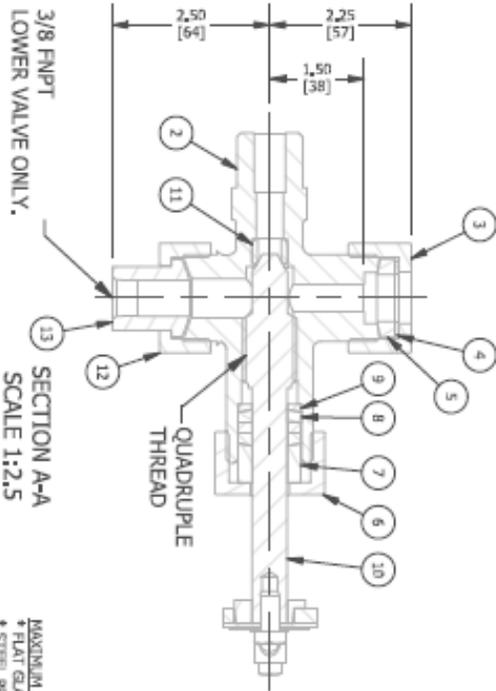
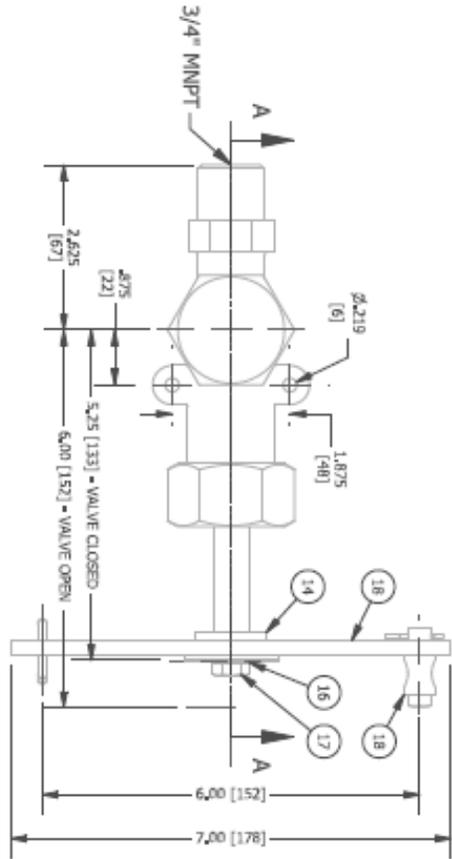


## Reliance® Bronze Water Gage Valves



**Includes BG400, BG200, and TG600 Series Bronze Water Gage Valves**

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3/8 FNPT LOWER VALVE ONLY.  
SECTION A-A  
SCALE 1:2.5

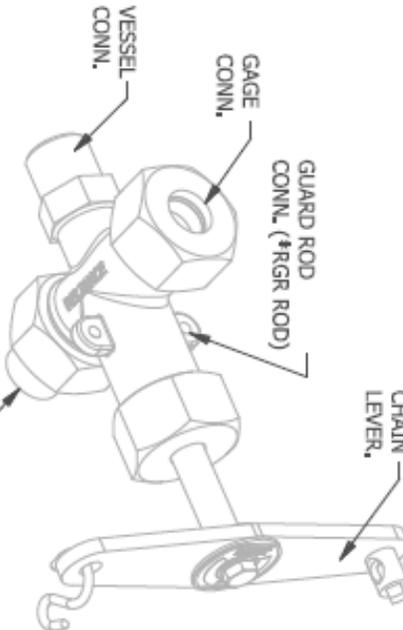
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MANUFACTURED BY  
**Clark-Reliance®**  
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STRONGSVILLE, OH 44149 USA  
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MODEL: BG404S HIGH PRESSURE  
BRONZE WATER GAGE VALVE SET

CLARK-RELIANCE®

- MAXIMUM STEAM PRESSURE WHEN USED WITH:
- \* FLAT GLASS GAGE - 450 PSIG.
  - \* STEEL PRISMATIC GAGE - 350 PSIG.
  - \* CAST IRON PRISMATIC GAGE - 250 PSIG.
  - \* TUBULAR GLASS GAGE - 250 PSIG.



BILL OF MATERIAL				
NO.	PART NO.	NAME OF PART	QTY.	MATERIAL
1	RBG404R 1A	VALVE BODY, UPPER	1	CAST BRONZE
2	RBG404R 1	VALVE BODY, LOWER	1	CAST BRONZE
3	RBG404R 2	GLASS NUT	2	BRASS
4	RBG404R 10	WASHER	2	CARBON STEEL
5	RBG403R 12	PACKING NIPPLE PACKING	2	GRAPHITE
6	RBG403R 3	STEM NUT	2	BRASS
7	RBG403R 4	GLAND, STEM PACKING	2	BRASS
8	RBG403R 9	STEM, PACKING	6	GRAPHITE
9	RBG403R 5	WASHER, STEM PACKING	2	BRASS
10	RBG403RS 3B	STEM, VALVE	2	303SS
11	RBG404R 4	SEAT	2	303SS
12	RBG404R 3	NUT, BLOWOFF	1	BRASS
13	RBG404R 2	BLOWOFF PIECE	1	BRASS
14	RBG403RS 1	SPROCKET	2	DUCTILE IRON
15	RBG403RS 2U	UPPER LEVER	1	1
16	X124130	LOCK WASHER	2	CARBON STEEL
17	X1212120	HEX HEAD CAP SCREW	2	CARBON STEEL
18	RBG403RS 2L	LOWER LEVER	1	1

\* GUARD RODS LENGTH ■ VALVE CENTERS + 1"

PART NUMBER: RBG404S

TOLERANCE CLASS (PER PRE-004) (PER PRE-004)		MATERIAL:	
REVISION: 0	DATE: 12/16/2013	DESIGNER: ST	DATE: 12/16/2013
ISSUED BY: SDS	REVISION NO: BG1030	DATE: 12/16/2013	REV: 0

GAGE GLASS OVERALL LENGTH IS EQUAL VALVE CENTERS - 2.75"

Note: Design variations in Bronze Water Gage Valves necessitate "typical" illustrations, but basic elements are similar in function and appearance.

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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® Bronze Water Gage Valves 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.

**INSTALLATION OF BG SERIES WATER GAGE VALVES:**

**Models and connection information:**

Bronze Water Gage Valve Sets			
Model	Design Pressure (Bar)	Vessel Connection	WT (lbs.)
BG251S	250 (17)	3/4" Male NPT w/ Ball Checks	8
BG252S	450 (31)	3/4" Male NPT w/ Ball Checks	8
BG402S	250 (17)	1/2" Male NPT	8
BG403S	250 (17)	3/4" Male NPT	8
BG404S	450 (31)	3/4" Male NPT	8
BG502RAS	250 (17)	3/4" 300# RF Flange	13
BG503RAS	450 (31)	3/4" 300# RF Flange	13
TG602RS	250 (17)	1/2" Male NPT	13
TG603RS	250 (17)	3/4" Male NPT	20
TG604RS	450 (31)	3/4" Male NPT	20
TG605RS	250 (17)	3/4" 300# RF Flange	28
TG606RS	450 (31)	3/4" 300# RF Flange	28

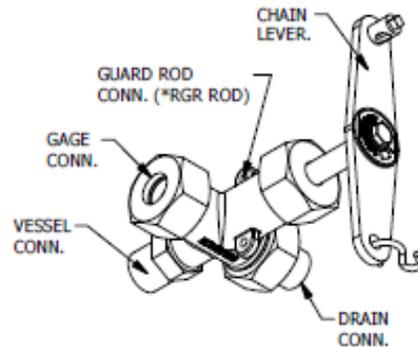


When mounting Reliance Water Gage Valves, make sure they are mounted in exact alignment, especially when tubular glass is used during Boil-out procedures. Any angular or offset misalignment of the valves will strain the tubular glass and may cause early failure. When installing the armored type gage glass, any misalignment could cause a leak from the packing cartridge that may result in damage to the valve or gage glass. When mounting the gage glass or tubular glass in vertical mounting applications, the overall length of the gage should be  $2\frac{3}{4}$ " less than the valve centers.

When mounting water gage valves and a gage glass directly to the vessel, the valve centers must be secured to prevent movement which could result in leakage around the gage glass nipple packing. Use of a Tie Bar with U-bolts, water column, or Standpipe to keep the water gage valve centers from expanding is recommended.

#### Installing the valves:

The valve set contains two valves: an upper and a lower. The lower valve has a  $\frac{3}{8}$ " FNPT drain connection and must be installed on the lower connection to guarantee proper operation of the valves and gage glass.



Reliance Bronze water gage valves typically are furnished with three types of vessel connections:

- 1)  $\frac{3}{4}$ " Male NPT
  - 2)  $\frac{1}{2}$ " Male NPT
  - 3) Flanged connections
- If furnished with Male NPT connections, coat the threads with a pipe joint compound such as Deacon 770® Thread Sealing Compound or equal. Assemble the upper and lower valves on to the vessel connections making sure there is no angular or offset misalignment of the valves
  - Flanged valves must be assembled to the mating flanges with the proper gaskets, studs, and nuts that are used for the flange size, class, and flange face. The studs should be lubricated with high temp anti-seize lubricant or equal. Tighten the fasteners to the recommended torque value that is associated with the flange size and class.

#### Commissioning valves on new installations.

1. When new water gage valves are installed, check the tightness on the operating stem packing and gage nipple packing nuts for tightness to prevent leakages.
2. The operating stem packing must be tightened sufficiently to prevent leakage but still enable the valve to be actuated. Use caution, because it is possible to overtighten packing, which can prevent valve operation or make it difficult.

After the installation has been heated for the first time, recheck the packing nuts to be certain the packing has been tightened sufficiently to stop any leaks, but not over-tightened

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### Attaching the 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.

### Attaching the 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 (Figure 1). 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.



Bronze Locking Fixture

Figure 1

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. Refer to IOM Form E207-A for additional instructions.

### Maintenance:

**Caution: Prior to any maintenance and disassembly of the water gage valves, first isolate the valves and be sure that the valves are relieved of all internal pressure, the temperature is ambient, and have been drained or purged of any water. Failure to do this may result in a sudden release of pressure and fluids, which could cause physical injury to personnel.**

### **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.

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- 4) Remove operating handle and sprocket from valve stem.
- 5) Loosen stem packing nut with 1 3/4" 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 3/4" wrench, 1/2" wrench, 1/4" 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 3/4" 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 3/4" 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.

### Other Reference IOMs

R500.E239	Hot Torque Procedure
R500.E156	Blowdown Procedure
R500.530	Offset Adaptor Installation
E231	Convert Tiltview Assembly from RH to LH Arrangement

To obtain this and other current information, please go to our website

[www.relianceboilertrim.com](http://www.relianceboilertrim.com)

**Important Note:** When assembling a gage glass to Reliance Bronze Water Gage Valves, the gage glass overall length must be the center-to-center distance less 2 3/4".

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## REPLACEMENT PARTS FOR BRONZE WATER GAGE VALVES

<b>PART NO.</b>	<b>DESCRIPTION</b>
RK-1A	BG403R-4 Packing Gland SG454-10 Packing Washer BG403R-12 Nipple Packing - (2) BG403R-9 Stem Packing - (3) BG403RS-3B Stem BG403R-5 Stem Packing Washer
RK-1B	BG403R-3 Stem Packing Nut - (2) BG403R-5 Stem Packing Washer - (2) BG403-9 Stem Packing - (6)
RK-1C	Repair Kit - Obsolete Use RK-1H
RK-1D	BG403RS-2 Upper Lever BG403RS-2A Lower Lever BG403RS-1 Sprocket - (2) X172120 Hex Head Cap Screw (Formerly BG403R-13) - (2) X174130 Lock Washer (Formerly BG403R-14) - (2)
RK-1E	BG403R-16 "S" Hook - (4) BG403R-18 Pull Handle, L.H. "Pull to Open" BG403R-19 Pull Handle, R.H. "Pull to Close"
RK-1F	BG503R-5 Flange Gasket - (2) X173850 Flange Stud (Formerly BG503R-2) - (8) P8366-2HA Hex Nut (Formerly BG503R-3) - (16)
RK-1G	BG404R-2 Blow Off Piece BG404R-3 Blow Off Nut
RK-1H	BG403R-2 Glass Packing Nut - (2) SG454-10 Glass Packing Washer - (2) BG403R-12 Nipple Packing - (2)
BG403R-9	Stem Packing
BG403R-12	Nipple Packing
GR	Guard Rod (Indicate Length)
#8B	Chain (Per Foot)
BG403R-15	Chain Fixture
WGCP-1	Chain Package w/ Pull Handles & 2 Chains (5' long)

### 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](http://www.relianceboilertrim.com) or [RelianceAppEng@clark-reliance.com](mailto:RelianceAppEng@clark-reliance.com).

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