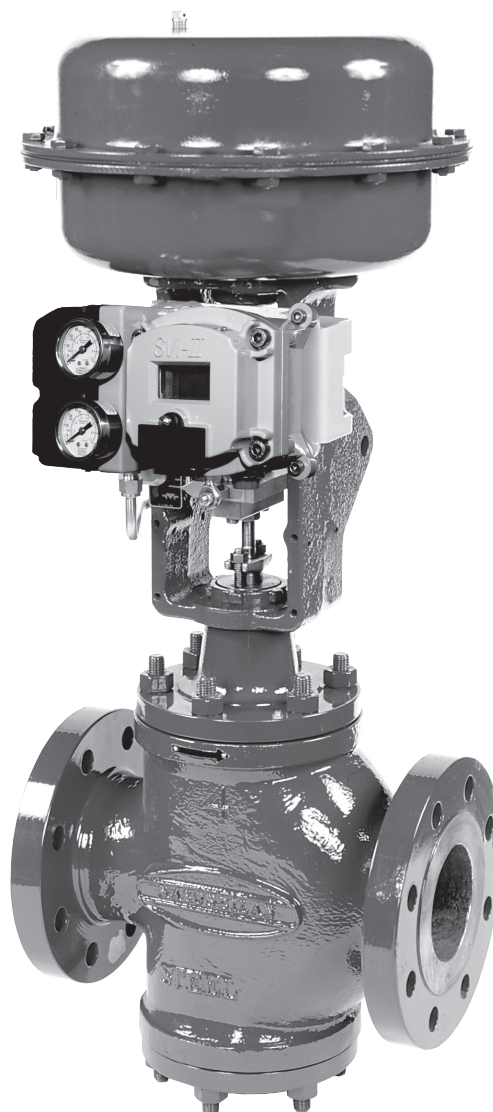


# Masoneilan™ 10000 Series

Double Ported Globe Valve

Instruction Manual (Rev.B)



**THESE INSTRUCTIONS PROVIDE THE CUSTOMER/OPERATOR WITH IMPORTANT PROJECT-SPECIFIC REFERENCE INFORMATION IN ADDITION TO THE CUSTOMER/OPERATOR'S NORMAL OPERATION AND MAINTENANCE PROCEDURES. SINCE OPERATION AND MAINTENANCE PHILOSOPHIES VARY, BAKER HUGHES COMPANY (AND ITS SUBSIDIARIES AND AFFILIATES) DOES NOT ATTEMPT TO DICTATE SPECIFIC PROCEDURES, BUT TO PROVIDE BASIC LIMITATIONS AND REQUIREMENTS CREATED BY THE TYPE OF EQUIPMENT PROVIDED.**

**THESE INSTRUCTIONS ASSUME THAT OPERATORS ALREADY HAVE A GENERAL UNDERSTANDING OF THE REQUIREMENTS FOR SAFE OPERATION OF MECHANICAL AND ELECTRICAL EQUIPMENT IN POTENTIALLY HAZARDOUS ENVIRONMENTS. THEREFORE, THESE INSTRUCTIONS SHOULD BE INTERPRETED AND APPLIED IN CONJUNCTION WITH THE SAFETY RULES AND REGULATIONS APPLICABLE AT THE SITE AND THE PARTICULAR REQUIREMENTS FOR OPERATION OF OTHER EQUIPMENT AT THE SITE.**

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## Safety Information

### Important - Please read before installation

These instructions contain **DANGER**, **WARNING**, and **CAUTION** labels, where necessary, to alert you to safety related or other important information. Read the instructions carefully before installing and maintaining your control valve. **DANGER** and **WARNING** hazards are related to personal injury. **CAUTION** hazards involve equipment or property damage. Operation of damaged **equipment can, under certain operational conditions, result in degraded process system performance that can lead to injury or death. Total compliance with all DANGER, WARNING, and CAUTION notices is required for safe operation.**



This is the safety alert symbol. It alerts you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.



When used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, could result in property damage.

**Note: Indicates important facts and conditions.**

## About this Manual

- The information in this manual is subject to change without prior notice.
- The information contained in this manual, in whole or part, shall not be transcribed or copied without Baker Hughes's written permission.
- Please report any errors or questions about the information in this manual to your local supplier.
- These instructions are written specifically for the 10000 Series Control Valve, and do not apply for other valves outside of this product line.

## Useful Life Period

The current estimated useful life period for the 10000 Series Control Valve is 25+ years. To maximize the useful life of the product, it is essential to conduct annual inspections, routine maintenance and ensure proper installation to avoid any unintended stresses on the product. The specific operating conditions will also impact the useful life of the product. Consult the factory for guidance on specific applications if required prior to installation.

## Warranty

Items sold by Baker Hughes are warranted to be free from defects in materials and workmanship for a period of one year from the date of shipment provided said items are used according to Baker Hughes recommended usages. Baker Hughes reserves the right to discontinue manufacture of any product or change product materials, design or specifications without notice.

### **Note: Prior to installation:**

- The valve must be installed, put into service and maintained by qualified and competent professionals who have undergone suitable training.
- All surrounding pipe lines must be thoroughly flushed to ensure all entrained debris has been removed from the system.
- Under certain operating conditions, the use of damaged equipment could cause a degradation of the performance of the system which may lead to personal injury or death.
- Changes to specifications, structure, and components used may not lead to the revision of this manual unless such changes affect the function and performance of the product.

# 1. Introduction

The following instructions are designed to assist maintenance personnel in performing most of the maintenance required on the 10000 Series valve.

Baker Hughes has highly skilled service people around the world available for startup, maintenance and repair of our valves and component parts. In addition, a regularly scheduled training program is conducted to train customer service and instrumentation personnel in the operation, maintenance and application of our control valves and instruments. Arrangements for these services can be made through your local Baker Hughes Representative. When performing maintenance use only Baker Hughes replacement parts. Parts are obtainable through your local Masoneilan Representative. When ordering parts always include Model and Serial Number of the unit being repaired. These installation and maintenance instructions apply to all sizes and ratings of the Masoneilan 10000 Series control valves, regardless of the type of trim used. The model number, size and rating of the valve are shown on the identification tags located on the actuator. Refer to Figure 1 to identify valve nomenclature.

## 2. Unpacking

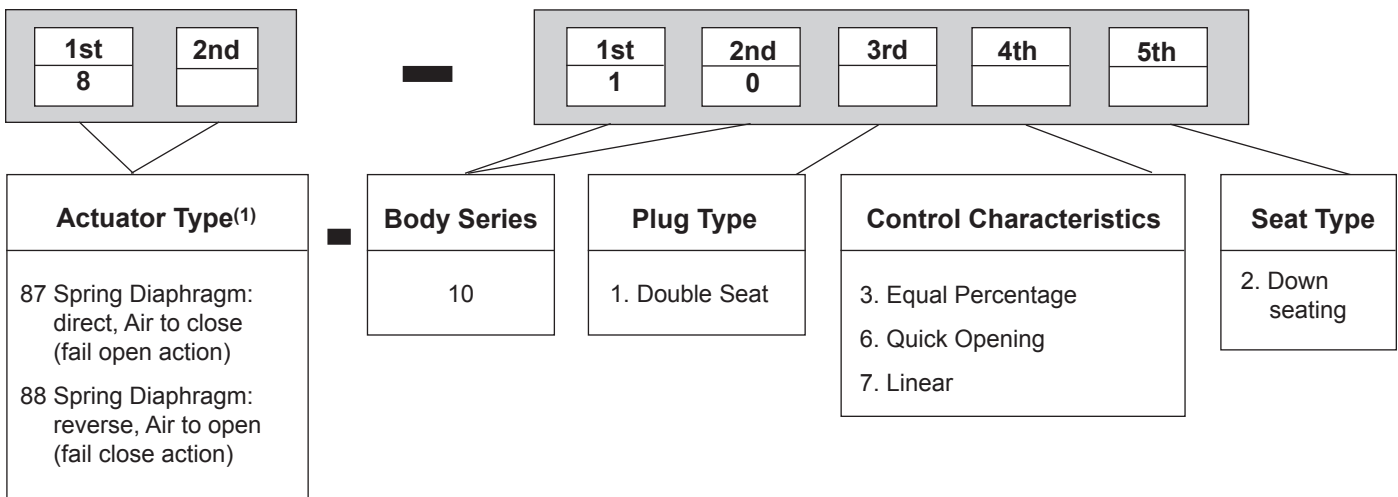
Care must be exercised when unpacking the valve to prevent damage to the accessories and component parts. Should any problems arise, contact your Baker Hughes Representative or Sales Office.

## 3. Installation

### CAUTION

The valve must be installed with the flow entering between the seats. In addition, the upper plug must be installed so that the larger of the two V-notches in the plug is oriented to face the inlet of the valve.

## Numbering System



1. For Valve Travel > 2.5", use Actuator Model 37/38.

- 3.1 Before installing the valve in the line, clean piping and valve of all foreign materials, such as welding chips, scale, oil, grease or dirt. Gasket surfaces should be thoroughly cleaned to ensure leak-proof joints.
- 3.2 To allow for in-line inspection, maintenance and removal of the valve without service interruption, provide a manually operated stop valve on each side of the 10000 Series valve with a manually operated throttling valve mounted in the bypass line (See Figure 2).

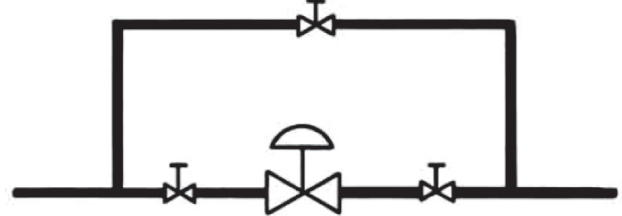


Figure 2

- 3.3 The valve must be installed so that the control substance will flow through the valve body in the direction indicated by the flow arrow located on the body or the words **in** and **out** stamped on end connections. In addition, see CAUTION above.
- 3.4 Where insulation of the valve body is required, do not insulate the valve bonnet.

## 4. Air Piping

The actuator is designed to accept 1/4" NPT air supply piping. Use 1/4" OD tubing or equivalent for all air lines. If the air line exceeds 25 feet in length or if the valve is equipped with volume boosters, 3/8" tubing is preferred. All connections must be free of leaks.

### CAUTION

Do not exceed loading pressure indicated on the warning tag located on the diaphragm cover. If no tag is present please consult the actuator instruction manual or consult the factory.

Figure 1

## 5. Body Disassembly (Refer to Figure 9)

Access to the internal components of the body should be accomplished with the actuator removed. To remove the actuator from the body, refer to the appropriate 87/88 actuator instruction 19530.

### CAUTION

Prior to performing maintenance on the valve, isolate the valve, vent the process pressure, shut off supply and signal air lines to the actuator. In addition, it is recommended that the bonnet, body and bottom flange be marked in relation to each other so the same orientation can be maintained during reassembly.

- A. Remove stem lock nuts and travel indicator if applicable.
- B. Remove packing flanged nuts (2), packing flange (3), packing follower (19) from the bonnet.
- C. Remove body stud nuts (11) from around the bonnet and bottom flange.
- D. Remove bonnet (6) bottom flange (10) gaskets (13) and plug and stem subassembly (9, 1 and 8) from the body.

**Note: If a new body gasket (13) is not available, care must be taken to preserve the old gasket for reuse. Spiral wound flexitallic gaskets are standard in the 10000 Series design, and it is recommended that a new gasket be installed each time the valve is disassembled.**

- E. Remove packing (17) and packing spacer (18) from the bonnet.
- F. Inspect all parts for wear and service damage. If bushings (14) must be removed from the bonnet or bottom flange, refer to Section 6.2. After determining the maintenance required, proceed to the appropriate section of these instructions.

## 6. Maintenance / Repair

The purpose of this section is to assist maintenance personnel by suggesting methods of component maintenance which is largely dependent on the tools and machine shop equipment available. Each section should be read and understood before proceeding.

### 6.1 Seat Ring Removal

Threaded seat rings (15 and 16) are installed tightly at the point of manufacture and after years of service they are often difficult to remove. To facilitate removal, seat ring wrenches can be fabricated to engage the seat ring lugs and adapted to a shock wrench (see Figure 3). If the ring is exceptionally resistant to removal the application of heat or penetrating oil should be helpful.

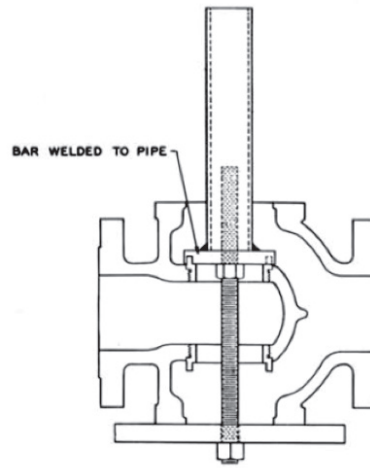


Figure 3

### CAUTION

When using heating devices, ensure that proper safety practices are observed. Such items as flammability and toxicity of the controlled substance must be considered and proper precautions taken.

### 6.2 Bushing Removal

The bushings (14) are press fit into the bonnet and bottom flange, and do not normally require replacement. However, should replacement be required, they can be pulled or machined out. When machining the bushings out, care must be taken to maintain proper dimensions and tolerances. These will be furnished upon request.

### 6.3 Lapping Seats

Lapping is the process of working the valve plug against the seat ring with an abrasive to produce a close fit. When valve leakage becomes excessive, lapping becomes necessary.

The plug and seat ring seating surfaces should be free of large dents, scratches and the contact surfaces of the seats should be as narrow as possible. This may require dressing both parts in a lathe. Both surfaces make an angle of 30° with the axis of the plug (see Figure 4).

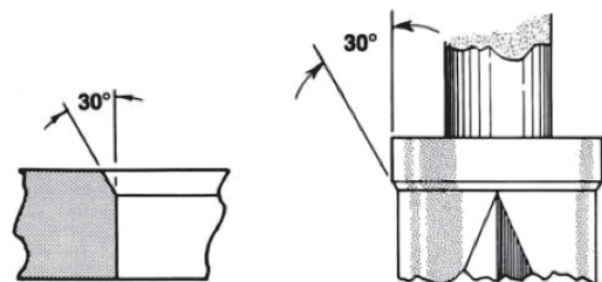


Figure 4

For the lapping operation, a good grade of fine grinding compound is required. The compound would be mixed with a small quantity of lubricant, such as graphite. This will slow the cutting rate and prevent tearing of the seating surfaces. The amount of lapping required depends on the materials, condition of seating surfaces and accuracy of machining. If a short period of lapping does not visibly improve seating there is usually no



advantage in continuing, as too much lapping may result in rough seats. The only remedy is replacement or re-machining of one or both parts. When lapping new plug and seat ring, begin with medium compound and finish with fine.

## CAUTION

Before lapping plug and stem must be true (see pinning operation, section 6.4).

**Note:** Seat repair in a double seated valve is critical. In a new valve the distance between the upper and lower seat ring seats is established in manufacturing and only lapping is required to make both parts close simultaneously. In the field, it is best to lap the seats first. If one of the seats is damaged beyond what is repairable by lapping, care must be taken to maintain the original distance between the seats on both the plug and seat rings. Therefore, when machining one seat of the plug or one seat ring the other must be machined in exactly the same way.

- A. Clean body gasket surface areas.
- B. When the seats have been removed, ensure that the sealing surfaces in the body bridge and the threads are thoroughly cleaned.  
**Note:** A lubricant such as *Chesterton 725* or a sealant compatible with the process should be applied sparingly, to the seat ring threads and sealing shoulder.
- C. Install and tighten seat rings using fabricated wrench used for removal. (See Figure 3).

## CAUTION

Do not over tighten. Do not strike seat ring lugs, this could distort the seat ring resulting in unwarranted seat leakage.

- D. Install bottom flange (10), ensuring bottom bushing (14) is in place and secure to the body using body stud nuts (12) spaced equally apart. Fasten the bottom flange to the body using only slight pressure and tighten evenly.

## CAUTION

Do not tighten nuts to torque specifications at this time. The bottom flange is used temporarily for guiding purposes.

- E. Apply lapping compound at several spots equally spaced around the seating areas of the plug.
- F. Insert the stem and plug assembly carefully into the body until it is seated.
- G. Place bonnet (6) on the body and using body stud nuts (12), spaced equally apart, fasten to the body using only slight pressure and tighten evenly.

## CAUTION

Do not tighten nuts to torque specifications at this time. The bonnet is used temporarily for guiding purposes.

- H. Insert two or three pieces of packing (17) into the packing box
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to assist in guiding the stem and plug during lapping.

- I. Screw a drilled and tapped rod with a tee handle onto the plug stem and secure with a lock nut. (See Figure 5).

**Note:** As an alternative, drill a hole through a flat piece of steel and fasten to the plug stem using two lock nuts.

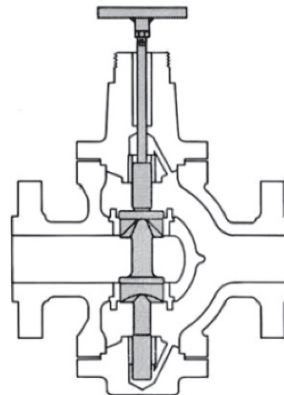


Figure 5

- J. Apply a slight pressure on the stem, rotating the stem in short oscillating strokes eight to ten times.

**Note:** The plug should be lifted and turned 90° before repeating step 10. This intermittent lifting is required to keep the plug and seat ring concentric during lapping. After completion of the lapping operation, remove body stud nuts (12) from the bonnet (6) and bottom flange (10).

- K. Remove bonnet (6) and bottom flange (10).
- L. The seat rings, plug and internal components of the valve must be cleaned of all lapping compound in preparation for reassembly.

## 6.4 Plug Stem Pinning

Valve plug and stem assemblies are normally furnished as a complete assembly in which case the installation involves no problem. It is only necessary to lap the plug and seat ring and assemble the valve. If it is necessary to replace the plug it is recommended that a new stem be used. If the old stem must be used, it is necessary to determine if the stem will be long enough since the stem will require cutting. If the stem does not engage the actuator stem by a minimum of one stem diameter, the old stem should not be used. If it does not engage a minimum of one stem diameter, proceed as follows.

**Note:** While pinning is being performed, care must be taken not to damage the seating surface and plug guides.

- A. Using a drift punch, drive out the old pin (8).  
**Note:** If it is necessary to drill out the pin, a drill somewhat smaller than the pin should be used and the remainder of the pin driven out.
- B. Unscrew the plug from the stem (counter clock-wise).



Figure 6

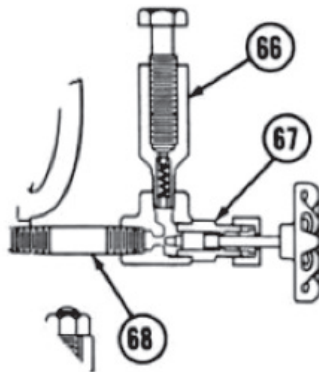
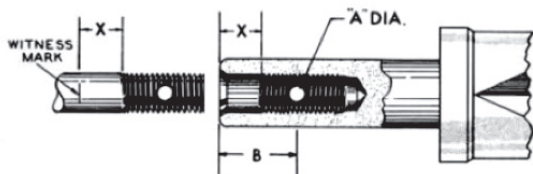


Figure 7

- C. Cut off the stem directly above the pin hole. (See Figure 6).
- D. Rethread the stem the original amount.

**Note: The area of the plug stem marked X in Figure 8, serves as a guide and must be checked to ensure a close fit in the valve plug.**



Stem Dia.	Hole Dia. "A"		"B"		"X"	
	in	mm	in	mm	in	mm
1/2	0,188	4,78	1,250	31,75	0,50	12,7
5/8	0,219	5,56	1,562	39,67	0,62	15,7
3/4	0,250	6,35	1,875	47,63	0,75	19,1
1	0,312	7,92	2,500	63,50	1,00	25,4

Figure 8

- E. Screw the stem solidly into the plug.
- Note: This can be checked by measuring the depth of the pilot recess in the plug (X in Figure 8), and making a reference mark on the stem the same distance from the thread. When properly assembled, the reference mark should be flush with the end of the guide section.**
- F. Place the plug guide on a V block and using a suitable size drill, drill the stem using the hole in the plug as a guide.
  - G. Remove any burrs from the plug guide by making a slight counter bore.
  - H. Select the correct size pin, apply a small amount of grease on it and press into the hole.
- Note: The pin must be recessed approximately 1/16" below the plug guide surface.**
- I. After the plug has been pinned it should be placed in a lathe to ensure it is running true. If it is not, strike the plug with a soft faced mallet to straighten.

**Note: The plug should be placed in a collet with the plug guide against it and the plug should be struck.**

## 6.5 Packing Box

Packing box maintenance is one of the principle chores of routine servicing. Tightness of the packing is maintained by packing compression. Compression is achieved by evenly tightening the packing flanged nuts (2) against the packing flange (3). Care must be taken not to over tighten, as this could prevent smooth operations of the valve. If all compression is used up and the valve leaks, new packing is required.

### CAUTION

**Valve must be isolated and pressure vented before performing packing box maintenance.**

Proceed as follows:

- A. Loosen and remove packing flange nuts (2).
- B. Raise packing flange (3) and packing follower (19) up the valve stem.
- C. Remove packing (17).

**Note: Only the top pieces of the old packing are removable by pulling them out the top of the bonnet. To remove all the packing the bonnet must be removed. (See appropriate section)**

- D. Replace packing. As a rule, 2/3 of the packing rings are placed below the packing spacer, and 1/3 above.

**Note: Ensure packing is inserted with skives 90° apart on successive rings.**

- E. Replace packing follower (19) and packing flange (3).
- F. Replace and tighten packing flange nuts (2).

### CAUTION

**Do not over tighten.**

- G. Put valve back in service and tighten packing only as much as is necessary to stop leaking.

**Note: In an emergency, string packing may be used as a temporary repair only and must be replaced with the correct packing as soon as possible.**

## 6.6 Packing Box (Optional Lubrication Figure 7)

In some applications, packing boxes are designed for use with a lubricator. The lubricator is provided with a ball check valve to prevent backflow of the process fluid. On some valves, an isolating valve (67) is added for positive protection against backflow. The lubricator (66) should be kept filled with the specified lubricant and turned in firmly but not tightly. One or two turns of the lubricator once every two weeks should suffice to provide the desired seal. Lubricants are available through your Baker Hughes Representative or District Office. Replacement of the packing (17) is accomplished in the same manner as the standard lubricator box. Care must be taken to ensure that the lantern ring (18) is in line with the lube hole located in the bonnet. As a rule, 2/3 of the packing rings are inserted below the lantern ring and 1/3 above.



## 7. Valve Body Reassembly

It is possible to change the valve from down seating to up seating or vice versa. However, the plug stem must be re-pinned to the opposite end of the plug. (If at all possible, a new stem should be used.) Then, simply invert the valve body and reassemble. The tolerances and clearances explained in this instruction apply to either seating direction.

After completion of the required maintenance, the valve should be reassembled using the following procedures.

**Note:** *If any of the following steps were completed during maintenance proceed to the next step. If the bonnet, body and bottom flange were marked in relation to each other, remember to align these marks to obtain the same orientation.*

- A. Clean all gasket surfaces.
- B. Apply a small amount of lubricant to the seat ring threads and sealing shoulder and install.
- C. Using seat ring wrench, fabricated for removal, tighten seat ring only enough to ensure a seal.

### CAUTION

**Do not over tighten. Do not strike the seat ring lugs. This could distort the seat ring, resulting in unwarranted seat leakage.**

**Note:** *Valve seats must be lapped before final assembly (See section 6.3).*

- D. Install bottom flange gasket (13) bottom flange (10) and loosely install body stud nuts (11). Install stem and plug assembly (1, 8 and 9).

### CAUTION

**The upper plug must be installed so that the larger of the two V notches in that plug is in line with the inlet of the valve. Placement of a witness mark on the stem may be helpful.**

- E. Install bonnet gasket (13), bonnet (6) and loosely install body stud nuts (11).

**Note:** *For ease of accessibility the bonnet should be positioned so that the packing flange studs are at right angles to the flow center line.*

### CAUTION

**Refer to Figure 10 for proper bolt torque and tightening sequence specifications. Additionally the plug must be stroked manually while evenly tightening the body stud nuts (11) around both bonnet and bottom flange to ensure proper alignment and prevent binding between the plug guides and the bushings.**

- F. Insert packing (17) and packing spacer (18).
- G. Install packing follower (19) and packing flange (3).
- H. Install packing flange stud nuts (2).

### CAUTION

**Do not tighten at this time. When placed in service they should be tightened only enough to stop leaking.**

- I. Install stem lock nuts and travel indicator on plug stem.
- J. Proceed to the appropriate actuator instructions for actuator to body assembly.

## Bolt Torque and Tightening Sequence<sup>1</sup>

Valve Size		ANSI Class	Studs		Maximum Torque <sup>(1)</sup>	
in	mm		Qty	Size (in)	ft. lbs.	m.daN
¾	20	600	6	½-13	55	7,5
1	25	600	6	½-13	55	7,5
1½	40	600	6	½-13	55	7,5
2	50	600	8	½-13	55	7,5
3	80	600	8	⅞-11	89	12
4	100	600	8	¾-10	170	23
6	150	600	12	¾-10	170	23
8	200	300	16	⅞-11	89	12
		600	20	¾-10	170	23
10	250	300	16	¾-10	170	23
		600	16	1⅞-8	428	58
12	300	300	16	⅞-9	236	32
		600	16	1½-8	789	107
14	350	-	-	-	-	-
16	400	300	16	1¼-8	332	45
		600	16	1⅞-8	789	107

<sup>1</sup> It is extremely important to tighten stud nuts evenly and in the sequence shown, otherwise damage to the guides or bushings could occur.

# 10000 Series Globe Valve - Parts Reference List

Ref. No.	Description
1	Plug Stem
2	Packing Flange Nut
3	Packing Flange
4	Packing Flange Stud
5	Drive Nut
6	Valve Bonnet
7	Valve Body
8	Plug Pin
9	Plug
10	Lower Flange
11	Body Stud Nut
12	Body Stud
13	Body Gasket
14	Guide Bushing
15	Lower Seat Ring
16	Upper Seat Ring
18	Lantern Ring (Optional)
19	Packing Follower

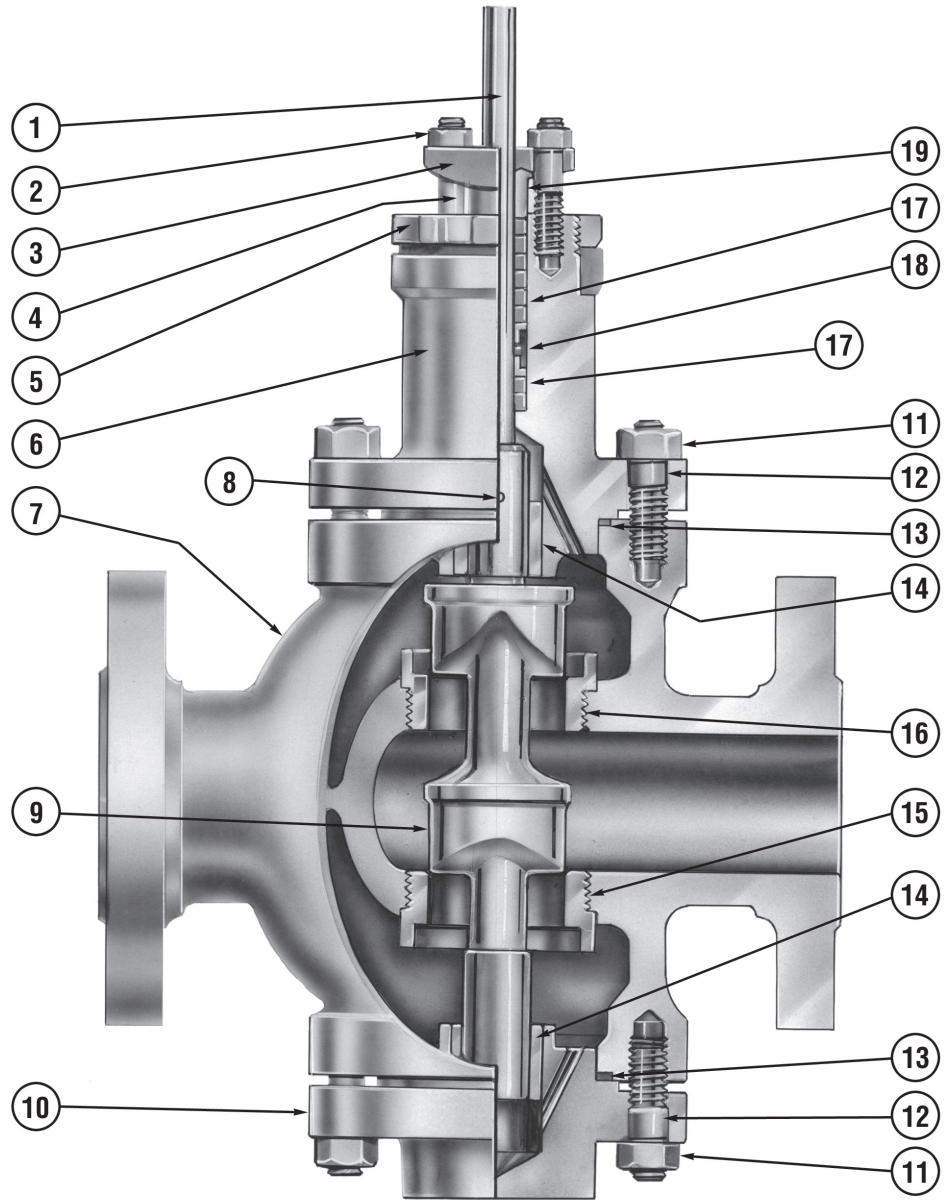


Figure 9

*Note: V-Port is shown 90° out of position. It must be installed as explained in Section 3.*

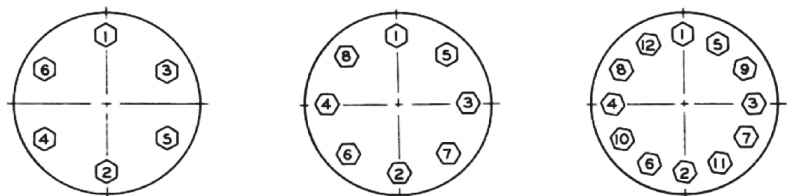


Figure 10

# Notes

# Direct Sales Office Locations

## Australia

Brisbane  
Phone: +61-7-3001-4319

Perth  
Phone: +61-8-6595-7018

Melbourne  
Phone: +61-3-8807-6002

## Brazil

Phone: +55-19-2104-6900

## China

Phone: +86-10-5738-8888

## France

Courbevoie  
Phone: +33-1-4904-9000

## India

Mumbai  
Phone: +91-22-8354790

New Delhi

Phone: +91-11-2-6164175

## Italy

Phone: +39-081-7892-111

## Japan

Tokyo  
Phone: +81-03-6871-9008

## Korea

Phone: +82-2-2274-0748

## Malaysia

Phone: +60-3-2161-03228

## Mexico

Phone: +52-55-3640-5060

## Russia

Veliky Novgorod  
Phone: +7-8162-55-7898

Moscow

Phone: +7-495-585-1276

## Saudi Arabia

Phone: +966-3-341-0278

## Singapore

Phone: +65-6861-6100

## South Africa

Phone: +27-11-452-1550

## South & Central America and the Caribbean

Phone: +55-12-2134-1201

## Spain

Phone: +34-935-877-605

## United Arab Emirates

Phone: +971-4-8991-777

## United Kingdom

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