

Weirless Radial diaphragm™ tank-bottom (90 degree) valve

Installation, operating, and maintenance manual

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1 Declaration of conformity

	EC Declaration of Conformity	
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MANUFACTURER: ASEPCO,
355 Pioneer Way,
Mountain View CA 94041

PRODUCT DESCRIPTION:

Pneumatic actuators are machined from 304 Stainless Steel and are designed to withstand some dings and drops. All actuators have a position indicating shaft that extends when the valve is open (for visual confirmation of valve position) and contain as few o-rings and seals as possible which require very simple maintenance on an annual basis. Additionally, to prevent any galling, we machine all our actuator bodies out of 304 Stainless Steel, our diaphragm shafts out of 316 Stainless Steel and our actuator shafts out of Galltough or 304. All ASEPCO actuators can withstand operating temperature of 135° C (or 275° F).

PART NUMBERS: **PN05, PN10, PN20, PN30, PN40**

APPLICABLE EUROPEAN DIRECTIVES:

ATEX: 94/9/EC

APPLICABLE INTERNATIONAL STANDARDS:

ATEX: EN 13463-1, EN 13463-5
ISO 9001:2000 Quality Management System

NOTIFIED BODY

Det Norske Veritas, ATEX NB 0575 retains a copy of the Technical File

ATEX product marking:  0575  II2G Exc IIA T4

The product described in this Declaration of Conformity complies with the Applicable European Directives and relevant sections of the Applicable International Standards. The signature on this document authorizes the distinctive European mark to be applied to the equipment described. A Technical Construction File is available for inspection by designated bodies.

Authorized Signature:

Date: 21 January 2013



Important safety information is contained in the installation manual; read and understand this information prior to installing or using this equipment.

This Document applies only to the equipment described above and is invalid if not reproduced in its entirety.

2 Safety notes

This safety information should be used in conjunction with the rest of this operating manual.

In the interests of safety, this valve and actuator should only be used by competent, suitably trained personnel after they have read and understood the manual and considered any hazard involved. If the valve is used in a manner not specified by ASEPCO, the protection provided by the valve and actuator may be impaired. Any person who is involved in the installation or maintenance of this equipment should be fully competent to carry out the work. In the UK this person should also be familiar with the Health and Safety at Work Act 1974 or its equivalent in other regions.



This symbol, used on the product and in the manual, means: Possibility of severe personal injury, loss of life, or equipment damage in indicated situation. Ensure all instructions are followed.



This symbol, used on the product and/or in the manual, means: Caution, high pressure air hazard.



This symbol, used on the product and in the manual, means: Caution, hot surface.



This symbol, used on the product and in the manual, means: Caution, risk of electric shock.



This symbol, used on the product and in the manual, means: Personal Protective Equipment (PPE) must be worn.



ASEPCO valves, actuators, and accessories are designed to work in specific operating conditions (such as process fluids, pressure, and temperature). Do not use them outside of their operating parameters without first contacting ASEPCO.



Avoid personal injury and property damage from any sudden release of process pressure or bursting of parts. Before performing any maintenance operations:



- **Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.**
- **Do not remove the actuator from the valve while the valve is still pressurised.**
- **Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.**
- **Check with your process safety engineer for any additional measures that must be taken to protect against process media.**



If hazardous fluids are to be used with the valve assembly, safety procedures specific to the particular fluid and application must be put in place to protect against injury to persons.



Ensure the chemicals to be used with valve assembly are compatible with the valve body, actuator, diaphragm, to be used in the fluid path. If you need assistance please contact your local sales office.



Exterior surfaces of the valve may become hot during operation. The unit should be allowed to cool prior to conducting any repositioning or maintenance operations.



To avoid moisture build up and increased actuator wear, use only clean dry air to operate pneumatic actuators.



Do not open the valve clamp during steaming or while the valve is under pressure.



Important: Replace Actuator O-rings annually. See "Parts list" on page 37, for replacement kit part numbers.

3 Overview

This manual is the primary information source for the installation, operation and maintenance of ASEPCO Weirless Radial diaphragm tank-bottom (90 degree) valves. The manual also covers the use of manual and pneumatic actuators. A separate manual is available for our 180 degree flow path Weirless Radial diaphragm in-line valve range.

3.1 Valve description

All valves assemble using a hygienic clamp to form a seal, surpassing anything available from weir-style valves. No tools are needed for maintenance.

There are three components to all the valves:

- **Valve body:** Our valve bodies are a single piece machined out of stainless steel bar stock with fittings welded on per customer requirements
- **Actuator:** Manual and pneumatic actuators are available in plastic or stainless steel. A number of options are available for the actuators, but for any particular valve the options available depend on the type and size of the valve. See "Specifications" on page 34.
- **Diaphragm:** Our radial diaphragms have two primary sealing surfaces: a shutoff seal at the inlet (seat) and a seal at the shoulder between the inside and outside of the valve. For most valves, a number of different diaphragm materials are available. See "Parts list" on page 37 for a list of available diaphragm materials.

4 When you unpack your valve

4.1 Unpacking your valve assembly

Unpack all parts carefully, retaining the packaging until you are sure all components are present and in good order. Check against the components supplied list below.

4.2 Packaging disposal

Dispose of packaging materials safely and in accordance with regulations in your area. The outer carton is made of cardboard and can be recycled.

4.3 Inspection

Check that all components are present. Inspect components for damage in transit. If anything is missing or damaged, contact your local sales office immediately.

4.4 Components supplied

- Valve
- Actuator
- Diaphragm
- Clamp
- User Manual

4.5 Storage

This product has an extended shelf life. However, care should be taken after storage to ensure that all parts function correctly.

Please observe the storage recommendations and use-by dates which apply to diaphragms that you may wish to bring into service after storage when used with this product.

5 Start-up check list

- Ensure that a suitable diaphragm for your process has been installed into the valve assembly, please refer to the advice in "Diaphragm selection" on the next page for additional information.
- Ensure that all pipes, valves and other equipment in your fluid path are properly supported and secured.
- Ensure that secure connections are achieved between the valve and any piping.
- Manual actuators - Ensure that easy and safe access is provided to the actuator handle, to enable rapid shut off in case of emergency.
- Pneumatic actuators - Ensure proper and safe connection has been made to a suitable air supply.

6 Diaphragm selection

Diaphragm materials must be selected with consideration to heat-resistance, chemical-resistance, steam-resistance, durability and handling as well as the number, temperature and duration of CIP/SIP cycles. It is critical that you select the appropriate diaphragm materials for your process. For material specifications and further information or assistance with material selection, visit www.wmftg.com or contact your local sales office.



Ensure the chemicals to be used with valve assembly are compatible with the valve body, actuator, diaphragm, to be used in the fluid path. If you need assistance please contact your local sales office.

Examine the diaphragm at least once a week for signs of wear. If you have any concerns with the condition of the diaphragm, contact your local sales office.

Diaphragm replacement

It is best practice to replace a diaphragm:

- At least **annually** - For fewer than five SIP cycles a week that are less than two hours each at less than 135C
- At least **every six months** - For five or more SIP cycles a week that are less than two hours each at less than 135C.

The following table summarises the availability of each diaphragm material for the different valve sizes.

Material	Valve Size Availability					
	0.5"	1"	1.5"	2"	3"	4"
Silicone	◆	◆	◆	◆	◆	◆
Silicone Plus	◆	◆	◆	◆	◆	n/a
EPDM	◆	◆	◆	◆	◆	◆
EPDM Plus	◆	◆	◆	◆	◆	n/a
Viton A	◆	◆	n/a	◆	n/a	n/a
Viton A (steam resistant)	◆	◆	◆	◆	◆	n/a
Viton GF	n/a	◆	n/a	◆	◆	n/a
PTFE	n/a	◆	◆	◆	◆	n/a

7 Installation

There are three basic steps to follow to install an ASEPCO valve:

Step 1: Install the valve body.

Step 2: Attach the diaphragm to the actuator assembly

Step 3: Insert the actuator/diaphragm assembly into the valve body and clamp them together.

Please use the following detailed instructions for each of these steps to ensure proper functioning of the valve.

7.1 Install the valve body

There are two basic options for installing a valve body, either you can use a hygienic clamp to clamp it into place, or you can weld it into place.

Clamping the valve body in place

You can use a single-hinge clamp, a double bolt clamp or a double hinge clamp for this purpose. Ask your engineering team about the most appropriate clamp to use.

ASEPCO valves are compatible with a wide range of clamps from a variety of manufacturers.

ASEPCO supplies every valve with a clamp to assemble the actuator/diaphragm assembly to the valve body.

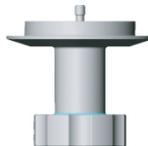
Welding the valve body in place

If you are welding the valve into place, please refer to "Welding guidelines" on page 39.

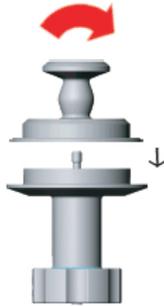
7.2 Install and remove diaphragm - manual actuator

Install an elastomer diaphragm

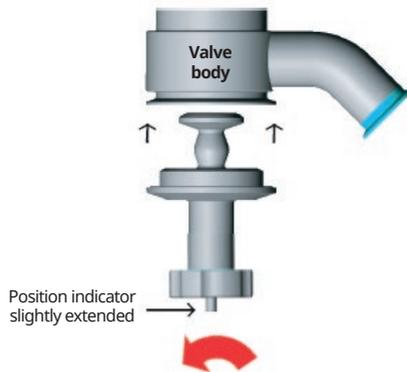
1. Close the valve until the position indicator is flush with the handle or the threaded shaft is fully extended. Place the actuator handle down on a flat surface to ensure that the position indicator is flush with the handle.



2. Turn the diaphragm clockwise onto the diaphragm/actuator assembly shaft until it is finger-tight.



3. Rotate the handle counter-clockwise two turns.
4. Insert the diaphragm/actuator assembly into the valve body.



5. Fasten the clamp and finger-tighten.

Install a PTFE diaphragm

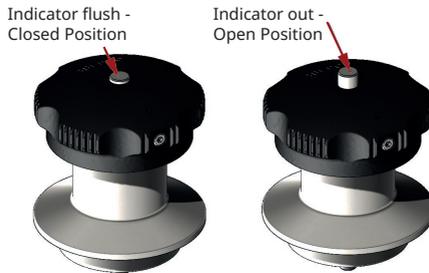
1. Verify that the O-ring is installed on the diaphragm shoulder seal.



2. Verify that the diaphragm insert is screwed into the diaphragm, just finger-tight.
3. Mount the diaphragm on the actuator shaft and turn clockwise until it is fully seated.
DO NOT FORCE! Finger-tight is sufficient.



4. Insert the actuator and diaphragm assembly into the valve body.
5. While keeping pressure against the valve body, rotate the handle counter-clockwise until the O-ring contacts the actuator flat surface. The position indicator should be protruding from the bottom of the actuator. For smaller diaphragm sizes, the side travel marks should be showing. While the diaphragm will be slightly retracted, the shoulder seals will remain in the same position.



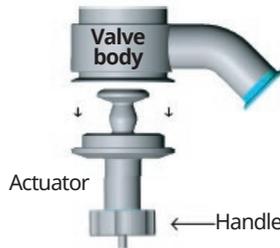
6. Make sure that the actuator flange and the valve flange are close enough to easily reinstall the clamp.
7. Reinstall the clamp on the actuator/valve assembly by hand. A double-bolt, high-pressure clamp is can be used, alternating between the two bolts to ensure even tightening.
8. Using a torque-controlled socket wrench set to 2.26Nm (50in-lbs), tighten the clamp. If using a double-bolt clamp, tighten the clamp by alternating between the two bolts until the bolts are fully torqued.

NOTE! Unlike elastomer diaphragm materials, the following steps are necessary to finish preparing a new PTFE diaphragm:

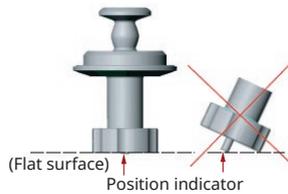
9. Open the valve and steam the valve for 15 minutes.
10. Close the valve and steam again for 30 minutes.
11. Check the valve seat for integrity. There should be no loss of pressure.

Remove the diaphragm

1. Open the valve.
2. Remove the clamp.



3. Close the valve until the position indicator is flush with the handle or until the travel marks are covered by the handle. Place the actuator handle down on a flat surface to ensure that the position indicator is flush with the handle.



4. Remove actuator and diaphragm assembly from the valve body by grasping the diaphragm edge and pulling downward from the valve body.
5. Turn the diaphragm counter-clockwise to unscrew and remove from the actuator.



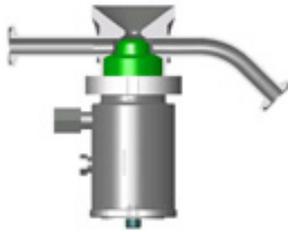
7.3 Install and remove diaphragm - pneumatic actuator

Install an elastomer diaphragm

1. Shut off the air so the actuator is fully closed.
2. Thread the diaphragm clockwise onto the actuator until it is finger-tight.



3. Insert the actuator/diaphragm assembly into the valve body.
4. Attach and turn on the air source to compress the diaphragm.
5. Install and tighten the clamp while the diaphragm is retracted.
6. Shut off the air source to fully close the valve.



Install a PTFE diaphragm

1. Verify that the O-ring is installed on the diaphragm shoulder seal.
2. With the air source off or disconnected, thread the diaphragm onto the actuator shaft and turn it clockwise until it stops. This ensures that the diaphragm is fully threaded onto the actuator.

DO NOT FORCE! Finger-tight is sufficient.



3. Insert the actuator and diaphragm assembly into the valve body.



Verify that the actuator is in the closed position (the indicator at the top of the actuator is flush with the actuator).



Indicator flush = Closed position

Indicator out = Open position

4. Turn the air source on and fully open the actuator; so that the diaphragm is retracted from the valve seat. The position indicator should be protruding from the top of the actuator. This pulls the diaphragm back to allow firm compression of the shoulder seal.
5. Make sure that the actuator flange and the valve flange are close enough to easily reinstall the clamp.
6. Reinstall the clamp on the actuator/valve assembly by hand. A double-bolt, high-pressure clamp can be used, alternating between the two bolts to ensure even tightening.

It might be necessary to push down on the actuator assembly while assembling the clamp.

- Using a torque-controlled socket wrench set to 2.26Nm (50in-lbs), tighten the clamp. If using a double-bolt clamp, tighten the clamp by alternating between the two bolts until the bolts are fully torqued.



Unlike elastomer diaphragm materials, the following steps are necessary to finish preparing a new PTFE diaphragm:

- Open the valve and steam the valve for 15 minutes.
- Close the valve and steam again for 30 minutes.
- Check the valve seat for integrity. There should be no loss of pressure.

Remove the diaphragm



Do not open the valve clamp during steaming or while the valve is under pressure.



- De-pressurise the system.
- Open the valve (by turning the air **on**).
- Remove the clamp.
- Close the valve (by turning the air **off**).
- Remove the actuator and diaphragm assembly by grasping the diaphragm edge and pulling it away from the valve body.
- Disconnect the actuator from the air source.

7. Turn the diaphragm counter-clockwise to unscrew it and remove it from actuator.



8 Actuators – AJS and AKS series

8.1 Maintaining a manual actuator

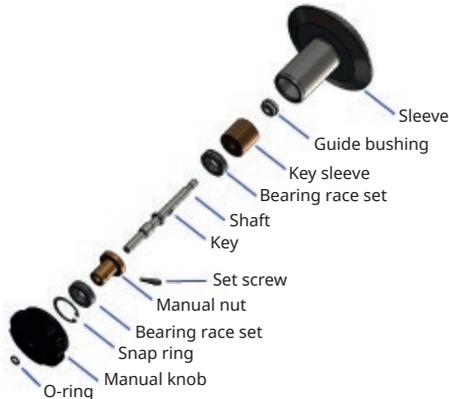
(a) MNXX AJS series

Step 1: Remove the actuator and diaphragm assembly from the valve

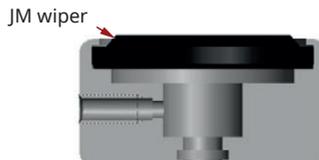
Step 2: Remove the diaphragm

Follow the instructions for "Remove the diaphragm" on page 14.

Step 3: Disassemble the actuator and replace O-rings and washers



1. Using a 1/8" hex key, remove the set screw on the handle.
2. Pull the knob off the sleeve.
3. Using an O-ring tool, take out the O-ring from the centre of the knob.
4. Replace the old O-ring with a new O-ring from the kit.
5. Put some of the lubricant (provided in the kit) on the O-ring.
6. Using a pair of pliers, pull the JM wiper out of the knob.
7. Replace with the new JM wiper.



8. Remove the snap ring from the top of the sleeve.
9. Grab the shaft and nut and pull them out of the sleeve. (One bearing race will come out with these parts.)
10. Using an O-ring tool or a pick, remove the bearing left in the sleeve.

11. Turn the sleeve over and let the key sleeve drop out.
12. Using a small rod or similar object (your hex key or the back of a ballpoint pen should be sufficient), push the guide bushing assembly out of the sleeve.

Step 4: Reassemble the actuator

1. Lubricate the O-ring for the guide bushing assembly and press the guide bushing assembly into the sleeve.
2. Drop the key sleeve back into the sleeve.
3. Using the shaft, turn the key sleeve around until it drops completely into place.
4. Place one of the bearing and race sets on top of the key sleeve (in the order of race-bearing-race). Press firmly into place.
5. Put the remaining lubricant provided on the threads of the shaft.
6. Insert the shaft into the key sleeve.
7. Screw the nut down over the shaft.
8. Place the second bearing and race set over the nut. Press it into place.
9. Re-insert the snap ring.
10. Before replacing the knob onto the sleeve, stretch the JM wiper by pulling the edges outward. This helps slip the knob over the sleeve.
11. Rotate the nut counter-clockwise until the shaft is fully extended. Slip the knob onto the shaft and sleeve.
12. Hold the entire assembly so that the set-screw hole in the knob is facing you. Rotate the actuator counter-clockwise until the hole in the knob lines up with the hole in the nut.
13. Insert the set screw and tighten with an hex key. Do not let the assembly shift while you are doing this or you will lose your alignment.

Step 5: Replace the diaphragm

Follow the instructions for "Install an elastomer diaphragm" on page 11 or "Install a PTFE diaphragm" on page 12.

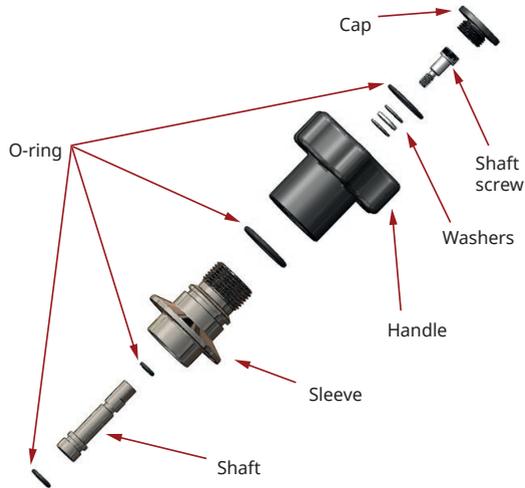
(b) MNXX-01 AKS Series

Step 1: Remove the actuator and diaphragm assembly from the valve

Step 2: Remove the diaphragm

Follow the instructions for "Remove the diaphragm" on page 14.

Step 3: Disassemble the actuator and replace small parts

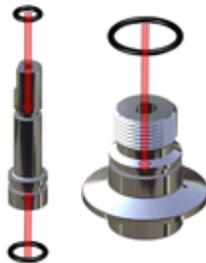


1. Remove the cap with a No. 14 drilled spanner screwdriver.
2. Using a 1/8" hex key, remove the shaft screw.
3. Unthread the handle from the sleeve.
4. Remove the shaft from the sleeve
5. Remove the O-rings from the shaft, handle and sleeve.



Step 4: Reassemble the actuator

1. Lubricate and install the O-rings on the shaft and sleeve.



2. Insert the shaft into the sleeve.

NOTE! Make sure the flat on the shaft is aligned with the flat on the sleeve.



3. Screw the handle onto the sleeve.



4. Install the O-ring into the groove on the handle.



5. Install the washers and screw onto the handle. Press the shaft towards the handle to ensure the shaft flats remain aligned.



6. Install the cap over the screw using a No. 14 drilled spanner screwdriver.



Step 5: Replace the diaphragm

Follow the instructions for "Install an elastomer diaphragm" on page 11 or "Install a PTFE diaphragm" on page 12.

8.2 Maintaining a pneumatic actuator

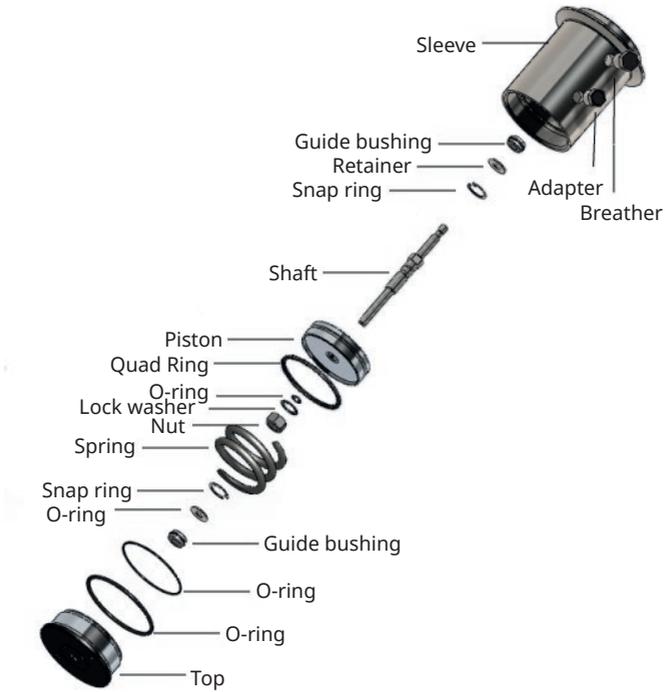
(a) PNXX AJS series

Step 1: Remove the actuator and diaphragm assembly from the valve

Step 2: Remove the diaphragm

Follow the instructions for "Remove the diaphragm" on page 17.

Step 3: Disassemble and reassemble the pneumatic actuator

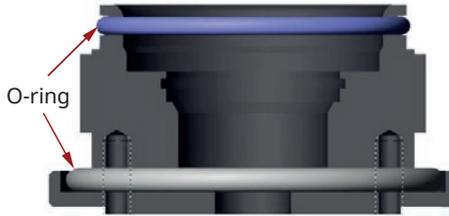


1. Place the actuator in a soft jaw vice (not supplied) with the top (black part) facing up. Do not close the vice on the flange of the actuator.
2. Using a pin spanner/wrench, turn the top counter-clockwise and remove the top from the actuator sleeve. Set the top on a flat surface.



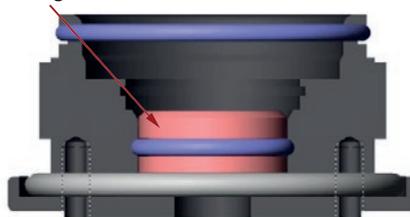
3. Using snap ring pliers, remove the snap ring from the centre of the top.

- On the outer sides of the top, there are two large O-rings. Remove the O-rings and replace with new ones.

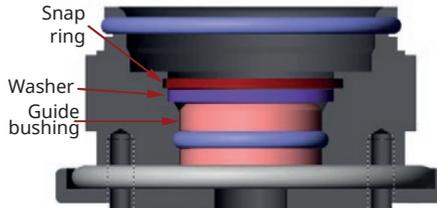


- On the inside, there is a guide bushing assembly (GBA). Using a small rod or similar object (the back of a ballpoint pen should be sufficient), push the GBA and washer out of the top.
- Lubricate and press the new GBA into place with your thumb.

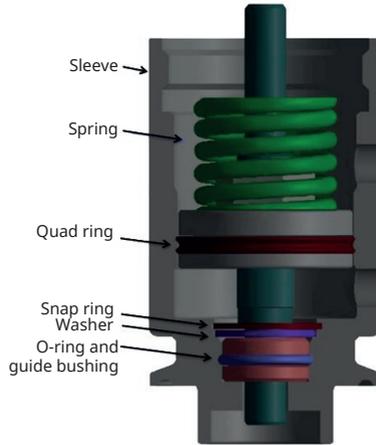
Apply silicone lubricant to inner and outer O-ring of guide bushing



- Place the washer on top of the guide bushing (purple), re-insert the snap ring on top of the washer (red). This completes the top assembly

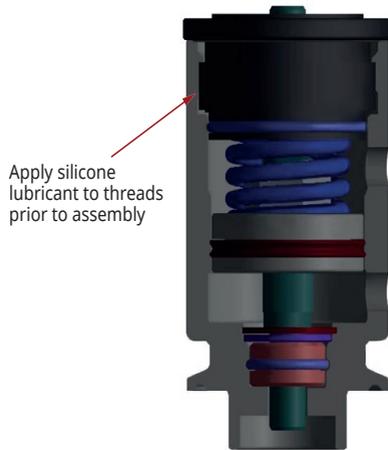


8. Remove the spring.



9. Pull the shaft and piston assembly out of the actuator sleeve. Remove the quad ring from the piston, slip the new quad ring over the piston, and run the O-ring tool between the piston and the quad ring to ensure that it is not twisted.
10. Place the shaft and piston assembly in a soft jaw vice (not supplied) with the spring side of the piston facing up. Make sure that the flats are secure in the vice.
11. Using a spanner, unscrew the nut from the shaft. Remove the piston.
12. Remove and replace a lubricated O-ring on the shaft. Replace the piston. Then, cover the quad ring with lubricant. Re-tighten the nut onto the shaft.
13. Remove the second GBA from the bottom of the actuator and replace.
14. Reinstall the piston and shaft assembly into the sleeve, making sure the cup of the piston is facing down.
15. Reinstall the spring.

16. Spread the rest of the lubricant on the threads of the top. Reinstall the top onto the sleeve.



17. Turn the top clockwise until it is flush with the sleeve.

Step 4: Replace the diaphragm

Follow the instructions for "Install an elastomer diaphragm" on page 15 or "Install a PTFE diaphragm" on page 15.

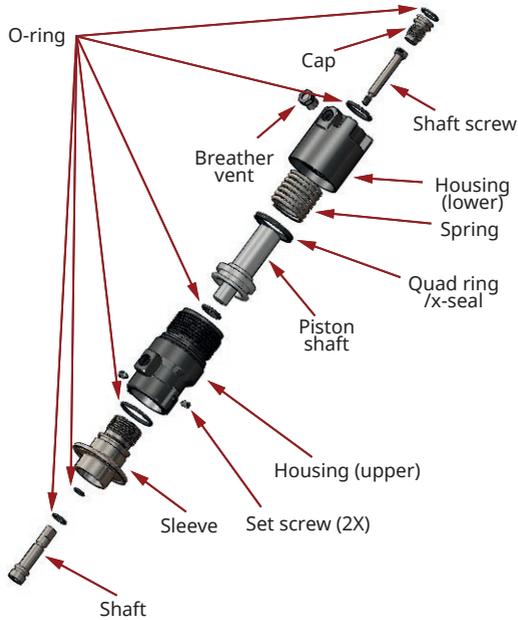
(b) PNXX-01 AKS series

Step 1: Remove the actuator and diaphragm assembly from the valve

Step 2: Remove the diaphragm

Follow the instructions for "Remove the diaphragm" on page 17.

Step 3: Disassemble the pneumatic actuator



1. Unscrew the cap from the top of the actuator.
2. Unscrew the housing (lower).
3. Remove the spring from inside of the actuator body.
4. Remove the piston.
5. Remove the shaft screw using a 1/8" hex key.
6. Remove the 10/32 set screws using a 3/32" hex key.
7. Unscrew the housing (upper).
8. Remove the shaft from the sleeve.
9. Remove the O-rings from the shaft, sleeve, piston, housings and cap.

Step 4: Reassemble the actuator

1. Install the O-rings on the shaft and sleeve.



2. Thread the upper housing onto the sleeve.



3. Thread the set screws into the upper housing and tighten.



4. Install the inner O-ring into O-ring groove.



5. Insert the shaft into the sleeve.
Note: Make sure the flat on the shaft is aligned with the flat on the sleeve.



6. Install the O-ring on the outside of the upper housing.



7. Install the quad ring/x-ring on the piston.



8. Insert the piston into the assembly.



9. Insert the spring into the assembly.



10. Insert the O-ring into the lower housing.



11. Thread the lower housing onto the assembly.



12. Thread the breather vent into the lower housing.



13. Thread the shoulder screw into the assembly. Press shaft towards the pneumatic housing to ensure the shaft flats remain aligned.



14. Install the O-ring on the shaft cap.



15. Thread the shaft cap into the assembly.



Step 5: Replace the diaphragm

Follow the instructions for "Install an elastomer diaphragm" on page 15 or "Install a PTFE diaphragm" on page 15.

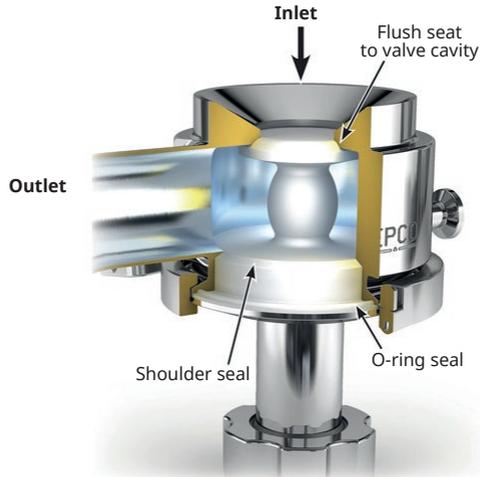
9 Cleaning and sterilisation

The ASEPCO patented valve architecture (US Patent #5152500) includes a unique radial diaphragm that forms three seals with the valve: the seal at the inlet, a seal with the compound shoulder and an O-ring seal at the bottom of the valve chamber.



Important: Replace Actuator O-rings annually. See "Parts list" on page 37, for replacement kit part numbers.

A behind-the-seat flow path allows complete flushing of the valve chamber. The result is a superb aseptic design that promotes self-draining and easy cleaning.



Ensure that your CIP/SIP cleaning process does not compromise the diaphragm due to chemical incompatibility or excessive exposure to high temperatures.

All of our valve bodies and actuators can be sterilised in an autoclave. The diaphragm materials that ASEPCO uses are rated for temperatures of 135C (275F) or higher, depending on the material. So, as long as the autoclaving process is below that temperature it is not necessary to wait for it to cool before reassembly.



The valve and actuator surfaces will be hot following sterilisation in an autoclave and may cause injury when handled. Suitable personal protective equipment must be worn and care must be taken when handling the valve and actuator.

All the actuators have built-in, non-adjustable travel stops that prevent over-tightening of the diaphragm in any conditions, hot or cold.

10 Specifications

Parameter	Value
Maximum operating temperature	135C (275F)
Maximum operating pressure	10bar (150psi)

Model number	Size	Air pressure minimum
PN05 / PN05-01	0.5"	4bar (60psi)
PN10 / PN10-01	1.0"	6bar (80psi)
PN17 / PN17-01	1.5"	6bar (80psi)
PN20	2.0"	6bar (80psi)
PN30	3.0"	6bar (80psi)
PN40	4.0"	6bar (80psi)

11 Troubleshooting

Issue	Possible Causes
Leaking process fluid	<ul style="list-style-type: none">• Clamp incorrectly installed onto valve• Actuator seal failure• Diaphragm failure• Diaphragm not screwed on fully• Valve damage
Leaking air	<ul style="list-style-type: none">• Actuator seal failure
Can't open/close valve fully	<ul style="list-style-type: none">• Actuator failure• Diaphragm failure• Diaphragm not screwed on fully
Valve sticking or stuck	<ul style="list-style-type: none">• Sticky diaphragm• Actuator problem

Valve body issues

The most common valve body issues are:

- Valve damage - If you are having issues with leaking around the valve, inspect the valve carefully for damage.
- Leaking diaphragm - If the clamp is not installed correctly, the diaphragm can leak because of poor seating. Follow the assembly instructions carefully.

Actuator issues

The most common actuator issues are:

- Seal failure or leaking seal in a pneumatic actuator - The operator usually hears air leaking from the valve during operation. In addition, the valve may not fully open or close.
- Bends or damages the actuator shaft or handle caused by dropping the valve assembly or actuator - When this occurs, the bent shaft or damaged handle may keep the diaphragm from seating properly, resulting in process fluid leakage.
- Bent or improperly assembled actuator - If the valve does not assemble easily, examine it carefully for damage. Do not force the valve together.
- The valve is not opening or closing easily - Double check the actuator to make sure that it is assembled properly.

Diaphragm issues

Diaphragms are the high-wear components of valves and the most common point of failure. Common causes of diaphragm failure are:

- Incorrect assembly - A diaphragm can wear prematurely if it isn't installed properly on the actuator and in the valve body.
- Actuator failure - Lack of servicing a pneumatic actuator can lead to a catastrophic diaphragm failure. Actuators don't need to be serviced often, but every year or so,

the actuator seals need to be replaced. The frequency depends upon the number of actuations performed.

- Diaphragm overuse—infrequent replacement - Diaphragm lifetime depends upon your process and the chemicals that it comes into contact with.

Replacement at correct intervals will significantly increase the lifetime of your valve and actuator, therefore maximising your return on investment.

- Chemical incompatibility - This is the most common cause of diaphragm failure. It is therefore critical to select a diaphragm material that is compatible with the chemicals used in your process.
- Incompatible operating temperature - Using a diaphragm at a temperature higher than it is rated for can cause leaks as the material degrades or melts, which can in turn lead to valve and actuator damage.

Make sure that you select an elastomer for your process than can handle the temperatures of your process.

If you cannot find the cause of your diaphragm failure, please contact your local sales office.

11.1 Technical support

ASEPCO offers comprehensive after-sales service. If any adverse issue (such as material defect or valve function) develops with your valve, contact ASEPCO immediately to determine the most effective resolution for the issue.

For spare parts and advice regarding operation of your ASEPCO valve, contact your local sales office or visit www.wmftg.com.

12 Parts list

12.1 Replacement diaphragms

Material	0.5" Standard	0.5" Extended	1.0"	1.5"	1.5/2.0"	3"	4"
Silicone	SL05	SG05	SL10	SL17	SL20	SL30	SL40
Silicone Plus	PS05	PSG05	PS10	PS17	PS20	PS30	N/A
EPDM	EP05	EG05	EP10	EP17	EP20	EP30	EP40
EPDM Plus	PE05	PEG05	PE10	PE17	PE20	PE30	N/A
Viton A	VT05	VG05	VT10	N/A	VT20	VT30	N/A
Viton A (steam grade)	VA05	N/A	VA10	N/A	VA20	VA30	N/A
Viton GF	N/A	VG05	N/A	N/A	VF20	VF30	N/A
PTFE	N/A	PFG05-1	PF10-1	PF17-1	PF20-1	PF30-1	N/A

12.2 Actuator maintenance kits

MNXX/PNXX Series (Stainless steel actuators)

Part #	Applicable To	Description
MAK-100	All manual actuator	Includes O-rings, guide bushing, and wiper seal
PAK-050	0.5" pneumatic actuator	Includes O-rings, guide bushing, and quad ring
PAK-100	1.0" pneumatic actuator	Includes O-rings, guide bushing, and quad ring
PAK-200	1.5"/2.0" pneumatic actuator	Includes O-rings, guide bushing, and quad ring
PKS-100	Saunders retrofitted pneumatic actuator	Includes O-rings and guide bushing

MNXX-01/PNXX-01 Series (Plastic actuators)

Part #	Applicable To	Description
MAK-060	0.5" radial manual actuator	Includes seals, hardware, and lubricant
MAK-110	1.0" radial manual actuator	Includes seals, hardware, and lubricant

Part #	Applicable To	Description
MAK-160	1.5 radial manual actuator	Includes seals, hardware, and lubricant
PAK-060	0.5" radial pneumatic actuators	Includes seals, hardware, and lubricant
PAK-110	1.0" radial pneumatic actuator	Includes seals, hardware, and lubricant
PAK-160	1.5" radial pneumatic actuator	Includes seals, hardware, and lubricant

13 Welding guidelines



This welding guideline must be read carefully and thoroughly understood before the valve is installed. All warnings must be considered.

The tank valve (or similar) pictured below is an integrated part of the vessel on which it is mounted. This document is a guideline on how to weld the valve into a dished-bottom vessel. Before starting to weld in the valve, please ensure that all necessary certificates and approvals have been received from ASEPCO.



Make sure to:

- Follow the welding guideline described in this document.
- Use a heat-sink to reduce the risk of warping (recommended).
- Cool the weld zone to 25C (80F) after each weld using **compressed air**.

13.1 Welding check list

Before welding, make sure:

- The welding guidelines for the tank valve has been carefully read and understood.
- All necessary certificates, approvals and other documentation has been received from ASEPCO.
- The welder is authorised and familiar with this type of welding operation.
- The orientation for the tank valve has been taken into consideration.
- The location of the tank valve and distances between welding joints fulfil the pressure vessel code.

During welding, make sure:

- The welding procedure for positioning of welds is followed according to these guidelines.

After welding, make sure to:

- Verify that the tank valve functions correctly by following the steps in "Final control (optional)" on page 43.

13.2 Positioning of the tank valve

The tank valve should be oriented on the vessel head to ensure that it can be fully full drained. In general, this is on centre of the tank, installed so that the ferrule face of the valve is horizontal and parallel to the floor.



Ensure that the tank valve actuator can be mounted and dismantled without any obstructions.

Free distance between welds

The minimum free distance between two welds is specific for each pressure vessel code. Check the relevant pressure vessel code for the smallest permissible distance (W) between the weld seam of the tank valve and any other weld.

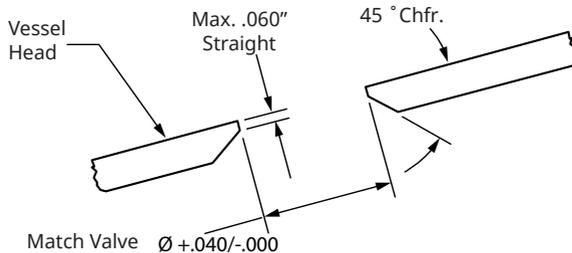
13.3 Location of tank valve

The location of the tank valve in the dished head should be located so that the requirements for the actual pressure vessel code are fulfilled.

13.4 Making the hole for the tank valve

After consideration of the previous instructions, the hole for the tank valve should be made with the same diameter as the tank valve (no more than 1mm (0.040") larger).

Minimise the air gap between the tank valve and the edge of the hole. The edge of the hole on the exterior of the head must be ground at a 45 degree angle sloping outwards to create a weld groove. A straight edge no more than 1.5mm (0.060") should be left on the inner edge.



13.5 Insertion depth of tank valve

The tank valve must be welded **flush** to the inner-dished head's ID surface.

13.6 Welding instructions

Before welding:

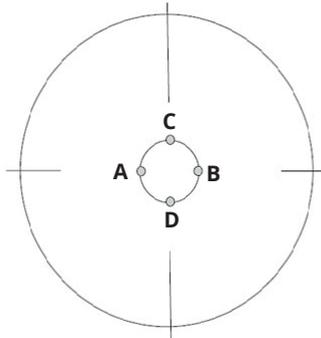
- Ensure the heat number on the tank valve matches tank valve material certificate.
- Set up for the TIG welding method unless this conflicts the local pressure vessel code.
- Prepare to use the proper filler material

Internal tack welding of the tank valve:

1. Place the tank valve into a pre-drilled hole so that the tank valve is **flush** with the inner surface of the dish.
2. Tack weld at A and B (shown below). Check the inner surface to ensure the valve is **flush**.
3. Make necessary corrections if necessary.
4. Tack weld at C and D (shown below).



Follow above instructions. Do not overheat the material.



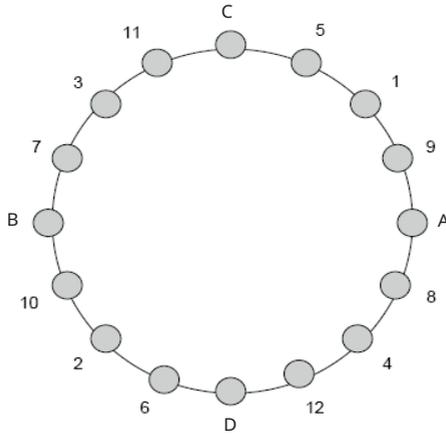
Tack Welding from **INSIDE** the vessel head

13.7 External tack welding of the tank valve:

1. Start with the dished head turned upside down on a clean working surface and fill it with protective gas (keep the gas flowing during the welding process).
2. Tack weld the tank valve as follows:
 - a) Start with A then B then C then D per figure 1.7
 - b) Next follow the numbers as indicated 1 through 12 below



Follow above instructions. Do not overheat the material.



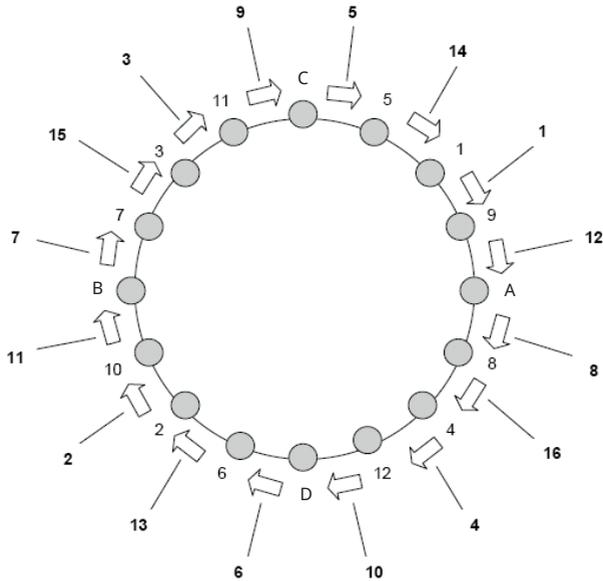
Tack Welding from **OUTSIDE** the vessel head

13.8 Final external welding of the tank valve

1. Using the appropriate filler material weld the tank valve in the progression as shown below.
2. Always weld in a clockwise movement from tack to tack.
3. Cool the weld zone to 25C (80F) after each weld using **compressed air**.
4. Repeat the welding process identified in steps 1-3 above until the weld profile is shaped like a fillet weld with no undercut present.



Follow above instructions. Do not overheat the material.



Tack Welding from OUTSIDE the vessel head

13.9 Final internal welding of the tank valve

1. Turn the dished head over and fill any imperfections in the weld seam. Use the appropriate filler material if needed.
2. Cool the weld zone to 25C (80F) after each weld using **compressed air**.



Follow above instructions. Do not overheat the material.

13.10 Grinding / polishing

After cooling, the welds can be ground and polished to the final finish required by the specifications. In addition to the above welding procedure, the conditions below should also be taken into consideration.

- When polishing the welds ensure that full penetration has been achieved.
- If there are weld imperfections they must be addressed immediately.

13.11 Final control (optional)

The final step in the welding operation should be to check the tank valve for deformation. This can be done by completing the following steps:

1. Ensure the valve is completely cooled to room temperature.
2. Coat the interior seat with riboflavin.
3. Use a fresh (or previously cleaned) diaphragm and install on a manual actuator.

4. Turn the actuator to **full open** position.
5. Install the actuator.
6. Close the actuator until it just touches the seat (you will feel minor resistance on the handle).
7. Open the actuator.
8. Remove the actuator.
9. Check the circumference of the diaphragm for even distribution of riboflavin (use a blacklight to see this clearly).

If the circumference is evenly coated, the valve has minimal or no warping. If it is not even, we recommend a pressure test to further determine if the valve is installed correctly.

If the valve does not pass a pressure test then most likely it has been warped out of specifications. We then suggest the valve is removed and a new valve is reinstalled.

For more help with installation contact your local sales office.

14 Warranty

The following terms and conditions are applicable to all sales of ASEPCO valves. Any acceptance by ASEPCO of a purchase order for its valves is hereby made conditional upon the customer's acceptance of these terms and conditions of sales; including, in particular, any that are different from or in addition to or vary the terms contained in the customer's purchase order or request for quotation. Such acceptance shall be deemed to occur upon the failure of the customer to object in writing specifically to these terms and conditions within 14 days of receipt hereof. No waiver, alteration, or modification of these terms and conditions whether in the customer purchase order or otherwise shall be valid unless specifically accepted in writing by an authorised representative of ASEPCO.

Limitations of use

ASEPCO valves are designed for aseptic processing at not greater than their rated working pressure and within the temperature range designated by ASEPCO. ASEPCO disclaims the suitability for its valves for applications or types of service other than those for which they are intended, as indicated in ASEPCO specifications as supplied to the customer. ASEPCO also disclaims suitability of its valves for any use whatsoever, following an unsuccessful installation qualification protocol or after service without replacement of the diaphragm in accordance with ASEPCO recommendations.

Warranty

ASEPCO warrants its products against defects in materials or workmanship for a period of three years from date of shipment for actuators and one year from date of shipment for all other components, excluding consumables, provided that they are used for a purpose and in a manner recommended or approved by ASEPCO. Warranty is contingent upon receipt and evaluation of the product by ASEPCO and determination by ASEPCO that the products or parts are found to be defective. In such case, the warranty obligation of ASEPCO shall not exceed the net sales price of the defective product or part. ASEPCO makes no warranty with respect to the products of other manufacturers which it may sell as part of an ASEPCO valve assembly.

ASEPCO makes no other warranty of any kind express or implied, and all implied warranties of merchantability and fitness for a particular purpose that exceed the aforementioned warranty are disclaimed by ASEPCO and excluded by this warranty. ASEPCO neither assumes nor authorises any person to assume for it, any other obligation in connection with the sale of its products. This warranty shall not apply to any products or parts that have been repaired or altered without prior authorisation by ASEPCO in writing; or have been subject to misuse of any kind including but not limited to contrary to ASEPCO instructions or recommendations. ASEPCO shall not be responsible for design defects due to inaccurate or incomplete information supplied by the customer or its representatives.

Tank valve body guarantee

In addition to the above stated general warranty, ASEPCO offers a lifetime free replacement of any ASEPCO tank valve body, no matter who breaks it or how it is broken. Furthermore, if it is proven that a properly assembled ASEPCO tank valve cannot CIP/SIP, ASEPCO will buy back our tank valve at full purchase price, buy an equivalent replacement valve per the customer's specification, and pay the cost of installation in the customer's tank.

15 Information for returning products

In accordance with local Health and Safety Regulations, you are required to declare the substances which have been in contact with product(s) you return to WMFTG or its subsidiaries or distributors. Failure to do so will cause delays. Please ensure that you email this information and receive a RMA (Returned Material Authorisation) from your local sales office before you despatch the product(s). A copy of the RMA form must be attached to the outside of the packaging containing the product(s).

Please complete a separate decontamination certificate for each product and attach it to the outside of the packaging containing the product(s). A copy of the appropriate decontamination certificate can be downloaded from the WMFTG website at www.wmftg.com/support/decon

You are responsible for cleaning and decontaminating the product(s) before return.

When returning a valve or valve component to the factory, contact ASEPCO for a Return Material Authorisation (RMA) number. Package the valve or component carefully to prevent damage in transit. Please label boxes, packing slips, and all correspondence with the RMA number provided by ASEPCO.

16 Name and address of manufacturer

ASEPCO Corporation
355 Pioneer Way
Mountain View
CA 94041
USA

www.wmftg.com

To locate your local sales office, visit <http://www.wmftg.com/gb-en/contact-us/>

17 Trademarks

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18 Publication history

m-radialdiaphragmvalve-en-01 Weirless Radial diaphragm™ tank-bottom (90 degree) valve

First published 02.18

19 Disclaimers

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ASEPCO products should be used only in services and within pressure and temperature ranges designated in its product information or specifications or as specifically approved by it in writing.

Misuse of ASEPCO products may result in personal injury or property damage. If any ASEPCO valve shows signs of leakage, do not operate—remove it from the line, and repair or replace it.