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Formerly D-10200

**INSTALLATION, OPERATING,
AND MAINTENANCE INSTRUCTIONS**

LESLIE CLASS GTB

TOP AND BOTTOM GUIDED CONTROL VALVES

1" - 16"

ANSI ASI 150 - 600

DIN 16 - 40



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**INSTRUCTION MANUAL
TOP AND BOTTOM GUIDED CONTROL VALVE**

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INTRODUCTION

DESCRIPTION

The Leslie Top and Bottom Guided Control Valve features a high flow capacity and high pressure drop capability. It is operated by a direct action or a reverse action pneumatically powered diaphragm actuator and is available in double and single seated versions. The plugs are easily reversed in the field from "down-to close" to "up-to-close". Top and bottom guiding provides long trim life at all pressure drops. Two point guiding minimizes trim damage caused by vibration from high pressure drops. The valve is available in a wide variety of material, trim and end connection options and comes in ANSI Classes up to 600.

The valve operates on a reciprocating principle. The plug moves in a straight line into and out of a seat ring. The flow through the valve is controlled by the contour of the plug and its distance from the seat ring. The valve is either *direct or reverse acting* in that the plug can be installed to either close or open on downward movement.

INSPECTION

This equipment has been properly packaged and protected for shipping, however, if improperly handled during shipment, damage could occur. Carefully inspect equipment for damage and malfunction. If the valve has been damaged in shipment be sure to file a claim with the freight carrier.

STORAGE

Store in a clean, cool, dry location and protect from dirt, dust and other debris. If stored outdoors, wrap the equipment in plastic and store high enough off the ground to keep it from being immersed in water or buried by snow. Replace the plastic plugs in the positioner ports with pipe plugs.

REPLACEMENT PARTS

It is advised that one set of recommended spare parts be kept on hand for each valve and actuator size and type. Recommended spare parts are identified on the Assembly Drawings. Replacement parts can be ordered from your local Leslie/K& M representative or from the sales and service centers listed on the back of this manual. When ordering parts, please include the valve size and the valve number from the second line of the data plate attached to the actuator. Also include the Assembly Drawing number, part name, item number and quantity as shown on the Valve Assembly Drawing (not the exploded view) or the Actuator Assembly Drawing.

LESLIE SERVICE

Leslie service personnel are available to start up and repair our products. Leslie can also train your own personnel to do this work. Contact your nearest Leslie representative for information on this service.

WARNING AND CAUTIONS

Warnings and Cautions must be strictly adhered to in order to avoid possible personal injury or damage to the valve, piping system or to property.

SECTION I-- INSTALLATION

WARNING

Unless otherwise specified, the stem of this valve has been assembly lubricated with a silicone base lubricant that may not be compatible with your pipeline medium. Ensure lubricant compatibility with your pipeline medium prior to startup. Failure to do so may result in personal injury and/or equipment damage. Stem will need no further lubrication unless a lubricated packing is used along with a lubricator bonnet.

WARNING

Unless otherwise specified, valves with a lubricator bonnet have been factory supplied with a silicone base lubricant that may not be compatible with your pipeline medium. Ensure lubricant compatibility with your pipeline medium prior to startup. Failure to do so may result in personal injury and/or equipment damage.

WARNING

Do not apply rotating torque to a bellows bonnet valve stem as it will rupture the bellows and break the seal. The pressure rating of the bellows unit may be lower than the pressure rating of the valve. See the Bellows Unit Data Plate on the actuator spring barrel for the pressure rating of the bellows unit. If the rating of the bellows unit is lower than the rating of the valve, do not operate the valve at a pressure greater than the rating of the bellows unit.

WARNING

Wear proper protective clothing, gloves and goggles to prevent contact with pipeline medium when installing the valve on a pipeline that has previously been in service.

A. BYPASS

In order to insure continuous operation of the pipeline during inspection or repair of the valve/actuator, it is recommended that a bypass system with a second control valve be installed.

WARNING

When using pressurized air for cleaning, use proper protective goggles to prevent flying debris from entering the eyes. All persons in close proximity to the cleaning operation must be so equipped. Air pressure used for cleaning must be less than 30 psi (OSHA 1926 302 (b) (4)).

B. CLEANING

Clean the piping interior of all foreign matter such as scale, dirt, oil, and grease before installing the valve on the pipeline. Clean all valve/pipe mating surfaces such as weld bevels and sockets, threads and flange faces and clean gaskets to assure a leaktight fit. Make sure that no foreign matter has fallen into the valve.

C. INSTALLATION POSITION AND CLEARANCES

1. Make sure that the centerline of the valve body coincides with the centerline of the pipeline.
2. Install the valve/actuator assembly in a vertical position with the actuator above the valve. For installation in any other position, contact your Leslie/K&M representative for instructions.
3. Install the valve according to the arrow on the valve body. The arrow indicates the correct direction of flow through the valve.
4. Allow sufficient clearance above the actuator to permit its removal from the valve. Clearance requirements are determined by the actuator yoke size. Clearance are as follows:

Yoke Size	Clearance Requirements Above Top of Diaphragm Case
C	7"
E	7"
F	8 5"
H	9"

SECTION I - INSTALLATION, CONTINUED

D. WELD END INSTALLATION

Piping systems using butt welded valves or butt welded piping must be flushed to remove welding debris before the system is put into service. See Section III, Flush System.

1. Weld End Specifications

Butt Weld Ends conform to ANSI B16.25, Butt Weld Ends, without backing rings unless otherwise specified by the customer. Socket weld ends conform to MSS-SP84, Steel Valves - Socket Welding and Threaded Ends.

2. Welding Material

Welding material must be compatible with one of the following valve body materials:

- a Carbon Steel, ASTM A216, Grade WCB
- b 316 Stainless Steel, ASTM A351, Grade CF8M
- c C-5 Chrome Moly, ASTM A217 Grade C5
- d Other material as specified by customer

Check the actuator data plate for valve body material. It will be indicated in the "BODY DESCR" box after the valve size.

3. Welding Procedure

- a Before welding a valve into a pipeline, raise the plug to the full open position to allow air to circulate through the valve. Do not allow the valve body temperature to exceed 475°F between weld passes. Measure the temperature at a point on the valve body approximately 1/2" from the weld material. Allow the valve to cool to ambient temperature before using it.
- b Use the correct welding procedure for the pipe size, material and wall thickness and for the application for which the valve is being used.

E. THREADED END INSTALLATION

1. Thread Specifications

Threads are NPT and conform to ANSI B1.20.1, Pipe Threads, General Purpose (inch).

2. Thread Sealant

Use a thread sealant that is compatible with the pipeline medium. Apply sealant to male pipe threads only. Do not apply sealant to the first few threads on a pipe.

F. FLANGED END INSTALLATION

1. Flange Specifications

Cast iron flanges conform to ANSI B16.1, Cast Iron Pipe Flanges and Flanged Fittings. Steel and alloy flanges conform to ANSI B16.5, Pipe Flanges and Pipe Fittings.

2. Gaskets

CAUTION

Deviation from any of the following requirements could result in flange breakage and/or valve leakage.

Use only full-face gaskets with Class 125 cast iron flanges (ANSI B16.1). Gasket dimensions for cast iron flanges are in ANSI B16.21, Nonmetallic Flat Gaskets for Pipe Flanges. Gasket dimensions for steel and alloy flanges are in ANSI B16.5 with the exception of ring-joint gaskets. Dimensions for this type of gasket are in ANSI B16.20, Ring-Joint Gaskets and Grooves for Steel Pipe Flanges.

3. Bolts

Use only carbon steel bolts (meeting ASTM A307, Grade B specifications) with cast iron flanges (ANSI B16.1). Use of alloy bolts could result in the cast iron flange breaking and the valve leaking. Joints (of any material) using low strength carbon steel bolts shall not be used above 400°F (200°C) or below -20°F (-29°C) (ANSI B16.5). Bolt and nut data for cast iron flanges are in ANSI B16.1. Bolt and nut data for steel and alloy flanges are in ANSI B16.5.

4. Installation

When installing a flanged valve in pipeline, do not use the flange bolts to draw the pipe flanges into contact with the valve flanges. Make sure that one end of the piping is free to move easily toward the valve. Properly support the piping so the valve flanges are not stressed. When installing the flange bolts, use a criss-cross pattern and tighten each bolt gradually.

SECTION I - INSTALLATION, CONTINUED

G. AIR SUPPLY

1. Make sure that the air supply to the pneumatic system does not exceed the pressure limit of the actuator or the instruments. The supply air to the system must be clean, dry (see ISA-S7.3) and properly regulated. Therefore, it is recommended that a combination regulator/air filter be installed in the supply air line. Air pressure to the instruments should be at least 5 psi above the maximum pressure required to operate the valve under the most severe service conditions.

H. ACTUATOR

1. If the actuator is not equipped with a positioner, connect the air line from the controller to the actuator.
2. Reverse Action Actuator/Air to Open
 - a. Remove the shipping plug from the vent and replace it with the breather cap that comes with the actuator.

- b. Do not rotate this type of actuator on a valve before taking the following steps. Connect an air supply to the actuator. Supply enough air to lift the plug off the seat ring, then turn the actuator on the valve. If this procedure is not followed, the actuator will be difficult to turn because of friction between the plug and the seat ring. Also, turning the actuator when the plug is seated could damage the plug and seat ring contact surfaces.
3. The actuator can be turned on the valve to make the positioner more accessible for servicing. To turn the actuator, loosen the locknut on C, E and F Yokes or remove the four bolts on an H Yoke. Always raise the plug off the seat ring before turning the actuator.

I. INSULATION

When insulating a piping system, do not insulate an extended bonnet on a valve. An extended bonnet is to be used for high and low temperature extremes (above 450°F or below 32°F). Insulation will interfere with the heat transfer capabilities of the bonnet and defeat its purpose.

SECTION II - OPERATION

Perform Steps A through D before putting anything into the pipeline. Refer to the valve drawings and actuator drawings for parts identification.

A. ACTUATOR CHECK

1. Reverse Action Actuator/Air to Open - Make sure that the shipping plug in the diaphragm case vent has been replaced by a breather cap.
2. Make sure that the supply air pressure to the controller (and positioner if included) is correct and that the air is properly filtered and regulated.

B. VALVE OPERATION CHECK

Connect a regulated air line to the actuator and operate the valve through its entire stroke range. It should operate smoothly. If it does not, check the packing nuts to see if they have been tightened excessively and air causing stem binding. Check the actuator scale to make sure that the valve is operating at full stroke. Full stroke length is indicated on the actuator data plate in the "STROKE DESCR" box.

C. FAIL-SAFE CHECK

Observe the fail-safe position of the valve to make sure that it is correct when there is no air pressure to the actuator. When there is no air pressure to the actuator, the valve should be open on a direct action actuator (air-to-close) and should be closed on a reverse action actuator (air-to-open). The action of the actuator will be indicated on the actuator data plate in the "DIAPHRAGM PRESS (OPENS) or (CLOSES) PLUG" box.

D. PACKING NUTS

Tighten the packing nuts one turn past finger-tight, alternately, one half turn at a time before putting the valve in service. It is not necessary to tighten V-Ring packing as it has already been tightened at the factory. Inspect for leakage when the valve is first put into service and periodically thereafter.

E. SYSTEM FLUSH

1. It is recommended that a piping system be flushed prior to putting it in service. Debris in the pipeline could damage a valve or render it inoperable. Piping systems that have butt welded valves and/or butt welded piping must be flushed to remove welding debris.
2. If a valve has Formflo or Milflo trim, remove the seat ring before flushing the pipeline. Debris could get caught in Formflo or Milflo trim because of its small size.
3. Make sure that all valves in the system are fully opened during the flushing process.

F. ACTUATOR LINES

Connect all lines in the actuator system.

SECTION III - MAINTENANCE

Refer to the valve drawing and actuator drawing for parts identification

A. SERVICE

Leslie service personnel are available to repair and maintain our products. Leslie can also train your own personnel to do this work. Contact your nearest Leslie representative for information on this service.

B. PERIODIC MAINTENANCE

1. Packing Box Adjustment

- a Spring-Loaded PTFE V-Ring Packing - This type does not need adjusting as constant spring pressure on the packing continually compensates for wear. The packing nuts are completely tightened down when this packing is installed. Replace it as soon as it begins to leak.

CAUTION

Tighten the packing nuts only enough to stop a leak. Over-tightening the nuts will cause excessive packing wear and could cause stem binding.

- b All Packing Other Than Spring-Loaded - Tighten the packing nuts periodically to compensate for wear. Alternate between nuts, tightening them one half turn at a time with the same total number of turns on each nut. If a packing leak develops, tighten the packing nuts only enough to stop the leak. When tightening the packing nuts no longer stops a leak, replace the packing.

2. Valve Stem Cleaning

Clean the valve stem and polish it with crocus cloth. Dirt on a valve stem causes excessive packing wear.

3. Valve Stem Lubrication

- a Use the correct lubricant in the lubricator bonnet for your particular valve application. It must be compatible with your pipeline medium.
- b If the valve has a lubricator on the bonnet, turn the lubricator screw a few revolutions at regular intervals to inject a small amount of lubricant into the packing box. If the valve bonnet is equipped with an isolation valve, open it every time the

valve is lubricated and close it when done. Do not tighten the lubricator screw excessively as compressed lubricant could cause stem binding. When the lubricator screw can no longer be turned down, back it all the way out and remove it from the lubricator reservoir. Refill the reservoir with the correct lubricant leaving space in the lubricator reservoir to insert the screw.

WARNING

Unless otherwise specified, the stem of this valve has been assembly lubricated with a silicone base lubricant that may not be compatible with your pipeline medium. Ensure lubricant compatibility with your pipeline medium. Failure to do so may result in personal injury and/or equipment damage. Stem will need no further lubrication unless a lubricated packing is used along with a lubricator bonnet.

WARNING

Unless otherwise specified, valves with a lubricator bonnet have been factory supplied with a silicone base lubricant that may not be compatible with your pipeline medium. Ensure lubricant compatibility with your pipeline medium. Failure to do so may result in personal injury and/or equipment damage.

C. TRIM INSPECTION AND REPLACEMENT

It is not necessary to remove the actuator from the bonnet on a direct action valve only or remove a direct or a reverse action valve from the pipeline in order to inspect or replace the trim (plug and seat ring). The actuator, bonnet and plug can be removed as a unit from the direct action valve body. By not removing the actuator from the bonnet, this eliminates the necessity of readjusting the actuator stem to valve stem gap when remounting. Keep the work area clean so as not to introduce any foreign matter into the valve that could interfere with parts or gasket seating. Install new gaskets when reassembly. Follow the valve disassembly and assembly procedures to remove and reinstall the bonnet and replace the trim.

SECTION III - MAINTENANCE, CONTINUED

WARNING

Wear proper protective clothing, gloves and goggles to prevent contact with pipeline medium. Wear a face mask when removing asbestos gaskets. Tag all valves in the system stating the repairs being made. Wash the exterior of the valve/actuator assembly and the interior parts of the valve after disassembly. Isolate the valve, depressurize and drain the piping system, depressurize the pneumatic system and turn off the electricity to the controller (if applicable) before disassembling the valve.

Inspect the interior of the valve, the seat ring plug and insert on a soft seating plug. Check for scratches, wear and damage and repair or replace parts as needed.

NOTE: When ordering replacement parts from Leslie, See Section I for instructions.

WARNING

Wear proper protective clothing, gloves and goggles to prevent contact with pipeline medium. Wear a face mask when removing asbestos gaskets. Asbestos particles are harmful to health when inhaled. Do not use pressurized air to clean asbestos off of valve parts. Tag all valves in the system stating the repairs being made. Wash the exterior of the valve/actuator assembly and the valve interior. Isolate the valve, depressurize and drain the piping system, depressurize the pneumatic system and turn off the electricity to the controller (if applicable) before removing the valve from the pipeline.

D. REMOVAL OF VALVE FROM PIPELINE

It is not necessary to remove the valve body from the pipeline to inspect or repair it or to change the trim or packing.

1. Remove all control and supply lines to the actuator and positioner.
2. Remove all flange nuts and bolts or unscrew the valve from the pipeline.
3. Remove the valve/actuator assembly from the pipeline.

4. Remove the gaskets from the pipeline/valve flanges (if applicable).

5. Scrape the flange surfaces to remove all gaskets particles or remove the sealant from the threads with a wire brush to assure a leaktight fit when the valve is reinstalled on the pipeline.

E. REMOVAL OF ACTUATOR FROM VALVE

See actuator section.

F. VALVE MAINTENANCE PROCEDURE

Keep the work area clean so as not to introduce any foreign matter into the valve that could interfere with parts or gasket seating.

WARNING

Wear proper protective clothing, gloves and goggles to prevent contact with pipeline medium. Tag all valves in the system stating the repairs being made. Isolate the valve, depressurize and drain the piping system. Wash the exterior of the valve and flush the interior thoroughly before beginning work on it.

1. Disassembly - Top and Bottom Guided Valves

- a. Remove the lubricator bonnet connections (if applicable) so they do not get broken off when handling the valve.
- b. Loosen the packing nuts (A9).
- c. Remove the valve stem jam nuts.
- d. Remove the bonnet to body nuts.
- e. 1 - Direct Action Valves - Remove the bonnet, the plug/stem assembly and the gasket from the valve body.
2 - Reverse Action Valves - Slide the bonnet off the valve body and stem and remove the gasket.
- f. Remove the bottom cover nuts.
- g. 1 - Direct Action Valves - Remove the bottom cover (A17) and the gasket from the valve body.

SECTION III - MAINTENANCE, CONTINUED

F. MAINTENANCE PROCEDURE, CONTINUED

2 - Reverse Action Valves - Remove the bottom cover (A17), the plug/stem assembly and the gasket from the valve body

2. Inspection and Replacement of Parts

Do not replace the stem packing until the final valve reassembly

- a Clean the valve stem and polish it with crocus cloth
- b Clean the plug stems and guide bushings
- c Clean all gasketed surfaces
- d Inspect the interior of the valve, the seat rings, plug stems, plugs guide bushings, insert on a soft seating plug and the valve stem. Check for scratches, wear and damage. Check the upper threads on the stem for sharp protrusions that could damage the packing when being installed. Repair or replace parts as needed. Use a medium compatible thread lubricant when reinstalling guide bushings and seat rings

NOTE: When replacing either a plug or a valve stem, it is recommended that the plug/stem assembly be replaced together as a unit. The new plug/stem assembly will come drilled and pinned together from the factory. If the plug or stem are purchased separately, they are not drilled.

- e When installing a new stem on an old plug, screw the stem into the plug until it bottoms out. Then drill the stem through the existing hole in the plug and pin the assembly.

NOTE: When ordering replacement parts from Leslie, see Section I, Replacement Parts, for instructions.

3. Valve Action Reversal Procedure

- a Drive the pin (A12) from the plug/stem assembly
- b Unscrew the stem from the plug
- c Screw the stem into the opposite end of the plug
- d Drill and pin the plug/stem assembly

NOTE: When assembling a valve that the plug has been reversed in, reverse the bonnet and the cover on the valve body.

4. Plug and Seat Ring Lapping (optional)

For critical shutoff application, to improve the shutoff performance of a valve, the seat ring and plug may be lapped.

To check for proper seating of the plugs and seat rings, apply a light coating of Permatex non-drying Prussian Blue on the seating surface of the plugs. Install the plugs in the bonnet and place the bonnet on the valve body, securing it finger-tight with two diagonally opposed nuts. Lower the plugs onto the seat rings and rotate the valve stem 5 to 10°. Lift the plugs off the seat rings and remove the bonnet and plugs from the valve body. Inspect the seat rings. For proper seating, there should be a continuous ring of blue on the seat rings.

Use the following lapping compounds:

Steel Plug/Seat - #400 grit compound for rough lapping
#600 grit compound for finishing

Stellite
Plug Seat - #300 grit compound for rough lapping
#600 grit compound for finishing

In a double seated valve lap the plug that is making contact with the seat ring. This will wear it down and bring the other plug into contact with its seat ring. Apply a light coating of grease to the seating surface of the plug that is not making contact with its seat ring. This will prevent its becoming scratched or galled when it does contact the seat ring. When both plugs make contact with the seat rings, they must both be lapped at the same time.

Reassemble with new gaskets. They may also be used for the final valve reassembly provided they have not been damaged during this procedure.

- a Apply rough lapping compound around the perimeter of the plug on the seating surface.

NOTE: Make sure that the old packing is in the bonnet and the packing nuts are loose.

- b Assemble the valve according to Section IV, Valve Maintenance Procedure, Reassembly, #7 or #8, with the exception that only two diagonally opposed nuts are used to hold the bonnet and the cover on the valve body. Screw the nuts down finger-tight on the bonnet and the cover.

SECTION III - MAINTENANCE, CONTINUED

F. MAINTENANCE PROCEDURE, CONTINUED

NOTE: For your convenience, you may want to fabricate a "T-handle" to turn the plug during lapping. Drill a hole (slightly larger than the valve stem) in a handle. Secure the handle on the valve stem using a jam nut (B2) on the top and bottom of the handle. Use the handle to rotate the plug back and forth.

To prevent scratching or galling of the plug and seat ring contact surfaces, do not allow the full weight of heavier plugs to rest on the seat ring when lapping. Do not force the plug against the seat ring.

If the valve is reverse acting, you will raise, rather than lower the plug(s) against the seat ring(s).

- c. Screw two jam nuts on the valve stem and tighten them together. Lower the plug onto the seat ring and rotate the stem back and forth several times using a wrench on the valve stem jam nuts. Do not force the plug against the seat ring. Lift the plug off the seat ring and rotate it a quarter turn. Lower the plug onto the seat ring and rotate it back and forth several times. Continue to repeat this procedure until the plug has been rotated against the seat ring at a total of four different positions (0, 90, 180 and 270°).
- d. Disassemble the valve according to Section IV, Valve Maintenance Procedure, Disassembly, #1.
- e. Clean the lapping compound off the plug and seat ring and examine them for defects. If defects still exist, repeat the lapping procedure. If defects have been eliminated, go to Step f.
- f. Repeat the lapping procedure with the following exceptions:

- 1 - In Step a, substitute #600 grit compound in place of the rough lapping compound.

NOTE: If extreme tightness in seating is required, after using the #600 grit compound, use a #900 grit compound followed by a #1200 grit compound.

- 2 - After Step d, remove the gaskets from the valve. Clean the interior of the valve body, the gaskets, the plug, seat ring, and all other parts of the valve assembly to remove the lapping compound. Remove the jam nuts from the valve stem.

5. Plug and Seat Ring Remachining (optional)

- a. The seating surface angle as measured from the valve stem axis is 30° on the plug and 32° on the seat ring.
- b. If lapping the seat ring on a metal to metal plug/seat assembly does not eliminate the defects, it is then recommended that the seat ring be replaced. Shutoff can only be obtained if the correct angles are carefully machined on the plug and seat ring.

6. Packing Removal

Keep the work area clean so as not to introduce foreign matter into the packing box. The bonnet must be removed from the valve for this procedure.

WARNING

Wear proper protective clothing, gloves and goggles to prevent contact with pipeline medium that will be in the packing box and on the packing. Tag all valves in the system stating the work being done. Isolate the valve and depressurize and drain the pipeline. Wash the exterior and interior of the valve.

- a. Remove the packing nuts (A9) and the gland plate (A8) from the bonnet.
- b. Remove the packing gland (A7) from the packing box.
- c. Remove the valve stem from the bonnet. Clean it, then polish it with crocus cloth.
- d. Inspect the valve stem. Inspect upper valve stem threads for any sharp edges that could damage packing when being installed. Repair or replace the valve stem as needed.
- e. Remove the packing from the packing box using a hook tool. Be careful not to scratch the packing box wall.
- f. Flush out the packing box thoroughly.
- g. Clean the packing box wall.
- h. Inspect the packing box wall for damage that could interfere with an effective packing seal and inspect for edges that could damage packing when being installed. Repair or replace the bonnet as needed.

SECTION III - MAINTENANCE, CONTINUED

F. MAINTENANCE PROCEDURE, CONTINUED

NOTE: Do not repack the bonnet at this point. If repacking is done before reassembly, the packing could be damaged when the stem is put into the bonnet. The packing must be installed carefully over the stem after the valve has been reassembled.

7. Reassembly - Top and Bottom Guided Valves

Reassemble with new gaskets. The new gaskets that were used for the lapping procedure (if done) may be reused if they were not damaged.

- a Place a gasket on the cover (A17)
- b Direct Action Valves - Place the cover on the bottom of the valve

Reverse Action Valves - Insert the plug/stem assembly into the valve body. Place the cover on the bottom of the valve, sliding the bottom guide bushing over the lower plug stem.

- c Screw the nuts on the cover plate studs finger-tight. Tighten them evenly, one half turn at a time using a criss-cross pattern.

- d Place a gasket on top of the valve body.

- e Direct Action Valves - Insert the plug/stem assembly into the valve body, sliding the lower plug stem into the bottom guide bushing. Slide the bonnet over the valve stem onto the valve body.

Reverse Action Valves - Slide the bonnet over the valve stem onto the valve body.

- f Screw the nuts on the bonnet studs finger-tight. Tighten the nuts evenly with a wrench, one half turn at a time, using a criss-cross pattern.

8. Reassembly - Top Guided Valves

- a Place a new gasket on the top of the valve body.
- b Slide the bonnet over the valve stem onto the valve body. Be careful not to turn the stem when the plug is in contact with the seat ring or the plug/seat ring contact surfaces could be damaged.

- c Screw the nuts on the bonnet studs finger-tight.
- d Tighten the nuts evenly with a wrench one half turn at a time using a criss-cross pattern.

9. Packing Installation

- a The various packing types (except for the bellows bonnet) are illustrated in Figures 1 and 2. Slide the packing components one at a time carefully over the stem and into the packing box. Push the packing components to the bottom of the packing box one at a time with the packing follower. Be careful when installing PTFE V-Ring packing so as not to damage the inner or outer edges. If the edges are damaged, the packing may not seal.

- b Place the packing gland (A7) in the packing box when repacking has been completed.

- c Place the gland plate (A8) on the bonnet.

- d Place the packing nuts (A9) on the stud (A10) and finger-tighten them.

CAUTION

Tighten the packing nuts only enough to stop a leak. Over-tightening the packing nuts will cause excessive packing wear and could cause stem binding.

- e All Packing Other Than Spring-Loaded - Alternate between nuts, tightening them one half turn at a time with the same number of turns on each nut. Tighten the nuts only enough to prevent leakage.

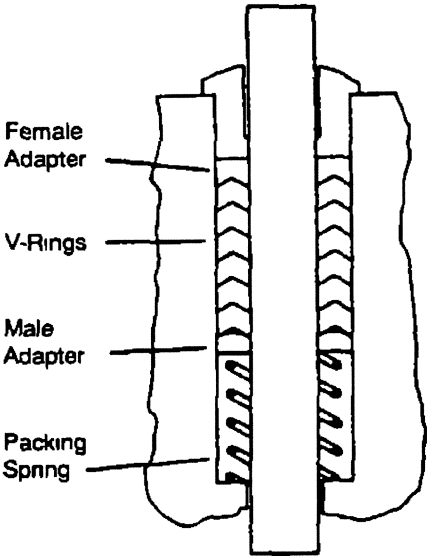
- f Spring-Loaded PTFE V-Ring Packing Only - Tighten the packing nuts (A9) completely down until they bottom out. The spring in the packing will apply constant pressure on the rings to compensate for wear. Replace this packing as soon as it begins to leak.

- g Lube Bonnet - Screw the lubricator or the isolation valve/lubricator onto the bonnet. See Section IV, Periodic Maintenance, Valve Stem Lubrication, #3 for the lubrication procedure.

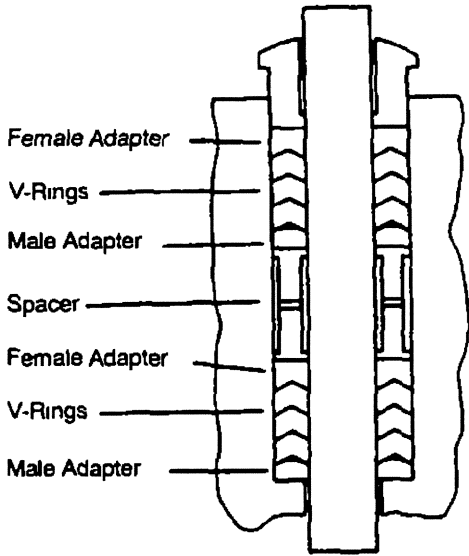
SECTION III - MAINTENANCE, CONTINUED

F. MAINTENANCE PROCEDURE, CONTINUED

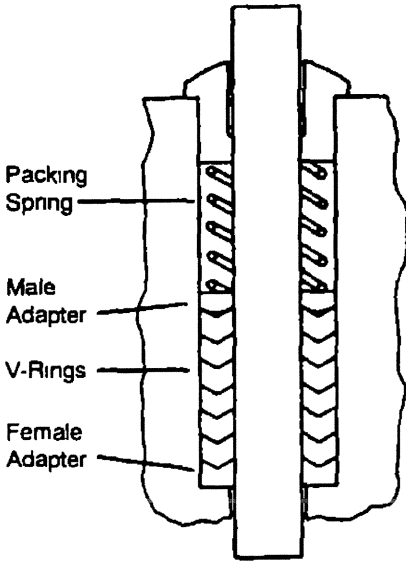
9. Packing Installation, continued



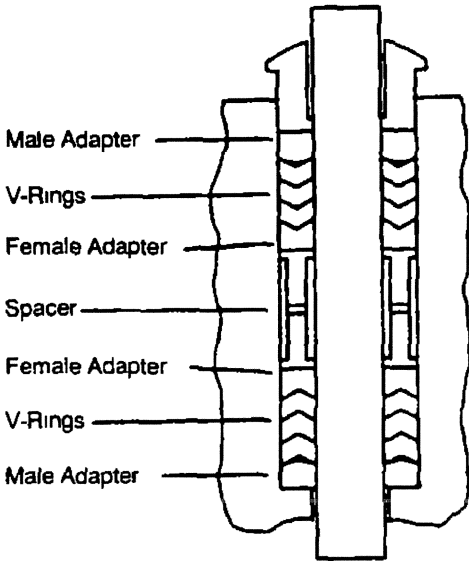
SPRING LOADED PTFE
V-RING PACKING



PTFE V-RING (DOU-
BLE PACKING)



SPRING LOADED PTFE
V-RING PACKING (VACUUM)



PTFE V-RING PACKING
(PRESSURE-VACUUM)

Figure 1

SECTION III - MAINTENANCE, CONTINUED

F MAINTENANCE PROCEDURE, CONTINUED

9. Packing Installation, continued

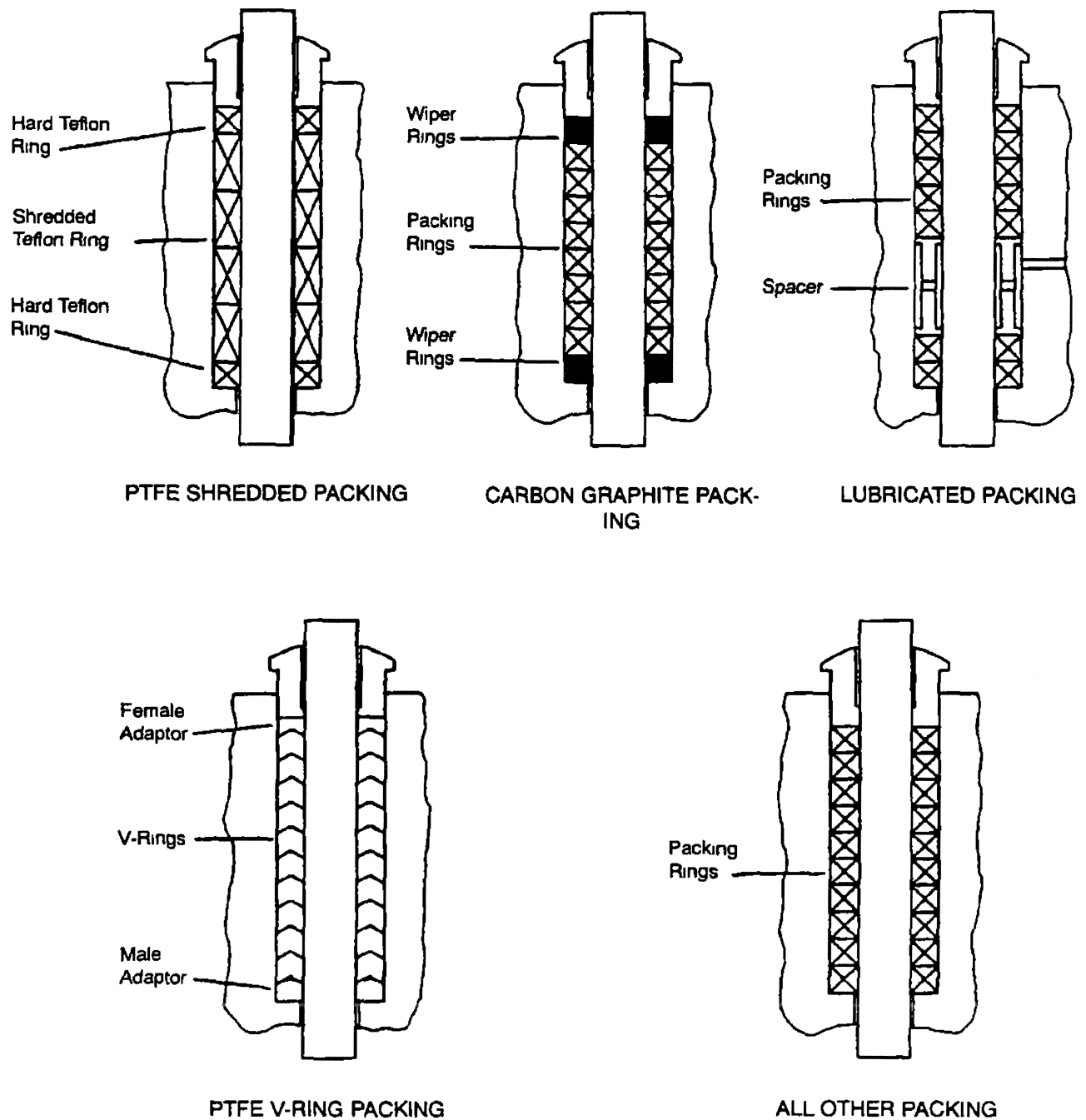


Figure 2

SECTION III - MAINTENANCE, CONTINUED

G. BELLOWS UNIT MAINTENANCE PROCEDURE

CAUTION

Do not apply rotating torque to the valve stem as it will rupture the bellows and break the seal

WARNING

If the pipeline medium is hazardous, a bellows bonnet must be equipped with a warning device that is capable of detecting a bellows rupture

WARNING

Wear proper protective clothing, gloves and goggles to prevent contact with pipeline medium. Wash the interior of the valve and all parts of the bellows unit that come in contact with pipeline medium. This includes the outer surface of the bellows and the interior of the bellows housing. There may also be pipeline medium inside the bellows, in the bonnet above the bellows flange and in the packing box if the bellows has been leaking

See the Bellows Unit Drawing (Figure 3) at the end of this section for parts identification

1. Disassembly - Direct Action Valve

- a Remove the Tell-Tale Gauge or other attachments from the bonnet tap
- b Remove the bellows housing to valve body nuts and slide the bellows unit (including the stem and plug) off the valve body, lifting straight up so as not to bend the valve stem
- c Remove the stem (6) jam nuts
- d Remove the packing nut (1) from the bonnet
- e Remove the screws (5) that hold the bonnet (3) on the bellows housing (9)
- f Pull straight up on the bonnet to remove it from the bellows housing
- g Screw the jam nuts on the stem (6) and tighten

them together

NOTE: Follow Steps i through p if the bellows is not leaking and the bellows unit is being disassembled for purposes other than to replace a damaged bellows

- h If the bellows is damaged, pull up hard on the stem (6) to free the bellows flange from the recess in the bellows housing and unscrew the stem from the torque adapter (7). If the bellows flange is stuck to the housing, place a wrench on the stem jam nuts and turn the stem counterclockwise to tear the bellows from the stuck flange. Unscrew the stem from the torque adapter, stick a screw driver into the flange hole and pry the stuck flange out of the housing recess. Go to step m
- i On a non-leaking bellows unit, make a continuous mark with a marking pen from the stem (6) to the top surface of the bellows flange
- j Lift up on the stem to free the bellows flange from the bellows housing recess. If the bellows flange can not be easily freed from the housing, go to Step l
- k Place a wrench on the stem jam nuts and slowly unscrew the stem counterclockwise from the torque adapter (7) while observing the marks on the stem and top of the flange. If the marks on the stem and flange begin to move apart, stop unscrewing the stem immediately or the bellows will be torn from the flange. Find out why the bellows is hanging up and not turning with the stem, correct the problem and continue to unscrew the stem from the torque adapter. Go to Step m
- l When the bellows flange is stuck to the housing on a non-leaking bellows, air pressure must be used to free the flange. If too much force is used in trying to pull a stuck bellows assembly out of a housing, the bellows could be damaged. Use the following procedure to free a stuck flange

NOTE: It is not necessary to install new gaskets for this procedure if the old gaskets are serviceable. Install gaskets where needed

1 - Remove the stem jam nuts

SECTION III - MAINTENANCE, CONTINUED

G. BELLOWS UNIT MAINTENANCE PROCEDURE, CONTINUED

1. Disassembly - Direct Action Valve continued

- l 2 - Replace the bonnet (3) on the bellows housing (9) and secure it with the bonnet to housing screws (5). Do not completely tighten the screws. Leave the screws loose enough to allow about 0.08" or 2mm of clearance between the bonnet and the gasket on top of the bellows flange when the bonnet is lifted up. This clearance is necessary to allow the flange to pop up when it is freed by air pressure.
- 3 - Replace the bellows unit on the valve body. Place the nuts on the valve body studs and tighten them evenly with a wrench.
- 4 - Secure gasketed blind flanges to the valve. One of the blind flanges must have an air line connector. If the valve has threaded ends, apply thread sealant to the pipe threads and screw a pipe plug into one end of the valve and a reducing bushing with an air line connector into the other end.

CAUTION

Do not exceed the pressure rating of the bellow unit or the valve body. Excessive pressure on the bellows will cause a rupture and break the seal.

- 5 - Connect an air line to the valve and slowly apply pressure until the bellows flange is freed from the housing.
- 6 - Remove the air line and the end connections from the valve.
- 7 - Remove the bellows unit from the valve.
- 8 - Remove the bonnet (3) from the bellows housing (9).
- 9 - Screw the jam nuts on the stem and tighten them together.
- 10 - Place a wrench on the stem jam nuts and slowly unscrew the stem counterclockwise

from the torque adapter (7) while observing the marks on the stem and top of the flange. If the marks on the stem and flange begin to move apart, stop unscrewing the stem immediately or the bellows will be torn from the flange. Find out why the bellows is hanging up and not turning with the stem, correct the problem and continue to unscrew the stem from the torque adapter.

- m Remove the bellows assembly (6) from the housing (9).
- n Remove the bellows flange gaskets (4).
- o Remove the plug/torque adapter assembly (10/7) from the bellows housing (9).
- p Remove the packing from the bonnet. Save for Plug and Seat Ring Lapping and the Bellows Leak Test.

NOTE: Do not repack the bonnet at this point. If repacking is done before reassembly, the packing could be damaged when the stem is put into the bonnet. The packing must be installed carefully over the stem after the bonnet, bellows assembly and bellows housing have been reassembled.

2. Disassembly - Reverse Action Valve

- a Remove the Tell-Tale Gauge or other attachments from the bonnet tap.
- b Remove the stem (6) jam nuts.
- c Remove the packing nut (1) from the bonnet.
- d Remove the screws (5) that hold the bonnet (3) on the bellows housing (9).
- e Pull straight up on the bonnet to remove it from the bellows housing.
- f Screw the jam nuts on the stem (6) and tighten them together.

NOTE: Follow Steps h through q if the bellows is not leaking and the bellows unit is being disassembled for purposes other than to replace a damaged bellows.

SECTION III - MAINTENANCE, CONTINUED

G. BELLOWS UNIT MAINTENANCE PROCEDURE, CONTINUED

2. Disassembly - Reverse Action Valve continued

- g If the bellows is damaged, pull up hard on the stem (6) to free the bellows flange from the recess in the bellows housing and unscrew the stem from the torque adapter (7). If the bellows flange is stuck to the housing, place a wrench on the stem jam nuts and turn the stem counterclockwise to tear the bellows from the stuck flange. Unscrew the stem from the torque adapter, stick a screw driver into the flange hole and pry the stuck flange out of the housing recess. Go to step l.
- h On a non-leaking bellows unit, make a continuous mark with a marking pen from the stem (6) to the top surface of the bellows flange.
- i Lift up on the stem to free the bellows flange from the bellows housing recess. If the bellows flange can not be easily freed from the housing, go to Step k.
- j Place a wrench on the stem jam nuts and slowly unscrew the stem counterclockwise from the torque adapter (7) while observing the marks on the stem and top of the flange. If the marks on the stem and flange begin to move apart, stop unscrewing the stem immediately or the bellows will be torn from the flange. Find out why the bellows is hanging up and not turning with the stem, correct the problem and continue to unscrew the stem from the torque adapter. Go to Step l.
- k When the bellows flange is stuck to the housing on a non-leaking bellows, air pressure must be used to free the flange. If too much force is used in trying to pull a stuck bellows assembly out of a housing, the bellows could be damaged. Use the following procedure to free a stuck flange.

1 - Remove the stem jam nuts

2 - Replace the bonnet (3) on the bellows housing (9) and secure it with the bonnet to housing screws (5). Do not completely tighten the screws. Leave the screws loose enough to allow about 0.8" or 2mm of clearance between the bonnet and the gasket on top of the bellows flange when the bonnet is lifted up. This clearance is necessary to allow the

flange to pop up when it is freed by air pressure.

- 3 - Secure gasketed blind flanges to the valve. One of the blind flanges must have an air line connector. If the valve has threaded ends, apply thread sealant to the pipe threads and screw a pipe plug into one end of the valve and a reducing bushing with an air line connector into the other end.

CAUTION

Do not exceed the pressure rating of the bellows unit or the valve body. Excessive pressure on the bellows will cause a rupture and break the seal.

- 4 - Connect an air line to the valve and slowly apply pressure until the bellows flange is freed from the housing.

- 5 - Remove the air line and the end connections from the valve.

- 6 - Remove the bonnet (3) from the bellows housing (9).

- 7 - Screw the jam nuts on the stem and tighten them together.

- 8 - Place a wrench on the stem jam nuts and slowly unscrew the stem counterclockwise from the torque adapter (7) while observing the marks on the stem and top of the flange. If the marks on the stem and flange begin to move apart, stop unscrewing the stem immediately or the bellows will be torn from the flange. Find out why the bellows is hanging up and not turning with the stem, correct the problem and continue to unscrew the stem from the torque adapter.

- l Remove the bellows assembly (6) from the housing (9).

- m Remove the bellows flange gaskets (4).

- n Remove the bellows housing to valve body nuts.

- o Slide the bellows housing (9) off the valve body and the plug/torque adapter assembly (10/7).

SECTION III - MAINTENANCE, CONTINUED

G. BELLOWS UNIT MAINTENANCE PROCEDURE, CONTINUED

2. Disassembly - Reverse Action Valve continued

- p Remove the cover and the plug assembly (with torque adapter attached) from the bottom of the valve body
- q Remove the packing from the bonnet. Save for Plug and Seat Ring Lapping and the Bellows Leak Test

NOTE: Do not repack the bonnet at this point. If repacking is done before reassembly, the packing could be damaged when the stem is put into the bonnet. The packing must be installed carefully over the stem after the bonnet, bellows assembly and bellows housing have been reassembled.

3. Inspection and Replacement of Parts

- a Clean the stem (6) and polish it with crocus cloth
- b Clean all gasketed surfaces
- c Clean the guide bushings and plug stems
- d Inspect the stem threads and the packing box wall for sharp protrusions that could damage the packing. Check the seat rings and guide bushings, interior of the bonnet (3) and the bellows housing (9), the bellows assembly (6), the torque adapter (7) and torque bushing (8), the plug (10), plug stems and packing nut (1) for wear or damage. Repair or replace the damaged parts as needed. Use a medium compatible thread lubricant when replacing seat rings and guide bushings.
- e To replace a torque adapter (7) or a plug (10), drive the pin (11) from the assembly and unscrew the adapter from the plug.
- f Replace the damaged parts and screw the torque adapter into the plug until it bottoms out.
- g Drill the adapter/plug assembly and pin it.

4. Plug and Seat Ring Lapping (optional)

In order to lap a plug and seat ring in a bellows bonnet valve, use the following procedure.

- a Make a valve stem from bar stock, threading it on

both ends to accept the plug on one end and the jam nuts on the other end. The stem must be as long as the combined lengths of the bellows assembly stem (6) and the torque adapter (7).

- b Screw the fabricated valve stem firmly into the plug.
- c Follow the plug and seat ring lapping procedure in Section IV, Valve Maintenance Procedure, Plug & Seat Ring Lapping, #4.

5. Plug and Seat Ring Remachining (optional)

- a Use the valve stem from the above procedure.
- b Follow the plug and seat ring remachining procedure in Section IV, Valve Maintenance Procedure, Plug & Seat Ring Remachining, #5.

6. Reassembly - Direct Action Valves

Install new valve and bellows unit gaskets during reassembly.

- a Insert the torque adapter (7) with the plug (10) attached and pinned into the torque bushing (8) in the bellows housing (9).

NOTE: The torque adapter and the torque bushing prevent any twisting motion that might be caused by the pipeline flow from being transmitted to the bellows attachment point on the bellows flange. Any rotating torque applied to the bellows could tear it from the bellows flange.

- b Place a gasket (4) in the flange recess on top of the bellows housing (9).
- c Insert the bellows assembly (6) into the housing (9) and screw it clockwise into the torque adapter (7) until it bottoms out.
- d Unscrew the bellows assembly (6) from the torque adapter (7) one complete turn. Free play is required in this connection to permit a slight rotating movement of the torque adapter within the torque bushing (8) without transmitting this torque up the bellows assembly to the bellows attachment point on the flange.
- e Place the bellows assembly flange on top of the gasket in the housing recess.
- f Place a gasket (4) on top of the bellows flange.
- g Remove the stem jam nuts.

SECTION III - MAINTENANCE, CONTINUED

G. BELLOWS UNIT MAINTENANCE PROCEDURE, CONTINUED

- h Slide the bonnet (3) over the stem (6), lower it onto the bellows housing (9) and finger-tighten the packing nut
- i Replace the housing to bonnet screws (5) Tighten them evenly using a criss-cross pattern
- j Place a gasket on top of the valve body
- k Replace the bellows unit on the valve body using the applicable steps in Section IV, Valve Maintenance Procedure, Reassembly, #7 or #8, with the exception that the plug and stem will be in the bellows unit (referred to as the "bonnet" in Section IV, Valve Maintenance Procedure, Reassembly, #7 or #8) when it is being mounted on the valve body

7. Reassembly - Reverse Action Valves

- a Place a gasket on the cover (A17)
- b Insert the plug/torque adapter assembly into the valve body through the bottom opening
- c Place the cover (A17) on the bottom of the valve, sliding the guide bushing over the lower plug stem
- d Secure the cover to the valve body Tighten the nuts evenly using a criss-cross pattern
- e Place a gasket in the flange recess on top of the bellows housing (9) and on top of the valve body
- f Lower the bellows housing (9) onto the valve body sliding the torque bushing (8) over the torque adapter (7)

NOTE: The torque adapter and the torque bushing prevent any twisting motion that might be caused by the pipeline flow from being transmitted to the bellows attachment point on the bellows flange Any rotating torque applied to the bellows could tear it from the bellows flange

- g Secure the bellows housing to the valve body Tighten the nuts evenly using a criss-cross pattern
- h Insert the bellows assembly (6) into the bellows housing and screw it into the torque adapter (7) until it bottoms out

- i Unscrew the bellows assembly (6) from the torque adapter (7) one complete turn Free play is required in this connection to permit a slight rotating movement of the torque adapter within the torque bushing (8) without transmitting this torque up the bellows assembly to the bellows attachment point on the flange

- j Place a gasket on top of the bellows flange

- k Remove the stem jam nuts

- l Slide the bonnet (3) over the stem (6) and lower it onto the bellows housing Finger-tighten the packing nut

- m Replace the housing to bonnet screws Tighten them evenly with a wrench using a criss-cross pattern

8. Bellows Leak Test

- a Secure gasketed blind flanges to the valve One of the blind flanges must have an air line connector If the valve has threaded ends, apply thread sealant to the pipe threads and screw a pipe plug into one end of the valve and a reducing bushing with an air line connector into the other end
- b Remove any attachment to the bonnet (3) tap
- c Attach an air line to the air connector on the valve
- d Apply a sufficient amount of soap solution to the bonnet tap to maintain a film across the opening

CAUTION

Do not exceed the pressure rating of the bellows unit or the valve body, whichever is lower

- e Finger-tighten the packing nut Pressurize the valve to pipeline operating pressure and observe the soap film across the bonnet tap for signs of a bellows leak Move the valve stem up and down to flex the bellows while continuing to hold operating pressure If a leak is detected, change the bellows assembly and repeat the test procedure

- f Remove the air line and the end connections from the valve

SECTION III - MAINTENANCE, CONTINUED

G. BELLOWS UNIT MAINTENANCE PROCEDURE, CONTINUED

9. Repacking

- a Remove the packing nut and the old packing and install the correct type and number of new packing components. If V-Ring packing is used, make sure that it is installed in the correct position for the type of service in your pipeline (pressure or vacuum). See Section IV, Valve Maintenance Procedure, Packing Installation, #9, Figure 1 for the proper installation position of V-Ring packing.
- b Slide the packing components one at a time carefully over the valve stem and into the packing box. Force the packing components to the bottom of the packing box one at a time with a piece of plastic pipe slightly smaller than the OD of the packing. Be careful when installing PTFE V-Ring packing so as not to damage the inner or outer edges. If the edges are damaged, the packing may not seal.
- c Screw the packing nut (1) into the packing box finger-tight.

10. Bellows Unit Drawing

NO	PART NAME	QTY
1	Packing Nut	1
2 *	Packing	-
3	Bonnet	1
4 *	Gasket	2
5	Screw	4
6 *	Stem and Bellows Assembly	1
7 *	Torque Adapter	1
8 *	Torque Bushing	1
9	Bellows Housing	1
10 *	Plug	1
11 *	Pin	1
12 *	Guide Bushing	1

* Recommended Spare Parts

Order by part name and by valve type and size. Include the valve number from the second line of the actuator data plate and the title of this drawing. Do not include the part number from this drawing.

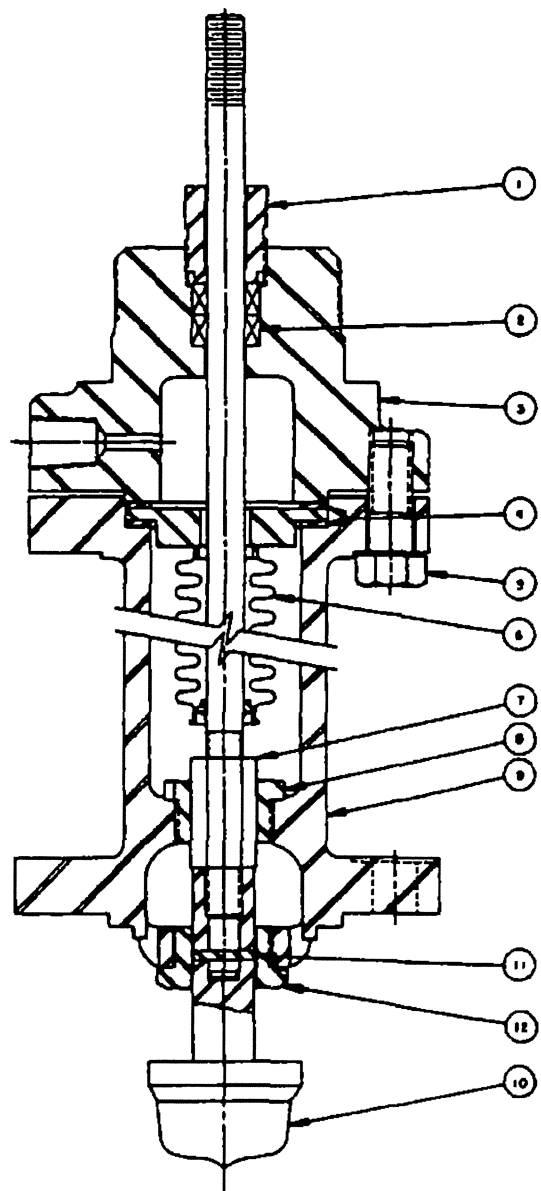


Figure 3

SECTION III - MAINTENANCE, CONTINUED

H REMOUNTING ACTUATOR ON VALVE

See actuator section

I. REINSTALLING VALVE/ACTUATOR ASSEMBLY

1. Installation Position

- a Make sure that the centerline of the valve body coincides with the centerline of the pipeline
- b Install the valve/actuator assembly in a vertical position with the actuator above the valve
- c Install the valve in the pipeline with the arrow on the valve body pointing in the same direction as *flow direction of the pipeline medium*

2. Threaded End Installation

Use a thread sealant that is compatible with the pipeline medium. Apply sealant to male pipe threads only. Do not apply sealant to the first few threads on a pipe.

3. Flanged End Installation

CAUTION

Deviation from any of the following requirements could result in flange breakage and/or valve leakage

- a Use only full-face gaskets with Class 125 cast iron flanges (ANSI B16.1). Install new gaskets on the flanges. Gasket dimensions for cast iron flanges are in ANSI B16.21, Nonmetallic Flat gaskets for Pipe Flanges. Gasket dimensions for steel and alloy flanges are in ANSI B16.5 with the exception of ring-joint gaskets. Dimensions for this type of gasket are in ANSI B16.20, Ring-Joint Gaskets and Grooves for Steel Pipe Flanges.
- b Use only carbon steel bolts (meeting ASTM A307, Grade B specifications) with cast iron flanges (ANSI B16.1). Use of alloy bolts could result in the cast iron flange breaking and the valve leaking. Joints (of any material) using low strength carbon steel bolts shall not be used above 400°F (200°C) or below -20°F (-29°C) (ANSI B16.5). Bolt and nut data for cast iron flange is in ANSI B16.1. Bolt and nut data for steel and alloy flanges is in ANSI B16.5.
- c When installing a flanged valve in a pipeline, do

not use the flange bolts to draw the pipeline flanges into contact with the valve flanges. Make sure that one end of the piping is free to move easily toward the valve. Properly support the piping so the valve flanges are not stressed. When installing the flange bolts, use a criss-cross pattern and tighten each bolt gradually.

4. Actuator Lines

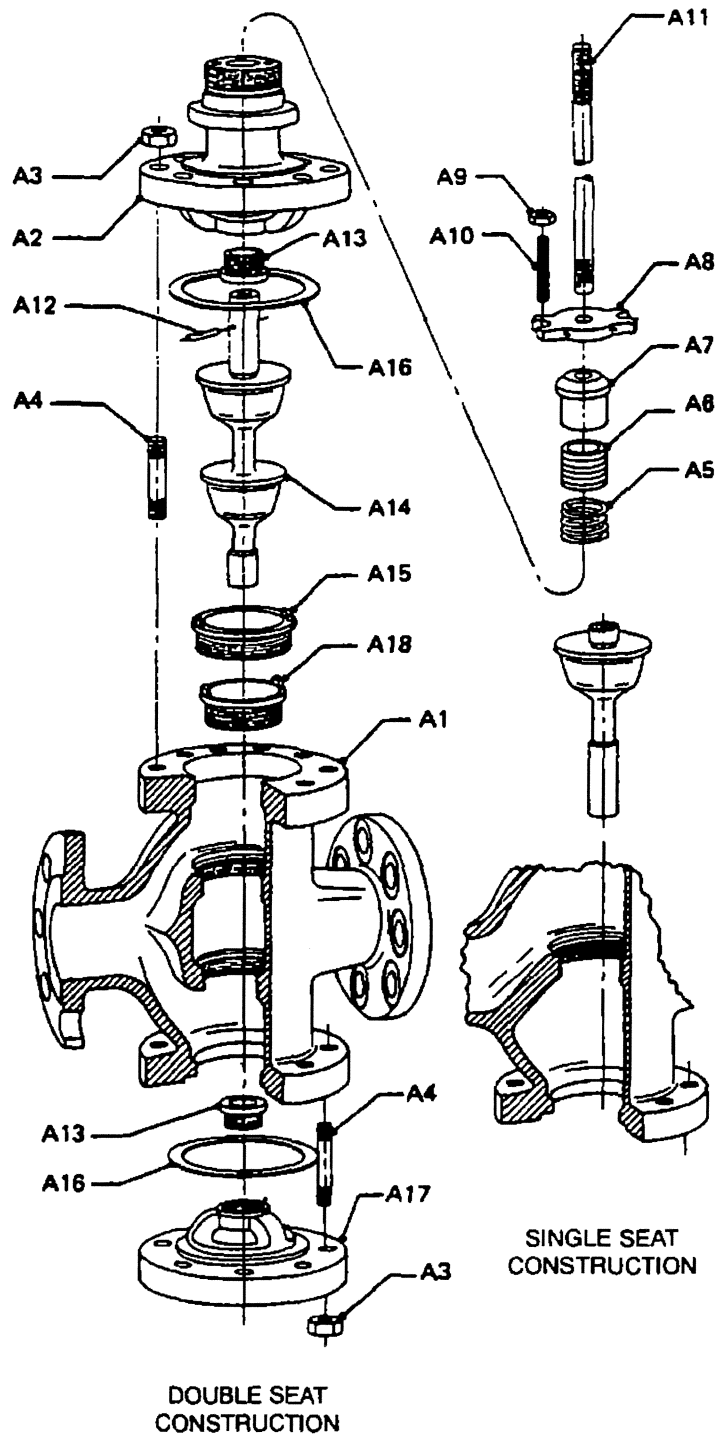
- a Connect all lines to the actuator and its control system
- b Check for air leaks at all connections

SECTION III - MAINTENANCE ,CONTINUED

I. EXPLODED VIEW OF VALVE

NO	PART NAME
A1	Body
A2	Bonnet
A3	Nut
A4	Stud
A5	Spring (V-Ring Packing)
A6 *	Packing
A7	Gland
A8	Gland Plate
A9	Nut
A10	Stud
A11 *	Stem
A12 *	Pin
A13 *	Bushing
A14 *	Plug
A15 *	Seat, Large
A16 *	Gasket
A17	Cover
A18 *	Seat Small

*Recommended Spare Parts



K. TROUBLESHOOTING

Listed below are some of the problems encountered in operating precision control valves along with their possible causes. See the valve and actuator maintenance sections for instructions on repairing or replacing parts. Refer to your positioner maintenance manual for positioner problems.

IF.	THEN...
Excessive flow through valve when closed	<ul style="list-style-type: none"> Weak, broken or out of adjustment spring in a reverse action actuator Low air pressure on a direct action actuator Diaphragm, control line or instrument air leak on a direct action actuator Improperly adjusted positioner Plug or seat ring scored or worn Bent valve stem Foreign matter in valve interfering with plug seating Actuator/valve stem gap out of adjustment
Insufficient flow downstream of valve when open	<ul style="list-style-type: none"> Weak, broken or out of adjustment spring in a direct action actuator Diaphragm, O-ring, control line or instrument air leak on a reverse action actuator Improperly adjusted positioner Foreign matter caught in valve Low air pressure on a reverse action actuator Vent cap plugged on a reverse action actuator Actuator/valve stem gap out of adjustment
Jerky Stem Travel	<ul style="list-style-type: none"> Stem Packing is too tight Low air pressure to actuator Bent actuator stem Improperly calibrated positioner or controller Vent cap plugged in a reverse action actuator Too much grease in lantern ring (used with lubricated packing)
Actuator does not move to fail-safe position upon loss of air pressure	<ul style="list-style-type: none"> Air in actuator not venting to atmosphere in a reverse action actuator Faulty positioner Spring failure Bent valve stem Foreign matter in valve Stem packing too tight
High air consumption or leakage	<ul style="list-style-type: none"> Leaking O-rings or gasket in a reverse action actuator Leaking diaphragm case Ruptured diaphragm Leak in air supply or instruments

K. TROUBLESHOOTING, CONTINUED

IF .	THEN...
<p>Actuator Does Not Respond to Signal Change</p>	<p>Spring failure Ruptured diaphragm Loss of air pressure Faulty positioner Faulty controller Foreign matter caught in valve Valve stem locked up from overtightened packing Vent cap plugged on a reverse action actuator Leaking O-ring in a reverse action actuator</p>
<p>Valve Not Controlling Flow Properly</p>	<p>Flow and pressure conditions in pipeline have changed Improperly adjusted positioner Positioner malfunction and/or incorrect cam selection Improper sizing of valve or trim Packing too tight</p>
<p>Packing Box Leak</p>	<p>Worn packing No grease in lantern ring (used with lubricated packing) Loose packing nuts Dirty packing box wall or valve stem Pitted or scratched packing box wall Pitted, scratched or worn valve stem Air in actuator not venting to atmosphere in a reverse action actuator</p>

SPECIFICATIONS

The specifications for your valve and actuator are noted on the actuator data plate (illustrated below) that is mounted on the actuator spring barrel. The information included on the data plate is explained below.

Information that is not included on the data plate can be obtained by writing or calling Leslie and giving us the valve number (C) from the second line on the data plate.

CODE	A		
WO	B	VALVE NO	C
TAG NO	D		
CUST PO NO	E		
ACTUATOR RATING	F	PSI	
SIGNAL	H	BENCH SET	I
<input type="radio"/> DIAPHRAGM PRESS	G	PLUG	<input type="radio"/>
RATING	J	MAX TEMP	Q
BODY DESCR	M	PLUG	N
TRIM MAT'L	P	GUIDE	L
TRIM SIZE	O	STROKE	K
		C _v	R

LESLIE
CORP. 1975

CODE

Example GTB DL-40-D-C-84
1 2 3 4 5 6

1. GTB = Globe Top and Bottom Guided Valve

NOTE: Items 2 to 6 are actuator specifications. See Actuator Instructions.

W/O

Factory originated work order number

VALVE NUMBER

Leslie identification number that gives access to the computer parts list for each valve/actuator assembly.

TAG NUMBER

Customer originated identification number

CUSTOMER P.O. NUMBER

Customer's purchase order number

NOTE: Items F and I are actuator specifications. See Actuator Section.

RATING

ANSI class designation of the valve

STROKE

Maximum plug travel in a travel in a properly adjusted valve.

GUIDE

Guide Bushing Material

17-4SSR = 17-4PH Stainless Steel
316/STEL = 316 Stainless Steel base with a Stellite overlay

BODY DESCRIPTION

Indicates valve size and body material

Valve size - indicated in inches by a full number or fraction or combination thereof

Body Material

CST IRON = Cast Iron
CRB STL = Carbon Steel
316 SST = 316 Stainless Steel
CH MOLY = Chrome Moly

SPECIFICATIONS, CONTINUED

PLUG

Indicated the flow characteristic of the plug

LINEAR = Linear flow characteristic
PERCENT = Equal percentage flow characteristic
QO = Quick opening

TRIM SIZE

Standard and Formflo trim sizes are indicated in inches by a number or fraction or combination thereof. Milflo trim is identified by the letter M and a number that indicates its maximum Cv.

TRIM MATERIAL

Plug and seat ring material

316SST = 316 Stainless Steel
/STEL = Stellite overlay
/RUL = Rulon insert in plug
/PTFE = Teflon insert in plug

MAXIMUM TEMPERATURE

Maximum operating temperature of the valve

Cv

Flow Coefficient

SALES AND SERVICE

Leslie representatives are located in major cities throughout the world. For the name of the representative nearest you phone or write:



A subsidiary of CIRCOR International, Inc.
12501 Telecom Drive • Tampa, FL 33637-0906

Ph (813) 978-1000 • Fax (813) 978-0984