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INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

Review Date: 01/09/2023
Original Date: 01/09/2020

Installation and Maintenance Guidelines for
NIBCO® FLO-BOSS®
Iron Automatic Balancing Valves

Figure Number

W-1880

Valve Size Range and Pressure Rating

2½"→14" 600 CWP

16"→30" 225 CWP

CAUTION: Only qualified personnel should undertake the procedures outlined in this document. NIBCO INC., its agents, representatives and employees assumes no liability for the use of these procedures. These procedures are offered as suggestions only.

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I. SHIPMENT & STORAGE

NIBCO iron automatic balancing valves are packaged depending on valve size and quantity shipped. Smaller size valves are individually boxed and may be placed into a larger box or secured to a pallet. Larger size valves are individually secured to a pallet. The valve faces are covered with hardboard or plywood to protect flange sealing surfaces for valves shipped on pallets.

Valves may be shipped or stored in any position. Storage should be limited to 10 years indoors with a temperature range of 40º F to 90º F (4°C to 32°C).

II. VALVE INSTALLATION GUIDELINES

Always wear proper personal protective equipment when handling, installing, and operating valves.

NIBCO valves, depending on size and pressure rating, are designed to mate with Class 125/150 and Class 300 flange patterns in conformance to ASME B16.1, ASME B16.5, or ASME B16.47 (Series A) flange patterns. Cast iron and steel flat-face or raised-face flanges can be used with all size NIBCO valves.

In a piping system, the combined use of mixing metals which have a relatively wide electrochemical potential difference should be avoided due to the risk of galvanic reaction between the metals through the piping medium, the electrolyte. NIBCO does not recommend installing iron or steel components into predominately copper piping systems to the risk of galvanic reaction (see NIBCO Technical Bulletin **NTB-0714** for more information).

There is no minimum straight piping requirements for the inlet or outlet, however balancing valves should be installed a minimum of ten (10) pipe diameters from pump discharge piping.

NIBCO balancing valves are directional and must be installed with flow in proper direction. These valves can be installed in horizontal or vertical piping, and the flow can be up or down.

NIBCO valves include mounting hardware, studs, washers, and nuts. The P/T ports are not installed in the valves “as shipped” to prevent breakage and must be installed after valve is installed into the piping system. A lifting eye bolt is included with 5” and larger size valves and must be installed in the valve body prior to valve installation. The drain plug is also packaged with the hardware and must be installed into valve body after valve installation. Flange gaskets are customer supplied.

The P/T port seals are made of EPDM rubber. EPDM is not compatible with petroleum based oils and products. Before probes are inserted into P/T ports, a non-hydrocarbon based lubricant should be applied to the probe to assist with insertion.

Each valve is labeled with an ID tag that lists the pressure and temperature limits, operating differential pressure range, and flow in GPM. When specified, each valve is labeled with a TAG number that identifies the specific valve location matching the piping drawing(s).

NIBCO recommends the use of a pipeline Y-strainer upstream of the automatic balancing valve to remove pipeline contamination that can adversely affect valve performance.

Automatic balancing valves will not work properly if air is trapped in the valve body. Suitable air separation equipment must be installed in the system piping to allow continuous de-aeration during normal system operation.

III. VALVE INSTALLATION PROCEDURE

Always position the connecting pipe flanges accurately in the line, allowing sufficient space between the flanges for the valve. Make sure the pipe flange faces are clean of any foreign material such as

scale, metal shavings, or welding slag. Position the valve so there is adequate space to ensure probes can be inserted into the P/T ports for flow measurement checks.

1. Review the valve ID tag and verify the TAG number matches the drawing location for that specific valve. The balancing valve is supplied with canisters fitted which are selected for each valve in accordance with the flow rate specified on the purchase order and marked as such.
2. Locate the eyebolt from the mounting hardware and securely thread it into the valve body (5" and larger size valves). This eye bolt should be used to lift the valve into piping position.
3. Locate the flow direction arrow on valve body and orient the valve to match piping flow direction.
4. Carefully insert the valve and customer supplied gaskets between the pipe flanges.
5. Line-up, center and secure valve and gaskets between flanges using supplied studs, washers and nuts. In horizontal piping, position valve with the P/T ports in "vertical up" position, allowing them to be used to vent air from each side of the valve body when filling the piping with water.

6. When an isolation butterfly valve is installed in combination with the automatic balancing valve, a spacer plate shall be installed between them. This will allow the butterfly disc clearance to open. If this spacer plate is not installed, the disc will interfere with the flow canisters and not function properly. After installation, verify that the butterfly valve will open and close fully.

7. After proper orientation and alignment is verified, tighten the bolts to the minimum recommended bolt torques listed in **TABLE 1**, using a cross-over pattern as shown in **FIGURE 1**.

   NOTE: NIBCO recommends a multi-stepped process utilizing the cross-over pattern to draw the flanges against the valve at the same rate, ensuring the gaskets are compressed evenly.

8. Locate 2 P/T ports from hardware. Apply PTFE tape or pipe thread sealant to male threads. Install the P/T port with Red color strap into valve body upstream port. Install the P/T port with Blue color strap into valve body downstream port.
9. Locate drain plug from hardware. Apply PTFE tape or pipe thread sealant to male threads. Install plug into valve body.
10. Pressurize piping to valve and inspect for leakage. If leakage is observed, tighten bolts using cross-over pattern, increasing torque until leak stops.
    DO NOT EXCEED MAXIMUM TORQUES LISTED IN **TABLE 1** below.

BOLT TIGHTENING SEQUENCE

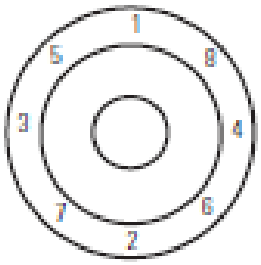

FIGURE 1

RECOMMENDED BOLT TIGHTENING TORQUES			
FLANGE SIZE	BOLT SIZE	MINIMUM BOLT TORQUE (ft./lbs.)	MAXIMUM BOLT TORQUE (ft./lbs.)
2½"→4"	5/8"-11 UNC	20	70
5"→8"	3/4" -10 UNC	30	120
10"and 12"	7/8"-9 UNC	50	200
14" and 16"	1"-8 UNC	70	240
18" and 20"	1⅛"-7 UNC	100	380
24" thru 30"	1¼"-7 UNC	140	520

TABLE 1

11. Purge air from the piping system. Then air must be purged from each side of the automatic balancing valve. With the P/T ports in the "vertical up" position, insert a lubricated probe into the P/T ports to provide a purge flow path.

IV. OPERATION

Automatic balancing valves are manufactured to a specified GPM flow rate. The valve contains one or multiple spring-loaded canisters that automatically adjust water flow to the pre-determined rate shown on the ID tag.

The flow can be verified by measuring the differential pressure across the valve using the P/T ports provided with the valve. When the differential pressure is within the limits specified on the ID tag, the flow rate will be within 5% of the specified amount. Note that pipeline contamination can restrict one of the P/T ports causing the differential pressure to read high, so make sure the valve is clean when verifying flow.
Flow rate accuracy will vary with incoming fluid temperature and specific gravity of the water mixture. The listed flow rate is suitable for glycol solutions up to 50%.

Automatic balancing valves will not work properly if air is trapped in the valve body.

V. REPAIR

No regular scheduled lubrication or maintenance is required for the balancing valve. If a butterfly isolation valve is installed, it needs to be fully cycled every 6 months, at a minimum, and inspected for smooth operation and external leakage. Pipeline Y-strainers need to be flushed periodically to clean strainer screen of trapped debris.

VI. TROUBLESHOOTING

ISSUE	POSSIBLE REASONS	POSSIBLE SOLUTIONS
LOW WATER FLOW	Y-strainer clogged	Flush Y-strainer to clean screen
	System valve is partially closed	Fully open all manual valves
	Wrong valve location	Make sure correct valve is installed, check GPM
	Low system pressure	Check the pressure at hook-up supply & return lines. The pressure drop through the coil and ATC valve may be too large for available head pressure.
	ATC valve port closed or wrong Cv	Make sure the ATC valve is wide open and has proper Cv
	Automatic balancing valve plugged	The automatic balancing valve may be contaminated with debris. Remove cartridge(s) clean or replace.
HIGH WATER FLOW	Wrong valve location	Make sure correct valve installed , check GPM
	Valve installed backwards	Check flow direction arrow on valve body. Reverse valve if necessary.
	System pressure too high	Check differential pressure across automatic balancing valve and compare with operating ΔP listed on ID Tag. If actual pressure is larger, slowly close the return-side ball valve until differential pressure is within operating ΔP range shown on ID tag.
NOISE OR VIBRATION	Differential pressure at or above rated maximum	Check differential pressure across automatic balancing valve and compare with operating ΔP listed on ID Tag. If actual pressure is larger, replace canister(s) with higher spring rate.
	Air trapped in piping and/or balancing valve	Air can cause a clicking sound. Purge system piping of all air. Purge air from both balancing valve P/T ports.
P/T PORT SEAL LEAKAGE	Probe left inserted too long	Allow additional time for seal to regain memory.
	EPDM seal is damaged	Replace P/T port with new one.

To achieve the required flow rate, different flow rate canisters may be installed in the same valve body. The flow rate of each canister is marked with code letters and symbols, along with a date code proceeded by the letter “N”. When replacing canisters, make sure the flow rate code letters & symbols match. Refer to **Flow Canister Replacement Guidelines for NIBCO FLO-BOSS Iron Automatic Balancing Valves** for flow canister replacement instructions. If the system design flow rate is changed, this can be done by replacing one or more of the canisters to achieve the new flow rate.