Manual No. 1888-PS
Issued: September 15, 2006
Revision A

INSTRUCTION MANUAL

for

½" thru 2" 1888 lb. Parallel Slide Gate Valves with Manual Tee Handles

Flowserve Corporation
Flow Control Division
1900 S. Saunders Street
P.O. Box 1961
Raleigh, NC 27603

Phone: (919) 832-0525
FAX: (919) 831-3369

Table of Contents

Revision Sheet

Revision	Date	Changes	Description
-	02/03/2004	Original Issue	
A	9/15/2006	Section 11, Rev. page	Added revision page and removed bolt torque value for part # 217.

1.0 PHYSICAL DESCRIPTION AND OPERATION OF EQUIPMENT

1.1 Parallel Slide Gate Valves

The Flowserve Corporation Parallel slide gate valve design is unique in that there are two independent discs. During each closing stroke, the two free floating parallel discs are allowed to rotate a few degrees in the plane of the seats. This rotating feature allows the disc to seat in a different position on each closing stroke, providing for equal wear and preventing small imperfections from being agitated into major leakage problems.

The disc assembly is designed to impart sufficient thrust to each disc to maintain acceptable low pressure seat leakage. As the differential pressure across the disc increases, the seating load also increases, thus maintaining acceptable leakage through the entire range of operating differential pressures. Furthermore, the differential pressure on the disc surfaces is all that is required to maintain leak tightness, and sealing is not dependent upon stem force. Since the discs are completely independent of each other and the design is essentially symmetrical, zero leakage can be maintained in either direction depending only on the direction of flow. This feature eliminates the necessity of installing a check valve to stop reverse flow.

To operate these manual valves, turn the tee handle in a clockwise direction for closure and counterclockwise for opening.

2.0 DESIGN CONDITIONS

2.1 N/A

3.0 OPERATING CONDITIONS

3.1 N/A

4.0 TEST CONDITIONS

4.1 Each valve covered by this manual has received the following hydrostatic tests with no measurable leakage:

4.1.1 A shell hydrostatic test at 1.5 times the 100°F pressure rating.

4.1.2 A seat leakage and disc closure test at 110% of the 100° F pressure rating.

4.1.3 A backseat leakage test at 110% of the 100°F pressure rating.

4.1.4 A packing test at 110% of the 100°F pressure rating.

5.0 OPERATING PRECAUTIONS AND LIMITATIONS

5.1 Maximum hydrostatic test pressure shall not exceed the values imposed by the ASME Code, Section III.

6.0 INSTALLATION INSTRUCTIONS

6.1 Lifting and Handling Requirements and Limitations

6.1.1 Good judgement should be exercised in selecting a lifting device that will safely support the unit's weight.

6.2 Installation

6.2.1 Although the valves have been shipped in a clean condition, prior to installing the valves, examine the lines and the valve ports for foreign matter and clean them thoroughly if they have been exposed to the elements; (BEFORE CLEANING IN THIS FASHION, CHECK AT THE SITE TO SEE IF A SPECIFIC CLEANING PROCEDURE SHOULD BE FOLLOWED.) Open the valves fully and flush them out with water if possible; otherwise blow them out with air or steam.

In performing this cleaning procedure, the ports should be vertical and the stem horizontal to assure complete removal of all matter that might have accumulated during storage.

6.2.2 Ensure that there is no line sag at the point of installation. Eliminate any pipeline deviation by the proper use of pipeline hangers or similar devices.

6.2.3 Where possible, install the valves with the stem vertical. When other orientations are used, take care when disassembling the valve so that the internals do not become damaged.

6.2.4 Remove the end protectors and clean the socket weld ends with a solvent such as Acetone in preparation for welding the valve into the line. The valves should then be blocked or slung into position with an apparatus that is sufficient to hold the valve assembly weight while the valve is being welded into the line. WELDING SHALL TAKE PLACE WITH THE DISCS IN THE OPEN POSITION.

6.3 Pre-Operational Checks

6.3.1 After installation the operation of manual valves should be verified by closing the valve. The valve should seat tightly with less than 60 lbs. of force on the handwheel rim. If the valve does not close tightly do not apply extra leverage; instead refer to Para. 9.4 A and B.

7.0 MAINTENANCE REQUIREMENTS

7.1 Preventive Maintenance

7.1.1 Check all nuts and bolts periodically to ensure tightness and to forestall possible leaks. Recommended torque values are presented in Section 11.0.

7.1.2 Keep valve stem clean and properly lubricated.

7.1.3 Check conditions of packing and replace as necessary.

7.2 Recommended Spare Parts

7.2.1 Recommended spare parts are gaskets, packing, disc pack and stem. The recommended quantity is one (1) set of packing and gaskets for every two (2) valves of a particular type but not less than 1 set of each type. One disc pack and 1 stem is recommended for every ten (10) valves of a particular type.

7.3 Lubrication

7.3.1 Apply a light coating of lubricant (Dow Corning Molykote 111 Compound, Dow Corning Molykote P37 paste or equal) when necessary to the threaded area of the stem.

7.3.2 The bearing area in the yoke bushing can be lubricated via the grease fitting (340) with the above mentioned lubricants.

8.0 PERIODIC INSERVICE TESTING RECOMMENDATIONS AND PROCEDURES

8.1 It is recommenced that the valve be operated from full open to full close at least once every six months.

9.0 MAINTENANCE INSTRUCTIONS

9.1 The following instructions cover the disassembly and reassembly of a gate valve. Typical valve configuration is shown in Figure 1 (see Section 12.0).

CAUTION

CHECK LINE PRESSURE: IF LINE IS STILL UNDER PRESSURE, VENT BEFORE VALVE DISASSEMBLY IS STARTED

9.1.1 Disassembly

Extreme care should be taken to ensure that the stem and discs do not separate when removed as one unit, until both are adequately supported. Failure to do so may cause damage to the disc.

After removal from the valve, care should be taken to protect the seating surface of the discs from damage. The discs should be placed in a clean area until they are ready to be replaced in the valve. THE SLIGHTEST NICK OR SCRATCH ON A SEATING SURFACE MAY PREVENT COMPLETE SHUT-OFF AND NECESSITATE EXTENSIVE REWORK OR REPLACEMENT.

(a) Place the valve in the closed position and open about one-half (1/2) of a revolution of the Tee handle.

(b) Remove the handwheel nut (240) from the yoke sleeve (017).

(c) Remove the tee handle (175) and thrust washer (147) from the yoke sleeve (017) by sliding it up and over the yoke sleeve.

(d) Remove the yoke clamp nut (233) allowing removal of the yoke capscrew (217).

(e) Rotate the yoke (011) in a counterclockwise direction to remove the body (001) and slide it up and over the yoke sleeve.

(f) Turn the yoke sleeve (017) off the stem (025).

(g) Remove the gland stud nuts (234), allowing removal of the gland bolts (210).

(h) Lift the flange gland (133) upward and remove the packing (110,112) from

the stuffing box. Removal of the packing is best accomplished with a packing hook or similar device.

(i) Loosen the gland retainer setscrews (220 until they do not make contact with the gasket retainer (033). Then turn the gland retainer (131) counterclockwise off the bonnet (002). Turn the gasket retainer (033) out of the body (001). If the bonnet (002) drops and turns with the gland retainer, grasp the stem (025) and lift to hold the bonnet, thus preventing it from rotating.

(j) Remove the pressure seal gasket (030) by carefully lifting the bonnet (002). It is imperative that the bonnet be lifted over the stem as straight as possible to eliminate the possible scoring of the stem. If the bonnet is wedged into position, carefully lift up on the stem until the gasket and bonnet come free.

(k) The stem (025), discs (004), disc carrier (178), and spring (269), can now be lifted from the valve body. As the discs (004) rise above the guides in the valve body, they should be retained to reduce the possibility of them becoming damaged by falling on the lapped surfaces (refer to figure 2).

(l) Remove the discs (004) from the disc carrier (178) and place them where they won't be damaged or scratched.

(m) The stem (025) can be removed from the upper carrier (178) by sliding it from the "T" slot. Be careful that the discs do not separate and the spring (269) is lost.

(n) At this time, the discs and seat rings may be lapped if required. The sealing surfaces should be inspected to determine if scratches or minor imperfections mat be corrected by lapping and/or replacement parts are necessary (refer to Para. 9.3 for lapping instructions).

9.1.2 **Assembly**

Assembly of the valves is simply the reverse of disassembly. Prior to reassembly, read the following special instructions.

(a) All dirt, scale and foreign matter should be removed from inside the valve body and bonnet.

(b) Check the seating surfaces to determine that scratches or minor imperfections do not exist on the discs or seat rings. If any are evident, lap these surfaces until none are visible. (Reference Para. 9.3.)

(c) Insert the stem (025) into the “T” slot in the disc carrier (178). The disc carrier (178), spring (269), and discs (004) can now be positioned onto the stem. As the stem and disc pack are lowered into the valve body, they should be contained to reduce the possibility of falling and becoming damaged.

(d) Once the stem / disc pack assembly is positioned into place, the bonnet (002) can be lowered into the body neck. Care must be taken in lowering the bonnet onto the stem to prevent possible scoring.

(e) With the bonnet resting inside the body neck, a new pressure seal gasket (030) can be inserted. Because of tolerances are close and the gasket may cock, it must be inserted with care.

(f) Thread the gasket retainer (033) into the body; tighten to the bottom of the threads and back out enough to align the packing gland bolts onto the valve body. With the gasket retainer in the proper position, the gland retainer (131) can be lowered over the stem and threaded onto the bonnet (002). The bonnet will be raised squarely until it is firmly in contact with the pressure seal gasket.

(g) Note that it is not necessary to torque the gland retainer. The bonnet is truly sealed by pressure. The only function of the retainer is to hold the bonnet in contact with the gasket until it is deformed by pressure, locking the joint together and insuring a tight seal. Since the bonnet is sealed by pressure, constant cycling may compress the gasket and necessitate tightening of the gland retainer setscrews.

(h) Once the bonnet is in the proper position, the gland retainer may require backing off to align the slots for the gland bolts. Once this has been accomplished, the gland retainer setscrews (220) should be installed and tightened.

(i) Install the packing into the bonnet in accordance with Section 9.2.

(j) Place the gland bolts (210) into the slots and through the flange gland (133) and tighten the gland stud nuts (234) (see Section 11.0)

(k) Replacement of the yoke (011), yoke sleeve (017), thrust washer (147), tee handle (175) and handwheel nut (240) can be accomplished by reversing the procedure specified in Para 9.1.1 (a), (b), (c), (d), (e), (f)

9.2 **Replacement of Packing** (Reference Figure 1)

If the valve is in service, backseat it. If the valve is not backseated be sure that line is depressurized.

(Refer to Figure 1 for referenced part designations.)

(a) Remove the two (2) Gland Stud Nuts (234) and raise the Gland Flange (133) allowing the Gland Bolts (210) to be removed.

(b) Lift the Gland Flange (133) upward and away from the stuffing box area.

(c) Use a packing hook or similar device to remove the old packing.

(d) Install the Packing (110, 112) one ring at a time - carefully placing the joint of each ring approximately 180° from the preceding piece to prevent a leakage path. It might be necessary to slightly flatten each packing ring prior to installation to allow easy insertion within the stuffing box. Do not use a pointed instrument to push the rings into position. The Gland Flange (133) can be used to seat the packing in position once a ring has been slipped within the box.

(e) Upon completely filling the stuffing box, replace the nuts and bolts and very carefully draw the packing to assure that the Gland Flange (133) is even and that the bore of the Gland Flange is concentric with the valve stem. If the Gland Flange (133) is drawn unevenly, scoring of the Stem (025) may result; or the Gland Flange might be tilted which could cause binding. Recommended torque values can be found in Section 11.0.

(f) Check the packing periodically (6-month intervals) replacing as needed.

9.3 Lapping Procedure

After the valve has been disassembled, a visual inspection of the seating surfaces of the Discs (004) and Seat Rings (013) can be made to determine if lapping is necessary to remove any minor scratches on these parts prior to assembling the valve. The following procedure should be followed:

(a) The disc should be lapped on a flat grooved lapping plate, or if available, a lapping machine may be used. A "medium" grade lapping compound should be used for the first and successive applications and a "fine" grade compound similar to "Clover A Grit No. 280" should be used for the final lapping process.

(b) If it is necessary to lap the face of the seat ring, a standard lapping plate can be used of approximately the same diameter as the disc.

9.4 Trouble Shooting

A. EXCESSIVE TEE HANDLE (175) EFFORT OR BINDING

Excessive tee handle effort or binding would indicate that the Stem (025) either needs to be lubricated; or the Gland Flange (133) is too tight as a result of the Gland Stud Nuts (234) being tightened unevenly. Lubrication (Para. 7.3) should be checked at regular intervals of 6-months. To tighten the Gland Stud Nuts evenly, they should be loosened and retightened in an alternating fashion.

B. LEAKAGE BETWEEN THE DISC (004) AND SEAT (013)

This could be an indication that there is foreign matter on the seating surfaces in which case the valve should be opened and closed ONE TIME in an attempt to dislodge any matter that may have inadvertently lodged there. DO NOT OPEN AND CLOSE THE VALVE MORE THAN ONCE AS THIS MAY CAUSE PERMANENT DAMAGE TO THE SEATING SURFACES IF THE FOREIGN MATTER IS SECURELY LODGED IN PLACE. Instead, disassemble the valve and remove the sources of the trouble. If no foreign matter is found, inspect the seating surfaces of the valve for signs of a scarred or damaged seat - in which case the seating surfaces of the Disc (004) and Seat Ring (013) should be lapped until no visible defects remain. (Refer to Para. 9.3)

C. LEAKAGE AROUND STEM (025) AND THRU THE STUFFING BOX

Worn Packing (110, 112). Replace the packing following the instructions set forth in Para. 9.2.

10.0 **STORAGE REQUIREMENTS**

The valves have been shipped in the closed position. Upon receipt of the valves at their destination, the crates should be examined thoroughly for signs of mishandling or damage during shipment. With the valves strapped to the shipping skids, all yoke cap and gland bolting should be checked to ensure that the joints are secure. Bolting on occasion may become loosened during shipment and handling.

The valves should then be stored in a sheltered area to protect them from the elements, dirt, and foreign material. They should not be exposed to the atmosphere, uncrated or removed from the shipping skids except in a clean area just prior to installation.

If the valves are not to be installed within a short period of time after receipt, and will require long-term storage, the following should be adhered to:

(a) They should be stored in an upright position, stem vertical, and where there is minimal temperature variation and the temperature does not drop below 50°F.

(b) In their storage condition, the valves should be wrapped in polyethylene to prevent accumulation of dust or foreign matter.

(c) The shelf life for grafoil and graphite filament packing and graphite gaskets is indefinite when stored under the proper conditions.

11.0 **BOLTING TORQUE VALUES**

At intervals of not more than six months, check the tightness of all bolting. The recommended torque values for all bolting are shown below:

Part #	Description	Size	Material	Torque (ft-lb) Nominal	Maximum
233	Yoke Clamp Nut	3/8-16	A194-2H	35	45
234	Gland Stud Nut	3/8-16	A194-8M	6	15
240	Handwheel Nut	1”-8	AISI 316	25	50

NOTE: The above table provides nominal design torque values and maximum torque values using an assumed friction coefficient of 0.2. The maximum torque values provide for material conditions such as rust and oxides that exist after equipment is in service.