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MAINTENANCE INSTRUCTIONS

FOR

NIBCO

¼" THROUGH 3" CLASS 125, 150, 300 AND 175 WWP

BRONZE, GLOBE AND ANGLE VALVES
FIGURE NUMBERS

<u>GLOBE</u>	<u>ANGLE</u>
<u>KT-211-W-UL</u>	<u>T-301-W</u>
T-211-B,Y	T-311-Y
S-211-B,Y	S-311-Y,W
S-235-B,Y	T-335-Y
T-235-B,Y	T-375-B
T-275-B,Y	T-376-A
T-276-A	T-376-AP
T-276-AP	KT-65UL

(Special models designated N.R. are non-return valves that prevent backflow.)

***** CAUTION *****

ONLY QUALIFIED PERSONNEL SHOULD UNDERTAKE THE PROCEDURES OUTLINED BELOW. NIBCO INC., ITS AGENTS, REPRESENTATIVES AND EMPLOYEES ASSUMES NO LIABILITY FOR THE USE OF THESE PROCEDURES. THESE PROCEDURES ARE OFFERED AS SUGGESTIONS ONLY.

1.0 GENERAL INFORMATION

1.1 SCOPE

These instructions are furnished for use in the installation, operation and maintenance of NIBCO 1/4" through 3" Class 125, 150 and 300 bronze globe and angle valves, with screwed in or union bonnet, rising stem and having handwheel operation.

1.2 GENERAL DATA

A. MANUFACTURER

NIBCO INC.
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B. FIGURE NUMBERS AND DESCRIPTION

<u>FIG. NUMBER</u>	<u>DESCRIPTION (Globe Valves)</u>
T-211-B, Y	Class 125 threaded end, rising stem valve, screw in bonnet, B-Bronze disc, y-Teflon disc.
S-211-B, Y	Class 125 solder end, rising stem, screw in solder end bonnet B-Bronze disc or Y-Teflon disc.
S-235-B, Y	Class 150 threaded end, rising stem, union bonnet, B-bronze disc, Y-Teflon disc.
T-235-B, Y	Class 300 threaded end, rising stem, union bonnet B Bronze disc or Y-Teflon disc.
T-275-B, Y	Class 300 threaded end, rising stem, union bonnet, A-nickel alloy disc and seat, or AP-410 stainless steel
T-276(A/AP)	500 Brinell disc and seat.

<u>FIG. NUMBER</u>	<u>DESCRIPTION (Angle Valves)</u>
T-301-W	175 WWP threaded end, rising stem, screw in bonnet
T-311-Y	Class 125 threaded end, rising stem, screw in bonnet Y-Teflon disc.
S-311-Y, W	Class 125 threaded end, rising stem valve, screw in bonnet Y-Teflon disc, W-Buna-N disc
T-335-Y	Class 150 threaded end, rising stem, union bonnet Y-Teflon disc.
T-375-B	Class 300 threaded end, rising stem, union bonnet, B-Bronze disc.
T-376-(A/AP)	Class 300 threaded end, rising stem, union bonnet, A-nickel alloy disc and, AP-410 stainless steel 500 Brinell disc and seat.

All threaded end preparations of valves meet American National Pipe Thread (N.P.T.) requirements. All solder end valves meet the requirements of ANSI Standard B16.22.

C. IDENTIFICATION PLATES

An aluminum identification plate is attached beneath the handwheel nut. This identification plate gives the figure number of the valve, some general information about the trim and location of NIBCO's corporate offices.

When more detailed information is required, Bronze and Iron Catalog or Fire Protection Catalog should be referred to, using the valve figure number as the guide.

D. SERVICE

When installing valves for service in corrosive media, the NIBCO chemical resistance guide may be consulted for specific data or contact can be made with NIBCO Technical Services. It is, however, the obligation of the user to make the ultimate decision of fitness for use.

E. PRESSURE TEMPERATURE RATINGS

Pressure and temperature ratings may be found in the Engineering section of the latest printing of NIBCO Bronze and Iron Catalog or Fire Protection Catalog. This information is taken from applicable ANSI or UL/FMRC Standards.

F. CODES & REGULATIONS

A valve used under the jurisdiction of the ASME boiler and pressure vessel code, the ANSI code for pressure piping, government or other regulations, is subject to any limitation of that code or regulation and to the applicable ANSI Standard.

G. PRODUCTION TEST PROCEDURES

Valves are pneumatically shell tested and seat tested at a pressure of 80 psi in accordance with Federal Specifications and MSS-SP-80 Manufacturers Standardization Society Requirements. Fire Protection valves are tested in accordance with the appropriate Underwriters Laboratories (UL) and Factory Mutual Research Corporation (FMRC) Specifications.

H. PRINCIPAL DIMENSIONS

Principal dimensions of the valve are specified in the appropriate catalog.

1.3 DETAIL DESCRIPTION

The globe and angle valves listed above and covered in these instructions are bronze valves Made of ASTM B62 material for Class 125, 150, and 175 WWP valves and from ASTM B61 Material for Class 200 and 300 valves.

The valves are operated with the handwheel and are used to start, stop or throttle the flow of fluids in piping systems. Globe and angle valves are rising stem type only. Non-rising stem globe valves are not available. The disc is closed through a clockwise turning direction of the handwheel.

The screwed bonnet type body and bonnet are held together by threads of the male and female type; male threads being on the bonnet section and female threads being within the body. There are no gaskets between the body and bonnet to effect seals. This is strictly a metal-to-metal seal as required by standards. This general arrangement is used on the Class 125 globe and angle valves only.

The union bonnet arrangement on 150 and 300 class has male threads on the body, the bonnet has no threads at all, however, a union nut is placed over the bonnet to fasten it to the body. Here the seal between the body and bonnet is also metal-to-metal without a gasket.

Flow through globe or angle valves is stopped by forcing the disc down onto the valve body seat. Throttling is accomplished by carefully turning the handwheel to some position between full open and full closed. The disc is either of bronze construction directly connected to the stem or in some cases where a soft seat is desired, the disc is made out of teflon or Buna-N. On bronze globe valves the disc is held in place on the stem by retainer bushings or in the special non-return models (N.R.) the disc is so arranged that it travels up and down within the valve body through the use of guides on the disc itself and it is not attached to the stem. This valve is a directional valve operated by gravity to prevent backflow. It may also be used as a globe or angle valve, however, the non-return feature will only operate in the direction of the flow arrow on the side of the valve.

All valves have back seats between the shoulder of the stem and the valve body. This was a requirement of standards so that the valve may be repacked while it is under full pressure. Caution: This is dangerous and could result in serious injury. It is not recommended by NIBCO. In addition, standards organizations, and governing societies today do not encourage valves to be repacked while the valve is transmitting a fluid at full pressure and/or temperature.

The stuffing box is formed by the annular space between the stem and the bonnet and is filled with non-asbestos packing. The packing is compressed in the stuffing box by a gland bushing and/or the packing nut draws down against the packing by turning the packing nut clockwise.

2.0 INSTALLATION

2.1 PRELIMINARY INFORMATION

The globe and angle valves should preferably be installed with the stem pointed vertically upward. However, it is normally acceptable to have the valve stem pointed in a horizontal position either in vertical or horizontal piping. Although a globe and angle valve will function satisfactorily in an inverted position it is not generally recommended because it allows fluids to become trapped in the bonnet cavity which results in contamination and the inability to fully drain the system.

To operate satisfactorily, the special model non-return (N.R.) can only be installed in the vertical position because gravity allows the disc to fall when the flow reverses. This feature also makes this valve directional and must be installed with fluid flow in the same direction as the flow arrow on the side of the valve.

Valves are shipped in the closed position to prevent damage to the seating surfaces. There is no internal blocking used for shipment. All NIBCO valves are shipped in cardboard boxes for protection against exterior damage and accumulation of dust or dirt on the delicate seating surfaces. The boxes are not waterproof and, therefore, require that they be protected from the weather.

2.2 HANDLING AND INSTALLATION

Each valve should be handled very carefully and not dropped or thrown into a dirty environment before it is assembled into the system. Under no circumstances should the valve be installed into the line by wrenching through the valve body, this means that when a valve is being threaded onto a pipe, the wrench should be on the end where the joint is being made.

It is very important to make certain that the threads of the pipe are clean at all times and machined properly. When improperly tapered pipe is screwed into the female valve threads the pipe can be screwed so deep that it can ruin the seats of the valve. Care should also be used to assure that the valve is not overtightened because the steel pipe

is much stronger than the bronze material therefore the bronze will distort and cause valve malfunction or leakage at the joint. When screwing the valve onto the pipe, the disc should remain in the closed position.

On solder end type valves it is necessary to make sure that the valve disc is in the open position while it is being heated for soldering into the line. The major caution here is that the valve not be overheated and that the proper amount of solder is used so that it does not flow into the valve rendering it inoperable.

Attached to this report in the Appendix are proper instructions for soldering, brazing, and threading type installation of valves.

~~In the event that it is necessary to remove the bonnet before the valve is put into a line either for brazing, soldering or threading in, it is always essential that the bonnet be removed with great care. It is necessary that a chain wrench rather than a pipe wrench be used to loosen the bonnet union nut. If at all possible, it is more desirable to use a socket wrench to remove the nut. The union nut, body and bonnet should all be marked so they can be returned to the same position as originally assembled. After the nut has been carefully removed or in the case of a screw in bonnet, the bonnet has been broken loose, (which may require slight impact,) it is then necessary to open the disc approximately to its halfway position before removing the bonnet assembly from the valve body. It is vital that no nicks or scars be put on the body or bonnet sealing areas, as this will create a leak path. It is also extremely important to make sure that the disc does not fall and hit any hard surface as it is being removed from the valve. Any mark or dent may cause leakage on the delicate seating surfaces when the valve is reassembled.~~

~~The valve body should then be installed into the pipe system using the appropriate procedures as outlined in valve installation for soldered, brazed or threaded ends. When reassembling the valve the disc should be again positioned at the approximate halfway open position before attempting to put it back in the body.~~

~~A slight amount of lubricant equivalent to about 10 weight oil should be put on the bonnet joint sealing surface of the body and the bonnet and on the top side of the bonnet when union nut joints are used. This gives lubrication to the joint so good tightening pressures can be applied. The chain or socket wrench should be used to tighten the bonnet. Stop the union nut approximately at the same place where it was when the valve was disassembled or possibly slightly past that mark. Remember any nick on the surfaces on the bonnet sealing area assures leakage.~~

After the valve has been installed, the valve should be tested to make sure that it opens and closes easily and that the bonnet joints or pipe joints are not leaking.

3.0 OPERATION

Globe valves are generally installed to be used for throttling purposes. They normally have high flow restriction and are not recommended where small pressure drops are mandatory.

A globe or angle pattern valve must be sized for the specific application, this is very important. When sizing a globe valve for throttling in either the straight or angle pattern it is important to avoid tight throttling. A valve sized too large that is tightly throttled can increase the velocity of the fluid to the point that it can cut (wire draw) through the seat and/or disc. When the valve is then shut off, it will leak badly.

4.0 TROUBLESHOOTING

4.1 LEAKAGE THROUGH THE BONNET JOINT

If the bonnet joint leaks, the valve should be isolated and depressurized. The bonnet should be removed according to instructions in Section 2. The seating surfaces of the bonnet and body should be closely inspected. If there is any scratch or mark on these surfaces then it is necessary that a flat surface sanding plate of 400 grit be used on the body to remove all the scratches. After the scratches are removed, blueing should be applied to a flat plate and put onto the bonnet surface, if there are no high spots on the bonnet surface, then it is prepared for reassembly. If there are scratches or nicks that are evident on the bonnet surface, it is necessary that it be indicated in a lathe and a very slight cut taken off of the bonnet sealing surface at an angle of approximately $2\frac{1}{2}^{\circ}$ tapered outward with a very fine 32 RMS finish. The two surfaces then can be reassembled using procedures in Section 2.

4.2 LEAKAGE THROUGH THE VALVE SEAT

~~Leakage across the valve seat most of the time is due to foreign matter lodged in the seat or scratched by some contamination in the line. Occasionally, such foreign material can be washed away by allowing flow through the valve. At times the leakage may be overcome by tightening the valve further. If the leakage persists, disassemble the valve and examine the seat surface on the disc and the seat surfaces within the body.~~

~~In the case of a bronze seated globe valve, seat leakage can be corrected by relapping the surfaces. The most effective way of doing this (in the case of a disc held onto the stem by means of a screwed in bushing) is to lock the stem and disc together, apply some fine grinding compound to the seating surfaces and slowly rotate the disc in the seat. This can be done while the valve body is still in the line after the pressure is relieved and the line.~~

FIRE PROTECTION VALVES ARE NOT RECOMMENDED FOR MAJOR REPAIR.

is drained. Care must be taken not to overlap the disc and seats or cause deep grooves in the seating surfaces, this can ruin the seating surfaces. To check for a good seating match - clean both the disc and the seat, then rotate the disc in the seat with as little pressure on the seat as possible. Remove the disc from the seat and examine both. A thin shiny line of contact should appear all the way around on both. It is important the line be unbroken, if it is, the steps outlined above must be repeated until the line is unbroken. After this is completed the stem should then be reinserted into the bonnet, the disc should be unlocked then be reassembled as outlined in Section 2.

In the case of a soft seated globe or angle valve, using this material such as teflon or Buna-N it is sometimes necessary to replace the soft disc to renew the function of the valve.

In order to do this, the bonnet should be removed carefully as outlined for bronze disc valves and the washer replaced. In some cases, it is sometimes possible to turn the disc around and use the other side of the disc to seat against the body seat. Care must be taken to assure that a good seal is made within the disc cage on the back side of the disc so that leakage does not occur through the cage.

On valves which have the 500 Brinell seat and disc relapping can be accomplished using the same procedures as outlined for bronze disc. Due to the configuration of the seats it is advisable after the lapping operation has been completed to put blueing onto the disc and tested against the seat to see that there are no high points which will eventually cause leakage. Another caution should be that the seat ring in the body should be tested to see that it has not become loosened.

FIRE PROTECTION VALVES ARE NOT RECOMMENDED FOR MAJOR REPAIR.

4.3 LEAKAGE THROUGH THE STUFFING BOX

Leakage through the stuffing box packing may be stopped by tightening the packing nut. Excessive tightening may cause difficult operation of the valve and could cause damage to the stem or packing nut.

If the gland has run out of travel, isolate and depressurize the valve for repacking or the addition of more packing. Repacking of valves under pressure is not a recommended practice. This is dangerous and could result in serious injury even if the valve appears to be back-seated. Foreign matter may have accumulated on the back seat, or by accident the stem could be knocked off the back seat position thereby allowing dangerous fluids to injure maintenance personnel.

Remove the handwheel packing nut and gland to remove the old packing. If the packing is removed, discard and do not try to put it back once it has been removed. Clean the stem and examine it for damage. On very small valves the packing is sometimes rope and is sometimes spiral wound around the stem and pushed into the stuffing box. Install

the new packing which may be one piece purchased from NIBCO or split rings. If it is split ring rope packing install one ring at a time with the diagonal cut in each ring being staggered 90° away from the cut in the ring below. Each ring should be firmly compressed in the stuffing box after it is placed in position before the next ring is added. Install the gland bushing and packing nut and tighten down. The packing nut should be tightened only enough to prevent leakage. Pressurize the valve and check the packing for leakage.

5.0 MAINTENANCE

5.1 TOOLS AND EQUIPMENT

Standard wrenches and tools are suitable for servicing valves as follows:

- A. For removing bonnet of the union type - a chain wrench is normally used or the appropriate socket that will fit the bonnet union nut. For screw in type bonnets - generally a socket wrench or open end wrench may be used if extreme caution is used. Pipe wrenches on union nuts or screw in bonnets have a definite crushing action which will deform the component and are not recommended.
- B. A Standard packing tool can be used and/or a blunt hook is generally used to remove packing rings. A screwdriver to raise the packing gland if it is in the fully down position and generally open end wrenches are used to tighten the packing nut.
- C. ~~Combination oil stone and flat plate glass, used with fine 400 grit sandpaper to polish flat surfaces. Precision flat plates to check high spots on flat surfaces such as bonnet, seal surface and body in conjunction with machinist blueing. Fine grinding compound will be needed for the disc and seat.~~

DOES NOT APPLY TO FIRE PROTECTION VALVES.

6.0 SPARE PARTS

Normal spare parts to be maintained on hand are listed on the NIBCO spare parts list. Fire Protection valves are not recommended for major repair due to strict testing requirements of UL and FMRC.

If the bonnet or body are damaged it is normally less expensive to remove the entire Valve from the line and install a new one.

When placing an order for spare parts it is necessary to give the size, the valve figure number found on the aluminum identification plate and also the serial letter which is cast into the valve body on its side. This will be an alphabetical letter, A, B, C, D, etc. It is vital to give the serial letter because over a period of time the valve designs

have had modifications which could render the parts useless if they are of a different letter series.

7.0 MAJOR REPAIRS

For other repairs or replacement not covered in the above description, contact the Technical Services Department of NIBCO INC. for special instructions. Always give the figure number and size shown on the identification plate affixed to the valve along with the general serial letter.