

!!!CAUTION! Safety Precautions!!

Before beginning installation or maintenance be sure to read and understand this entire manual.

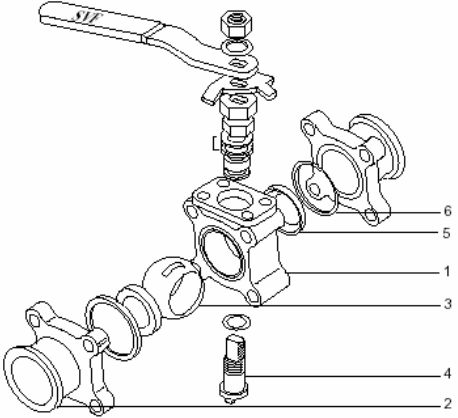
Always use protective gear.

SVF *CleanFLOW* ball valves have a ¼ turn operation closing in a clockwise direction. It is possible to see if the valve is opened or closed by the position of the handle. When the handle is in line with the tubing the valve is in the OPEN position.

MAINTENANCE

GENERAL

SVF *CleanFLOW* ball valves have a trouble-free life, and maintenance is seldom required. But when necessary, the valve may be refurbished, using a small number of components, none of which require machining. SVF valves are designed for easy servicing. The following checks should, however, help to extend valve life or reduce operation problems.



Materials

Item	Description	Material
1	Body	316L Stainless Steel
2	Body Connector	316L Stainless Steel
3	Ball	316L Stainless Steel
4	Stem	316L Stainless Steel
5	Seat	PTFE-TFM
6	Body Connector Seal	PTFE

STEM LEAKAGE

Examine the Belleville washers (Disc Springs) for damage. If in good condition, tighten the packing nut until the Belleville washers are firmly compressed, then back off 1/16th of a turn. If Belleville washers are damaged, dismantle the stem down to the *follower*, fit new Belleville washers with their outer edges touching, and replace using new gland nut. Any further maintenance requires rebuilding of the valve.

LEAKAGE AT BODY JOINT

Check for tightness in the body connector bolts. If loose, tighten body bolts evenly and diagonally across each other, alternatively until proper torque is achieved.

If there is still leakage, this will be due to damage of the seal or back-face of the seat area and will require rebuilding the valve.

!!!CAUTION! Safety Precautions!!!

Before performing maintenance on any valve, NOTE that:

Media flowing through a valve may be corrosive, toxic, flammable, or of a contaminant or harmful nature. Where there is evidence of harmful fluids having flowed through the valve, the utmost care must be taken.

It is suggested that the following minimal safety precautions be taken when handling valves.

1. Always wear eye shields.
2. Always wear gloves and overalls.
3. Wear protective footwear.
4. Wear protective headgear.
5. Ensure that running water is readily accessible.
6. Have a suitable fire extinguisher ready if media is flammable.
7. Be sure that you are aware of the fluid that has been passing through the valve before opening or dismantling any valve. Require MSDS information.

Check line gauges to ensure that no pressure is present at the valve (or actuator).

Ensure that any media is released by operating valve slowly to the half-open position.

Ideally, the valve should be decontaminated when the ball is in the half open position AND while still in the line.

AUTOMATED VALVES

Disconnect all electrical sources and supply air pressure sources from automated valves.

NEVER open or in any way tamper with an electric actuator, solenoid or any other electrically operated field device before checking and understanding the area rating. Terms like: NEMA-7, Hazardous Area Rating, Class and Division Statements all indicate that the area is specially classified and is potentially hazardous and that THE IGNITION OF HAZARDOUS ATMOSPHERE IS POSSIBLE.

DO NOT perform maintenance on any automated valve assembly that utilizes a Spring Return actuator before determining that the supply air pressure has been completely exhausted. Spring Return actuators utilize the powerful mechanical force of the springs to operate the valve upon loss of air.

Valves and accessories must not be used as a sole support of piping or human weight

Safety accessories such as safety relief (overpressure) valves are the responsibility of the system designer.

It is the user/system designer's responsibility to use insulation in high temperature applications. Refer to OSHA documents for more details.

Under normal conditions the SVF "8" Series of valves can provide a 10 year service life span. For valve operation or service that exceeds the normal service life span and outside the normal operating conditions, a periodic examination of valve integrity is required. Consult SVF for valve design and manufacturing parameters.

If these valves are used in a partially open (throttled) position for extended periods, seat life may be reduced.

Always refer to the SVF Corrosion Resistance Guide for materials selection of pressure containing components.

Refer to the Pressure/Temperature chart and ANSI B16.34 for service limitations.

Tools Required for Maintenance

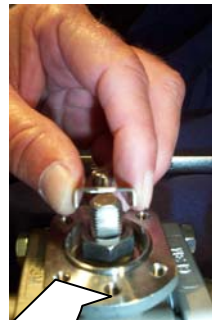
Valve Size	BODY BOLTING			
	Body Bolts	Nuts	QTY	Wrench for Body Bolts
1/2"	M6-1.0P X 50 mm LG	M6	4	10 mm Flat to Flat
3/4"	M6-1.0P X 55 mm LG	M6	4	10 mm Flat to Flat
1"	M8-1.25P X 75 mm LG	M8	4	13 mm Flat to Flat
1-1/2"	M10-1.5P X 100 mm LG	M10	4	17 mm Flat to Flat
2"	M12-1.75P X 110 mm LG	M12	4	19 mm Flat to Flat
2-1/2"	M16-2.0P X 130 mm LG	M16	4	25 mm Flat to Flat
3"	M10-1.5P X 30 mm LG	TAPPED BODY	16	17 mm Flat to Flat
4"	M12-1.25P X 30 mm LG	TAPPED BODY	16	19 mm Flat to Flat
6"	M16-2.0P X 30 mm LG	TAPPED BODY	28	25 mm Flat to Flat



Valve Size	Stem Nuts	
	Stem Nut Thread Size	Stem Nut Socket Size
1/2"	3/8"-24UNF	9/16"
3/4"	3/8"-24UNF	9/16"
1"	7/16"-20UNF	11/16"
1-1/2"	9/16"-18UNF	7/8"
2"	9/16"-18UNF	7/8"
2-1/2"	M20-2.5P	30 mm
3"	1"-14UNS	1-1/2"
4"	1"-14UNS	1-1/2"
6"	M35 - 1.5P	50mm



Valve Size	SB7-ISO MOUNTING PAD HOLES	
	MTG Tapped Holes	QTY
1/2"	M5-0.8P X 0.23" DP.	4
3/4"	M5-0.8P X 0.23" DP.	4
1"	M5-0.8P X 0.23" DP.	4
1-1/2"	M6-1.0P X 0.43" DP.	4
2"	M6-1.0P X 0.48" DP.	4
2-1/2"	M8-1.25P X 0.52" DP.	4
3"	M10-1.5P X 0.60" DP.	4
4"	M10-1.5P X 0.60" DP.	4
6"	M12 - 1.75P X 0.65" DP	4



General Information

When performing maintenance-or when operating SVF ball valves-it is important to know the exact position of the valve (OPEN or CLOSED) at all times.

In general, manual ball valves are **OPEN** when the handle (or other indicating method) is positioned **PARALLEL** to the direction of the process line.

Conversely, the valve is **CLOSED** when the handle (or other indicating method) is positioned **PERPENDICULAR** to the direction of the process line.

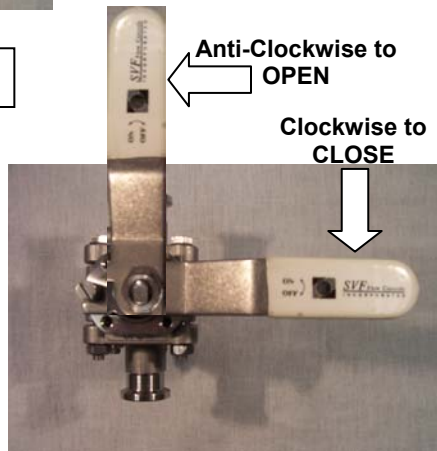
For Manual operation, the handle is rotated **Anti-Clockwise to OPEN** and **Clockwise to CLOSE**.



VALVE IS OPEN



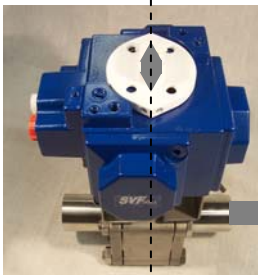
VALVE IS CLOSED



For **automated valves** the Top Mounted indicator rotates with the actuator drive shaft.

In these examples the position of the indicator is **PERPENDICULAR** to the line of flow.

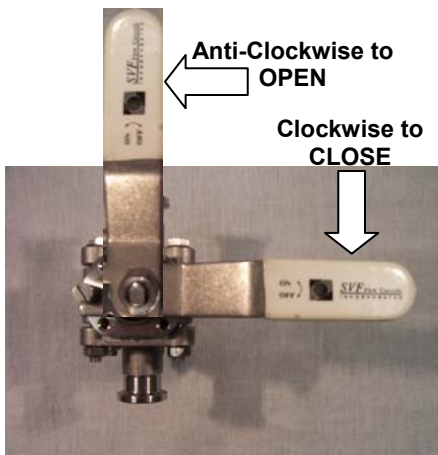
Therefore they are indicating that the valves are in the **CLOSED** position.



Tips and Techniques

The following Tips may be used when operating a valve to place it in the desired OPEN or CLOSED position during maintenance.

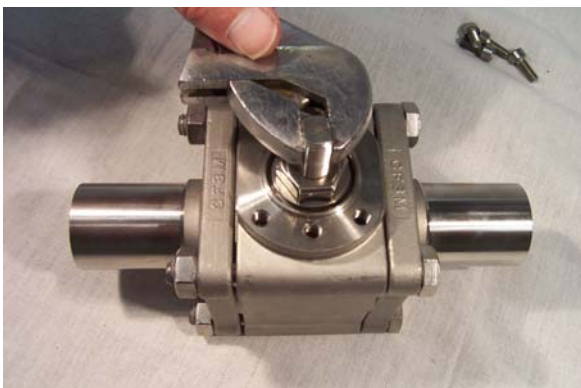
- Manual Lever Handle
- Adjustable Wrench applied to the flats of a bare stem valve. **Keep in mind that the valve stem has “flats” that indicate OPEN or CLOSED (PARALLEL and PERPENDICULAR respectively)**
- Actuator – **NEVER tamper with an actuator that is in the Automatic Mode.** When it is necessary to rotate a ball valve that has been de-commissioned, it is possible to use the loosened actuator as a lever operator. Remove the four mounting bolts from the bottom of the actuator. Rotate valve to desired position by leaving the actuator engaged with the drive coupling on the valve.



A- Manual Lever Handle



Loosened actuator may serve as a manual operating device to position a valve for maintenance.



Wrench applied to bare stem

Bare stem indicates valve position



CLOSED

OPEN

Identifying Valves and Components

SVF valves and actuators are supplied with permanently affixed or etched labels to identify them by size and materials of construction. The part numbering system is shown below.

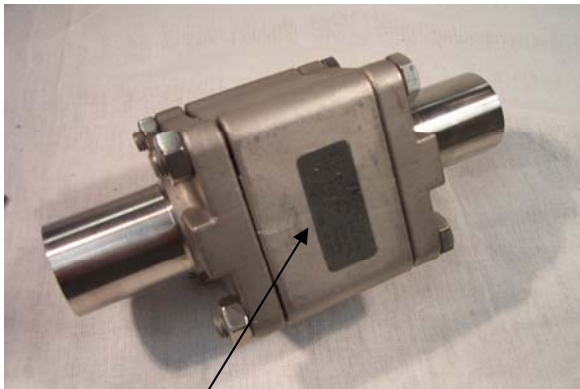
HOW TO ORDER

Part Numbering System for SVF *CleanFLOW* Series SB7 and TSB7

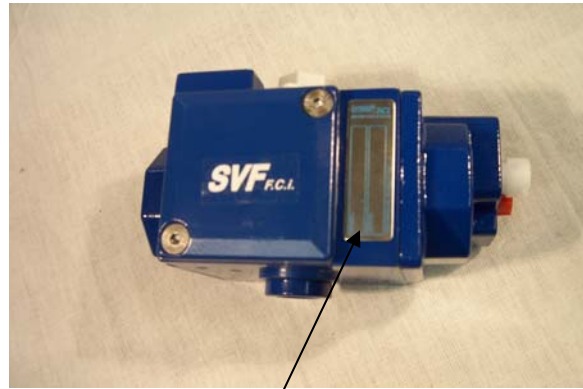
Series **SB7**

EXAMPLE							
2"	SB7	66	66	A	T	ETO	
SIZE	STYLE	BODY+END	BALL+STEM	SEAT	BODY SEAL	END CONNECTION	FLOW PATTERN*
1/2							ST1
3/4	SB7 - 2-WAY	6-STAINLESS 316L	6-STAINLESS 316L	A-TFM	T-TFE	TR-TRICLAMP	ST2
1							SL1
1 1/2	SBC7 (CAVITY FILLED)						BT1
2							BT2
2 1/2	TSB7 - 3-WAY*					ETO-EXTENDED TUBE	BL1
3							BL2
4							BL3
6							

Result: 2" SB7666ATETO
 *TSB7 is a multi-ported valve. The complete part number includes "FLOW PATTERN" column.



SVF Flow Controls, Inc.
 SB76666AT/ETO
 2" - 1500



SVF Flow Controls, Inc.
 MODEL – H25 D/A 1/90

Performing Maintenance

SVF High Purity Ball Valves (*CleanFLOW* Series SB7 and TSB7) feature a three-piece design which facilitates easy maintenance in the field or at a work bench.

“Three-Piece” means that the valve is comprised of a center section (Body) and two ends. This design also means that a valve may be supplied with two identical ends or with different ends. For instance, a valve may be supplied with an extended tube end (ETO) on one end and a Tri-Clamp fitting (TR) on the other.

All **SVF** High Purity Ball Valves are permanently labeled at the factory with the appropriate part number and may also be furnished with special tagging as required by the end user.

Although the Three-Piece design allows the valve to be maintained while remaining inline (Swing Out), **SVF** recommends that all valves be maintained on a work bench in a clean area. This means that the center section should be removed entirely from the ends/line for repair.

The Three-Piece “Swing out” steps are shown at the right. It is performed as follows:

Important! To relieve pressure in the ball cavity, always rotate the valve ball to the OPEN position before starting any maintenance and before loosening any of the body bolts.

- 1- Loosen and remove three of the four body bolts.
- 2- Loosen the fourth bolt.
- 3- Swing out the center section to expose the End Seals, Seats and ball cavity area inside the body.



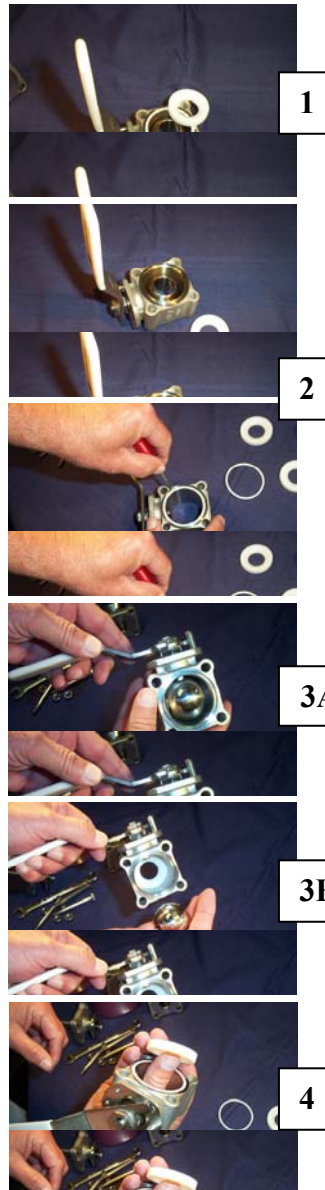
- 4- In the “Swing Out” position it is possible to perform simple replacement of the seats and seals. For Stem Seal replacement you should remove the Center Section.
- 5- To remove the Center Section simply remove the fourth body bolt.

Removing Seats and Seals

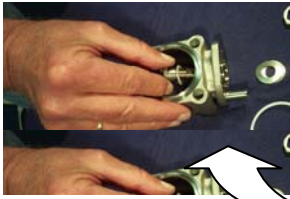
When performing a general maintenance of the valve-by replacing all of the soft components-keep in mind that the ball and stem will be re-used and should be protected from scratching and kept clean from dirt, dust and greases that will allow the attachment of deleterious particles.

Removing Seats and Seals

- 1- After removing the center section from the line, remove or pry out one of the exposed seats.
- 2- Remove or pry out each of the two body seals.
- 3- To remove the ball, rotate the handle to the "Closed" position. Push the ball out of the body through the end from which the first seat was removed. Be sure to protect the ball surface from damage.
- 4- Push out the other seat.



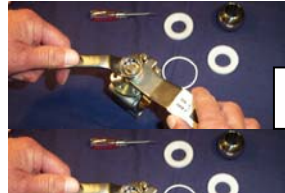
Removing the Handle and Stem Seals



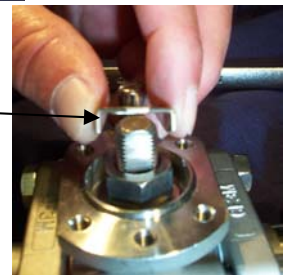
Note: The valve stem is installed/removed through the inside of the body cavity. This is because it features a “blow-out-proof” design.

Removing the Handle and Stem Seals

- 1- Hold the handle in one hand, while applying a wrench to the handle retaining nut. This will keep the stem from rotating while removing the nut.
- 2- Remove handle. This will expose the packing nut and Retainer Clip. Note: The Retainer Clip will be re-used and is an important component. When in place it prevents the packing nut from rotating loose during frequent operation. This is especially important with automated valves which are generally not monitored as often as manual valves.
- 3- Remove Retainer Clip. Apply wrench to packing nut. You should reinstall the ball in this step. The ball can be used to prevent the stem from turning when the wrench is applied. Hold ball while turning wrench.
- 4- Push stem out through the body cavity. Avoid damage to stem. Save the Packing Nut, and Gland Follower Ring. Discard the Disc Springs (Belleville Washers).



Note: Retainer Clip



Replacing Seats and Seals



The Repair Kit – “RK”

Reading the Label

Each repair kit is labeled to show the style, size and seat/seal combination contained in the package. The package shown to the left is labeled: RK-SB7-10-AT which indicates the following:

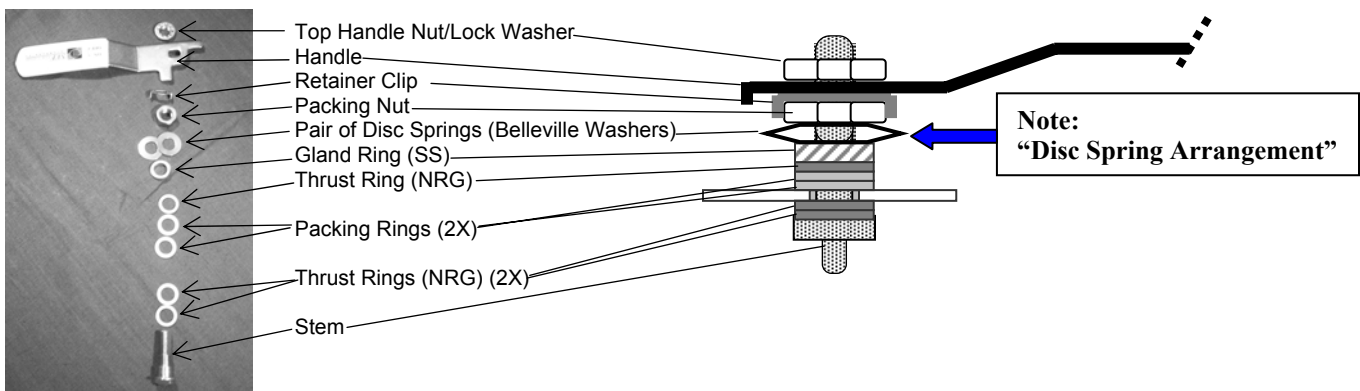
- 1- RK = “Repair Kit”
- 2- SB7= SVF Series SB7 High Purity Ball Valve
- 3- 10 = 1” (05 = ½”, 07 = ¾”, 15 = 1.5”, 20 = 2” etc.)
- 4- “A” = TFM (Seat Material), “T” = TFE (Seal Material)

Each RK contains:

- 2 X Seats
- 2 X Body Seals
- 2 X Disc Springs
- 3 X Thrust Rings <Tan/Beige in color> (2 for the stem shoulder and a third that fits below the gland ring)
- 2 X Stem Seal Rings <White>
- 1 X Printed Instructions

When repairing the valve, first reassemble and install the stem and packing (See next page for details).

A fully assembled stem assembly is shown below.

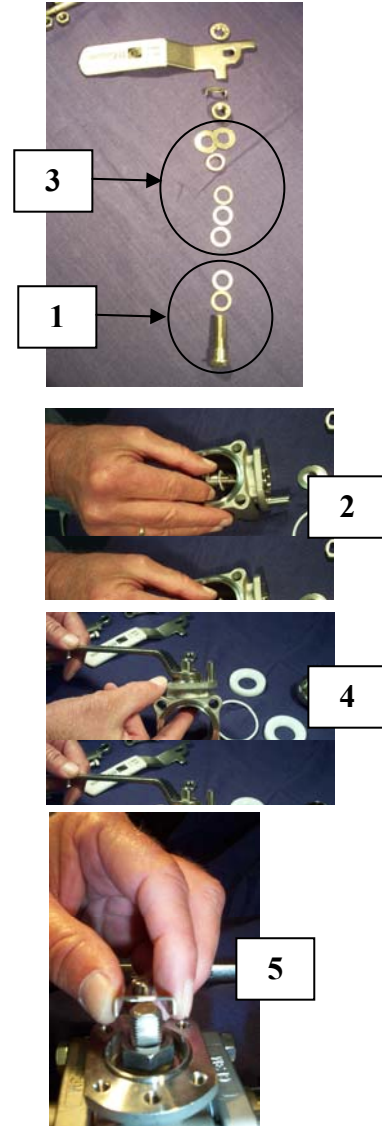


Replacing Stem and Packing

Reassemble stem and packing as follows:

When handling soft components always be careful to avoid deforming them or scratching any of the surfaces.

- 1- Slide two thrust rings <Tan/Beige in color> onto the stem all the way to the shoulder.
- 2- Insert this stage of the assembly into the stem area through the body cavity as shown in Step 2
- 3- Slide (in the following order) the Two (2) seal rings, One (1) Thrust Ring, One (1) Gland Follower Ring (Stainless Steel) and Two (2) Disc Springs onto the exposed stem. Note: The Disc springs are to be arranged such that the two concave surfaces are facing each other. See “Disc Spring Arrangement” in graphic on previous page.
- 4- Thread the packing nut onto the stem. Tighten according to the Table 1. Install the ball to assist with the tightening and to avoid the stem rotating while applying torque. NOTE: In the absence of an appropriate torque wrench for this operation, a common practice is to tighten the stem nut until the disc springs are flattened and then back off 1/16th of a turn.
- 5- Place the Retainer Clip onto the top of the Packing Nut after tightening.



VALVE SIZE	TORQUE Lbf. In.
1/2" - 3/4"	35
1" - 1.25"	80
1.5" - 2"	115
2.5"	265
3" - 4"	530
6"	650

NOTE: In the absence of an appropriate torque wrench for this operation, a common practice is to tighten the stem nut until the disc springs are flattened and then back off 1/16th of a turn.

Replacing Seats and Seals

Seat and Body Seal replacement is performed in the reverse order of the disassembly steps done previously.

When handling soft components always be careful to avoid deforming them or scratching any of the surfaces.

For assembly, do the following:

- 1- Gently place the body seals into the machined groove on each end of the body. The seals will fit snug but do not force.
- 2- Install one of the seats.
- 3- Rotate the valve stem using the handle (or wrench) to the "CLOSED" position. When the handle/lever is positioned off to the side of the body this indicates the proper position.
- 4- Place the ball into the opening and ensure that the top slot on the ball engages with the tang of the stem.
- 5- Place the second seat into the valve. Turn ball to OPEN position.
- 6- Ensure that all surfaces are clean and then place the body between the two ends. Loosely fit all of the four body bolt assemblies.
- 7- Tighten the body bolts in alternating order according to the tightening listed in Table 2.

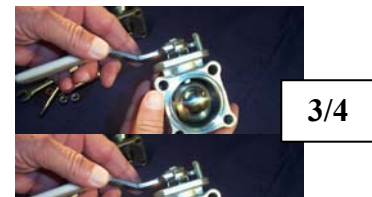
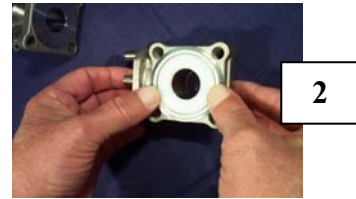
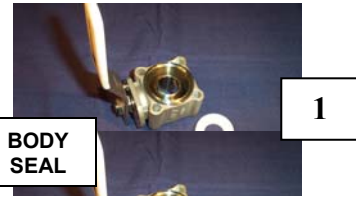


Table 2 - Body Bolt Tightness	
VALVE SIZE	TORQUE Lbf. In.
1/2" - 3/4"	80
1" - 1.25"	168
1.5" - 2"	345
2.5"	345
3" - 4"	576
6"	1450