

# Clark•Reliance

## INSTRUCTION MANUAL

**Clark-Reliance  
Boiler Safety Devices in  
Stationary Service for  
Pressures up to 250 lbs.**



MODEL W0250-EA4:  
PROBE ALARM/CONTROLS  
TYPE WATER COLUMN ASSEMBLY  
WITH TUBULAR GLASS GAGE AND TRIM

### ***How to Install, Operate and Maintain...***

Clark-Reliance ALARM Water Columns.....	2
Water Gage Valves.....	6
PRIMATIC Water Gage Insert.....	7
Water Gage Illumination.....	7
Water Column Gage Cocks.....	8
Water Columns with Probes.....	8

---

MANUAL NO. 505C

---

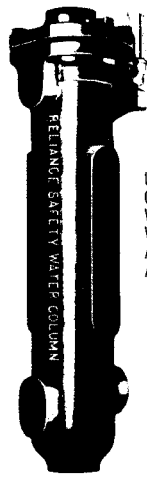
*For additional information  
contact your local Clark•Reliance  
representative*

# Clark•Reliance®



16633 FOLTZ INDUSTRIAL PARKWAY • STRONGSVILLE, OHIO 44136 • USA  
TELEPHONE: +1-440-572-1500 • FACSIMILE: +1-440-238-8828

Note: Clark Reliance shall not be liable for damages of any kind resulting in part from failure to install its products in accordance with all applicable codes and/or state and local regulations, improper application and/or maintenance



UNIVERSAL  
CAST IRON  
WATER COLUMN  
W0250-FA  
AS FLOAT  
ALARM TYPE



UNIVERSAL  
CAST IRON  
WATER COLUMN  
W0250-EA  
AS PROBE  
ALARM/CONTROLS  
TYPE

Fig. 1 — Five principal styles of Reliance Water columns for pressures to 250 lbs.

## Instructions for Installing Reliance Water Columns

**WE RECOMMEND** that you check carefully the A.S.M.E. and local Code requirements before installing your Water Column. Be sure all connections run straight. Provide for cleaning by installing crosses with plugs at all right-angle turns as pipe and fittings often stop up with scale and sediment. After steam is up, make sure column connections to boiler are free by observing action of water in gage glass, blowing down the column for double-check which also tests the low alarm signal. Check gage glass blow-off. Keep gage glass clean and properly lighted for good visibility. Operate gage cocks regularly to insure their being satisfactory for emergency service.

**HORIZONTAL RETURN TUBULAR BOILER:** Fig. 2 illustrates typical piping of water column to a horizontal return tubular boiler. The steam connection to the column should be taken from the top of the shell or the upper part of the

head; should drain into the water column and be free of water pockets. The water connection should be taken from a point not less than 6" below the centerline of the shell and should drain toward boiler.

**FIRE BOX BOILER:** As shown in Fig. 3, the fire box type of boiler should have the water connection to the water column enter at a point not less than 6" below the lowest water line or as near thereto as possible, and in no case less than 18" above the mud ring.

**WATER TUBE BOILER:** When water column is mounted at a distance from drum, as in Fig. 4, pipes should be supported by brackets permitting longitudinal freedom for expansion. Consideration should be given to vertical setting of column as gage glass will show less water height than is actually in the drum during normal steaming operation, due to difference in temperature. Water column may be connected direct to drum head.

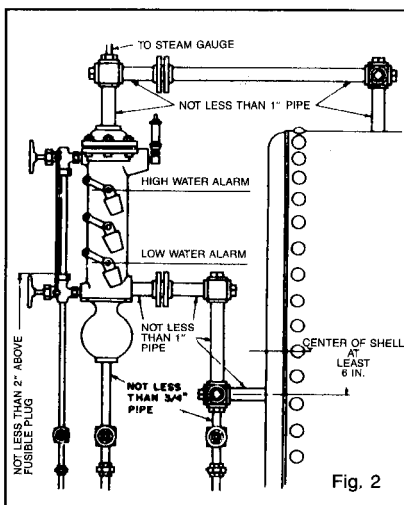


Fig. 2

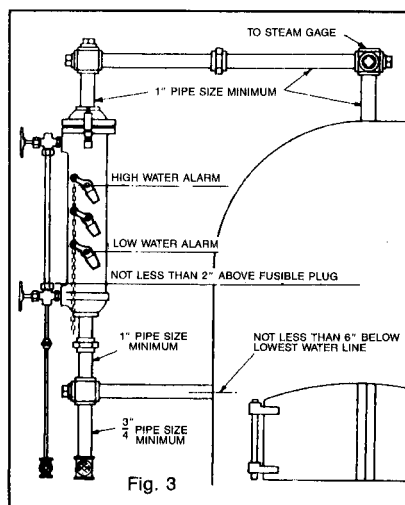


Fig. 3

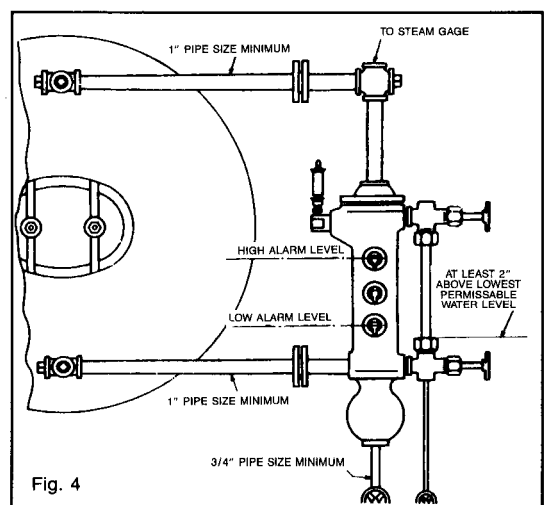


Fig. 4

# Reliance ALARM Water columns

## POINTS TO CHECK

The water column shall be fitted with a drain cock or drain valve with a suitable connection to the ashpit, or other safe point of waste, and if the water connection thereto has a rising vend or pocket, which cannot be drained by means of the water column drain an additional drain shall be placed on this connection in order that it may be blown off to clear any sediment from the pipe.

No outlet connections except for damper regulator, drains or steam gages, shall be placed on the pipes connecting the water column to the boiler.

When shut-offs are used on the water column connections, they shall be either outside screw and yoke type gate valves or stop cocks with levers permanently fastened thereto, and such valves or cocks shall be locked or sealed open.

The A.S.M.E. Code requires that the lowest visible part of the water glass shall be not less than two inches above the lowest permissible water level. The lowest permissible water level is the location of the fusible plug, which varies in different types of boilers and is given in the Appendix of the Code.

The Reliance Alarm Water Column is a safety device and not a feed water regulator. The alarm should never sound except in an emergency or when testing the column. Do not wait for the alarm to sound before regulating the feed valve; use the water glass for that purpose.

Besides the regular sizes and types of Reliance Safety Water Columns there are a number of special designs made to meet the requirements of the manufacturers of water tube boilers. Some of these are made with special connections to attach direct to the boiler without extra piping and in some the high alarm blows when the level is above the upper gage cock.

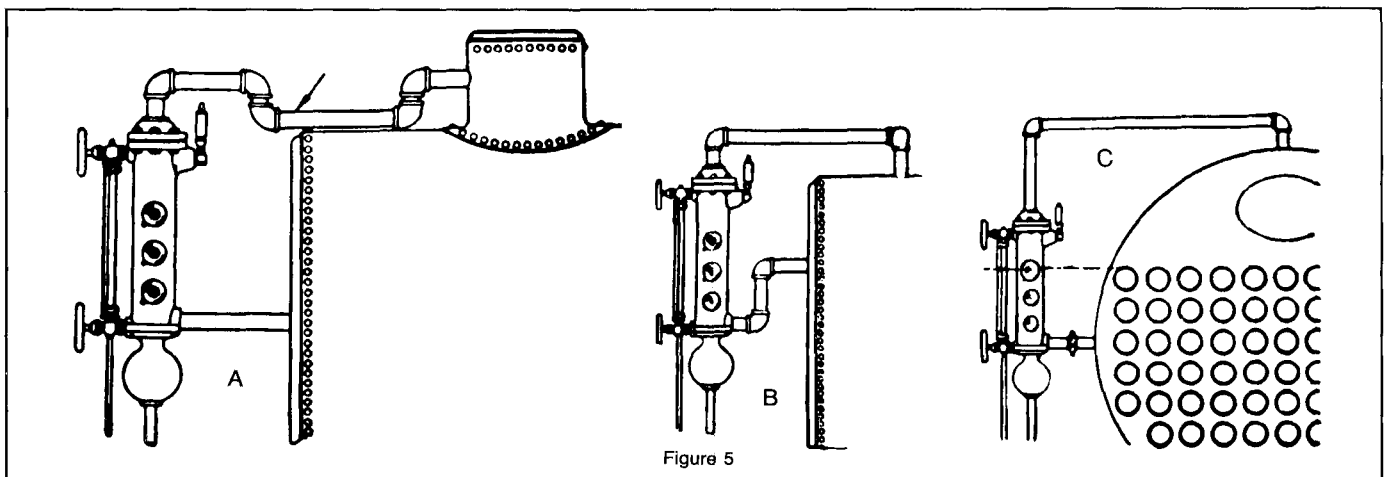
## How NOT to Attach the Column

It is extremely important that every part of the steam pipe connecting the column to the boiler should drain either into the column or into the boiler. It makes no difference as to the kind of a column; any "trap," "sag," "water pocket" or whatever you call it, will be fatal to the operation of the column. Condensation collects at the lowest point and cuts off the circulation of steam to the column, and the water glass and column indicate a higher water level than actually exists in the boiler.

The illustrations in Fig. 5 are from actual cases discovered on Reliance Columns because they whistled when the water level in the column rose to the upper gage cock. In such cases the rush of steam to the whistle drives the trapped water out of the pipe and the level in the column instantly falls to the true level in the boiler, the steam pipe being temporarily unobstructed. As soon as condensation collects, the false level in the column again appears.

Piping troubles are not, however, confined to "traps" in the steam connection. A new boiler was burned the first time fire was put under it. "B" shows the way the column was connected to the boiler. The column of course showed two gages of water, whether there was any water in the boiler or not, because it could not drain back into the boiler. The steam connection may drain either toward the boiler or the column, but the water connection must always drain to the boiler.

Here is still another. The pipes were run as straight as possible but their arrangement brought the column too low and the upper tubes were exposed even when the glass showed full of water. The level at which the column is set is of the utmost importance.



# How to Install Parts in Reliance Castiron Columns

## Warning

Do not attempt to unscrew the whistle valve — as turning it without first disconnecting the float rods will damage the working parts. Do not lift the column by inserting a rod in any of the openings as it may damage the levers, rods or floats.

### FIRST — To remove parts for replacement.

1. Unscrew whistle carefully, with open-end wrench.
2. Take off cap by removing 6 bolts.
3. Remove cotter pins from float rods — and release valve levers.
4. Unscrew valve with monkey or open-end wrench, holding levers with hand as shown in Figs. 7 and 8, so they will not catch on sides of column and bend.
5. Then lift out float rods and floats.



Figure 7



Figure 8

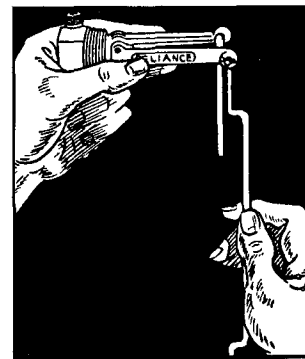


Figure 9

### SECOND — To reassemble column.

1. Screw float rods into floats firmly, taking care not to change the shape of the rods.
2. Check up on float rods by holding valve in one hand and hooking rods into levers, from inside out. See Fig. 9.
3. Remove rods from levers after above check-up, hold rods with floats together in position and lower into column.
4. Screw in whistle valve — make sure whistle connection points straight up. Hold levers inside column as in Figs. 7 and 8.
5. Hook float rods into levers from the inside out, so that the cotter pins will be on the outside of the levers. (See Fig. 11). Make sure low alarm rod in in low alarm lever (See Fig. 10) and insert new style cotter pins which require no spreading.
6. Replace cap on column — be sure to use new gasket. Tighten bolts firmly.

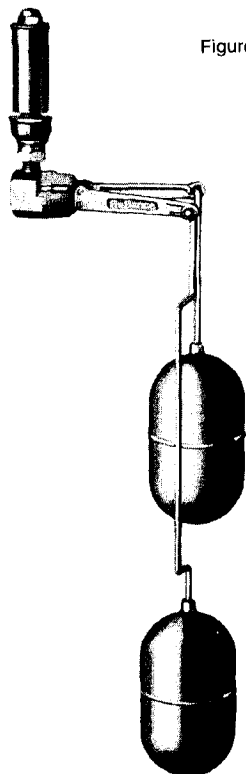


Figure 6

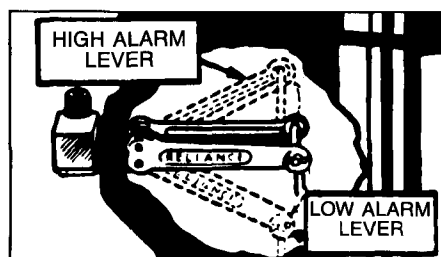


Figure 10

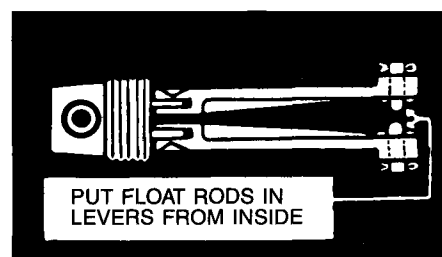


Figure 11

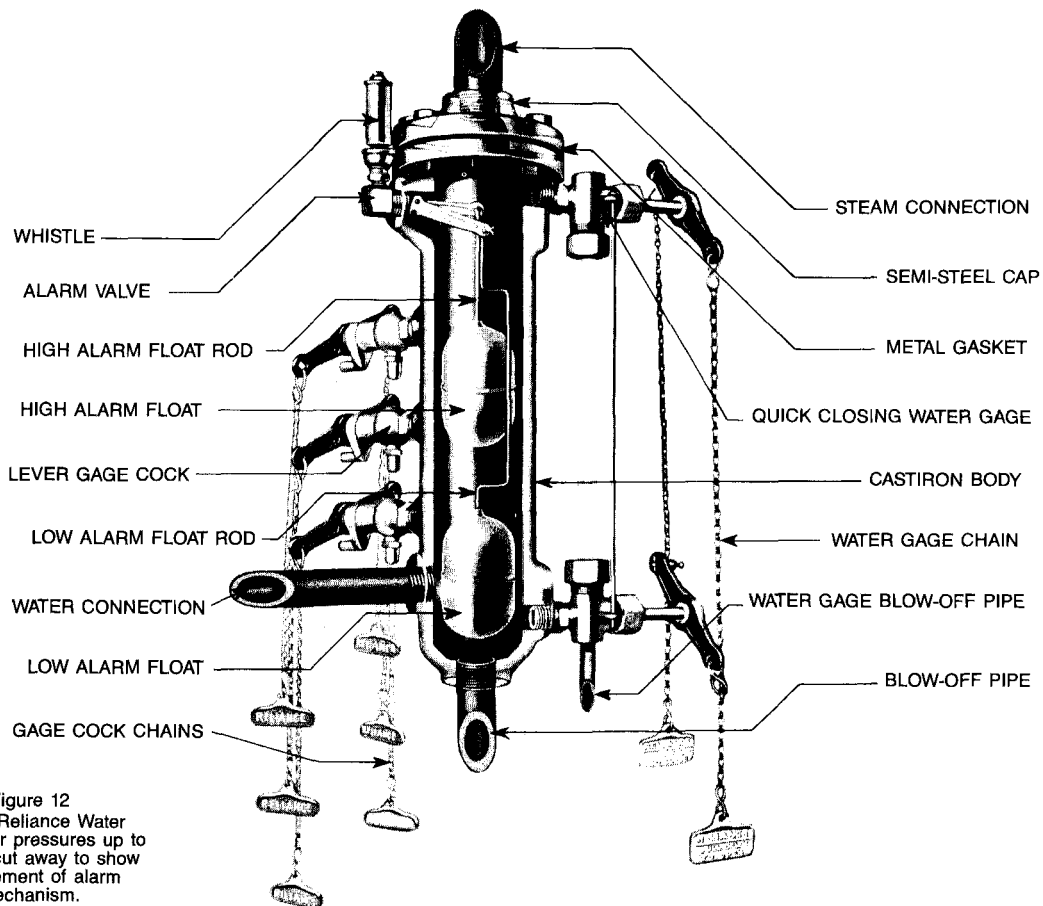
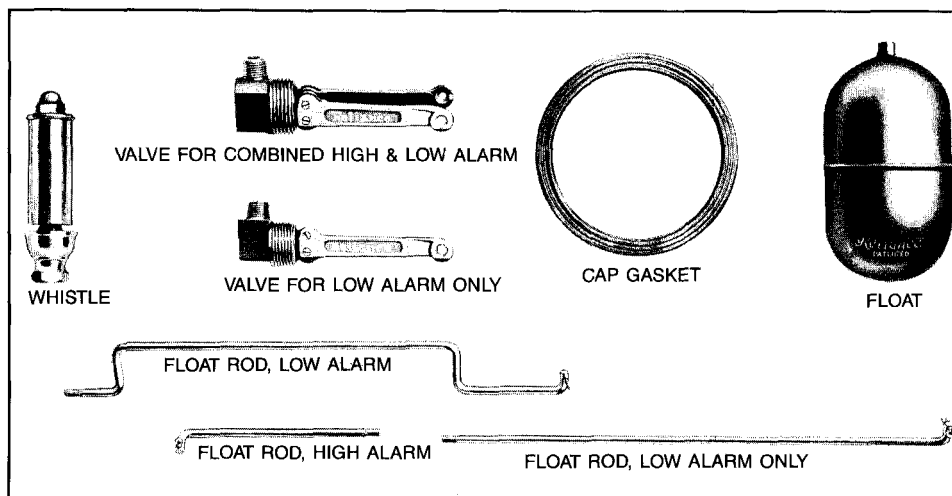


Figure 12  
Typical Reliance Water  
Column for pressures up to  
250 lbs. cut away to show  
arrangement of alarm  
mechanism.

## Reliance Replacement Parts



When ordering replacement parts always state the number of your column which is on the sediment chamber, cast on the side of the column, or always on the nameplate.

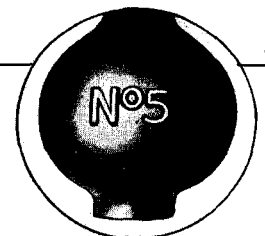


Figure 14

## Catalog Numbers of Columns

Jr	Jr3	0	00	1	1A	1-1/2	2	5	5	5BW
5EM	5FL	5R	6	6A	6EM	7	7B	7L	9	10
11	12	14	16	20	23	30	32	36	36A	36AC
40	40C	41	42	42A	42AC	42AFX	42B	42BC		
43	A	E	I	F	FH-12	FH-15	56	56L	58	58L
W0250-FA	W0250-EA									

# Reliance Bronze Gage Valves

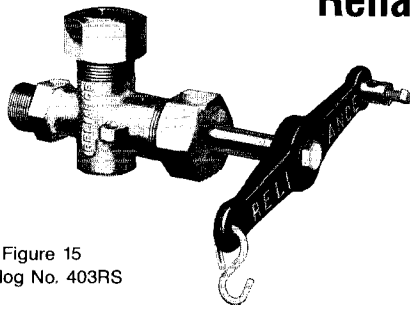


Figure 15  
Catalog No. 403RS

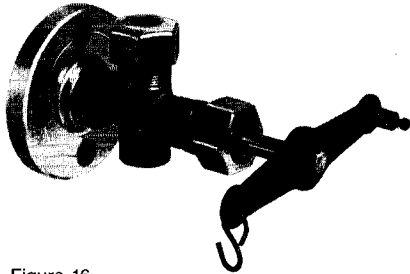
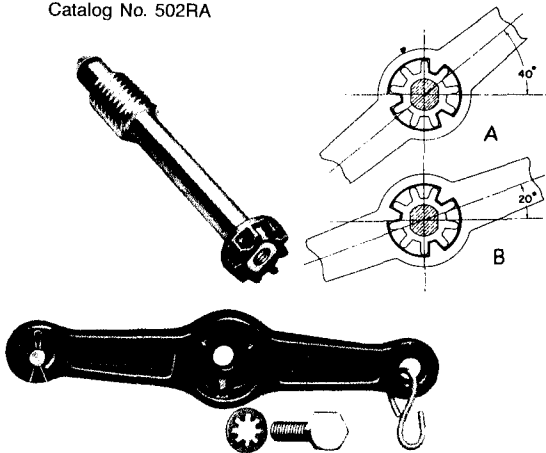


Figure 16  
Catalog No. 502RA



Lever position adjustable with 18 settings on positive-holding sprocket. Patented.  
Figure 16a

## How to Install Tubular Glass in Bronze Water Gage Valves

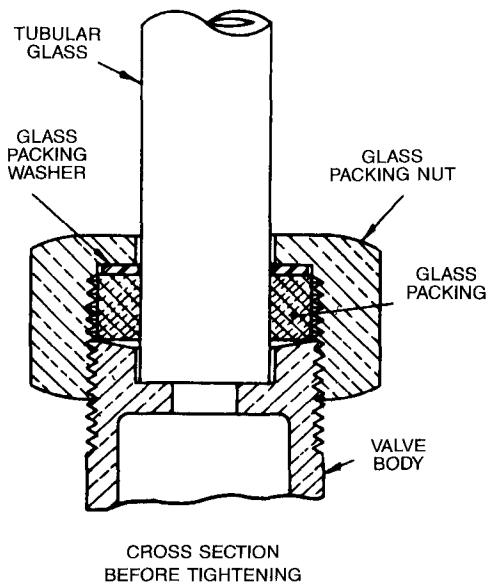


Figure 18

Design variations in bronze gage valves necessitate "typical" illustrations but basic elements are similar in function and appearance. Some valves used in vertical mounting are also used in Tiltview Water Gage, and operating precautions likewise apply.

Glass end stuffing box has included rubber packing 11/16" x 1-3/16" x 7/16" size 3/4" dia. tubular glass. If Prismatic or other gage is used a moulded composition ring 3/4" x 1-1/4" x 7/16" should be employed. *Do not* use "loose packing" because it can easily be forced below glass or nipple end and thus plug valve opening.

Be sure valves are mounted in exact alignment if tubular glass is used. Only a slight "off center" position will strain glass and cause early failure. Keep stem stuffing box tight by pulling up nut. Continued leakage may score stem, causing replacement.

To set operating levers in correct position, close valve stems tight. Loosen levers by removing cap screws. Pull levers forward and turn, with right hand end down, until they are positioned at 45° to horizontal center line of valve. Push lever back to engage sprocket teeth at nearest point to 45° setting. If levers do not line up, additional adjustment can be obtained by rotating sprocket wheel 180° on stem. Operating chain on right hand side of levers should be snug between levers, to close both valves tight when chain is pulled from below.

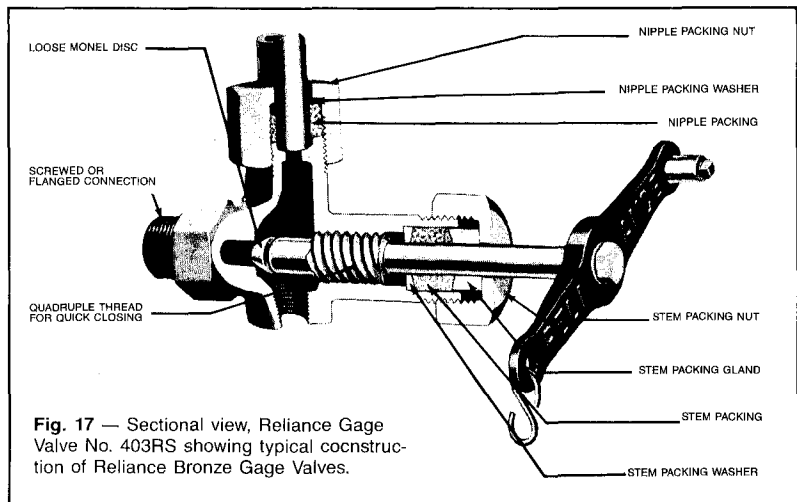


Fig. 17 — Sectional view, Reliance Gage Valve No. 403RS showing typical construction of Reliance Bronze Gage Valves.

Before installing a tubular glass make sure the water gage valves are lined up accurately with each other to accept the tubular glass. Then make sure that you have the proper diameter-size and length of glass. To install glass, follow this procedure:

1. Slip a glass packing nut onto each end of the tubular glass to be installed.
2. Slip a glass packing washer onto each end of the glass to be installed.
3. Slip a glass packing ring onto each end of the glass.
4. Insert one end of the tubular glass into the upper gage valve body far enough to allow the lower end to be dropped into the lower valve body.
5. Slide the packing rings, packing washers and packing nuts to each water gage valve and tighten.
6. Open blow down; to put the glass in service, slowly bring it up to operating temperature by cracking the water gage valves slightly. After the glass has had time to warm up, close blow down valve and open water gage valves completely.

# Reliance PRISMATIC Water Gages

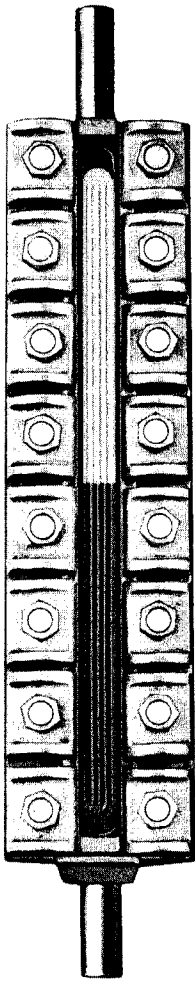


Figure 19

After this gage is placed in service and becomes thoroughly heated, expansion of the metal parts causes the bolting pressure to ease somewhat. Therefore, it is necessary to retorque (hot torque) nuts to 35-40 ft-lb" at operating temperature with isolation valves closed, and drain valve open. For cleaning and/or replacing the prismatic glass, remove gage from gage valves and follow this procedure:

1. The gasket seat surface should be thoroughly cleaned after old glass and gaskets have been removed. Surface should be smooth and free from scratches. Any irregularities in the surface can cause the glass to shatter as insert is being tightened.
2. The sealing gasket and the glass should be placed centrally on the gage body, then being careful that they remain correctly located, the cushion gasket and cover plate or adaptor are placed in position.
3. Next put the clamps, washers and nuts on the lubricated bolts. Use molycote or high-temp lubricant on threads prior to assembly. Take care to see that the nuts turn on the lubricated bolts freely. This enables the assembler to determine with less error when he has the studs drawn up evenly.

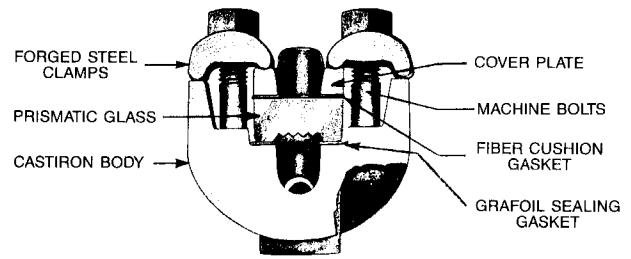
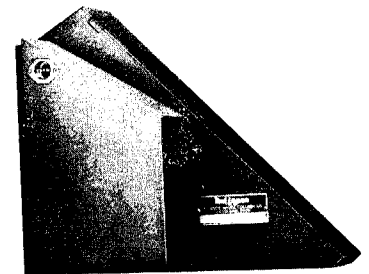


Figure 20

4. Finally, tighten the nuts as follows: Turn down all the nuts *finger tight* first; then starting from the center pair of nuts, tighten in alternate pairs toward either end. Each nut should be tightened only about 10 ft-lb at a time. Go over the nuts enough times to draw them all up to 35 to 40 foot pounds of torque.
5. Now mount the gage in the water gage valves in the usual way. Bring up to operating temperature slowly by opening blow down valve and cracking steam connection valve slightly, injecting a small amount of steam to heat the insert. When insert is thoroughly heated, close blow down valve and open steam and water valves.

## Illumination for PRISMATIC Water Gages

The contrasting black and white reading of water and steam is obtained simply by light rays thrown directly on the *face* of the glass. Those rays meeting prisms in the steam space are reflected back to the observer. Those rays meeting prisms filled with water cannot be reflected, thus this portion appears black. It should be obvious therefore that the illumination for this glass come directly from in front, and at right angle to the face of the glass. This is important — usually poor visibility is directly caused by poor lighting arrangement. See illustrations below for suggested location of illuminators.



Hinged top with mirror attached opens for cleaning of mirror.



Periscope type illumination for the Prismatic Gage, as illustrated above, is a further step in lighting for direct observation. The image of the gage is transmitted from a mirror in the hood to the observer's mirror at the operating floor level. A direct unobstructed vertical space is essential for installation. Clean mirrors and at least 100 watt lamps are needed for continued satisfactory vision.

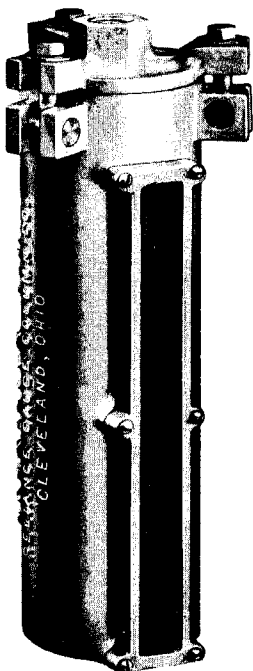


Figure 21  
GL 53 GAGE LITE

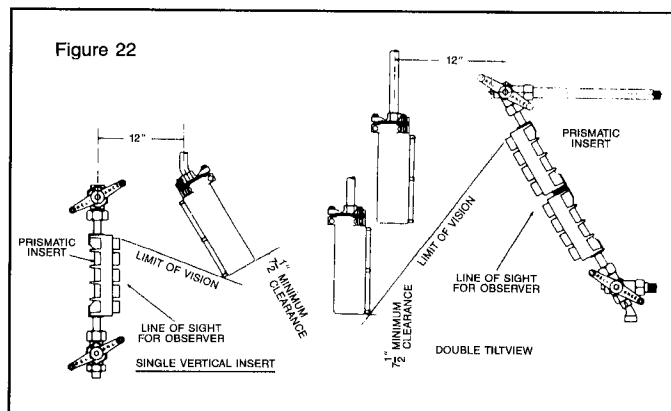


Figure 22

# Proper Care of Reliance Gage (Try) Cocks

Gage cocks are all tested for tightness before shipment and should not leak unless there is dirt on the seat. If gage cock leaks, give it a severe blow down to remove dirt from seat. Hang as little chain (certainly no other weights) on gage cock levers as possible. Avoid running chain around obstructions

to reach operating level. Give weight full power and it will close valve tight. Pull lever full open — permit a thorough blow for many seconds. Insure complete removal of sediment and you will not experience wire drawing that leads to aggravating leakage.

## Weighted Type — Nos. 310 and 311

Will provide dependable service at moderate pressures without leakage if reasonably handled. The seat has right-hand thread and can be removed through the shank with standard screwdriver. Weight and stem and joined by 12-place adjustment for most efficient position of weight.

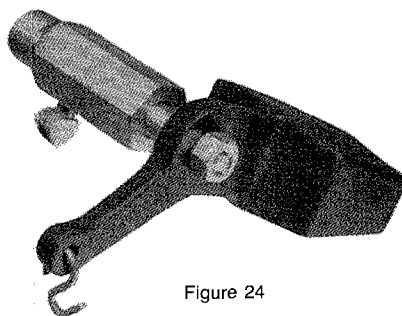
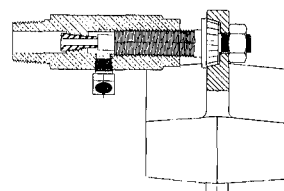


Figure 24



## Screw Type — Nos. GC450 and GC451

For replacing stem and seat proceed as follows: Remove locking nut and lever from end of stem. Remove stem by turning counter-clockwise. Remove seat by turning counter-clockwise with Reliance seating tool or large screw driver. The seat has a tapered thread, therefore no gaskets are required when installing new seat.

**For standard Clark Reliance Replacement Parts call your nearest Clark Reliance Representative or contact the factory.**

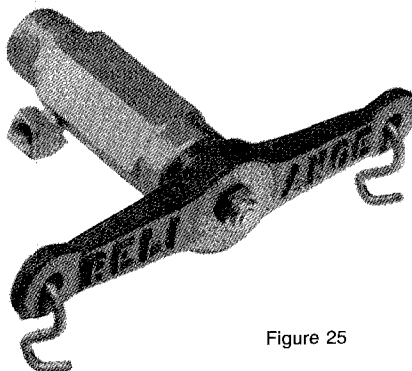
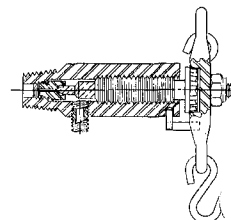


Figure 25



## Water Columns with Probes

Model W0250-EA type water columns contain "T" probes. Be certain that no pressure is in water column before servicing, and drain valve is open. For servicing, remove probe housing and probes. Probe housing is attached to top of water column with 2 screws. Probes can be removed with a 7/8" deep well socket.

Probes must be torqued to 40 Ft-Lb, when installed. Probe threads must be lubricated with molykote or high-temperature never-sieze lubricant.

Probes must be installed with copper sealing gasket (part number WCM-13).

Probe length is identified on hex nut of probe. Example:

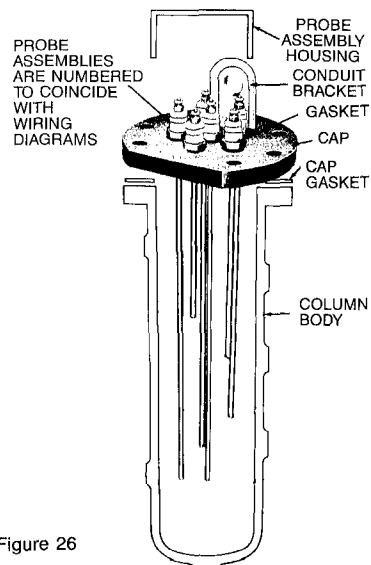
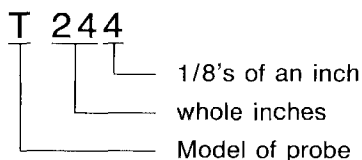


Figure 26

This represents a typical cast iron column.



# Clark•Reliance®

*World's Leader in Boiler Trim  
Instrumentation & Controls*

Section: R400  
Bulletin: E189-A-2  
Date: 4-06-05  
Supersedes: E189-A-1



MODEL T PROBE  
FOR PRESSURES  
TO 450 PSI  
(TEFLON® INSULATED)



MODEL V PROBE  
FOR PRESSURES  
TO 1000 PSI  
(TEFLON® INSULATED)



MODEL ZG PROBE  
FOR PRESSURES  
TO 1500 PSI  
(ZIRCONIUM OXIDE  
INSULATED)



MODEL FG PROBE  
FOR PRESSURES  
TO 3000 PSI  
(ZIRCONIUM OXIDE  
INSULATED)

Patented Probes:  
U.S. 4,507,521  
S.A. 83/864  
U.K. 2,127,976  
Canada 1,200,283  
Plus Others World-Wide

## A. Maintenance

Clark-Reliance probes require very little maintenance. We suggest weekly blow downs of the water columns to prevent the build-up of contamination on the probes. A bypass switch can be installed on fuel cutout circuits. This switch will prevent a false trip during blow-down. The blow-down procedure is conducted thoroughly by closing the water valve and opening the drain valve slightly for about 20 seconds. (Refer to Clark-Reliance Form E156-B, "Recommended Blow-Down Practices for Water Columns, Electrolevs, and Water Gages)

If blowing-down of the column does not clean the probes sufficiently, use a stainless steel wire brush or fine emery cloth to clean the stainless steel rod portion of the probe. To clean the insulator, use a soft cloth and a mild detergent.

If probes are removed at any time for replacement or inspection, the sealing gasket must be replaced. Probe replacement kits are furnished with two spare gaskets. The gasket part numbers are as follows:

<u>Probe Type</u>	<u>Gasket part Number</u>
T	WCM-13
V	X175500 (Formerly E10-10)
ZG or ZB	E10-10S
FG or FB	E10-10S

### Replacing the probes:

1. Before removing and replacing any probes, make sure that the column is isolated from any pressure and the drain valve is open.
2. After the column has cooled, remove probe to be inspected or replaced.
3. When replacing the probes, coat the threads lightly and uniformly with a high temperature anti-seize type lubricant such as 'Never-Seize', 'MolyCote G' or 'Fel-Pro C'
4. Torque the probes as follows:
  - Type T, V, ZG, or ZB to 40 Ft-Lb. (54 Newton-Meters)
  - Type FG or FB Probes to 90 Ft-Lb. (122 Newton-Meters)

Hot torquing is suggested for all probes. However, the column *must* be isolated from service with the drain valve open *before* re-torquing the probes. The hot torquing procedure will extend probe sealing gasket life and should be performed as follows:

1. Partially open *steam* valve to warm up the column with the drain valve slightly open.
2. Close steam (and water) valves to isolate the column.
3. Open the drain valve completely.
4. Re-torque as instructed above.
5. Return to service by closing the drain valve and opening the steam and water valves.

## **B. Interwiring**

The wires attached to the probes must be of high temperature type in order to withstand the heat. Clark-Reliance suggests the following types of wire:

Maximum Application Pressure (PSI)	Wire Specification
1000	18 Ga. Stranded conductors, Teflon insulation rated at 300 VAC and 200°C (Belden #83029, Alpha #5857, or equal)
1001 to 3000	18 Ga. Stranded conductors, Teflon treated glass braided insulation rated at 300 VAC and 400°C, Nickel coated copper conductor U.L. #5182 (Radix #MGT-4502 or equal)

The high temperature wires attached to the probes can be routed to a local junction box or directly to the control unit. If a junction box is used, a low cost 18 Ga. Multi-conductor cable may be used to carry the signal to the control unit. We suggest Belden #8467 or equal.

**Note:** When installing the high temperature wire to the probe, use an open end wrench to prevent the Probe assembly from turning while tightening the wire terminal nut. Use a ¼" wrench for both the compression nut and the terminal nuts on T and V type probes. ZG, ZB, FG, and FB type probes require a ½" wrench for the compression nut and a 3/8" wrench for the terminal nut.



## **C. Troubleshooting**

Troubleshooting is only necessary in the event that a control relay fails to energize or de-energize. In the event that the relay fails to *de-energize* during blow-down, the cause is a failed (short circuited) probe. The probe should be replaced.

In the event that a relay fails to *energize*, the following steps should be taken:

1. Verify probe wiring to the appropriate probes from each relay.
2. Verify water level in the column.
3. Exchange relays to verify function. If the problem moves with the relay, then replace the relay.

Any additional questions should be directed to your local Clark-Reliance Representative, or to the Factory.  
Phone: (440) 572-1500 Fax: (440) 238-8828

**"Always use only genuine Clark-Reliance replacement parts!"**

# Clark•Reliance®

## BOIL-OUT GAGES PRACTICE AND POLICY

On new boiler installations it is common procedure initially to operate the boiler at a reduced pressure for a short time in order 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 blowdown discharges. However, a small amount of residue is unavoidably deposited as a film on all internal, wetted surfaces. ... including those of the water level gage. This type of scum layer is nearly impossible to remove by blowing down the gage, particularly if the gage glasses are protected by mica shields, as they must be, in high pressure installations.

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 and then rebuild the gage intended for regular service. For boil-out purposes on new water columns and direct-to-drum gage assemblies, Clark-Reliance

provides temporary level gage at no charge or at a refundable charge under one of the following conditions:

1. When a Prismatic gage, flat glass gage or Simpliport gage, having 3/4" diameter end nipples, is supplied as part of a water column or direct-to-drum assembly, we automatically furnish for temporary boil-out service the following parts at no charge:
  - 1 pc. — 3/4" OD tubular gage glass of proper length
  - 2 pc. — Rubber packing rings (\*)
  - 1 pc. — Low visibility tubular shield (so that low vision level in the tubular gage is same as in the gage that will be used for regular service).

At the conclusion of the boil-out procedure all of the above parts should be discarded. When the gage having stainless steel nipples is then 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 having flanged connections is supplied as part of a water column or direct-to-drum assembly, and the boil-out pressure will not exceed 200 PSIG, we will furnish the following parts at no charge:

- 1 set — VB-991 gage valves with 1/2" NPT conn.
- 1 pc. — 5/8" OD tubular gage glass of proper length
- 1 pc. — Low visibility shield

The boil-out gage valves should be temporarily installed in the 1/2" NPT "Test" connections in the flanges of the regular water gage shut-off valves, which are on the water column or direct-to-drum assembly. This equipment may be discarded after the boil-out has been completed.

3. On installations like the above but where boil-out pressures will exceed 200 PSIG, the following are recommended for temporary service:

- 1 set — RV1-113 gage valves with 1/2" NPT conn.
- 1 pc. — RLR-110 reflex gage of proper visibility (t \* =No. of sections and size of each)

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).

*For additional information  
contact your local Clark•Reliance  
representative*

# Clark•Reliance®

16633 FOLTZ INDUSTRIAL PARKWAY • STRONGSVILLE, OHIO 44136 • USA  
TELEPHONE: +1-440-572-1500 • FACSIMILE: +1-440-238-8828

Illustrations that show how Boil-out gage assemblies are to be used on water columns or Direct-to Drum Units having flanged gage connections.

The boil-out gage per Fig. 2A or 2B should be temporarily installed on the gage valves flanges per Fig. 3A or 3B, until the boil-out procedure is finished. Then the flanged gage per Fig. 1A or 1B should be installed for regular service.

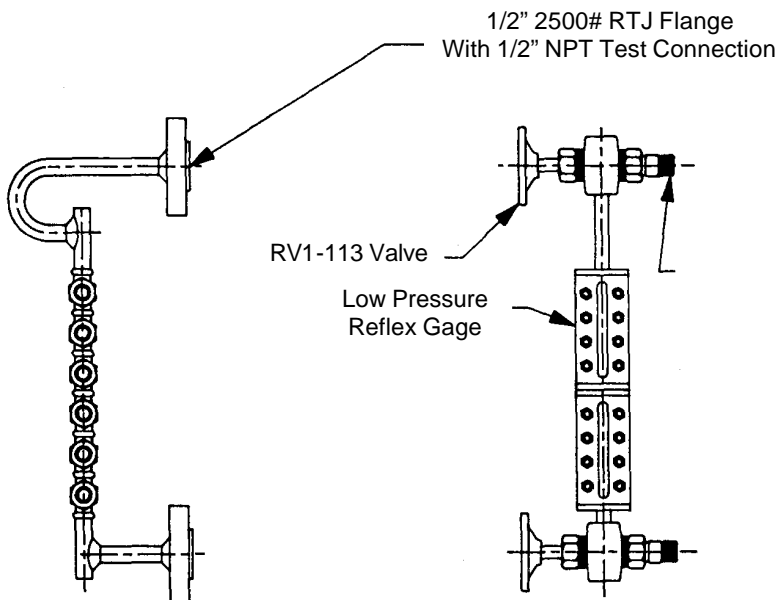


Fig. 1A  
Simpliport with  
flanged gage conn.

Fig. 2A  
Steel Valves and Reflex  
Gage for Boil-out service

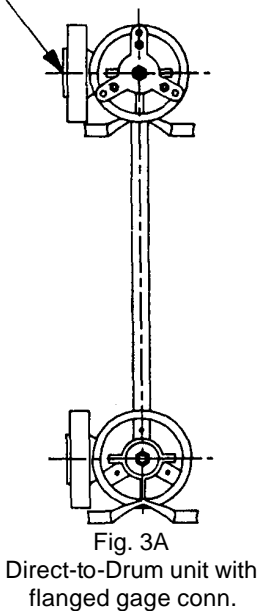


Fig. 3A  
Direct-to-Drum unit with  
flanged gage conn.

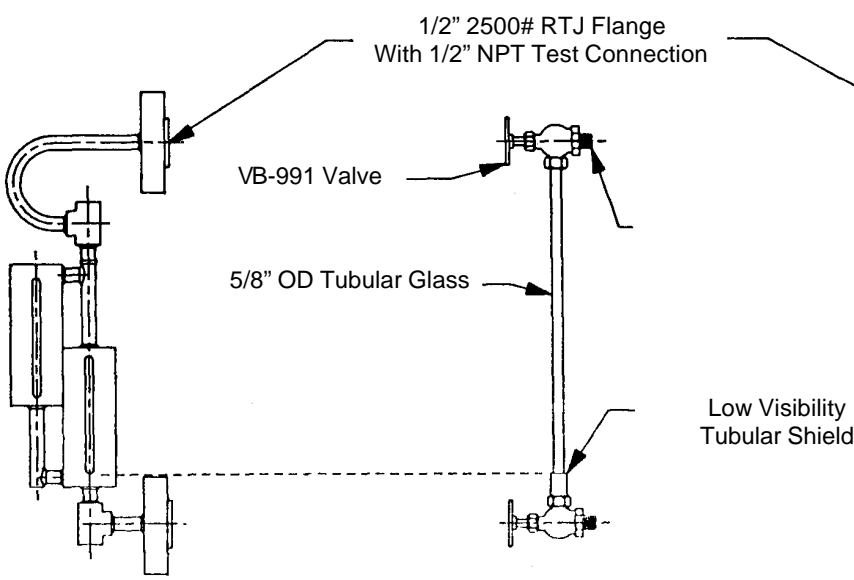


Fig. 1B  
Flat glass gage with  
flanged gage conn.

Fig. 2B  
Bronze valves and tubular gage  
glass for boil-out service

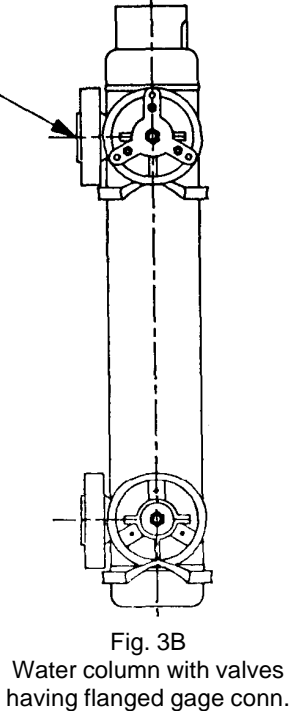


Fig. 3B  
Water column with valves  
having flanged gage conn.

---

## Recommended Blow-Down Practices For Water Columns, Electrolevs and Water Gages

---

It is common practice to blow-down water columns and gage glasses. However, the frequency and method of blow-down may affect service life and performance of this equipment.

Clark-Reliance suggests the following blow-down procedure:

1. Close both the steam and water valves between the boiler drum and the water column or water gage.
2. Open the drain valve fully on the bottom of the water column or water gage.
3. Crack open the steam valve and allow a gentle rush of steam to pass through the water column or water gage for no longer than 20 seconds.
4. Close the steam valve.
5. Inspect the water gage to insure that all foreign matter is flushed from the glass or mica. If the gage is not visually clean, repeat steps 3 and 4.
6. Close the blow-down valve and simultaneously open the steam and water valves, slowly bringing the equipment back to a normal operating level.

Note:

1. Any trip or alarm circuits that are actuated by the equipment being blown-down should be bypassed to prevent false alarms during the blow-down process.
2. Blow-down should be conducted on a weekly basis, or as necessary, based on water quality.

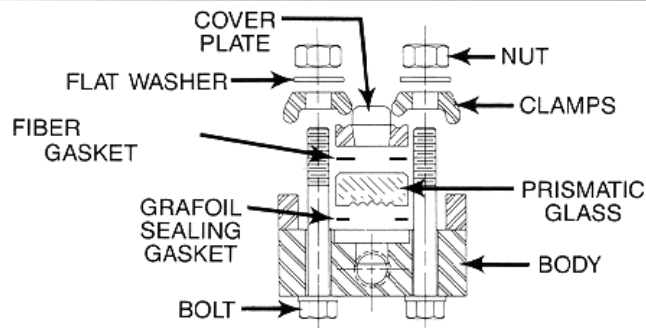
*For additional information  
contact your local Clark•Reliance  
representative*

# Clark•Reliance®

16633 FOLTZ INDUSTRIAL PARKWAY • STRONGSVILLE, OHIO 44136 • USA  
TELEPHONE: +1-440-572-1500 • FACSIMILE: +1-440-238-8828

# Clark-Reliance

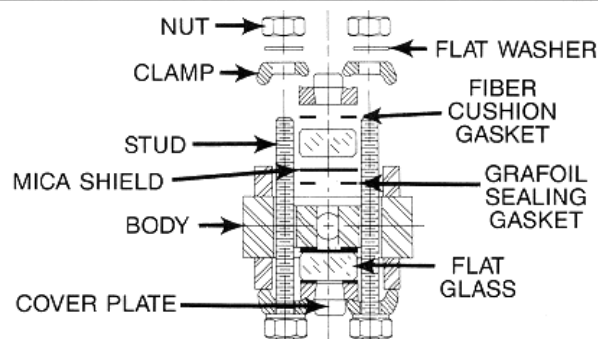
## PRISMATIC AND FLAT GLASS GAGE MAINTENANCE INSTRUCTIONS



### PRISMATIC TYPE

("C" or "S" Model)

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



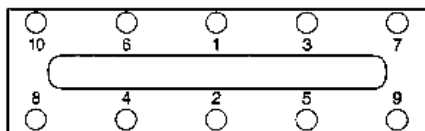
### FLAT GLASS TYPE

(FG400, FG900, FG1500, or FG2000 Model)

Note: 1) Mica shields are typically furnished in two pieces. Insert the thicker of the two pieces first.

### COMMENTS

1. Upon disassembly of either type of gage, examine body gasket surface for steam cuts or pitting.
2. Use a bronze scraper or similar tool for cleaning gasket surfaces to avoid gouging.
3. Lubricate all fasteners with Molycote or similar high-temperature anti-seize lubricant.
4. Torque sequence for all gages, as shown below:



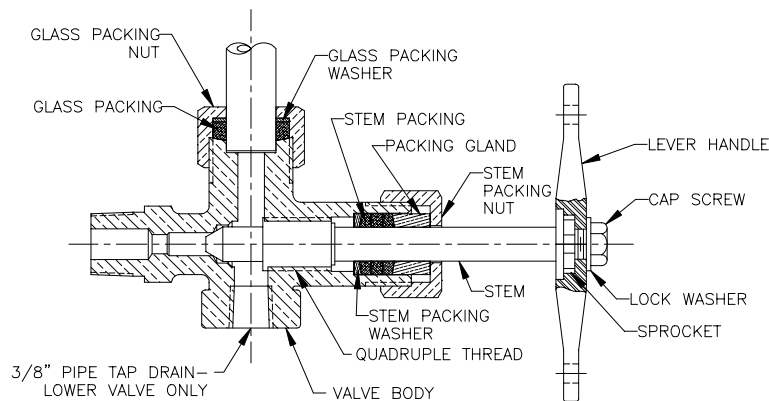
5. Torque Values = Prismatic - 40 FT-LBS (54 Newton-Meters)  
FG400 or FG900 - 45 FT-LBS (61 Newton-Meters)  
FG1500 or FG2000 - 70 FT-LBS (95 Newton-Meters)
6. All gages should be torqued in  $\frac{1}{3}$  increments prior to installation.
7. Retorque gage to full torque after gage is warmed-up to operating temperature (approx. 10 min.) with isolation valves closed and drain valve open.
8. Return gage to service.

Consult Clark-Reliance Corporation with any questions:

Tel: 440-572-1500 Fax: 440-238-8828

or your local Clark-Reliance Representative

# Maintenance Instructions for Clark-Reliance Bronze Water Gage Valves



Design variations in bronze water gage valves necessitate “typical” illustrations, but basic elements are similar in function and appearance. Some valves used in vertical mounting are also used in Tiltview Water Gage Valves, and operating precautions likewise apply.

## Installation

When mounting bronze water gage valves, make sure they are mounted in exact alignment, especially when tubular glass is used. Any angular or offset misalignment of the valves will strain the tubular glass and may cause early failure. When installing the armored type gage glass or tubular glass in vertical mounting applications, the overall length of the gage should be 2 ¾” less than the valve centers. With Tiltview applications, please consult drawing number B-7535 to determine the correct gage length.

Note that each bronze water gage valve set includes one upper and one lower valve. The lower valve will have a 3/8” FNPT drain connection. The valves must be installed in the correct orientation to ensure proper function.

## Operating Levers

Tools required: ½” wrench

To set operating levers in the correct position, close the valve stems tight. Loosen the levers by removing the cap screws. Pull levers forward and turn, with right hand end down, until they are positioned 45° to horizontal centerline of valve. Push the lever back to engage the sprocket teeth at the nearest point to the 45° setting. If the levers do not line up, additional adjustment can be obtained by rotating the sprocket wheel 180° on the valve stem.

## Operating Chain and Pull Handles

Tools required: ¼” wrench, pliers

Attach the chain to each side of the upper valve with the “S” hooks, which are included in the chain package. At this stage the levers should be parallel with each other. Attach the chain on the left side of the valve lever to the “S” hook on the lower valve. Insert the chain on the right hand side of the lever into the bronze locking fixture. Pull the chain tight between the two valves and tighten the locking screw. This is important in order to obtain full closure of both valves. If there is some slack in the chain on the left side of the valves, it has no adverse effect on the actuation of the valves for opening. Both chains should extend to a safe elevation below the water gage, usually one platform or 10 feet below. Be sure to have water gage valve-operating chains of equal length.

Each pull handle comes equipped with “S” hooks. Insert the free end of each “S” hook in the bottom link of the correct chain. The handle marked ‘Open’ is to be installed on the left-hand chain. The handle marked ‘Closed’ is to be installed on the right-hand chain. Close each hook onto the chain with pliers.

## Replacing Stem Packing

Tools required: 1 ¾" wrench, ½" wrench, ¼" wrench

- 1) Isolate valves from pressure.
- 2) Open the drain valve to eliminate any potentially trapped pressure.
- 3) Unhook operating chains from operating levers.
- 4) Remove operating handle and sprocket from valve stem.
- 5) Loosen stem packing nut with 1 ¾" wrench.
- 6) Turn stem counter-clockwise to remove stem/packing assembly.
- 7) Remove stem packing nut, packing gland, stem packing, and stem packing washer. Discard old stem packing material.
- 8) Inspect valve stem and packing cavity in the valve body for steam cut and damage. Replace if necessary.
- 9) Replace stem packing washer, stem packing (set of three), packing gland (concave side toward stem packing), and stem packing nut.
- 10) Turn stem/packing assembly into valve body.
- 11) Thread stem packing nut onto the valve body and tighten with wrench. Ensure that the valve stem, while being tightly sealed, will still open and close.
- 12) Replace sprocket and operating handle, making sure the handle is properly aligned (see instructions for Operating Levers).
- 13) Replace operating chain onto operating levers.
- 14) Slowly open isolation valves and inspect for leakage. Isolate the valve, relieve pressure, and tighten stem-packing nut if necessary.

## Replacing Glass Packing

Tools required: 1 ¾" wrench, ½" wrench, ¼" wrench

- 1) Isolate valves from pressure.
- 2) Open the drain valve to eliminate any potentially trapped pressure.
- 3) Unhook operating chains from operating levers.
- 4) Remove operating handle and sprocket from valve stem.
- 5) Loosen top and bottom glass packing nuts with 1 ¾" wrench.
- 6) Remove tubular glass gage or armored gage from valves.
- 7) Remove nipple/glass packing, glass packing washer, and glass packing nut. Discard old packing material.
- 8) Inspect the ends and bore of the tubular glass or gage nipples for erosion or steam cutting. Replace any deteriorated or damaged items.
- 9) To reinstall, slip a glass packing nut onto each end of the tubular glass or ¾" O.D. gage nipple. Follow this with a glass-packing washer and a nipple/glass packing ring.
- 10) Insert the top of the tubular glass or upper gage nipple into the top valve body. Insert far enough to allow the lower end of the tubular glass or lower gage nipple to be placed into the lower valve body. Slide packing rings, glass packing washers, and glass packing nuts to each valve body and tighten.
- 11) Replace operating chain onto operating levers.
- 12) Slowly open isolation valves and inspect for leakage. Isolate the valve, relieve pressure, and tighten glass-packing nut if necessary.

**NOTE:** Always use only genuine Clark-Reliance replacement parts.

Any additional questions should be directed to your local Clark-Reliance Representative, Plant-Op Center, or to the Factory (440) 572-1500.

The Clark-Reliance Corporation  
16633 Foltz Industrial Parkway  
Strongsville, Ohio 44149 USA  
Telephone: (440) 572-1500  
Fax: (440) 238-8828  
[www.clark-reliance.com](http://www.clark-reliance.com)

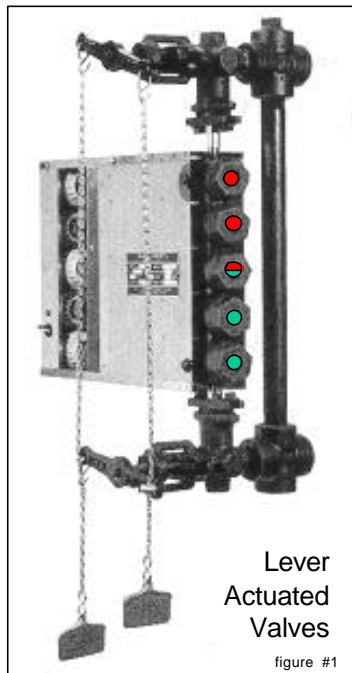
Form E221-A



# Clark•Reliance®

## Instructions for Installing Chains on Water Gage Isolation Valve Sets

Section: M100  
Bulletin: E-207-A  
Date: 7/1/01  
Supersedes: NEW



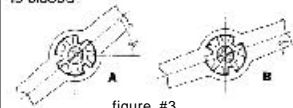
### Installing chains on lever actuated valve set (fig #1) as follows:

1. Adjust levers as illustrated (see fig #1) with both valves closed and each lever should be positioned at a 45 degree angle downward to the right. See figure #3. for instructions to adjust lever onto valve stem.
2. Attach the chain (use #8 size chain) to each side of the upper (steam) valve with the "s" hooks, which are included in the chain package. At this stage the levers should be parallel with each other.
3. Attach the chain on the left side of the valve lever to the "S" hook on the lower "water" valve .
4. Insert the chain on the right hand side of the lever into the locking bronze fixture. Pull the chain tight between the two valves and tighten the locking screw. This is important in order to obtain full closure of both valves. If there is some slack in the chain on the left side of the valves, it has no adverse effect on the actuation of the valves for opening.
5. Both chains should extend to a safe elevation below the water gage, usually one platform or 10 feet below.

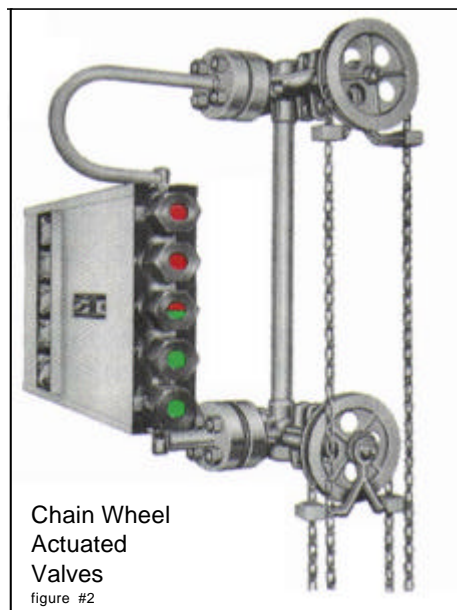
### 18-POSITION GAGE LEVER

Positive, non-slip locking in 18 positions is assured with the patented Clark-Reliance gage lever. The lever is standard on all Series 400 and 500 bronze water gage valves and all Series 800 forged steel water gage valves.

The gage lever is readily adjusted to the desired angle regardless of the valve stem orientation when the valve is closed.



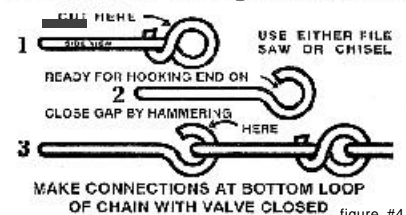
MOVING THE LEVER FROM POSITION A TO B ACHIEVES AN INTERMEDIATE ANGLE ADJUSTMENT QUICKLY AND EASILY.



### Installing chains on chain wheel actuated valve models (fig #2):

1. The chain wheel on the upper (steam) valve extends further from the valve body than the lower (water) valve. This allows the upper valve chain to fall parallel to the lower valve chain without intersecting it. Install a loop of chain around the chain wheel operator, and through the chain guides.
2. Attach ends of chain together (see fig #4).
3. The length of chain for each wheel = the length of drop required times two.
4. Use #1/0 size double loop chain

### Directions For Making Endless Chain



**World Leaders in Boiler Level Indication & Control**

**Clark•Reliance®**  
CORPORATION

16633 Foltz Industrial Parkway Strongsville, OH 44149, U.S.A.  
Phone +1(440) 572-1500 Fax +1(440) 238-8828  
www.clark-reliance.com

