Installation, Operation, & Maintenance Instructions
R500.E264A
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Reliance®

Prismatic Water Gage Glass Maintenance Instructions

Reliance®
A PRODUCT OF CLARK-RELIANCE
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Caution: Before proceeding, follow any and all plant lock-out/tag-out procedures required. Any trips/alarms should be bypassed to prevent any false trips/alarms when servicing the equipment. Verify that all power is turned off to any applicable equipment. If under pressure, the equipment should be isolated, or the boiler should be shut down before proceeding with the installation. Open drain valve to eliminate any trapped pressure. All inspection and installation steps should be performed by a qualified technician and should be executed in accordance with all applicable national and local codes and plant procedures.

Only use a properly calibrated torque wrench to guarantee that the specified torque values are achieved. Make sure all bolting is clean and lubricated per the applicable Reliance IOM.

STORAGE and HANDLING

The Reliance® Prismatic Gage Glasses meet or exceeds all applicable specifications when shipped from the factory. The equipment should be stored in an area protected from the elements and corrosive fumes, in a secure manner where they can neither fall, nor be struck by other objects. Avoid placing any objects on the valves or Boil-out Kit (if furnished) at any time. The temperature of the storage area should not exceed 150 degrees F. (65.5 degrees C) or drop below 32 degrees F (0 degrees C).

Unpacking and inspection

Upon receipt of the Boiler Drum Level instruments, examine the contents of the container(s) for damage. Care should be exercised as the items are uncrated. The shipment may contain fragile glass components. Report any faulty conditions as soon as possible to your carrier to avoid acceptance of damaged goods. Clark-Reliance will not be responsible for goods damaged in shipping or storage, or subsequent loss or damage due to improper storage or exposure as a result of damage to shipping containers. Submit a digital photo of any damaged equipment and container to Clark-Reliance, if possible.

Verify that all materials are present as recorded on the Packing List provided with each shipment. Report any discrepancies to Clark-Reliance immediately. Have the Clark-Reliance order number and shipping waybill available at the time of your call.

Handling

Your Clark-Reliance shipment has been carefully packed. However, the shipment may include spare parts, temporary water gages for “Boil-out” purposes, maintenance instructions, and engineering drawings. Upon receipt of the order, the equipment and above items should be identified and verified against the packing list. Any documentation that has been provided should be directed to the appropriate personnel.

Recommended Maintenance and Annual Inspections

Regarding any recommended maintenance procedures or annual inspections, we suggest gage glasses should be inspected annually (at a minimum) for visual clarity, excessive corrosion, and leakage.

Boil-out Gage Practice and Policy

On new boiler installations, it is common procedure to initially operate the boiler at a reduced pressure for a short time to 'cook out' foreign materials (pipe joint compound, grease, oil, flux, etc.) that remain in the drum or other pressurized parts of the system after the boiler has been constructed. During this boil-out period, most of the suspended or dissolved debris is flushed out with blow-down discharges. However, a small amount of residue is unavoidably deposited as a film on all internal wetted surfaces… including those of the water gage glass. This type of scum layer is nearly impossible to remove by blowing down the gage glass.

As a practical matter, it is more expedient to employ an inexpensive temporary level gage, which can be discarded or returned after the boil-out procedure, rather than to use then rebuild the gage glass intended for regular service. For boil-out purposes on new water columns, Clark-Reliance provides a temporary level gage at no charge, or at a refundable charge, under one of the following conditions:

1) When a Prismatic gage glass having ¾" O.D. end nipples is supplied as part of a water column, and the boil-out pressure will not exceed 200 PSIG, Clark-Reliance automatically will furnish for temporary boil-out service the following parts at no charge for new boiler installations:

1 pc. – ¾" O.D. tubular glass gage cut to the proper length

2 pcs. – Rubber packing rings (*)

1 pc. – Low visibility shield (so that low vision in the tubular glass gage is the same as in the gage glass that will be used for regular service).

At the conclusion of the boil-out procedure, all the above parts should be discarded. When the gage having stainless steel nipples is installed, it is essential that the appropriate (non-rubber) packing rings are used, to assure durable sealing of the stainless steel nipples.

2) When a gage glass having flanged connections is supplied as part of a water column, and the boil-out pressure will not exceed 200 PSIG, Clark-Reliance will furnish the following parts at no charge:

1 set – VB991 gage valves with ½" MNPT connections

1 pc. – 5/8" O.D. tubular glass gage cut to the proper length

1 pc. – Low visibility shield.

The boil-out gage valves should be temporarily installed in the ½" FNPT "Test" connections in the flanges of the regular water gage shut-off valves, which are on the water column. This equipment may be discarded after the boil-out has been completed.

3) On installations like the above, but where the boil-out pressure will exceed 200 PSIG, consult Clark-Reliance to discuss options for an appropriate temporary use gage and valves. The cost of this assembly will be listed separately on our order invoice. However, full credit will be issued upon its return to Clark-Reliance.

* Bronze valves are supplied with rubber packing rings. These are to be used for the boil-out procedure. Steel valves are supplied with packing cartridges and separate rubber packing rings (to be used for boil-out).

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Hot Torque Procedure

When a new piece of equipment, whether a Gage Glass or a Probe type device is installed, the hot torque procedure must be performed. This ensures that all bolting and components are properly seated for optimum performance. This procedure must also be performed after any maintenance is done to the equipment. Note that only the affected components, such as the installation of a new probe or glass kit, need to be hot torqued.

All work must be done by a qualified technician. All plant rules and procedures must be followed, including any lock out / tag out requirements. Verify that all alarms and trips have been by-passed on probe columns before any maintenance is performed, to prevent any false alarms or wiring hazards.

The hot torque procedure should be performed as follows:

1) Isolate the gage glass or probe device from any pressure.
2) Fully open the drain valve to evacuate any built-up pressures and to allow the contained steam and water to escape during equipment warm up.
3) Slowly open the *steam valve* to allow a gentle rush of steam to flow through the equipment. Inspect the equipment to make sure there are no obvious leaks. This should take approximately 5 – 10 minutes. The observer should see the High Temperature lubricant “sizzling” and smoke emanating from the gage of column. This is an indication that the equipment has reached operating temperatures.
4) When the equipment has been properly heated, close the steam valve. The drain valve should remain open to allow any residual steam or pressure to escape.
5) Immediately re-torque the equipment to the correct values stated in the applicable instruction manual. There should be movement of approximately 1/8 of a turn or more.
6) If there is no movement of the bolting or probes, the equipment was not heated properly. Repeat the procedure.
7) Once the hot torque procedure is completed, close the drain valve, and the equipment can be put back into service. Carefully check for any leaks in the equipment and verify proper operation of all illumination, relay controls and wiring, or other accessories.

Refer to IOM R500.E239-A for additional information.

See the Hot Torque Procedure video online at
https://www.youtube.com/watch?v=THwWN5w64lI
Or visit our website RelianceBoilerTrim.com

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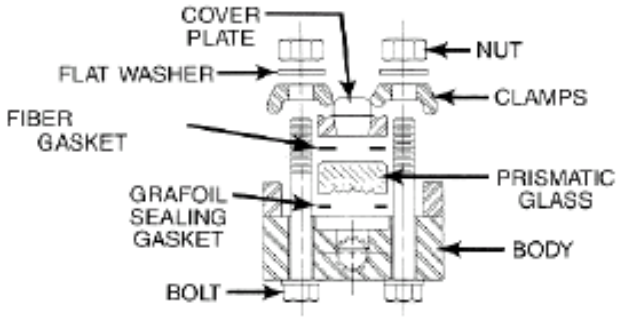


PRISMATIC TYPE
("C" or "S" Model)

Note: 1) Prism side of glass must face inside of gage, as shown

BEFORE YOU INSTALL THE GAGE GLASS:

- Confirm that the gage glass model number and the pressure rating, which can be found on the nameplate, meet the required specifications and design conditions for the application.
- Verify the overall length of the gage, including the end stem nipples. When using Reliance Bronze Valves, the overall length must be the center to center length less 2 ¾". When using Reliance Steel Valves, the overall length must be the center to center length less 3 ¼". Note: when using Tiltview Valves, refer to drawing B-7535 to verify the correct overall length.
- Support brackets should be considered for gages over four feet long and weighing in excess of 100 pounds. The support brackets will help prevent overloading of the connecting valves and piping. The brackets will also help prevent damage caused by excessive vibration.

Maintenance

Water Gage Removal Procedure

This procedure applies to all Clark-Reliance water level gages with nipple end connections. Nipple end connected water gages are designed in various models to service pressure up to 1500 PSIG (103.4 BarG) saturated steam applications. Water gages designed for use with bronze water gage valves have an overall length of 2 ¾" (70mm) less than the design of the water gage valve centers. Water gages designed for use with steel water gage valves have an overall length of 3 ¼" (82.5mm) less than the design of the water gage valve centers.

1) Isolate the water gage valves and open the drain valve.
2) Remove the packing yoke bolts on steel valves. On bronze valves loosen the nipple packing nut.
3) Grasp the water gage firmly and push up into the upper (steam) valve. This action will disengage the water gage from the lower (water) valve.
4) Carefully swing the water gage off to one side and drop it out from the steam valve.

Disassembly:

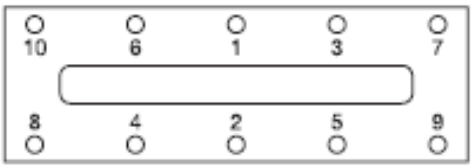
- After pressure is relieved from the gage glass, remove from the boiler drum and lay flat on a workbench
- Loosen end bolting first, working from the opposite ends toward the center of the gage.
- Remove all components including washers, finger clamps, cover plates, gaskets, and glass. Retain the bolting and cover plates. Discard all gaskets and glass. Note: ***Never*** re-use these components, even when they appear to be in perfect condition!

Notes:

- The Graphite sealing gasket has an integral stainless steel shim. When removing the gasket, make sure it is completely removed from the gasket surface of the body. If the stainless steel shim remains on the gasket surface, carefully use a utility knife to get underneath the gasket and peel away the stainless steel shim. Then remove any remaining gasket residue with a brass scraper, using care to not scratch or gouge the gasket surface of the gage body.
- If the cushion gasket does not come off when carefully using a utility knife, it may be necessary to sandblast the cover plate to remove the gasket.

Reassembly:

- Inspect all glass kit components. Verify that the repair kit is the correct one for the model gage that is being repaired. Carefully inspect the glass for any chips, cracks or scratches. Do not use the glass if it is damaged! Inspect the gaskets for any visible signs of damage, Do not use these components if damaged!
- Use a bronze or brass scraper to remove any bits of gasket material that may remain, without causing damage to the gage body or cover plate(s).
- Examine body gasket surfaces for steam cuts or scratches. Gouged or scratched gasket surfaces may be re-machined if necessary. See Clark-Reliance Form R500.E190A for machining details and tolerances.
- Locate the gaskets and glass centrally in the seat and cover to avoid any glass-metal contact at the ends or sides.
- Clean and lubricate all fasteners with Molycote or similar high temperature anti-seize lubricant.
- Tighten nuts ‘finger tight’ in the sequence shown in the sketch. Using a calibrated torque wrench, tighten all nuts in the proper sequence in 1/3rd increments.



- Using a calibrated torque wrench, torque the bolting using the following torque values:
  ‘C’ and ‘S’ model Prismatic Gages: 40 ft/lbs (54 Newton Meters)

- Reinstall the gage glass. Close the water gage valve drain and slowly open the water gage valves and inspect for any possible leaks. If the gage glass does leak, carefully observe if the leak is originating from the water gage valve nipple packing or the gage glass itself. Immediately close the valves and open the drain valve to relieve pressure. Tighten the nipple packing nut or packing yoke or retorque the gage glass with the above torque values. Close the drain valve and slowly open the water gage valves. If no further leaks are observed, the procedure is complete.
- If no further leaks are observed, proceed to the Hot Torque procedure found on page 3 of this manual.

Recommended Spare Parts

PRISMATIC GAGE GLASS			
Size/Type	**Part No.**	**Description**	**Quantity**
C4 or S4	**RK-35**	**Repair Kit (incl. Glass & Gaskets)**	**1 per section**
C5 or S5	**RK-35A**	**Repair Kit (incl. Glass & Gaskets)**	**1 per section**
C6 or S6	**RK-35B**	**Repair Kit (incl. Glass & Gaskets)**	**1 per section**
C7 or S7	**RK-35C**	**Repair Kit (incl. Glass & Gaskets)**	**1 per section**
C8 or S8	**RK-35D**	**Repair Kit (incl. Glass & Gaskets)**	**1 per section**
C9 or S9	**RK-35E**	**Repair Kit (incl. Glass & Gaskets)**	**1 per section**

REPLACEMENT PARTS WARNING

THE USE OF NON-ORIGINAL EQUIPMENT MANUFACTURER PARTS (SUCH AS GLASS, GASKETS, PROBES, MODULES, ETC.) WILL VOID THE AGENCY APPROVAL (FM, UL, CAS, CRN, ABS, ETC.) PRESSURE/TEMPERATURE RATING, AND WARRANTY OF THE EQUIPMENT. CLARK-RELIANCE REQUIRES THE USE OF OEM PARTS FOR ALL REPAIRS IN ON THIS PRODUCT IN ORDER TO MAINTAIN PLANT AND PERSONNEL SAFETY, AND RELIABLE OPERATION.

Consult the factory or your local Clark-Reliance Representative with any questions. Please have the model numbers and/or reference drawing numbers available when calling. You can also contact us at our website www.relianceboilertrim.com or RelianceAppEng@clark-reliance.com.

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