

Strahman VALVES, INC.

Drain Valve

INSTALLATIONS, OPERATING, & MAINTENANCE INSTRUCTIONS

THE ORIGINAL RAM TYPE DRAIN VALVE

INSTALLATION INSTRUCTIONS

Strahman Ram Type drain valves ship completely assembled and ready for installation unless otherwise specified. Strahman thoroughly tests and inspects each valve before shipping. A minimum clearance of 1" between the valve and floor is recommended for installation. To properly install the valve follow the procedures below.

1. Strahman drain valves ship with the piston flush with the inlet flange to protect the piston from damage. **DO NOT** extend the piston before or during installation of the valve.
2. Before installing the valve, inspect the inlet and discharge ports of the valve and remove any foreign material. Also check the bore of the mounting pad or nozzle for weld splatter or distortion.
3. If a Strahman nozzle is supplied, weld it to the vessel before installing the valve. Inspect the nozzle for weld splatter or distortion of the bore after welding. If the valve is supplied with a Strahman adapter, install it with the valve.

NOTE: If a STRAHMAN adapter or nozzle is not supplied or the existing nozzle does not provide piloting, as given in TABLE 1, the bore of the existing nozzle must be .250" larger than the diameter of the piston, per TABLE 2.

4. Clean all flange surfaces. Place gasket on inlet flange and center the valve on the vessel nozzle or adapter pad.
5. Tighten diagonally opposite mounting bolts evenly while keeping the valve centered on the nozzle. **Make sure the valve does not cock during installation.** After mounting the valves, check the distance between the valve inlet flange and mounting flange at four places to make sure the valve is not cocked. Where piloting is available, per

TABLE 1, the gasket and raised face of the valve must fit securely in the recess.

6. After installation, close the valve until the piston is at its maximum extension. When the piston is fully

extended, tighten each gland nut snugly, in 25 in-lb increments, to provide a seal. Do not overtorque gland nuts. **Excessive torquing of the gland nuts will decrease the life of the packing rings and make operation of the valve more difficult.**

TABLE 1 – Piloting For 150 & 300# valves*

Valve Size	Piloting Depth "D"	Piloting Diameter "E"
1"	1/8"	2.004"
1 1/2"	11/64"	2.879"
2"	11/64"	3.629"
2 1/2"	11/64"	4.129"
3"	3/16"	5.004"
4"	3/16"	6.191"
6"	3/16"	8.504"
8"	3/16"	10.629"
10"	3/16"	12.754"
12"	3/16"	15.004"

* 600# Valves: "D" Dimension is 15/64" for all size, "E" Dimension as above.

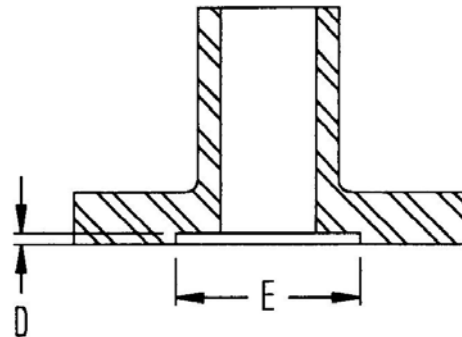


TABLE 2 – Minimum required Nozzle Bores Without Piloting

Valve Size	Piston Diameter	Minimum Nozzle Bore
1"	.984"	1.234"
1 1/2"	1.181"	1.431"
2"	1.575"	1.825"



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2 1/2"	1.968"	2.218"
3"	2.362"	2.612"
4"	3.149"	3.399"
6"	4.921"	5.171"
8"	5.905"	6.155"
10"	7.480"	7.730"
12"	11.000"	11.250"

- Loosen and remove the bonnet nuts and the cage lock. Discard the cage lock gasket.
- Turn the handwheel clockwise until the piston is fully extended and the bonnet legs clear the bonnet studs. Place spacers between the bonnet legs and studs and turn the handwheel counterclockwise until the bonnet assembly is free of the body.
Precaution should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.
- Remove the gland nuts and gland.

MAINTENANCE INSTRUCTIONS FOR DRAIN VALVES

Since Strahman drain valves are in use in a wide range of applications, it is difficult to define a maintenance schedule. Inspect the packing rings and piston surface for damage and wear every 6-12 months. The compressible packing rings allow the valve to be resealed if it should leak due to wear. To reseat the valve, simply tighten the gland nuts in increments of 25 in-lbs until the valve stops leaking. Tighten the gland nuts only when the valve is in the closed position. IF any of the parts show evidence of excessive wear, they should be replaced as soon as possible to ensure proper operation of the valve.

Since the vessel must be drained before the valve can be disassembled, it is suggested that the entire valve always be removed from the line for easier servicing and safety considerations. To guarantee the best performance, use original Strahman replacement parts.

NOTE: When servicing STRAHMAN Ram Type drain valves, precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.

DISASSEMBLING THE DRAIN VALVE

- Loosen the gland nuts and turn the handwheel counterclockwise until the piston is fully retracted.
- Remove the drain valve from the vessel.
- Place the valve with the inlet flange face down on a clean, nonabrasive surface.

DISASSEMBLING THE AIR OPERATED DRAIN VALVE

Loosen the gland nuts and operate the valve until the piston is fully retracted.

- Remove the drain valve from the vessel. Strahman recommends removing any switches or solenoids prior to disassembling the valve.
- Place the valve on the floor with the cylinder end down. Remove the bonnet nuts and the cage lock. Discard the cage lock gasket.
- Connect an air regulator to the cylinder port furthest from the body and slowly increase air pressure to operate the valve until the piston is fully extended and the bonnet legs clear the bonnet studs. Place spacers between the bonnet legs and studs. Connect regulator to the port closest to the valve and operate the valve until the bonnet assembly is free of the body.

Precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.

- Remove gland nut and gland.

MOTOR OPERATED DRAIN VALVE DISASSEMBLY



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1. Loosen the gland nuts and operate the valve until the piston is fully retracted.
2. Remove the drain valve from vessel. Strahman recommends removing any switches prior to disassembling the valve.
3. Place the valve on the floor with electric/air motor end down. Remove the bonnet nuts and the cage lock. Discard the cage lock gasket.
4. Operate the valve until the piston is fully extended and the bonnet legs clear the bonnet studs. Place spacers between the bonnet legs and studs. Operate the valve until the bonnet assembly is free of the body.

Precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.

5. Remove gland nuts and gland.

PACKING RING REPLACEMENT

Follow the instructions for disassembling the valve given above. After the valve is apart, set the body with the inlet flange face down on a clean nonabrasive surface. For best results use a Strahman ring puller and follow the procedures below. If a ring puller is not used, take precautions to avoid damaging the bore of the valve body when removing the rings. To replace the packing rings, follow the procedures outlined in the appropriate section below.

A. RING REMOVAL

NOTE: A ring puller is not needed for valves with graphite packing.

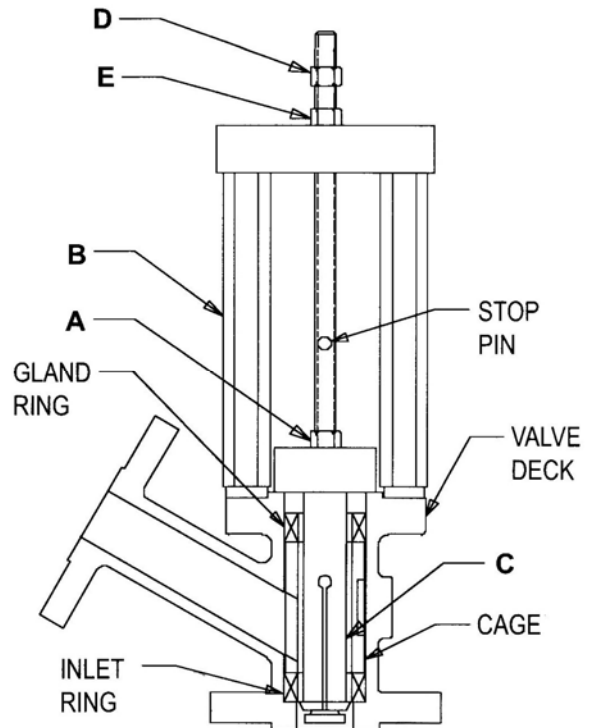


Figure 1 – Drain valve body assembly with ring puller installed

1. Turn nut "A" (See Fig. 1) Counterclockwise to stop pin.
2. Thread hex post "B" onto the gland studs.
3. Insert the puller leg "C" into the valve body until the puller flange rests on the valve deck.
4. Hold nut "D" with a wrench and turn nut "A" clockwise until it is tight against the puller flange. Turn nut "E" clockwise until the packing rings and cage are extracted from the valve body.
5. Clean the valve body, cage lock slot and cage lock.

B. TFE RING INSTALLATION

NOTE: TFE rings can be put in a freezer for approximately 5-10 minutes for easier installation.



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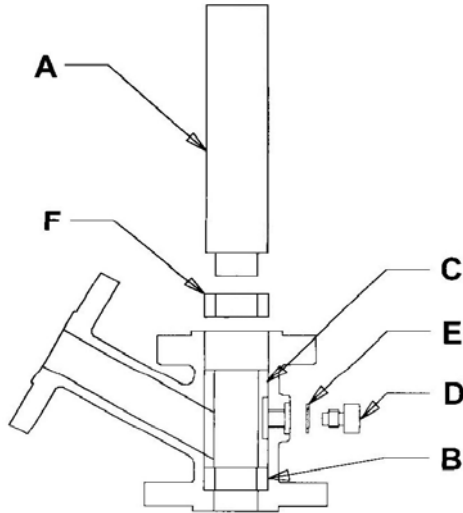


Figure 2 – Installation of TFE packing rings.

1. Using a Strahman ring seater "A" (See Fig. 2) or the valve cage "C", install inlet ring "B". The ring should sit evenly on shoulder.
2. Set the cage "C" in position, checking that it's opening aligns with the discharge port.
3. Reinstall the cage lock "D" and a new gasket "E". Tighten the cage lock with a wrench. The cage should easily slide up and down in the valve body.
4. Seat the gland ring "F" on top of the cage using the ring seater or by pressing it into the valve body.
5. Lubricate the gland studs. Reinstall the gland and hand-tighten the gland nuts.

C. BRAIDED TFE GLAND RING INSTALLATION

NOTE: Install the braided ring as the gland ring only.

1. Using a Strahman ring seater "A" (See Fig. 3) or the valve cage "C", install inlet ring "B". The ring should sit evenly on shoulder.

2. Set the cage "C" in position, checking that it's opening aligns with the discharge port.
3. Reinstall the cage lock "D" and a new gasket "E". Tighten the cage lock with a wrench. The cage should easily slide up and down in the valve body.
4. Seat the three-piece gland ring "F" on top of the cage. The ring should be installed exactly as shown with the two "gaskets" on either side of the braided ring.
5. Lubricate the gland studs. Reinstall the gland and hand-tighten the gland nuts.

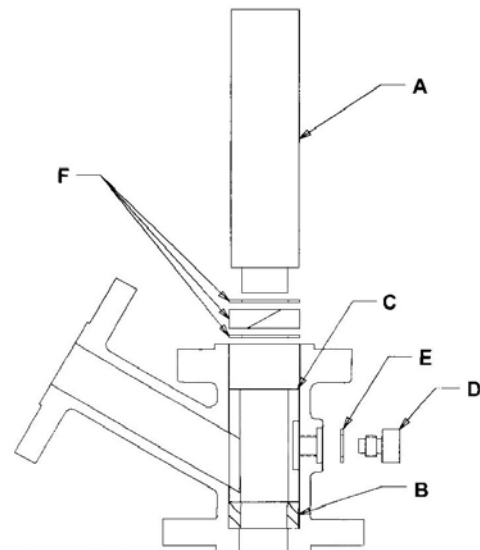


Figure 3 – Installation of braided TFE gland ring.

D. CHEVRON TFE GLAND RING INSTALLATION

NOTE: Install the chevron ring as gland ring only.



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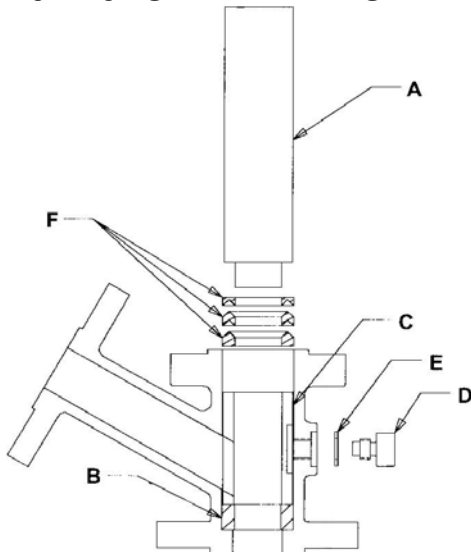


Figure 4 – Installation of chevron TFE gland ring.

1. Using a Strahman ring seater "A" (See Fig. 4) or the valve cage "C", install inlet ring "B". The ring should sit evenly on shoulder.
2. Set the cage "C" in position, checking that it's opening aligns with the discharge port.
3. Reinstall the cage lock "D" and a new gasket "E". Tighten the cage lock with a wrench. The cage should easily slide up and down in the valve body.
4. Seat the three-piece gland ring "F" on top the cage. The ring should be installed exactly as shown.
5. Lubricate the gland studs. Reinstall the gland and hand-tighten the gland nuts.

E. GRAPHITE RING INSTALLATION

A ring seater is not necessary for installing our graphite rings. Graphite rings are fragile and care must be taken to avoid cracking or scratching them.

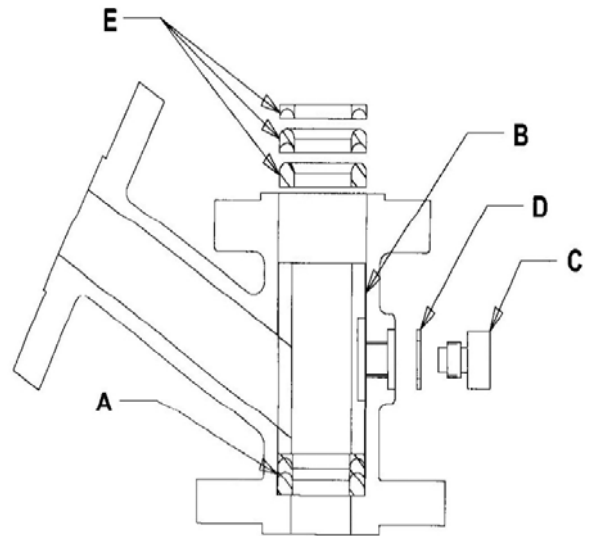


Figure 5 – Installation of graphite rings.

1. Install the pieces of the inlet ring set "A" (See Fig. 5) separately. The rounded ends of the ring must face the gland. Place the ring in the body so that it seats evenly on the shoulder.
2. Set the cage "C" in position checking that it's opening aligns with the discharge port.
3. Reinstall the cage lock "D" and a new gasket "E". Tighten the cage lock with a wrench. The cage should easily slide up and down in the valve body.
4. Seat the pieces of the gland ring "E" on top of the cage separately. The ring should be installed as shown in figure 5 above.

PISTON ASSEMBLY MAINTENANCE FOR AIR OPERATED VALVES

Disassemble the valve following the instructions given above. After the valve is apart, follow the procedures below.

1. Place the bonnet assembly in a vertical position with the cylinder end down. Remove the cylinder nuts and switch trips if applicable.



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2. Carefully slide the bonnet over the piston and set aside. Slide piston assembly off cylinder.

Precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.

3. To replace the piston, remove the setscrew and place piston in a soft-jawed vice. Unscrew the piston connector.
4. Thread the connector back into the new piston and replace the set crew. Slide the piston assembly back onto the cylinder button.
5. Carefully slide the bonnet over the piston.

Precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.

6. Replace the cylinder nuts and switch trip if applicable.
7. Reassemble valve according to the procedures below.

SPECIAL NOTES:

When servicing spring-return (fail closed) air cylinders, Strahman recommends installing a speed control valve on the exhaust cylinder port (the port closest to the valve body). The speed control valve should be used to slowly exhaust the air from the cylinder until the piston is fully extended.

For spring-retract (fail open) air cylinders, Strahman recommends installing a speed control valve on the exhaust cylinder port (the port farthest from the valve body). The speed control valve should be used to slowly exhaust air from the cylinder until the piston is fully retracted.

PISTON ASSEMBLY MAINTENANCE FOR MOTOR OPERATED VALVES

Disassemble the valve following the instructions given below.

1. Operate the valve until the piston partially extends out of bonnet.
2. Place the drain valve in a horizontal position. Remove the bonnet grease fitting, motor nuts,

washers, cap screws, crosshead guide, cap screws, grease fitting, switches, switch trip and cap screws.

3. Remove the cap screws and bushing.
4. Turn the stem clockwise until the bearings, bearing collar, bearing seal, and bearing retainer are out of bonnet and remove them.
5. Carefully slide piston assembly out of bonnet.

Precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.

6. To disassemble the piston and stem, hold the piston in a soft-jawed vise and remove the setscrew. Turn the crosshead counterclockwise to remove the stem.
7. To replace the stem or crosshead, remove the collar pin and stop collar from the stem. Turn the crosshead until it slips off the stem.
8. Replace worn or damaged parts as required.
9. Reassemble the piston and stem. Take all precautions to avoid damaging the piston.
10. Re-grease the stem and bearings.
11. Carefully slide the piston assembly back into the bonnet and install the parts as follows:
 - 11.1. Bearing Retainer
 - 11.2. Bearing seal
 - 11.3. Bearing (roller facing up, larger inside diameter towards seal)
 - 11.4. Bearing Collar (slide onto stem)
 - 11.5. Bearing (roller facing down, smaller inside diameter towards collar)
12. Thread bushing into the bonnet and wrench tighten. Thread cap screws onto bushing and wrench tighten.



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13. Slide body assembly onto bonnet. Operate valve until piston is fully extended. Thread and tighten gland and bonnet nuts.
14. Gear Reduction unit and motor assembly inspect keyway on motor shaft and remove any burrs. Mate motor and gear reduction unit. Tighten coupling setscrews.
15. Place reducer coupling and key on shaft of gear reduction unit. Tighten coupling setscrew.
16. Using test motor and gear reducer, thread four motor assembly studs into the bonnet flange with stud seater.
17. Mount motor assembly to bonnet, make sure coupling is engaged, with motor assembly nuts. Tighten with wrench.
18. Fasten switch brackets to bonnet in correct location with bracket mounting Screws
19. Mount switches to brackets with switch mounting screws.
20. Connect electrical or air supply to motor as required.
21. Extend piston and check for correct extension
22. Mount safety shield over shaft of reduction unit with washer and cap screws.

3. Continue turning the stem by hand or with a wrench until the stem and piston assembly are free from the bonnet.

Precautions should be taken to protect the piston. Scratches or nicks on the piston will cause the valve to leak.

4. If replacing the bushing, loosen the setscrew and remove the old bushing. Thread the new bushing into the bonnet and wrench tighten. Tighten the setscrew.
5. When replacing the piston, stem or split nut, the piston should be held in a soft-jawed vise. The split nut has left hand thread and should be turned clockwise to loosen. Replace parts as required.
6. Reassemble the piston, stem and split nut as follows:
 - 6.1 Apply grease to the button and threads of stem.
 - 6.2 Place the split nut on the stem.
 - 6.3 Thread the stem and split nut into the piston by hand. With the piston held in a soft-jawed vise, wrench-tighten the split nut. After tightening the split nut the stem should still turn freely.
7. Insert the stem assembly into the bonnet and thread it into the bushing. Turn the stem clockwise until the square comes through the bushing.
8. Place the handwheel, washer and nut onto the stem. Continue turning the stem until it stops.
9. Reassemble valve according to the procedures in valve assembly section.

BONNET ASSEMBLY MAINTENANCE FOR 1" & 1 1/2" HAND OPERATED VALVES

Disassemble the valve following the instructions given above. After the valve is apart, follow the procedures below.

1. Turn the handwheel clockwise until the piston is fully extended.
2. Remove the nut, washer and handwheel.

BONNET ASSEMBLY MAINTENANCE FOR 2" THROUGH 6" HAND OPERATED VALVES

Follow the instructions for disassembling the valve as given in section 1. After the valve is apart, follow the procedures below.

1. Turn the handwheel clockwise until the piston partially extends out of the bonnet.



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2. Remove the nut, washer and handwheel.
3. Remove the setscrew and bushing.
4. Place the bonnet assembly on a clean nonabrasive surface with piston face down. Turn the stem clockwise until the bearings, bearing collar, bearing seal, and bearing retainer are out of the bonnet and remove them.
5. Lift the bonnet over the piston and stem assembly and set aside. It is important to protect the piston and stem from damage if either is to be reused. *Precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.*
6. To disassemble the piston and stem, hold the piston in a soft-jawed vise and remove the setscrew and turn the crosshead counter clockwise to remove the stem.
7. To replace the stem or crosshead remove the collar pin and stop collar from the stem and turn the crosshead until it slips off the stem.
8. Replace worn or damaged parts as required.
9. Reassemble the piston and stem. Take all precautions to avoid damaging the piston.
10. Re-grease the stem and bearings.
11. Carefully slide the bonnet back over the piston assembly and install the parts as follows:
 - 11.1 Bearing Retainer
 - 11.2 Bearing Seal
 - 11.3 Bearing (roller facing up, larger inside diameter towards seal)
 - 11.4 Bearing Collar (slide onto stem)
 - 11.5 Bearing (roller facing down, smaller inside diameter towards collar)
12. Raise the bonnet to an upright position to seat all the parts in the neck of the bonnet. Thread the bushing into the bonnet and wrench tighten.
13. Reinstall the setscrew, handwheel, washer and nut.
14. Reassemble the valve according to the procedures in valve assembly section.

VALVE ASSEMBLY

After servicing, reassemble the valve following the procedures below.

1. Place the body assembly "A" (See Fig. 6) with the inlet flange face down on a clean, non-abrasive surface. Place two leg extensions "B" on two bonnet studs diagonally across from each other.
2. Place the bonnet assembly "C" onto the leg extensions and hold in position with two bonnet nuts.
3. Turn the handwheel clockwise until the piston "D" seats in the gland ring "E". REMOVE the bonnet nuts from the leg extensions and continue turning the handwheel until the bonnet legs "F" are clear of the leg extensions.

Precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.

4. Remove the leg extensions and turn the handwheel counterclockwise until the bonnet rests on the body deck. If the bonnet legs stop short of the body deck, push down on the bonnet until it rests on the body deck.
5. Thread the bonnet nuts onto the bonnet studs and wrench-tighten.
6. Lay the valve down horizontally and turn and turn the handwheel clockwise until the piston is at full extension.
7. Turn the handwheel counterclockwise until the piston is flush with the raised face of the inlet flange.



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- With the valve in the closed position, torque the gland nuts to 50-100 in-lbs and hydrostatically test the valve to maximum service pressure rating for leakage. If leaks occur through the gland or from the valve inlet, tighten the gland nuts in 25 in-lb increments until the valve seals.

DO NOT overtighten the gland nuts, apply enough torque to seal the valve only. Overtorquing the gland nuts will reduce the life of the packing rings.

- Reinstall the valve following the procedures outlined in the installation instructions.

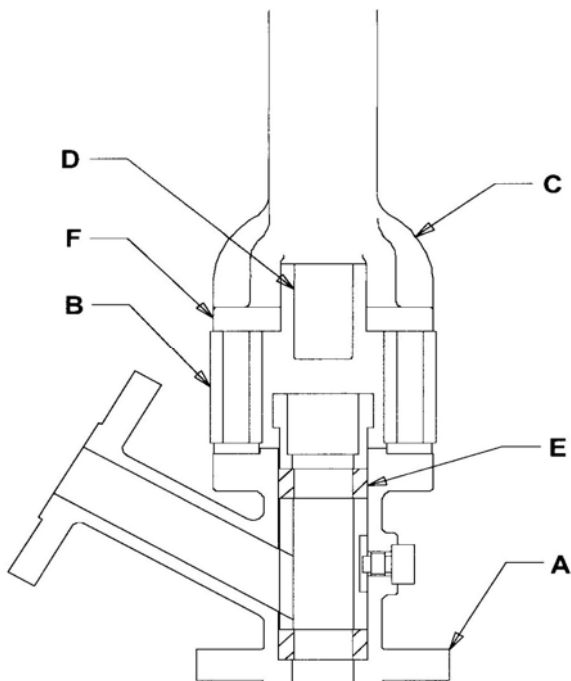


Figure 6 – Valve assembly using leg extensions

AIR OPERATED DRAIN VALVE ASSEMBLY

After servicing, reassemble the valve following the procedures below. (See Fig. 6)

- Place the body assembly "A" with the inlet flange down on a clean, non-abrasive surface. Place two

stud extensions "B" on two bonnet studs diagonally across from each other.

- Place the bonnet assembly "C" on the floor with the cylinder end down. Place the body onto the bonnet and hold in place with the stud extensions and two bonnet nuts. Cylinder ports should be to the right of the valve discharge.
- Connect the air regulator to the cylinder port furthest from the body. Operate the valve until the piston "D" passes through the gland ring "E" and is even with the valve discharge. REMOVE the bonnet nuts from the stud extensions and continue operating the valve until the bonnet legs "F" clear the stud extensions.

Precautions should be taken to protect the piston. Scratches or nicks on the piston surface will cause the valve to leak.

- Remove the stud extensions and disconnect the air regulator from the cylinder. Connect the air supply to the cylinder port closest to the body and operate until the bonnet rests on the body deck. If the bonnet legs stop short of the body deck, push down on the bonnet studs and wrench tighten.
- Thread the bonnet nuts onto the bonnet studs and wrench-tighten.
- Lay the valve down horizontally and connect the air supply to the cylinder port furthest from the body. Operate the valve until the piston is at full extension.
- Disconnect the air regulator. Connect the air regulator to the cylinder port closest to the body and operate the valve until the piston is flush with the raised face of the inlet flange.
- With the valve in the closed position tighten the gland nuts, (For graphite – torque the gland nuts to 50-100 in-lbs) and hydrostatically test valve to the maximum service pressure rating for leakage. If leaks occur through the gland or from the valve inlet, tighten the gland nuts in 25 in-lb increments until the valve seals.



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***DO NOT** overtighten the gland nuts, apply enough torque to seal the valve only. Overtorquing the gland nuts will reduce the life of the packing rings.*

9. Reinstall the valve following the procedures outlined in the installation instructions.
10. Reinstall any switches or solenoids.

SPECIAL NOTES:

When servicing spring-return (fail closed) air cylinders, Strahman recommends installing a speed control valve on the exhaust cylinder port (the port closest to the valve body). The speed control valve should be used to slowly exhaust the air from the cylinder until the piston is fully extended. For spring-retract (fail open) air cylinders, Strahman recommends installing a speed control valve on the exhaust cylinder port (the port farthest from the valve body). The speed control valve should be used to slowly exhaust the air from the cylinder until the piston is fully retracted.

MAINTENANCE OF CYLINDERS, ETC.

Manufacturers' maintenance instructions for switches, cylinders, air motors, electric motors, etc. are included with the valve. Follow all instructions per the manufacturer's recommendation.

MAINTENANCE OF RTD EQUIPPED DRAIN VALVES

Due to the special design of our RTD equipped drain valves, we recommend returning the valve to Strahman for repair.

PERVENTITIVE VALVE MAINTENANCE

Air operated drain valves

To reduce cylinder wear we recommend use of a filter, regulator and lubricator.

All air cylinder operated drain valves require support to relieve strain on the inlet flange bolts and to absorb part of the opening stroke shock. All Strahman air cylinder operated drain valves include two cylinder mounted support lugs.

Hand operated drain valves

To reduce wear of the stem and crosshead, or bushing, keep the stem lubricated.

1. Grease the stems of 1" and 1 ½ " valves when the piston is in the open position and the stem extends out of the bonnet.
2. For 2" through 6" valves use the grease fitting in the bonnet to keep the stem and bearings lubricated.

For the Distributor nearest you, answers to technical questions or, a complete product catalog contact:

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All Strahman drain and sampling valve equipment 32DN to 300DN, Class 150Lb, 300Lb, and 600Lb in ferrous and non-ferrous materials conform to the Pressure Equipment Directive 97/23/EC.

Addendum to installation instructions

Caution should be taken to ensure continued safe operation of the Strahman Drain Valve. When and where applicable, particular care should be exercised in the following areas: Earthquake, external piping loads, unstable fluids, wear and erosion, surface temperature and over/under pressure and temperature during operation. Additionally, only bolting and gaskets as permitted by B16.5 are to be used.

