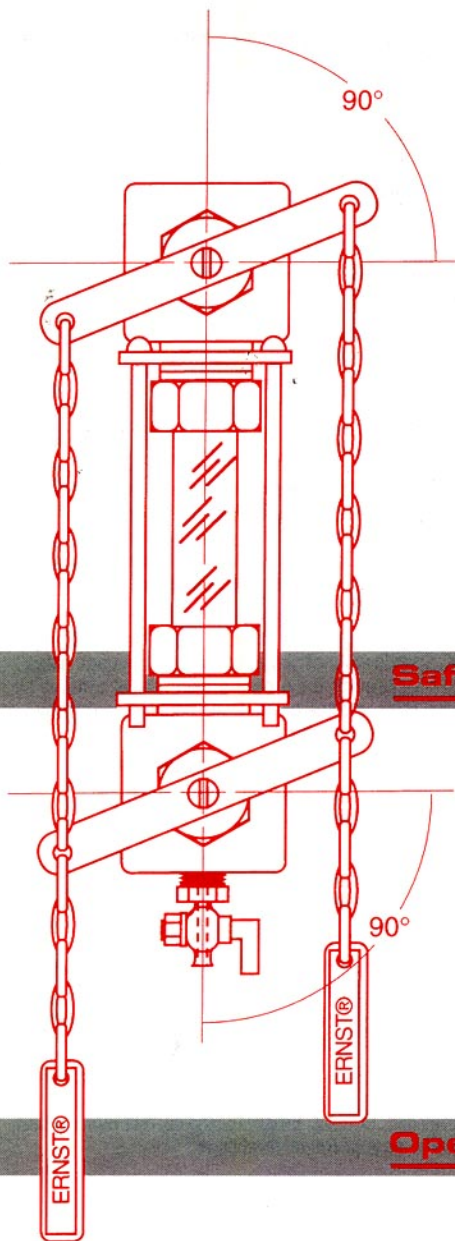


Fig. 1

Gage valve assembly with levers

Upper and lower valves are to be threaded into the vessel in a true vertical alignment.

- 6 Remove the gage glass nut, friction ring (or gland, depending on the model gage), and sealing washers from the valves. Place the nut, friction ring (or gland), and sealing washer in the same order on both ends of the gage glass. (Refer to Figure 2 for detail.)
- 7 Carefully insert the top end of the gage glass into the top valve. Then, carefully insert the bottom of the gage glass into the bottom valve until the glass touches the ledge inside the bottom valve.
- 8 Raise the glass approximately 1/16" from the lower valve's ledge. Provide positive clearance between the ends of the gage glass and the metal fittings to allow for expansion. **Note: glass-to-metal contact will keep the gage glass from expanding and cause breakage.**
- 9 Carefully slide the sealing washer for the lower valve down the glass until it comes in contact with the supporting ledge or shoulder in the lower valve.
- 10 Carefully slide the upper sealing washer into the top valve as far as possible while keeping it at all times in full contact with the gage glass.
- 11 Generally, you can use cylindrical or conical rubber or neoprene gage glass washers for LOW and MEDIUM pressures. HIGH pressures and HIGH temperatures require specialized packings. If special sealing washers are required, contact Ernst®.
- 12 Make sure that the valves are held rigidly to prevent misalignment when tightening the gage glass packing nuts. First hand tighten both upper and lower packing nuts. Then, with a wrench tighten 1/2 additional turn — enough to prevent leakage, but not so much that you hinder expansion and contraction. Check to make sure that both upper and lower valves are still in a true vertical alignment. (Refer to Figure 1.)
- 13 Place guard rods in position down through the upper valve guard rod holes with the capped tips of the guard rods at the top and run them down through the guard rod holes on the lower valve.

Safety Check Test

- 1 **Double check** all of the above installation instructions to make sure *all* steps have been followed.
- 2 We recommend that installation and system be **hydrostatic pressure tested** to check for any leakage before subjecting the gage assembly to the actual operation.
- 3 The gage hand wheels or levers **must be opened very slowly** so that the gage assembly and the tubular gage glass equalize with the test system.
- 4 If there is any evidence of leakage:
 - a relieve the vessel of pressure.
 - b tighten 1/8 turn or 1/4 turn.
 - c **hydrostatic pressure test again** to see that the leakage has been stopped.

If any leakage occurs, repeat above procedure, tightening only 1/8 to 1/4 at a time. **Do not over tighten.**

Operation

- 1 Bring the gage valve assemblies into service **slowly**.
- 2 **Mechanical and thermal stress must be avoided.** The gage handwheels or levers **must be opened very slowly** so that the gage assembly and the tubular gage glass equalize with the vessel.

Note: If the valves are equipped with ball checks, the valves must be opened **completely** (after first opening slowly to allow for equalizing) so that the ball checks are able to seat in the event of glass breakage.

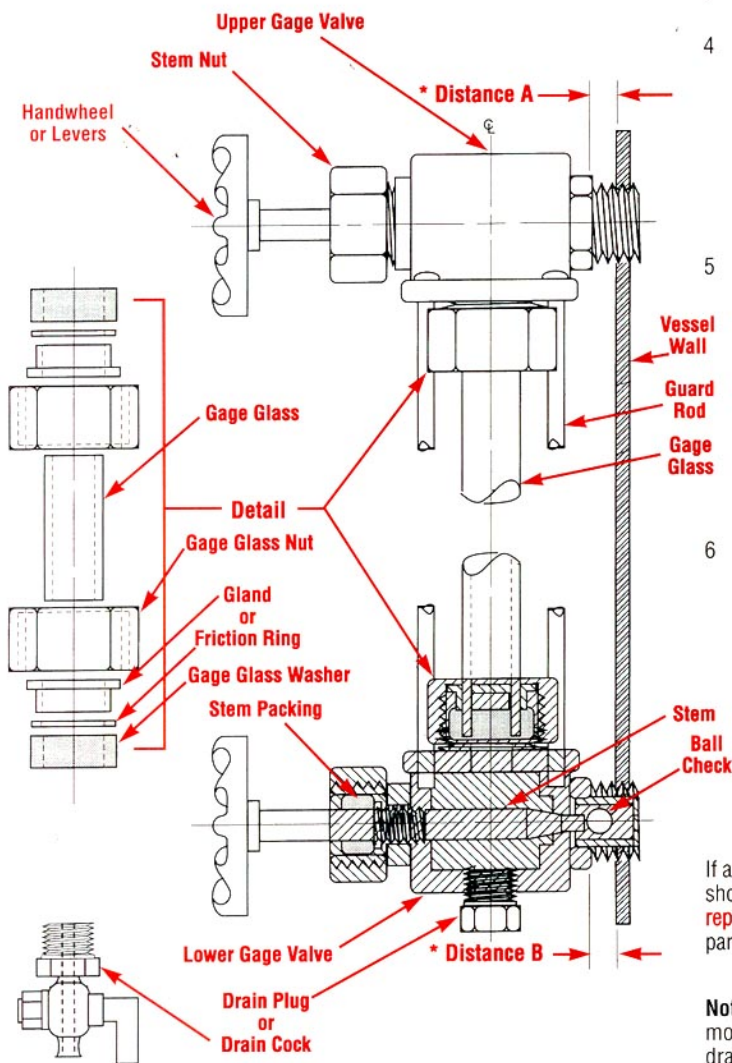


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