



ARRAY



OPERATION & MAINTENANCE MANUAL

MODEL APD900 LOW PRESSURE SURFACE SAFETY VALVE



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INTRODUCTION

The APD 900 series diaphragm actuated gate valve is a “fail-closed” gate valve. The APD 900 should be installed on the flow wing or flow line SDV production manifolds, gas lift or dump valve installations, gathering lines and compressor stations.

This installation and maintenance manual contains assembly, disassembly, and installation procedures, trouble shooting and technical specification information.

The standard configuration of the APD 900 Gate Valve has 2” LP threaded end connections, a reduced bore size of 1¹/₄” diameter and a maximum working pressure of 3,000 psi (207 bar). Additionally, raised face (RF) and ring joint (RTJ) flanged connections are available.

ACTUATOR OPERATION

Array Model APD 900 is designed to operate an Array Fail Safe Gate Valve. The thrust required to do this is created by application of pneumatic control pressure to the actuator inlet port. Pneumatic pressure acting on the diaphragm overcomes the thrust created by the forces of the valve pressure acting on the bonnet stem and gate friction due to any pressure differential acting on the valve gate and spring. It will open fail-closed and failopen gate valves depending on the gate valve design type. Removal of this control pressure allows the bonnet stem forces to return the gate valve to its fail-safe position. The actuator return spring provides the required force to overcome dynamic seal friction and the weight of moving parts when NO pressure exists in the valve.

Upon removal of control pressure, the motion should move throughout the entire stroke. As a general rule, the faster the control pressure is removed from the actuator, the quicker it will close.

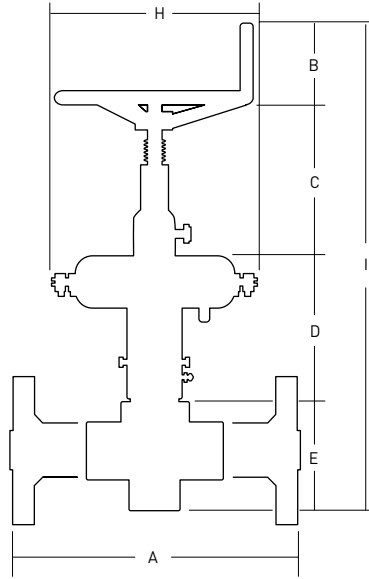


ACTUATOR TECHNICAL SPECIFICATION

1.	Gate Valve Body	ASTM A487-4C Steel-NACE
2.	Gate	17-4 ph Stainless Steel - Nitrided NACE
3.	Stem	17-4 ph Stainless Steel - NACE
4.	Downstream Seat Seal	Viton 70 Durometer
5.	Assembly Temperature Rating	-20° F to 250° F (-29° C to 121° F)
6.	Gate Valve Working Pressure	Maximum Working Pressure 3,000 psi (207 bar)
7.	Gate Valve Test Pressure	6,000 psi (414 bar)
8.	Actuator Maximum Working Pressure	75 psi (5 bar)
9.	Actuator Test Pressure	113 psi (8 bar)
10.	Diaphragm	Buna N w/Nylon Backing
11.	Housing	Low Carbon Steel
12.	Spring Alloy Spring	Steel - Plastic Coated
13.	Packing Poly-pak	Viton O-ring energizer



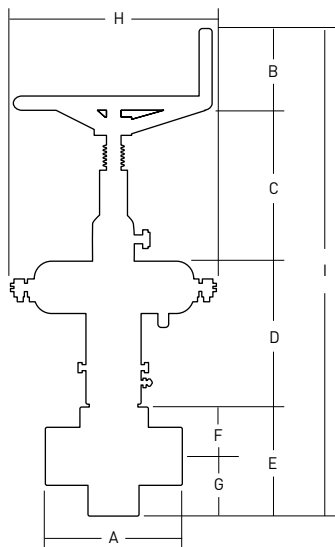
ACTUATOR DIMENSIONS AND FLANGE OPTIONS



FLANGED

FLANGE OPTIONS:

END CONNECTION	VALVE WORKING PRESSURE	ACTUATOR CONTROL PRESS.	VALVE BORE SIZE	DIMENSION "A"	
	psi	psi	in	in	mm
SE 2" LP	3,000	56	1.25	7.50	190
150 RF	285	10	1.25	7.00	177
300 RF	740	18	1.25	8.50	215
600 RF	1,480	30	1.25	11.50	292
900 RF	2,160	42	1.25	14.50	368
600 RTJ	1,480	30	1.25	11.62	295
900 RTJ	2,160	42	1.25	14.62	371
3000 RTJ	3,000	56	1.25	14.62	371



SCREWED END

DIMENSIONS:

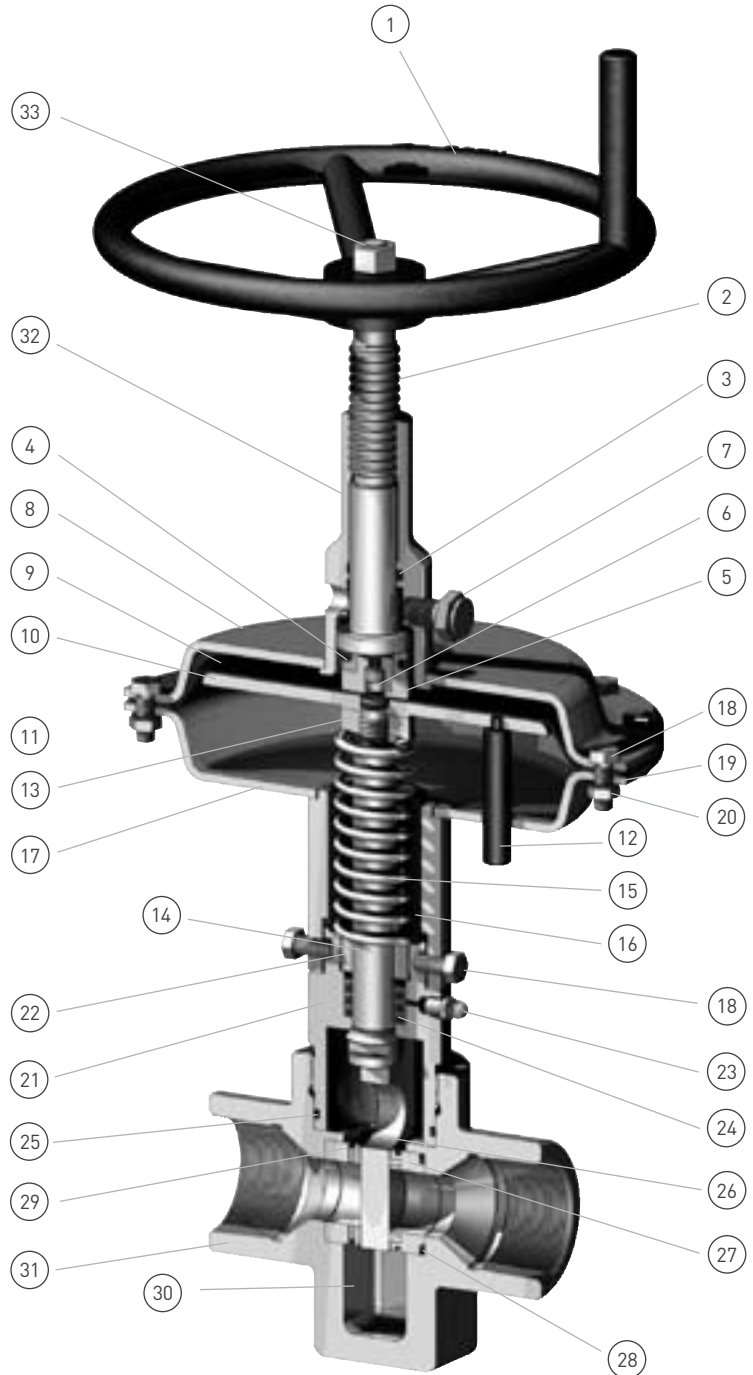
CONNECTION	in	mm
A	(see chart)	
B	4.25	107
C	8.57	217
D	8.05	204
E	6.10	154
F	2.70	68
G	3.40	86
H	13.00	330
I	27.00	685



PARTS LIST

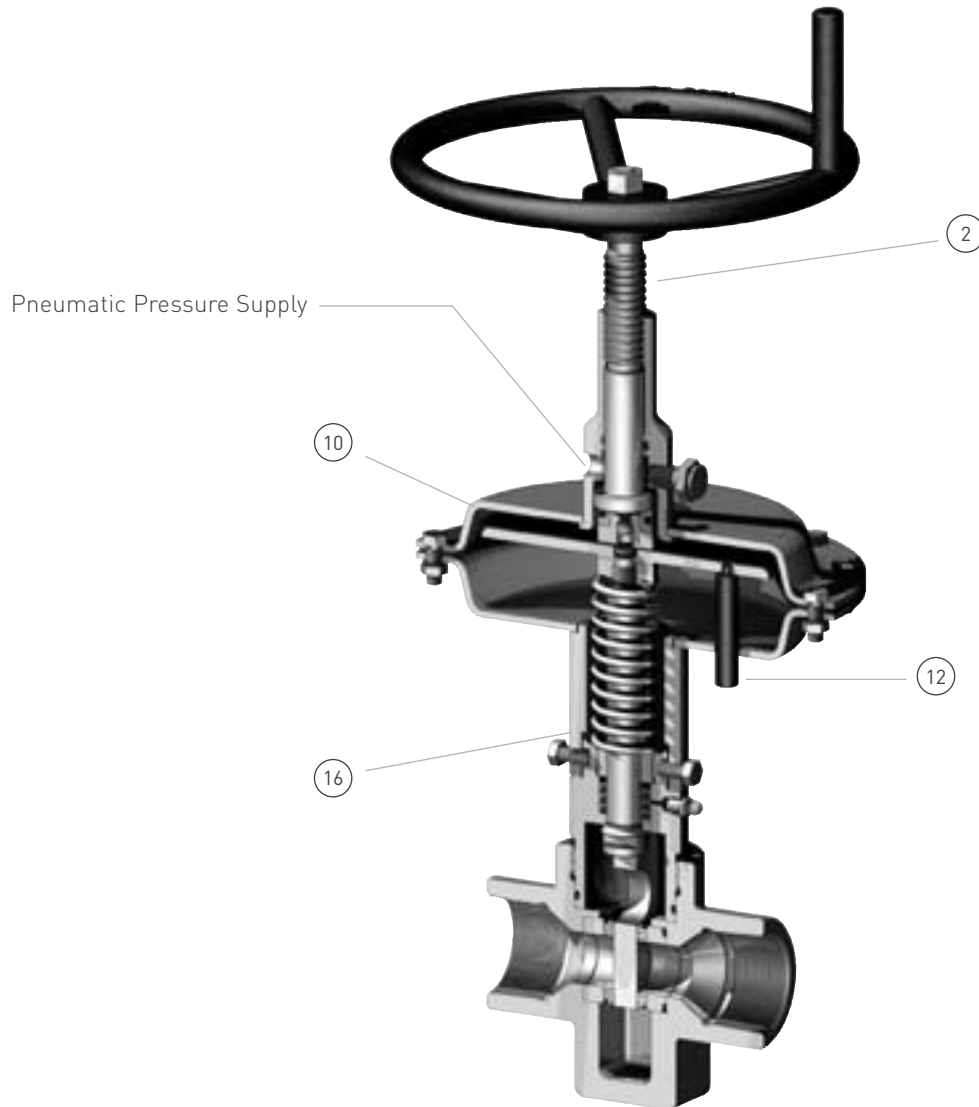
#	DESCRIPTION
1	Override Handwheel
2	Override Stem
3	Override Stem Seal (RK)
4	Override Bearing
5	Override Bearing Retainer Plate
6	Socket Head Shoulder Cap Screw
7	Pressure Relief Fitting
8	Actuator Upper Housing Assembly
9	Diaphragm (RK)
10	Diaphragm Retainer Plate
11	Retainer Plate Restrictor Ring (RK)
12	Position Indicator
13	Stem Nut / Spring Retainer
14	Bonnet Stem
15	Spring
16	Downstop Tube
17	Actuator Lower Housing Assembly
18	Hex HD Bolt - 3/8" - 16 x 1.00 LG (RK)
19	Lock Washer - 3/8" (RK)
20	Hex Nut - 3/8" - 16 (RK)
21	Bonnet
22	Packing Retainer
23	Bonnet Weep Fitting
24	Bonnet Stem Packing (RK)
25	Bonnet Seal (RK)
26	Reverse Acting Slab Gate
27	Downstream Seat
28	Downstream Seat Seal O-ring (RK)
29	Upstream Seat Spacer
30	Body Grease Fitting
31	Gate Valve Body
32	Fitting
33	Handwheel Nut

(RK) = Included In Redress Kit





MONITORING VALVE STROKE



There is no drift adjustment within the APD 900 design. The drift has been set at the factory prior to testing and shipping.

In the fully closed position, the position indicator is retracted within the lower actuator housing unit. The bonnet stem is backseated and sealed metal to metal in case of fire.

The manual override stem will be fully extended.

Pneumatic control pressure acting forces the diaphragm and diaphragm retainer plate down stopping on the stroke indicator tube.

The position indicator will protrude from the lower housing flange indicating that the valve is fully open.

Caution: Handwheel override stem should remain in the extended position. To engage diaphragm retainer plate by the handwheel override stem would lock gate valve in the open position.



MAIN ACTUATOR ASSEMBLY

The following outlines the assembly of the Diaphragm Actuator in first sub assemblies then into a final assembly. All item numbers refer to Bill of Materials items. **Caution: It is imperative that when assembling the APD 900 Diaphragm Actuator, the assembly area be clean and free of all debris.**

PROCEDURE

1. Place **(Gate Valve Body #31)** on a flat surface. Inspect pipe threads and internal cavity for debris. Inspect pipe thread on face of valve body. Inspect internal bore in top of valve body. Inspect seat sealing surfaces in valve body bore. Check both areas for surface finish.
2. Place **(Upstream Seat Spacer #29)** on a flat surface. Inspect for cleanliness and burrs. Lightly grease and install in upstream seat cavity of **(Gate Valve Body #31)**. The cast arrow indicates flow stream direction and upstream seat location. Facing the valve, the flow arrow goes from left to right. The upstream side is to the left of the arrow. The APD 900 is primarily designed as a mono directional gate valve however, customer requests will comply and the APD 900 can become bidirectional. To secure upstream seat for assembly, additional grease may need to be applied to cavity.
3. The **(Upstream Seat Spacer #29)** is designed as a blank seat. As previously stated, the upstream seat provides an unobstructed flow passage into the bonnet cavity. This eliminates high flow particle buildup.
4. Place **(Downstream Seat #27)** on a flat surface. Inspect face seal for chips, tears, and cuts. Sealing surface of face seal must be clean, flat and have no surface imperfections. Inspect o-ring surface in rear seal. No sharp edges or corners allowed. Lightly grease o-ring sealing surface on rear seat.
5. Install **(Downstream Seat Seal O-ring #28)** to back of downstream seat. Grease lightly. Install downstream seat into seat pocket of gate valve.
6. Place **(Reverse Acting Gate #26)** on a clean flat surface. Inspect both sides of sealing surface of gate. No imperfections to surface are allowed.
7. Place **(Bonnet Stem #14)** on a clean flat surface. Inspect stem O.D. sealing surface and back seat face.
8. Engage milled tang bonnet stem to T-slot cavity in gate. Lift both components together and grease entire surface of gate.
9. Lower gate into body cavity centrally locating gate between both seats. Some resistance will be felt due to o-ring loading of downstream seat. Push inward with enough force to install gate totally into valve body. **Note:** Do not install the gate to the fully open position. Allow the top of the gate to be located just below the top of the gate valve body.
10. Set gate valve assembly aside. Take **(Bonnet #21)** on flat planar surface. Clean and inspect packing bore and threads. Install three pieces of **(Bonnet Stem Packing #24)**. **Note:** Grease packing bore thoroughly prior to installation of three pieces of packing. Install the packing with lips and o-ring energizer facing downward or inward. **Caution: Do not cut or tear corner or edge of packing. Press all three (3) rings so that the shoulder on bonnet stops.**
11. Install **(Packing Retainer #22)** into bore of bonnet. Rotate packing retainer clockwise until stopping. Tighten securely but do not over torque.



12. Install the **(Bonnet Weep Fitting #23)** to the side NPT port located on the bonnet O.D. Tighten securely but do not over torque.
13. Install **(Bonnet Seal #25)** on nose of bonnet O.D. groove. Grease lightly prior to installation and after installation.
14. With gate valve standing upright grease thoroughly top threaded top chamber of valve body. Place bonnet up, over and down onto bonnet stem. **Caution: You must center the bonnet stem so that travel through the multi packing arrangement will not be injured. Continue to push until bonnet threaded nose enters into top of body. Once engaged rotate bonnet in a clockwise direction.** **Note:** The torque will increase as o-ring on bonnet nose engages in sealing chamber of the body I.D. This is normal. Rotate until bonnet stops. Tighten securely but do not over torque.
15. Install **(Spring #15)** over bonnet stem. Grease entire spring lightly. Install **(Downstop Tube #16)** over and down onto bonnet face.
16. Install **(Stem Nut #13)**. A slight compression loading of the spring will be required in order to engage the threads of the bonnet stem and the retainer nut. Rotate the nut in a clockwise direction until stopping on the shoulder. **Note:** It is not necessary to hold or to grip the bonnet stem when rotating the nut.
17. Install **(Retainer Plate Restrictor Ring #11)** about the top groove of the bonnet stem. Do not grease groove. Grease o-ring lightly.
18. Set bonnet and gate valve body aside. Place **(Actuator Lower Housing Assembly #17)** on a flat planar surface. Position lower housing tapped holes at the base of the housing so that the position indicator hole will be with the run of the valve. Install **(Diaphragm Retainer Plate #10)** down onto the retainer plate restrictor ring. Extra force must be exerted to engage angle of retainer plate and restrictor ring boss. A snapping action will be present. Align position indicator hole with diaphragm position indicator.
19. Place the **(Diaphragm #9)** down onto the flange face of lower housing. Align holes. Inspect the diaphragm for any type of holes, scrapes, cuts, etc.
20. Place Actuator Upper Housing on a flat planar surface. Install **(Pressure Relief Fitting #7)**. Apply Teflon[®] tape or Teflon[®] liquid to threaded nose. Install fitting into tapped hole located at the base of the override housing. Tighten securely. Install **(Fitting #32)** into tapped hole located at the upper portion of the override housing. Tighten securely. **Note:** This fitting is for application of grease to o-ring seal and O.D. threads of handwheel screw. It is not a pressure grease fitting. There is no spring or ball check internal.
21. Apply Never-Seez[®] to the internal threads of the handwheel upper housing. Apply thoroughly. **Note:** Do not use Never-Seez[®] in the area of the internal o-ring groove as this could possibly cause a malfunction in sealing.
22. Install **(Override Stem Seal #3)** into o-ring groove in handwheel housing.
23. Apply Loctite[®] sparingly to the internal thread located at the end of the nose of the override stem.
24. Grease lightly and install **(Override Bearing #4)** down onto the shoulder of handwheel override stem.
25. Grease lightly and install **(Override Bearing Retainer Plate #5)** into bearing I.D.



26. Install **(Socket Head Shoulder Cap Screw #6)** into tapped hole located at the end of the override stem. Use red loctite sparingly. Tighten securely.
27. With override stem assembled properly, hold the override stem in the right hand and rotate the override bearing plate and bearing with your left hand. If assembled properly these two components should rotate very easily.
28. Place **(Actuator Upper Housing Assembly #8)** in a horizontal position. Insert override stem assembly into override housing. Thread counter clockwise for engagement until top end of override stem protrudes through the top end of override housing.
29. Once override stem is exposed, install **(Handwheel #1)** on flats of handwheel stem. Seat properly and install **(Handwheel Nut #33)**. Tighten securely. Rotate in a clockwise direction to seat override stem into top of override housing.
30. Place **(Actuator Upper Housing Assembly #8)** onto flange and diaphragm of upper housing. Align holes. Insert **(Bolts #18)** through holes.
31. Apply **(Lock Washer #19)** and **(Hex Nut #20)** in a star pattern and engage. Tighten securely. The recommended torque of each bolt is 45–60 foot pounds. A note that would indicate over torquing of bolts would be too much diaphragm extrusion. Tighten bolts in a star pattern.
32. The APD-900 is now fully assembled. Recheck all bolting. Recheck fittings for secure tightness. Rotate handwheel to check that the stroke is even and non-binding stroke.
33. The unit is now ready for testing and field installation. Place the **(Diaphragm #9)** down onto the flange face of lower housing. Align holes. Inspect the diaphragm for any type of holes, scrapes, cuts, etc.



FIELD REMOVAL AND REPLACEMENT OF BONNET SEAL PACKING

1. Disconnect power source going into inlet nipple located on top of actuator housing. **Caution: If a pneumatic quick exhaust is used, disconnect. The piston or diaphragm may not shift totally, thereby trapping a small amount of air pressure in top case. This could be injurious to personnel during disassembly.**
2. Do not disconnect the pressure relief device. Replace if necessary.
3. If electric proximity switches are installed, remove them from top of actuator. Do not injure or mishandle. Be aware when removing bracket so as to correctly install properly later. **Caution: All wire leads must be replaced carefully.**
4. If lock open screw is engaged so that the gate valve is in the open position, rotate clockwise till override stem stops and gate valve is fully closed. Locate the position indicator located under the lower housing to monitor gate valve position. **Note:** When the position indicator is fully extended beyond the housing, the valve is in the fully open position. When the position indicator is totally recessed, the valve is in the fully closed position.
5. The location of the access to the diaphragm actuator will determine the disassembly procedure. In some locations the diaphragm actuator should be removed from the site and repaired in a different location.
6. Make sure safety valve is in the fully closed position with bonnet stem backseated. The weep fitting located above packing will indicate any type of leakage.
7. Using box end wrench or adjustable wrench, remove all **(Housing Hex Nuts #20)**, **(Washers #19)** and **(Bolts #18)** from top and bottom case flanges. Set aside. Clean prior to installation.
8. Remove **(Top Case Assembly #8)**. The override assembly is designed into the top case assembly. Retract override stem into top of override assembly housing. Clean and grease **(Fitting #32)** prior to installation and testing. Inspect **(Socket Head Cap Screw #6)** for tightness. Rotate clockwise to tighten.
9. Remove diaphragm from top of **(Actuator Lower Housing Assembly #17)**. The diaphragm may be difficult to remove if it has been in field service for a length of time. Remove all residue from face of both top and bottom actuator case flange faces.
10. Inspect **(Diaphragm Retainer Plate #10)**. Remove from top on **(Bottom Stem #14)**, check **(Retainer Plate Stem Seal #11)**, replace. Clean and inspect groove and install **(Retainer Plate Stem Seal #11)**, grease lightly. Check entrance diameter and angle of **(Retainer Plate #10)**. Inspect for sharp corners and edges.





11. Position diaphragm (**Diaphragm Retainer Plate #10**) over and down onto top of (**Bonnet Stem #14**). Push down evenly and forcefully. The snapping action heard is the retainer plate seating properly over the (**Retainer Plate Restrictor Ring #11**).
12. Make sure position indicator is centered properly on hole in bottom of lower housing.
13. Place (**Diaphragm #9**) down onto top flange of lower case. Center holes of both diaphragm and lower case. **Caution: Do not apply adhesive or grease to flange and diaphragm face. The flange design with the proper torque will seal diaphragm properly.**
14. Place (**Actuator Upper Housing Assembly #8**) assembly onto top of diaphragm and lower housing assembly. Center holes of all three components. Install (**Bolts #18**) into the open flange of (**Actuator Upper Housing Assembly #8**). Install (**Lock Washers #19**) and (**Nuts #20**) onto (**Bolts #18**). Tighten in a crossing pattern at 35–45 foot pounds.
15. **Caution: Locate pressure relief safety device so that personnel are not injured when unit exhausts.**
16. Fill (**Override Stem #2**) and housing cavity of override housing with grease. **Caution: Do not over fill or overpressure with grease gun. Too much pressure will extrude o-ring seal. The fitting does not contain a spring or ball. It is not designed as a grease fitting.**
17. Re-install pressure control line.
18. Re-install quick exhaust valve if applicable. Tighten securely. Pressurize diaphragm actuator and check for leaks.



FIELD REMOVAL AND REPLACEMENT OF DIAPHRAGM

1. Disconnect power source going into inlet nipple located on top on actuator housing. **Caution: If a pneumatic quick exhaust is used - disconnect.** (The piston or diaphragm may not shift totally thereby trapping a small amount of air pressure in top case. This could be injurious to personnel during disassembly).
2. Do not disconnect the pressure relief device. Replace if necessary.
3. If electric proximity switches are installed, remove them from top of actuator. Do not injure or mishandle. Be aware when removing bracket so as to correctly install properly later. **Caution: All wire leads must be replaced carefully.**
4. If lock open screw is engaged so that the gate valve is in the open position, rotate clockwise till override stem stops and gate valve is fully closed. Locate the position indicator located under the lower housing to monitor valve position. **Note:** When the position indicator is fully extended beyond the housing, the valve is in the fully open position. When the position indicator is totally recessed, the indicator is in the fully closed position.
5. The location of and access to the diaphragm actuator will determine the disassembly procedure. In some locations the diaphragm actuator should be removed from the site and repaired in a different location.
6. Make sure safety valve is in fully closed position with bonnet stem backseated. The weep fitting located above packing will indicate any type of leakage.
7. Using box end or adjustable wrench or socket, remove four (4) **(Bolts #18)** from **(Actuator Lower Housing Assembly #17)**. Set aside. Clean threads and inspect for re-assembly.
8. Lift actuator assembly from **(Bonnet #21)** and set aside. The removal of the diaphragm retainer will require force to remove as the **(Retainer Plate Restriction Ring #11)** is designed to hold the retainer plate from coming detached. Check restrictor ring for chips or tears. Replace if damaged, set assembly aside.
9. Remove **(Stem Nut #13)**.
10. Remove **(Downstop Tube #16)**.
11. Remove **(Spring #15)**.
12. Remove **(Position Indicator #12)**. Unscrew by rotating in a clockwise direction, set aside. **Caution: If a hissing noise is present when rotating packing retainer for removal, stop! There is valve pressure in the packing area. The bonnet stem has not backseated and/or the packing is leaking severely.**





13. Remove **(Bonnet Stem Packing #24)**, three (3) rings. Clean packing bore and replace. **Note:** Inspect packing rings with seal and o-ring facing toward gate valve, push down till all three rings stop. Grease thoroughly.
14. Install **(Packing Retainer #22)**. Rotate clockwise until stopping on shoulder. Tighten securely.
15. Install **(Spring #15)**, **(Downstop Tube #16)**.
16. Compress **(Spring #15)** with **(Stem Nut #13)**. Tighten securely.
17. Lower actuator housing down on top of bonnet shoulder. Align holes of lower housing and groove in bonnet. Install four (4) **(Bolts #18)**. Use a crossing pattern and tighten securely. **Note:** Check that position on stroke indicator is properly installed.
18. Re-install pressure control line.
19. Re-install quick exhaust valve if applicable. Tighten securely. Pressure diaphragm actuator and check for leaks.



SERVICING

1. Prior to servicing the actuator assembly, it is recommended that this manual be read in its entirety. Should the service technician have any questions or feel that a certain procedure cannot be performed safely, contact the factory for assistance.
2. For safety precautions due to the weight and/or size of some actuator assemblies and the presence of pressurized fluids in the actuator and valve, personnel should be wearing the proper safety equipment such as steel toe shoes, hard hats, safety goggles and lifting support belts.
3. When moving an actuator assembly, suitable lifting devices such as hoists and a come-a-long should be used. It is recommended that the weights of the equipment being serviced be obtained from the appropriate gate valve manufacturer's technical bulletins to confirm that any lifting equipment be used is adequate. **CAUTION: When using lifting eyes make sure they are forger single piece design. Engage thread completely before lifting.**
4. DO NOT attempt to remove any items from the actuator assembly when it is pressurized. BLEED OFF ALL control pressure and disconnect the supply lines before performing any service functions. Failure to do so could result in equipment damage or personal injury.
5. The work area should be clean and free of contaminants such as dirt, sand and metal shavings, etc.
6. All grease or lubricants must be free of any contaminants. Any utensils such as brushes or applicators must also be free of any foreign particles.
7. All tools used should be clean, in good working order and be the proper tool for the operation to be performed.
8. Keep all elastomers and/or replacement parts in the original storage or shipping packaging until installed.
9. Cleaning must be finished prior to installation or inspection of any new or used component. A suitable fluid should be used that is compatible with the part being cleaned. Most naphtha based solvents are good for heavy de-greasing of metallic parts. A solution of warm soap and water is recommended for all non-metallic pieces or simply wipe with a clean cloth. The use of commercially available aerosol dispensed brake cleaners may be used on metal parts only.
Caution: If the part is coated, test the vapor build up if using indoors.
10. All new or used parts must be examined after cleaning for burrs, dings, anomalous marks, cuts, nicks, etc. prior to using them.
11. Lightly lubricate all sealing surfaces with suitable grease prior to installing them.
12. When handling any parts that have sealing surfaces, care should be taken not to mar those surfaces.
13. **Caution: Failure to follow the procedures given in this manual may result in equipment damage, operating problems and/or personal injury.**



TESTING

1. The new assembled actuator will be tested per API 6A, latest edition. The following section applicable is 10.16.5.
 - a. Verify the following that the mechanical lock open devices is retracted when proceeding with operational testing.
 - b. When hydrostatically testing the gate valve body, engage the mechanical lock open device to move the gate to the half open position.
 - c. Remove the pressure relief devices from the actuator. After testing is complete the safety relief device will be assembled to the actuator. Use a gauge or solid plus as a replacement.
 - d. All testing must be performed by certified assemblers and testers.

PERIODIC MAINTENANCE

The following maintenance schedule is recommended to insure safe and reliable operation of the Array Model APH Actuator.

	MAINTENANCE OPERATION	INTERVAL
1.	Cycle actuator under normal operating conditions.	Monthly
2.	Replace pressure relief device. Check for leakage around threads.	Monthly
3.	Grease top fitting for seals and mechanical override. [Do not overpressure].	Monthly
4.	Inspect position indicator for alignment and proper position.	Monthly
5.	Check bolts at base of bonnet and diaphragm flange nut at top of override stem.	Every three months



TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Actuator will not stroke on a valve whether or not valve is pressurized.	Insufficient pressure in control line	Verify pressure availability from source. Consult control pressure information from the information chart size valve application.
	Valve and/or seats improperly installed	Remove actuator as instructed per this manual. Remove bonnet as per bonnet manufacturer's operating instructions. Repair and/or replace valve components per valve manufacturers repair manual.
	Gate/Seat Galled	Remove bonnet kit. Inspect gate and seats and replace if necessary.
Actuator will not attach to Bonnet Assembly.	Debris in stem or housing	Re-inspect housing and spring.
	Bonnet stem is not fully extended and back seated.	Grasp stem in bonnet and pull to full extension properly back seating system.
Actuator will not stroke to the Full Closed or 'Fail Safe Close' position.	Gate and seats are improperly installed causing excessive friction	Remove actuator as instructed per this manual. Manually push and/or pull bonnet stem to determine severity of binding. If severe, remove bonnet and gate and seats, clean and inspect gate and seats for wear and abrasion. Replace if necessary.
	Excessive seal friction due to loss of lubrication in bonnet/valve	Lubricate in accordance with manufacturer's maintenance manual.
	Improper gate to stem engagement	Remove actuator as instructed per this manual. Remove bonnet as per bonnet manufacturer's instructions and/or drawings, re-assemble. This problem only applies to certain valves.
Diaphragm Pneumatic Actuator will not stroke to open position. Actuator is in fully closed position.	Actuator control supply too low (psi)	Check regulator and control pressure gauge.
	Shut in tubing head pressure too high (psi)	Gauge on top cap illustrates shut in. Change actuator control supply regulator to increase psi. Actuator will not stroke after psi increase. Contact factory.



TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Diaphragm Pneumatic Actuator will not stroke to open position. Actuator is in fully closed position.	Diaphragm leaking	Air will flow through hole at base of lower housing. Use (snoop) or a soapy substance.
	Relief Valve or Burst Disc Bad	Air will exhaust, hold hand over to check.
	Bad quick exhaust valve (piston not shifted)	Remove quick exhaust check piston or diaphragm for movement.
	Gate galled against seat	Remove actuator downstop, spring retainer and spring, negotiate bonnet stem by hand.
	Packing seized	Remedy same as above



ORDERING INFORMATION

The following information should be provided when requesting a quote or issuing a purchase order to Array Products for an APD 900 Surface Safety Valve.

Actuator

Model of Actuator: _____

Actuator Control Pressure Availability: _____

Special Requirements:

• Testing _____

• Coating _____

Bonnet / Gate Valve

Gate Valve End Connection (S.E.; RTJ; RF): _____

Temperature Rating: _____

Material Class: _____



MODEL APD 900 LOW PRESSURE SURFACE SAFETY VALVE

TECHNICAL DATA

Valve Body	ASTM A487-4C Steel – NACE
Gate Material	17-4 ph Stainless Steel – NACE – Nitrided
Stem Material	17-4 ph Stainless Steel – NACE
Rear Seat Seal	Viton 75 Durometer
Temperature Rating	P -20° F to 180° F (-29° C to 82° C)
Gate Valve Maximum Operating Pressure	3,000 psi (207 bar)
Test Pressure	6,000 psi (414)
Actuator Maximum working Pressure	75 psi (5 bar)
Actuator Test Pressure	113 psi (8 bar)
Actuator Diaphragm	Buna-N w/Nylon Backing
Actuator Housing	Carbon Steel
Spring	Alloy Spring Steel – Plastic Coated

LIMITED PRODUCT WARRANTY

The following warranty is exclusive and in lieu of all other warranties. Whether express, implied or statutory, including, but not by way of limitation, any warranty of merchantability or fitness for any particular purpose.

Array Products warrants to each original buyer of products manufactured by Array that such products are free from defects in material and workmanship under normal use and service for a period of one (1) year from the date of shipment provided that no warranty is made with respect to: Any product which has been repaired or altered in such a way in ARRAY's judgment, as to affect the product adversely; Any product which has, in ARRAY's judgment, been subject to negligence, accident or improper storage; Any product which has not been operated or maintained in accordance with normal practice and in conformity with recommendations and public specification of Array.

ARRAY's obligation under this Warranty is limited to use reasonable efforts to repair, replace or, at it's option, refunding the purchase price. The cost of labor for installing a repair or replacement product shall be borne by Purchaser. Replacement parts provided under the terms of this Warranty are warranted for the remainder of the warranty period of the products upon which they are installed to the same extent as if such parts were original components thereof. Warranty services provided there under do not assume any liability for damages caused by any delays involving warranty service. For complete specification information, prices and name, address and telephone number of the ARRAY representative nearest you, call or write to us at the address below.

ARRAY HOLDINGS, INC., D.B.A. ARRAY PRODUCTS

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