

# 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

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MANUAL NO. 505C

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*For additional information  
contact your local Clark•Reliance  
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# Clark•Reliance®



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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

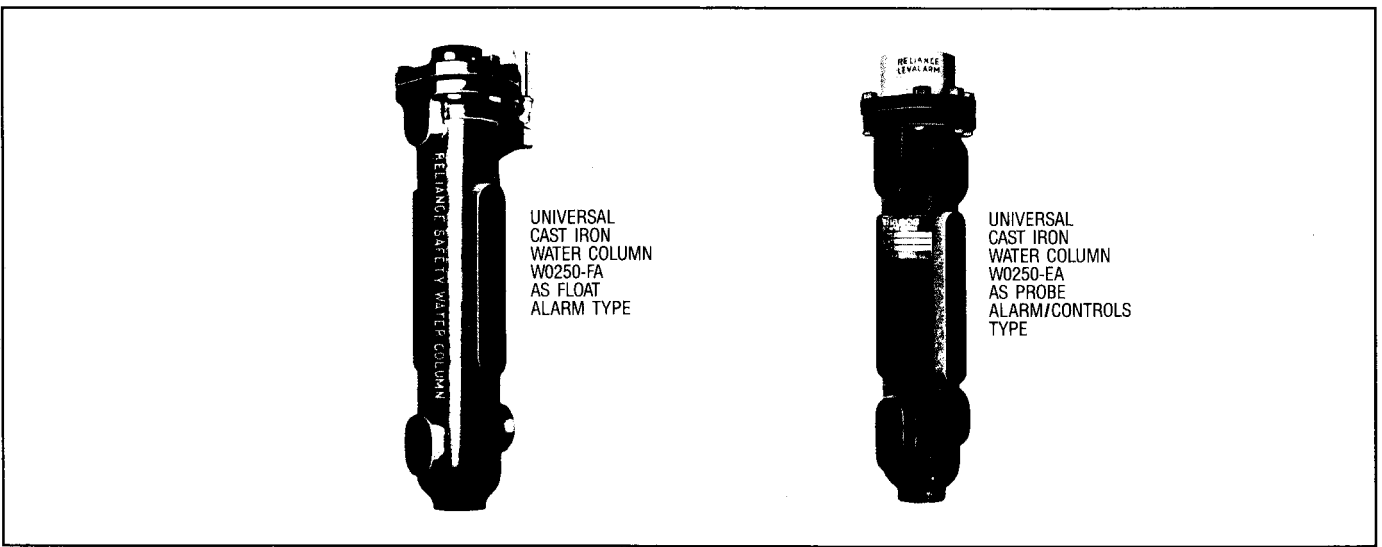


Fig. 1 — Five principal styles of Reliance Water columns for pressures to 250 lbs.

## 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.

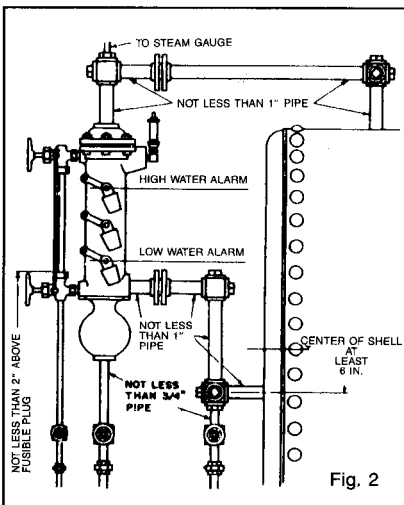


Fig. 2

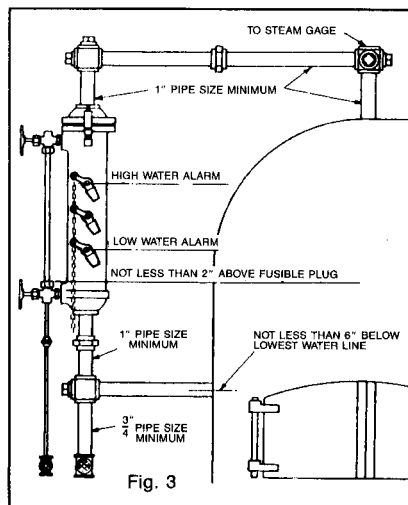


Fig. 3

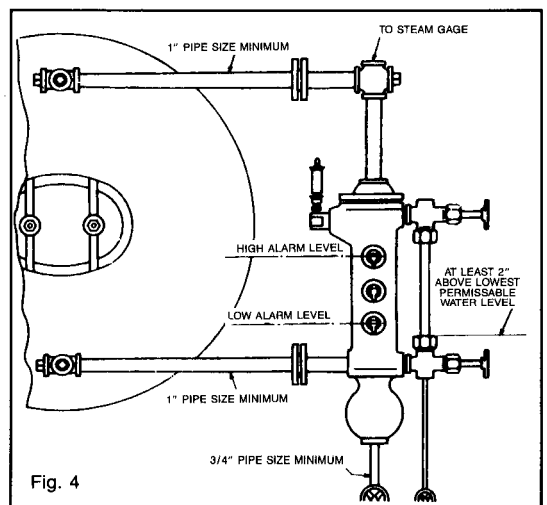


Fig. 4

# 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.

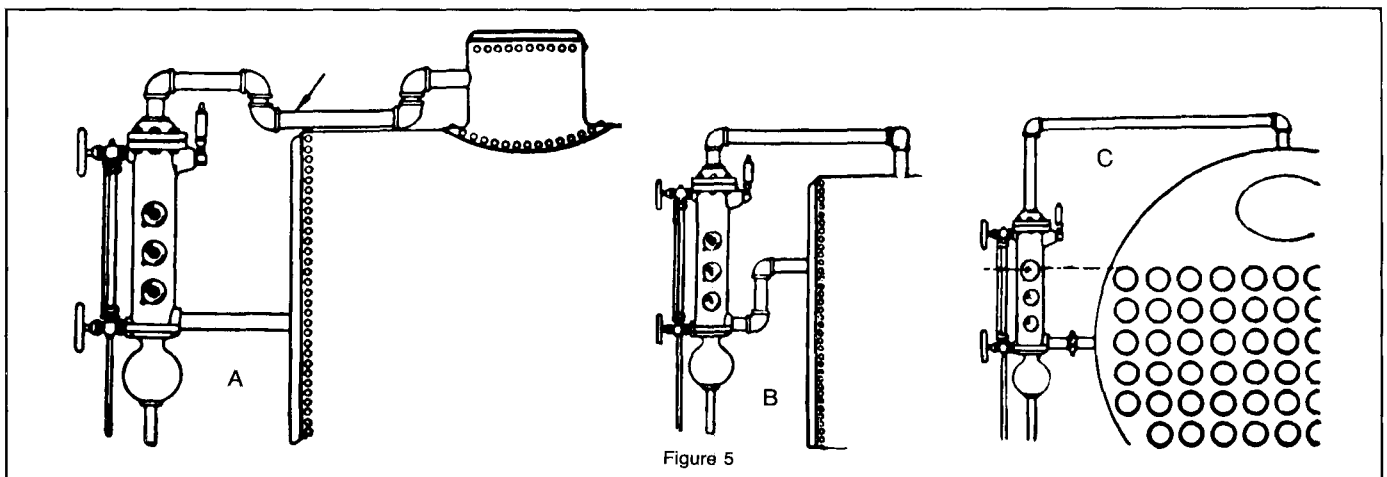
## How NOT to Attach the Column

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

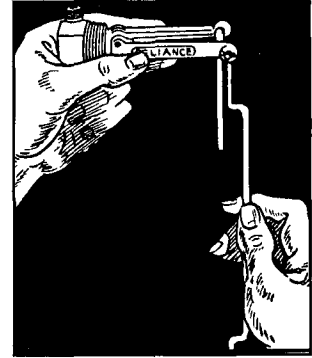


Figure 9

### 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.

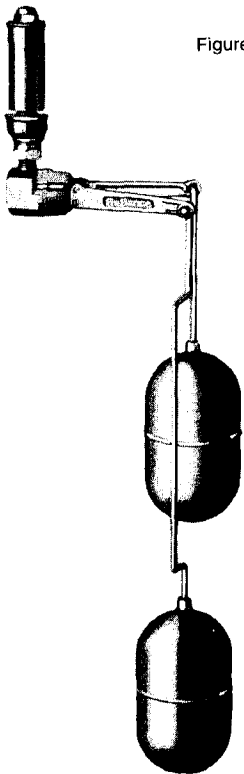


Figure 6

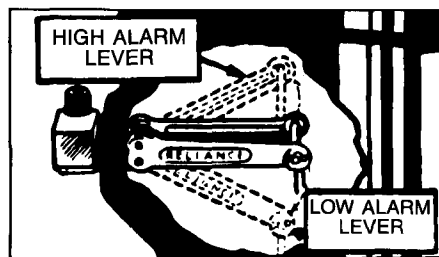


Figure 10

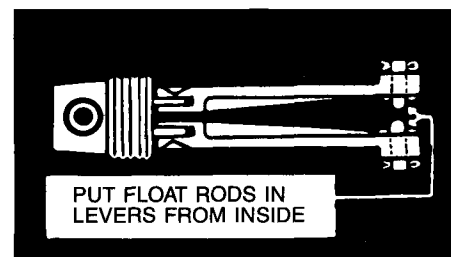


Figure 11

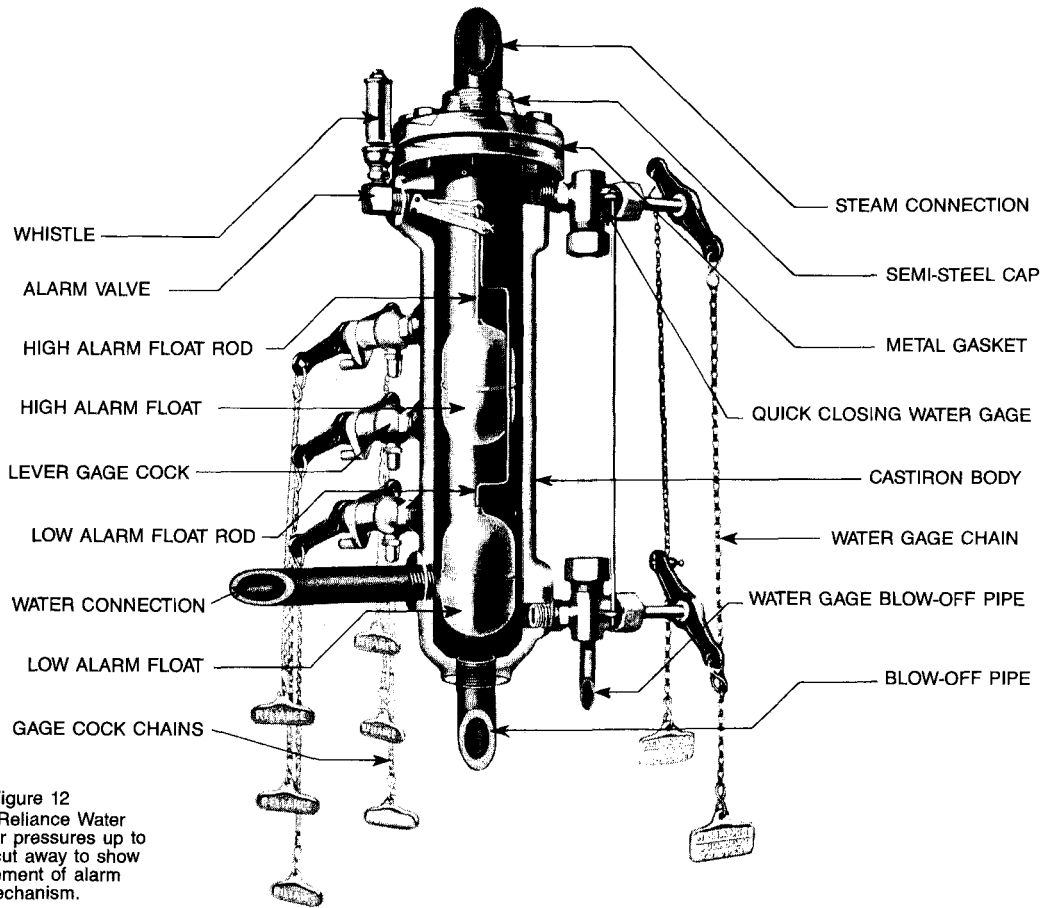
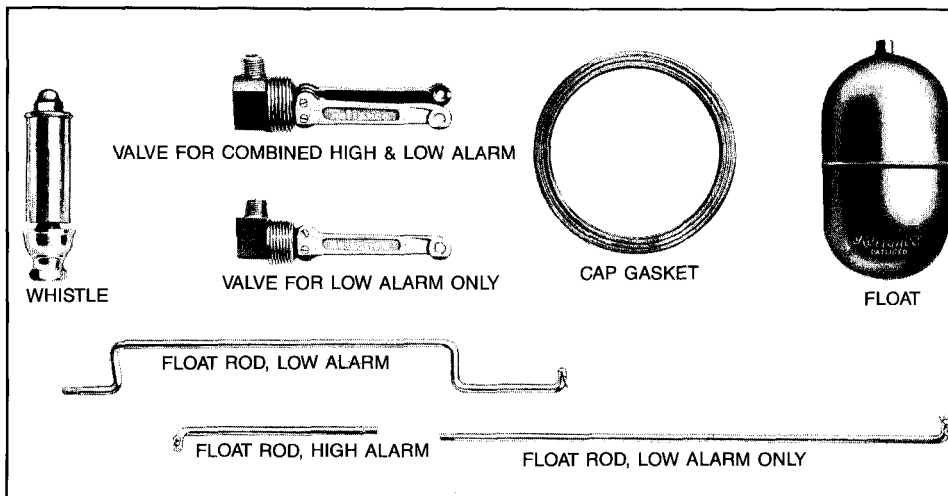


Figure 12  
 Typical Reliance Water  
 Column for pressures up to  
 250 lbs. cut away to show  
 arrangement of alarm  
 mechanism.

## 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.

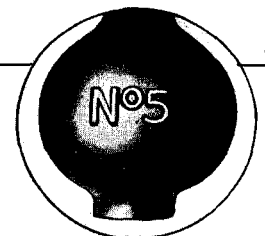


Figure 14

## 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

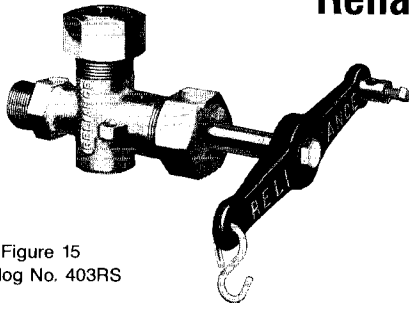


Figure 15  
Catalog No. 403RS

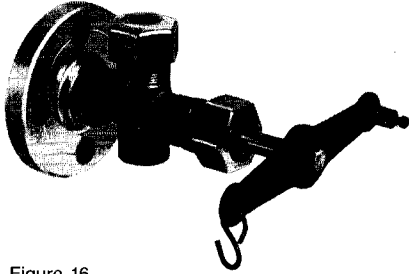
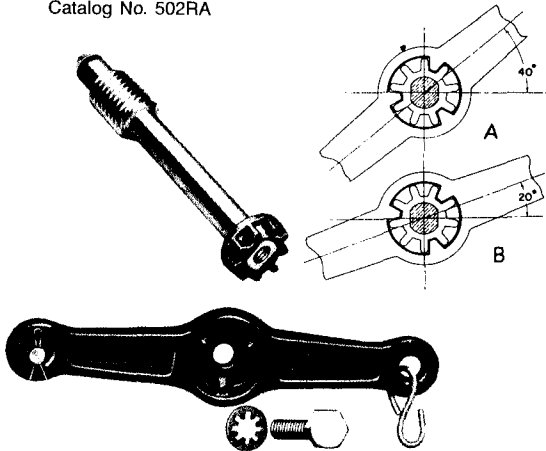
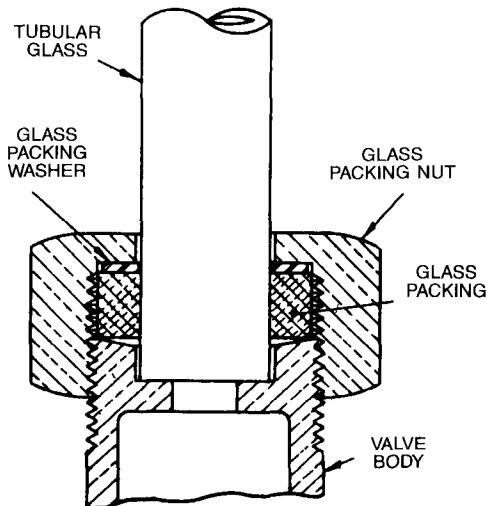


Figure 16  
Catalog No. 502RA



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

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



CROSS SECTION BEFORE TIGHTENING

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.

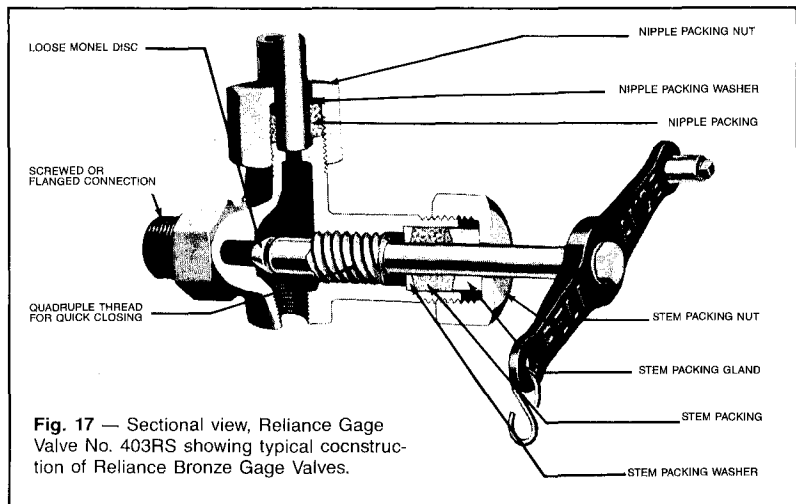


Fig. 17 — Sectional view, Reliance Gage Valve No. 403RS showing typical construction of Reliance Bronze Gage Valves.

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

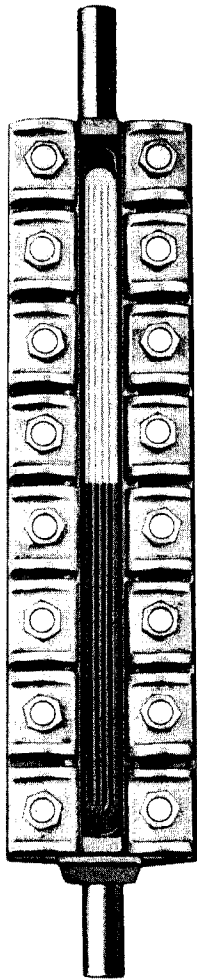


Figure 19

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.

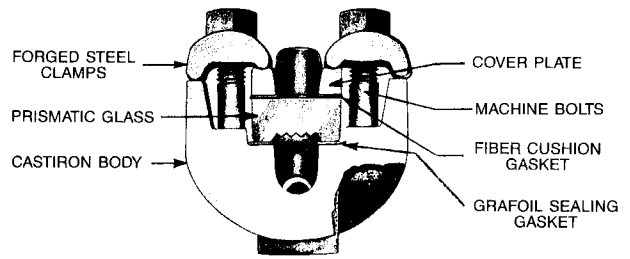
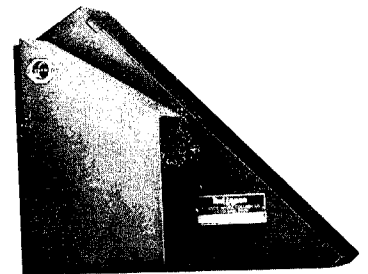


Figure 20

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.

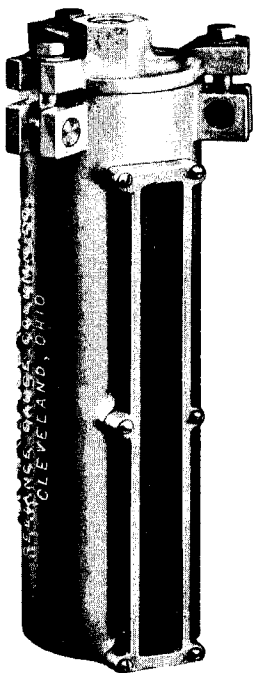
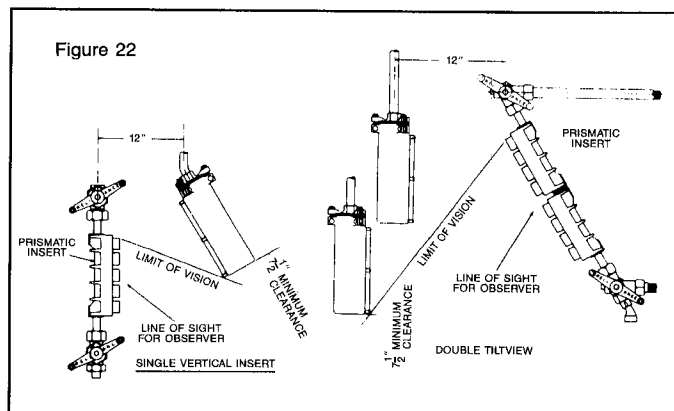


Figure 21  
GL 53 GAGE LITE



# 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.

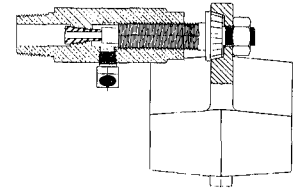
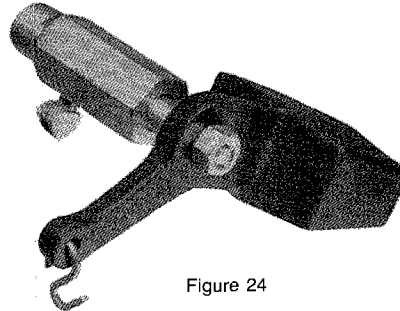


Figure 24

## 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.**

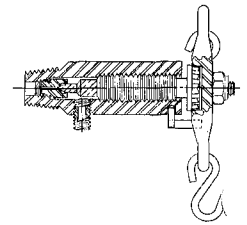
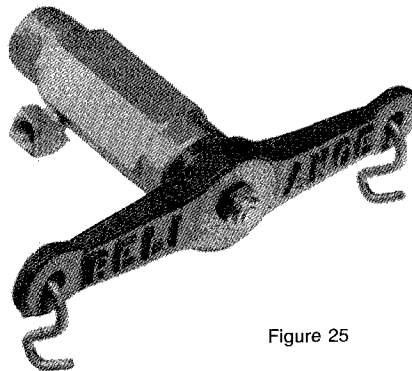


Figure 25

## 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:

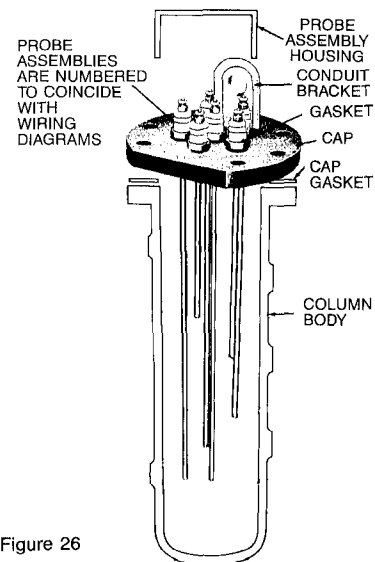
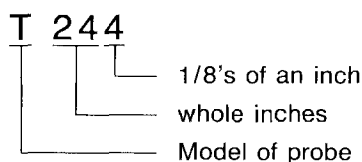


Figure 26

This represents a typical cast iron column.



## Notice to Plant Operators

The use of non-Original Equipment Manufacturer parts (such as glass, gaskets, probes, modules, etc.) will void the Agency Approval (FM, UL, CSA, CRN, ABS, etc.), pressure/temperature rating, and warranty of this equipment. Clark-Reliance requires the use of OEM parts for all repairs on this product in order to maintain plant and personnel safety, and reliable operation.

**"PARTS-PLUS"**  
Critical spare parts for overnight  
delivery, direct from the manufacturer.

[clark-reliance.com/parts](http://clark-reliance.com/parts)



Steel Valve Repair Kit



Replacement Probes



Gage Glass Repair Kit



Simpliport Module



Simpliport Packing Nut



Replacement Relays



Probe Repair Kit



Replacement EA100 Ass'y



Replacement Micro-switch



Bronze Valve Repair Kit



Valve Packing



Replacement Floats

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