

**AVK SERIES 41 SWING CHECK VALVE
FIELD MAINTENANCE AND INSTRUCTION
MANUAL FOR SWING CHECK VALVES 3" - 12"**

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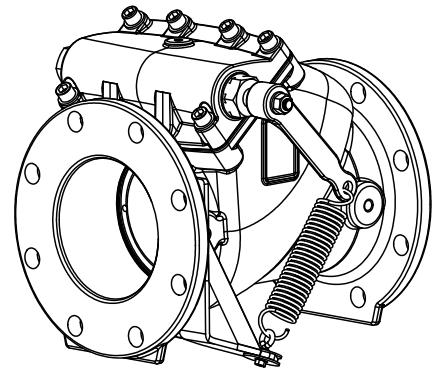
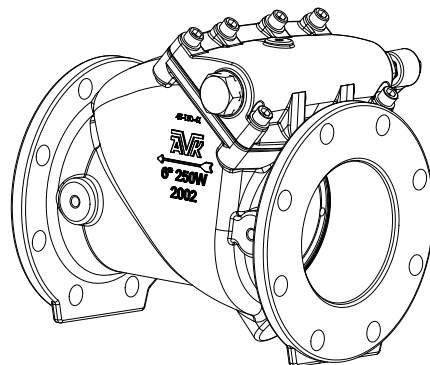
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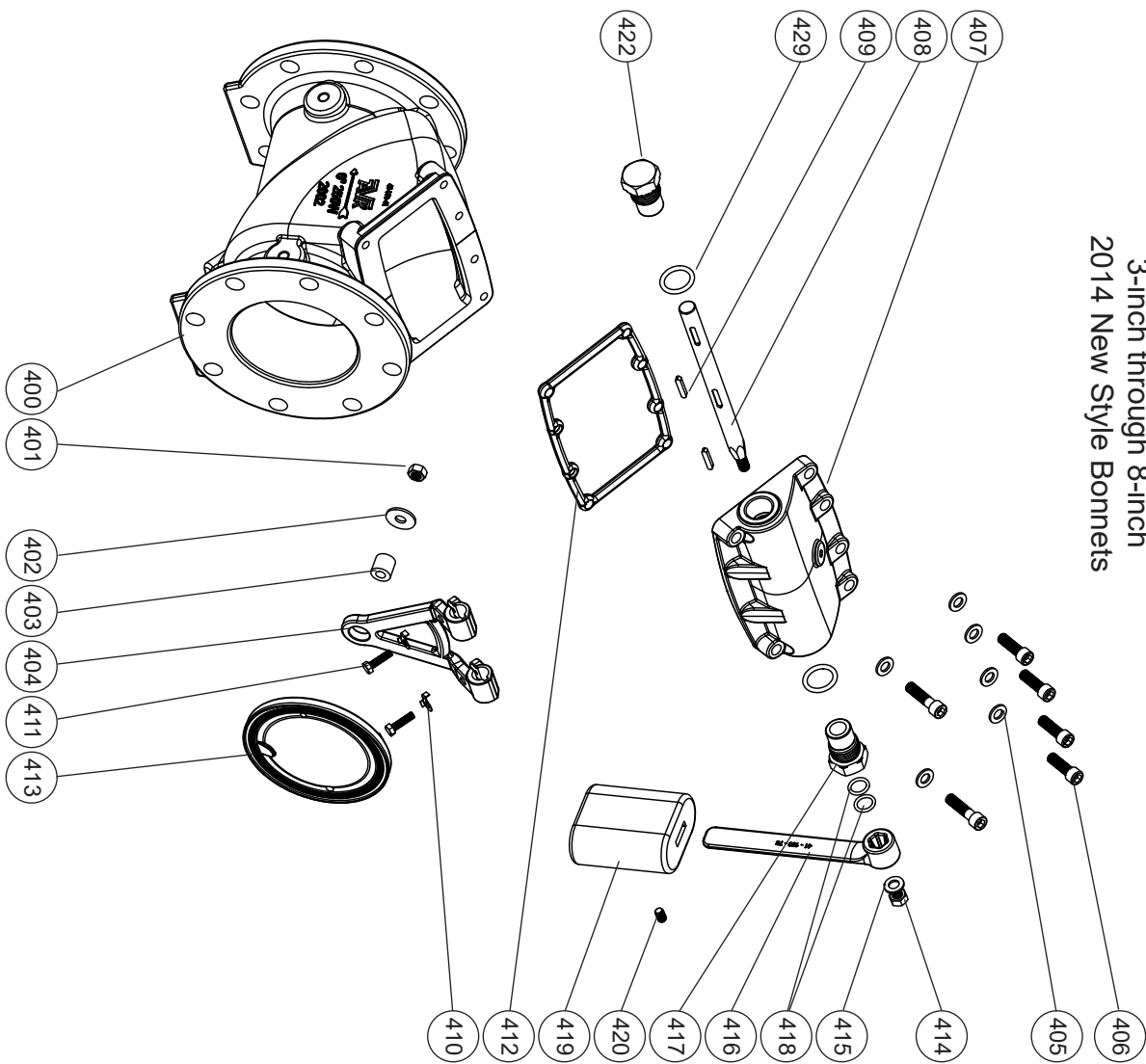
American AVK Series 41 Swingcheck Valve
Exploded Parts Breakdown
3-inch through 8-inch
2014 New Style Bonnets

Components:

- 400. Body
- 401. Disc Nut*
- 402. Disc Washer
- 403. Disc Bushing
- 404. Hinge
- 405. Bonnet Washer
- 406. Bonnet Bolt
- 407. Bonnet
- 408. Shaft
- 409. Key
- 410. Lock Washer
- 411. Hinge Bolt
- 412. Bonnet Gasket
- 413. Disc
- 414. Shaft Nut
- 415. Shaft Washer
- 416. Lever
- 417. Open Bushing
- 418. Inner Bushing O-ring
- 419. Weight
- 420. Set Screw
- 422. Closed Bushing
- 429. Bonnet O-Ring**

* As of March 1st, 2008 on 3" through 8" valves, the Disc Lock Washer and Disc Nut are replaced by a self locking Disc Nut.

** As of June 2014, additional o-rings included in new style bonnet assemblies for 3" through 8" valves.



Item No.	Description	Material
400	Body	Ductile iron, ASTM A536
401	Disc Nut	304 Stainless steel
402	Disc Washer	304 Stainless steel
403	Disc Bushing	Polymide 6.6
404	Hinge	316 Stainless steel
405	Bonnet Washer	304 Stainless steel
406	Bonnet Bolt	304 Stainless steel
407	Bonnet	Ductile iron, ASTM A536
408	Shaft	Optional 420 or 316L Stainless steel
409	Key	304 Stainless steel
410	Lock Washer	304 Stainless steel
411	Hinge Bolt	304 Stainless steel
412	Bonnet Gasket	EPDM rubber
413	Disc	EPDM encapsulated steel disc
414	Shaft Nut	304 Stainless steel
415	Shaft Washer	NBR
416	Lever	Ductile iron ASTM A536
417	Open Bushing	Brass
418	Inner Bushing O-ring	NBR
419	Weight	Ductile iron, ASTM A536
420	Set Screw	304 Stainless steel
422	Closed Bushing	Brass
423*	Disc Lock Washer	304 Stainless steel
424	Spring	Stainless Steel
425	Spring Eyebolt	Stainless Steel
426	Spring Eyebolt Nut	Stainless Steel
427	Spring Eyebolt Washer	Stainless Steel
428	Spring Bracket	Carbon Steel
429**	Bonnet O-ring	NBR
430	Hinge Connector 10"-12"	Stainless Steel
431	Retaining Washers 10"-12"	Stainless Steel
432	Shaft Spacers 10"-12"	Stainless Steel
433	Spring Arm Washer 10"-12"	Stainless Steel
434	Spring Arm Nut 10"-12"	Stainless Steel
435	Spring Arm rod 10"-12"	Stainless Steel
436	Spring Bracket Mount Bolt 10"-12"	Stainless Steel
437	Spring Arm Spacer 10"-12"	Stainless Steel
438	Priming Actuator Seal Washer	Fiber
439	Priming Actuator Body	Brass
440	Priming Actuator O-ring	NBR
441	Priming Actuator Spindle	Stainless Steel
442	Priming Actuator Handle	Stainless Steel
446	Bonnet Plug Bolt 10"-12"	Stainless Steel
447	Bonnet Plug Washer 10"-12"	Copper
448	Shaft Lock Washer 10"-12"	Stainless Steel
449	Spring Bracket Mount Washer	Stainless Steel

For individual part ordering, refer to the item number, size & configuration of the valve when contacting American AVK Customer Services
Note: Items (#401) through (#423) may be ordered as a replacement kit. (Head Assembly) Refer to "HEAD REPLACEMENT" on page 13. Specify the appropriate valve size and configuration when ordering.

*As of March 1st, 2008 on 3" through 8" valves, the Disc Lock Washer and Disc Nut are replaced by a self locking Disc Nut.

**As of June 2014, additional o-rings included in new style bonnet assemblies fo 3" through 8" valves.

INTRODUCTION / DESCRIPTION

The American AVK Series 41 Swing Check Valve is designed to be a trouble free, easy to maintain check valve. This manual will provide you with the information needed to properly install and maintain the valve and to ensure a long service life. The valve is opened by fluid flow in one direction and closes automatically to prevent flow in the reverse direction. An optional priming actuator may be mounted on the bottom of the valve to allow manual priming through the valve in the reverse direction for sizes 3- through 8-inch. An optional limit open device is available for sizes 10-inch and 12-inch. The Size, Flow Direction, and Maximum Working Pressure are cast into the body of the valve for reference.

RECEIVING AND STORAGE

Inspect valves upon receipt for damage in shipment. Unload all valves carefully to the ground without dropping. Do not allow lifting slings or chains to pass through the valve; use eyebolts or rods through the flange holes on large valves. Never lift a valve by the lever and weight assembly or lever and spring assembly as this may damage the valve. Valves should remain crated, clean and dry until installed to prevent weather related damage. For long term storage the valves should be stored indoors.

INSTALLATION

WARNING: The line must be isolated, depressurized, and drained before removing the valve bonnet or removing the valve from line. Failure to do so may cause pressure to be released resulting in severe injury or death.

Correct installation of the Series 41 Check Valve is important for proper operation. It may be installed in either horizontal or vertical flow-up applications. If installed in the vertical flow-up position, a lever and weight or lever and spring assembly must be used to ensure proper valve operation. See figures 2, 3 and 4 for proper positioning of the lever and weight for horizontal and vertical flow-up applications. In all installations, the flow arrow cast in the valve body must be pointed in the direction of flow during normal system operation.

Flanged valves should only be mated with flat-faced pipe flanges equipped with full face resilient gaskets. The valve and adjacent piping must be supported and aligned to prevent cantilevered stress on the valve. Once the flange bolts or studs are lubricated and inserted around the flange, tighten them uniformly hand tight. The tightening of the bolts should then be done in graduated steps using the crossover tightening method. The appropriate torques are listed in table 1. If leakage occurs, allow gaskets to absorb fluid and check torque and leakage after 24 hours. Do not exceed bolt rating, extrude gasket, or compress gasket more than 50% of it's thickness. When torque values are specified in this manual, AVK advises the use of torque wrenches when required.

Note: Flange mounting bolts must be installed with nuts on the Swing Check Valve flange side.

Valve Diameter (Inches)	Bolt Diameter (inches)	Recommended Torque (ft-lb)
3	5/8	30
4	5/8	35
6	3/4	35
8	3/4	50
10	7/8	60
12	7/8	70

Table 1
Recommended Flange Bolt Torque Values

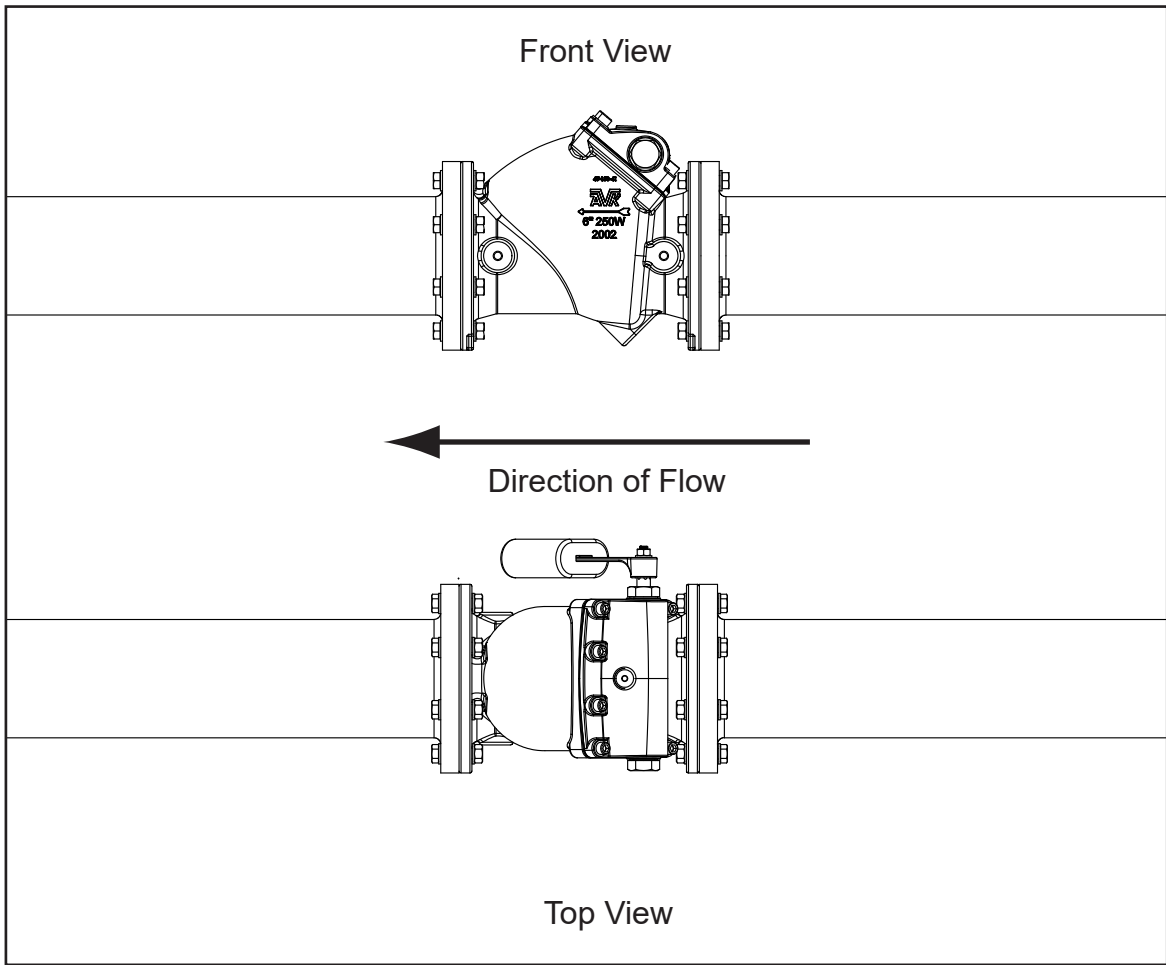


Fig. 2
Horizontal Mounting

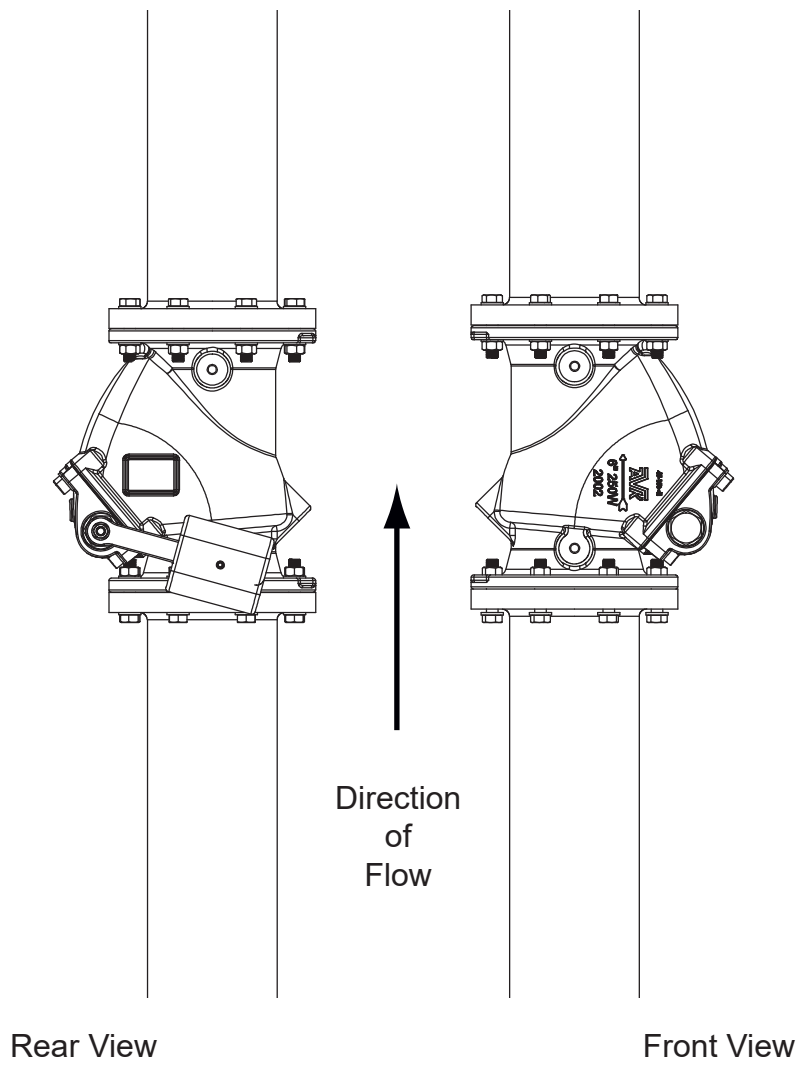
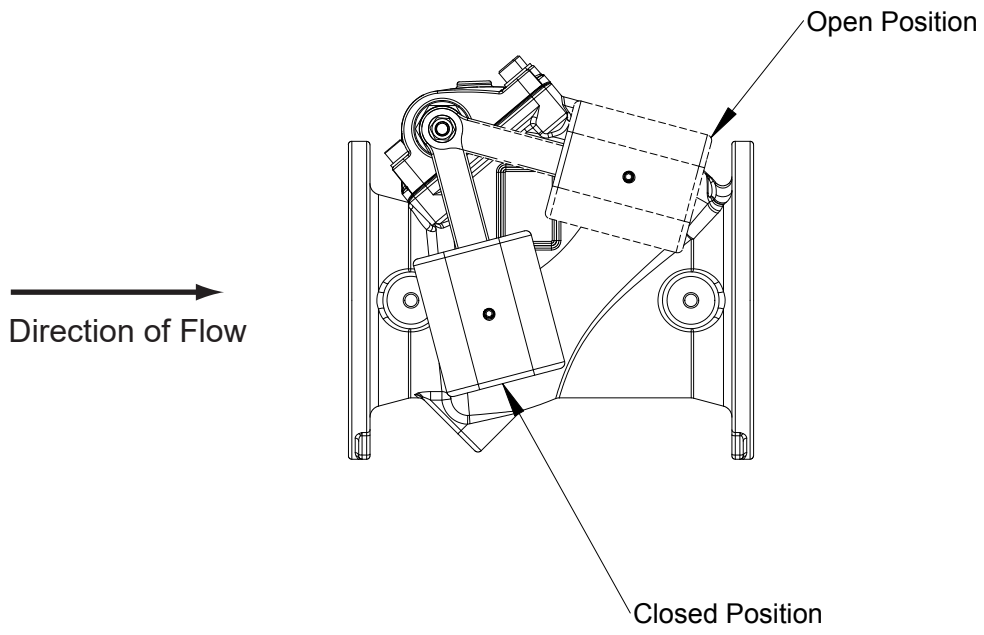
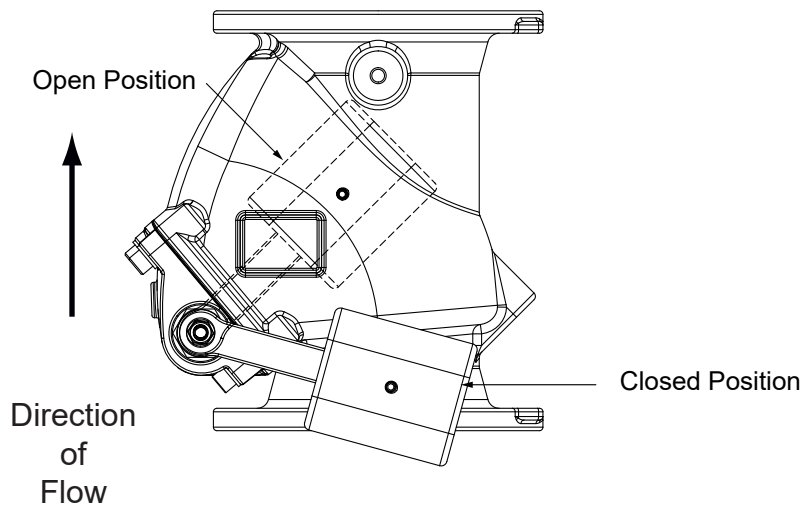


Fig. 3
Vertical Mounting



Horizontal Mounting



Vertical Mounting

Fig. 4
Optimal Leverage
Configurations

INSTALLATION - continued:

SWING

A valve without a lever is referred to as 'Swing'. For Swing installation, follow the "INSTALLATION" instructions on page 3 .

LEVER AND WEIGHT (OPTIONAL)

Once the valve is properly installed, the lever and weight assembly needs to be attached to the Shaft (408) passing through the Open Bushing (417) in the Bonnet (407). Slide the Lever (416) onto the Shaft (408) and position as shown in figure 4. Secure the Lever with the Shaft Washer (415) and Shaft Nut (414) and tighten to 30 ft-lbs. Attach the Weight (419) and tighten the Set Screw (420) to hold the weight in place. A medium strength thread locking compound such as Locktite 242 should be used to attach the Lever and Weight.

WARNING: The weight can be moved on the lever to adjust closing speeds for optimum performance. DO not adjust the weight while the system is operation. Serious injury can occur.

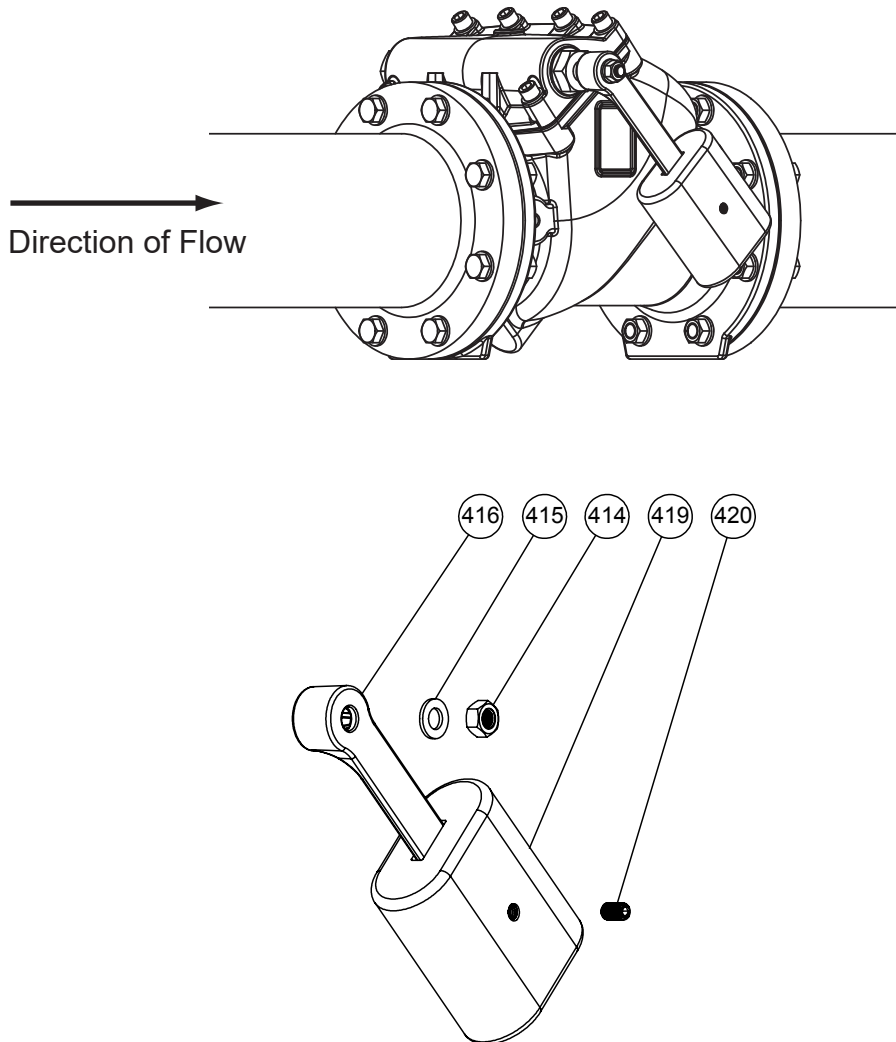


Fig. 5
Lever & Weight Mounting

INSTALLATION - continued:

LEVER AND SPRING 3" - 8" (OPTIONAL)

For sizes 3-inch through 8-inch, the Spring Bracket (428) must be installed using the flange mounting hardware (figure 6). Install the Spring Eyebolt (425) on the Spring Bracket, securing it with the Spring Eyebolt Nuts (426), and Spring Eyebolt Washers (427), one washer and nut on each side of the Spring Bracket (428). Slide the Lever (416) onto the Shaft (408) and position as shown in figure 4. Secure the Lever with the Shaft Washer (415) and Shaft Nut (414) and tighten to 30 ft-lbs. Attach Spring (424) in it's relaxed position as shown in figure (6). A medium strength thread locking compound such as Locktite 242 should be used to attach the Lever.

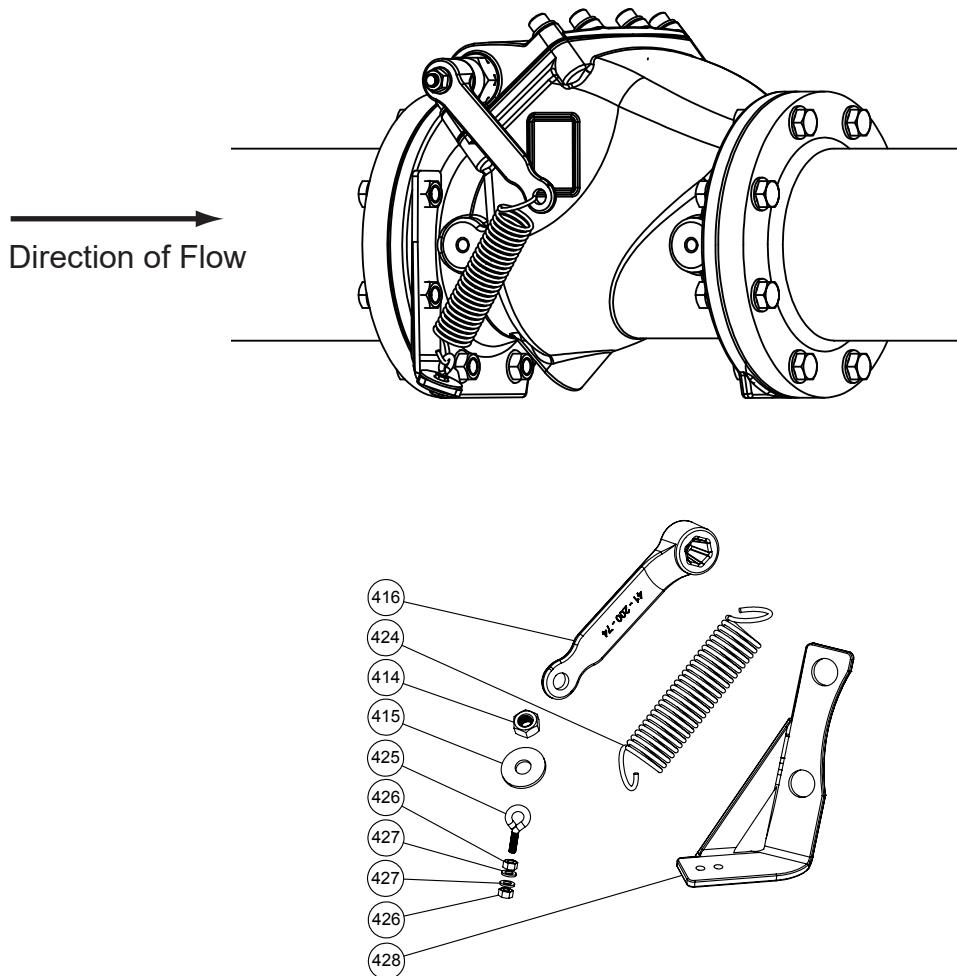


Fig. 6
Lever & Spring Mounting
3" - 8"

INSTALLATION - continued:

LEVER AND SPRING 10"-12" (OPTIONAL)

For Lever and Spring equipped 10-inch and 12-inch swing check valves, the Lever and Spring Assembly is installed at the factory.

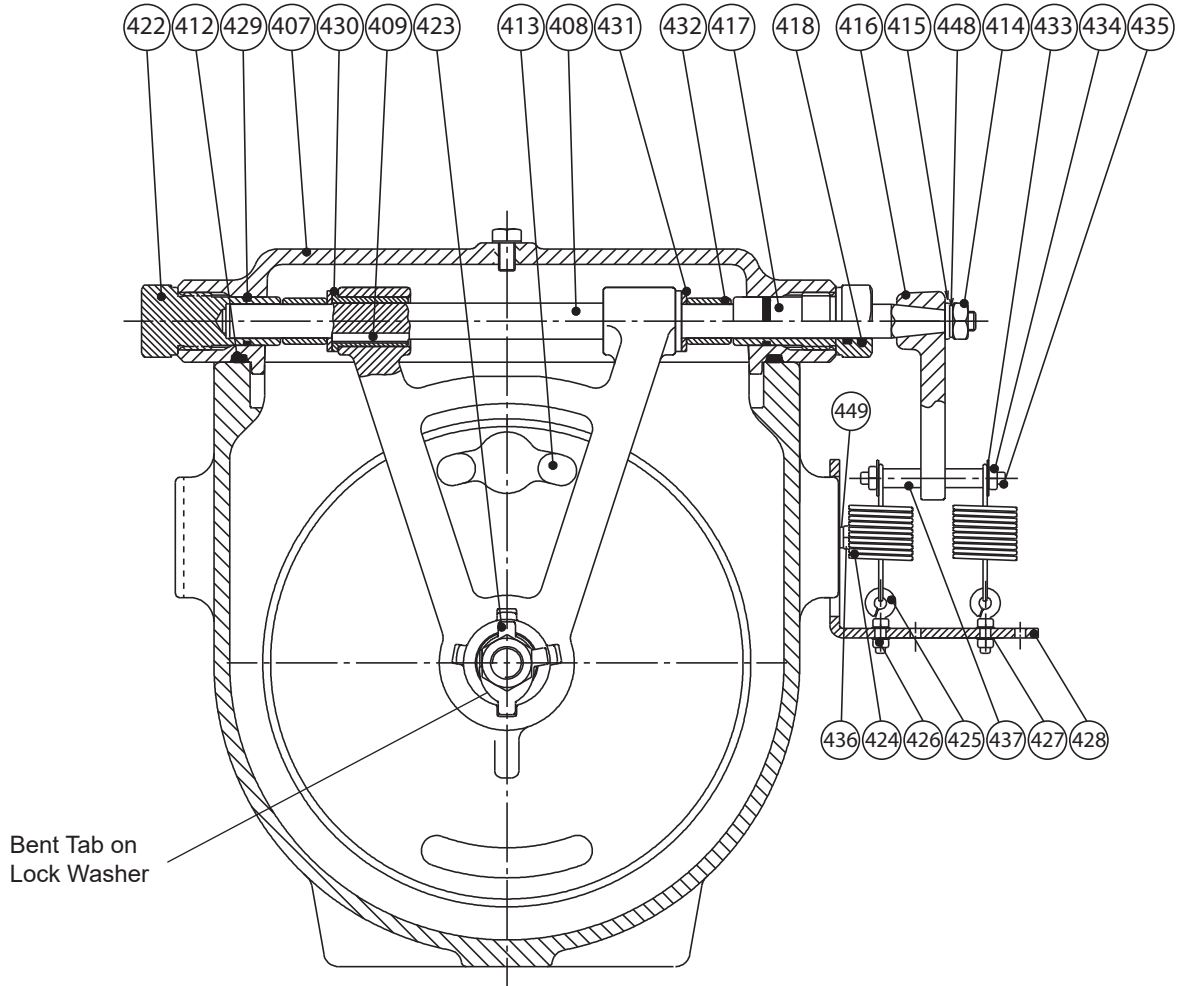


Fig. 7
Lever & Spring Mounting
10" - 12"

MAINTENANCE AND INSPECTION

The AVK Series 41 Check Valve requires no scheduled lubrication or maintenance. The valve can be serviced or inspected without removal of the valve body from the line.

INSPECTION:

If inspection of the valve is required, follow the DISASSEMBLY FOR INSPECTION Instructions.

TROUBLESHOOTING:

WARNING: The line must be isolated, depressurized, and drained before removing the valve bonnet or removing the valve from line. Failure to do so may cause pressure to be released resulting in severe injury or death.

Several problems and solutions are presented below to assist you in troubleshooting the valve.

- Leakage at the shaft bushings (Open Bushing (417), Closed Bushing (422)) : Ensure that the shaft bushings are properly tightened to 45-ft-lbs. If leakage persists replace the Inner and Outer Bushing O-rings, (418,429) with an AVK Series 41 seal replacement kit.
- Leakage at the Bonnet: Ensure that the bonnet bolts are tightened to 45-ft;lbs. If leakage persists, replace bonnet gasket (412).
- Valve leaks when closed: Remove and inspect disc for damage. Replace if necessary. Ensure that the sealing surface in the valve body is clean and undamaged. NOTE: Per the AWWA C508 standard for swing check valves, bronze seated valves do not seal drop tight.
- Valve does not open or close: Verify operating pressure is high enough to open the valve. Disassemble the valve to check for an obstruction in the valve or pipeline.

DISASSEMBLY FOR INSPECTION:

For convenience, the valve can be disassembled without removing it from the pipeline. All work on the valve should be performed by a skilled mechanic with proper tools and a hoist for larger valves. Disassembly may be required to inspect the disc for wear or the valve for deposits.

WARNING: The line must be isolated, depressurized, and drained before removing the valve bonnet or removing the valve from line. Failure to do so may cause pressure to be released resulting in severe injury or death.

1. Refer to Figure (8). If equipped with a lever and spring, disconnect the spring (424) from the lever (416). If equipped with a lever and weight, the weights may need to be removed from the lever before the head assembly can be removed. Remove the Bonnet Bolts (406), and Bonnet Washers (405) from the Bonnet (407). Note bolt length when the bolts are removed. The bonnet bolts are different lengths depending on location (upstream or downstream). The longer bonnet bolts are located upstream.
2. Pry the Bonnet (407) loose and lift off the head assembly. Refer to Figure (8) for head assembly components.
3. Inspect head assembly for worn or damaged parts. If resilient seated, inspect the disc for tears or cracks in the EPDM coating.
4. Replace worn parts as necessary or replace head assembly with a new head assembly.

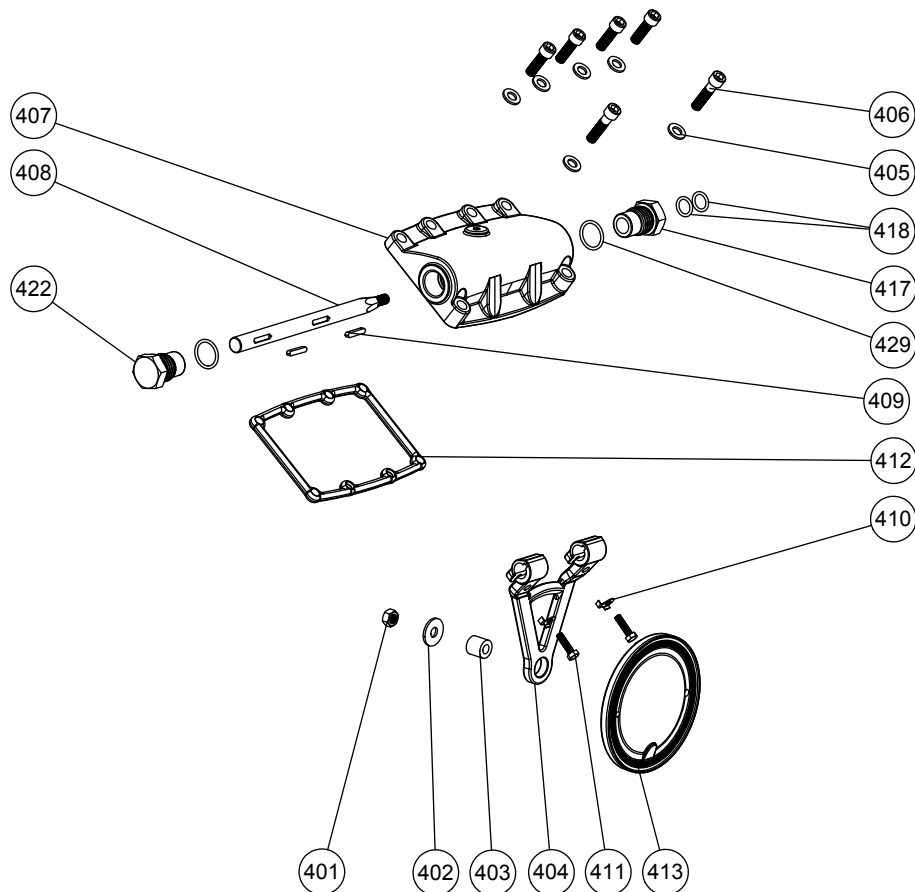


Fig. 8
Head Assembly Components

REASSEMBLY AFTER INSPECTION:

All parts and sealing surfaces must be cleaned before reassembly. Worn parts and seals should be replaced prior to reassembly..

1. Lay the head assembly upside down on a clean surface so that the disc is up.
2. Place the Bonnet Gasket (412) in the groove in the Bonnet (407). Place a Bonnet Bolt Washer (405) on each of the Bonnet Bolts (406). Carefully slide the bolts into the bolt holes and then through the corresponding holes in the Bonnet Gasket. Ensure that the bonnet bolts are properly located by their length. The longer bonnet bolts are upstream. The bonnet bolts will hold the Bonnet Gasket in place.
3. Pick up the head assembly holding the bolts and Bonnet Gasket in place and mount it on the valve body. Ensure that the disc is facing the proper direction and that the Bonnet Gasket is not being pinched between the bonnet and valve body.
4. Tighten the bonnet bolts to 45 ft-lbs incrementally in a crossover pattern to ensure that the bonnet does not bend or crack and the bonnet gasket is evenly compressed.
5. If equipped with a lever and weight assembly, remount weights if necessary. If equipped with a lever and spring assembly, reattach spring.

REPAIR PROCEDURES:

WARNING: For all of the following repair procedures, the line must be isolated, depressurized, and drained before removing the valve bonnet or removing the valve from line. Failure to do so may cause pressure to be released resulting in severe injury or death.

HEAD REPLACEMENT:

1. AVK can supply a complete head assembly for easy replacement. When ordering a new head assembly, please refer to the check list below.

AVK Series 41 Head Assembly Ordering Checklist
Valve Size: _____ inches
Shaft Options: _____ Swing _____ Weight _____ Spring
Lever Location (Looking Downstream): _____ Left-Hand _____ Right Hand
Sealing Options: _____ Resilient _____ Bronze

2. Remove the head assembly according to the 'DISASSEMBLY FOR INSPECTION' section.
3. Remove the Lever (416), if equipped, by removing the Shaft Nut (414), and Shaft Washer (415), and place aside for later use.
4. Install the new head assembly according to the "REASSEMBLY AFTER INSPECTION" section. Install the lever removed in step 3 above according to "LEVER AND WEIGHT" or "LEVER AND SPRING" installation procedures.

REPAIR PROCEDURES - continued:

SEAL REPAIR KIT:

The Seal Repair Kit consists of two (2) Inner Bushing O-rings (418), two (2) Bonnet O-rings (429). The Inner Bushing O-rings are not used on valves without a lever. 10-inch and 12-inch valves have Bonnet O-rings (429).

1. Remove the head assembly as described under DISASSEMBLY FOR INSPECTION above.
2. Remove the bushings. For valves with a lever, one bushing is open (417) and one bushing is closed (422). For valves without a lever, both bushings are closed (422).
3. Remove the old O-rings from each bushing and replace with new O-rings.
 - a. Valve sizes 3-inch through 8-inch, without a lever, have Bonnet O-rings (429) only.
 - b. Valve sizes 10-inch and 12-inch without a lever have two (2) Bonnet O-rings (429) only.
 - c. Valve sizes 10-inch and 12-inch, equipped with a lever, have two (2) Inner Bushing O-rings (418), located inside the Open Bushing (417) and two (2) Bonnet O-rings (429).
 - d. 3-inch through 8-inch valves equipped with a lever, have two (2) Inner Bushing O-rings (418) located inside the Open Bushing (417) and two (2) Bonnet O-rings (429).
4. Install the new O-rings as shown in figure (7) for 10-inch and 12-inch, figure (9) for 3-inch through 8-inch. Installing the Inner Bushing O-rings (418) can best be accomplished with a good set of small picks. Be careful not to cut the O-rings during installation.
5. Install the bushings in the valve Bonnet (407) and tighten to 45-ft-lbs.
6. Install the rebuilt head assembly according to "REASSEMBLY AFTER INSPECTION" above.

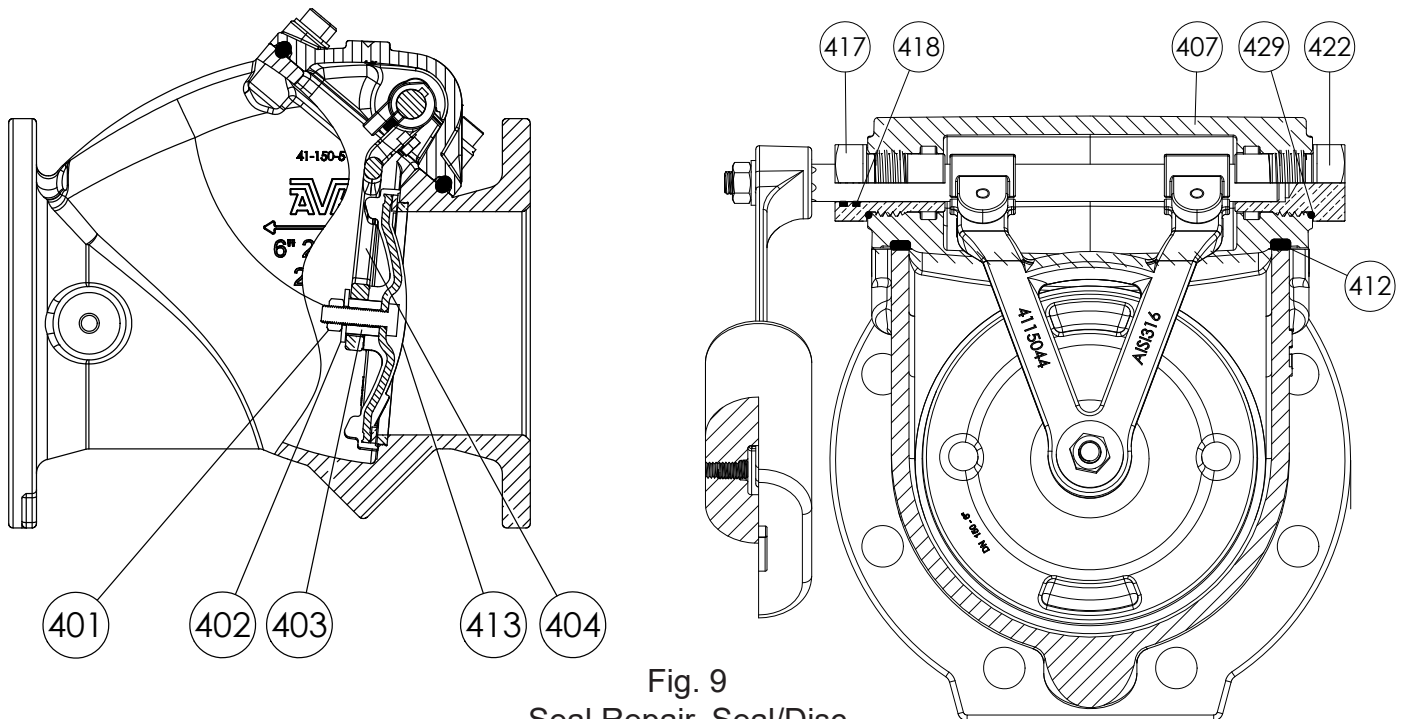


Fig. 9
Seal Repair, Seal/Disc
Kit Components

SEAL/DISC KIT:

For 3-inch through 8-inch valves, the Seal/Disc Repair Kit consists of two (2) Inner Bushing O-rings (418), two (2) Bonnet O-rings (429), and one (1) Bonnet Gasket (412), one (1) Disc (413), one (1) Disc Bushing (403), one (1) Disc Washer (402), one Disc Lock Washer (423)*, and one (1) Disc Nut (401).

Note: When ordering, specify whether your valve is resilient seated or metal seated. For 10-inch and 12-inch valves, two (2) Bonnet O-rings (429), Two (2) Hinge Connectors (430), two (2) Retaining Washers (431) and two (2) Shaft Spacers (432) are also required for assembly. (See figure 7) No Disc Bushing is required for the Disc Assembly.

1. Remove the head assembly as described under "DISASSEMBLY FOR INSPECTION" above.
2. Remove the bushings. For valves with a lever, one bushing is open (417) and one bushing is closed (422). For valves without a lever, both bushings are closed (422).
3. Remove the old O-rings from each bushing and replace with new O-rings.
 - a. Valve sizes 3-inch through 8-inch, without a lever, have Bonnet O-rings (429) only.
 - b. Valve sizes 10-inch and 12-inch without a lever have two (2) Bonnet O-rings (429).
 - c. Valve sizes 10-inch and 12-inch, equipped with a lever, have two (2) Inner Bushing O-rings(418), and two (2) Bonnet O-rings (429).
 - d. 3-inch through 8-inch valves equipped with a lever, have two (2) Inner Bushing O-rings (418) located inside the Open Bushing (417) and two (2) Bonnet O-rings (429).
4. Slide the Shaft-Hinge-Disc assembly from the bonnet (407).
5. Remove the Disc Nut (401) , Disc Bushing (403) Disc Washer (402), and Disc Lock Washer (423)* to remove Disc (413) from Hinge (404).

NOTE: On 10-inch and 12-inch valves, a tab on the Disc Lock Washer must be bent to remove the lock washer. (See figure 7)
6. Reassemble the Shaft-Hinge-Disc assembly as shown in figure (9). Tighten Disc Nut (401) until the Disc Lock Washer (423) is flat. On 10-inch and 12-inch valves, bend the appropriate tab on the Disc Lock Washer to secure the Disc Nut.

NOTE: On 3-inch through 8-inch valves, insure that the thrust plate on the Disc (413) is located at the 6 o'clock position. (See Detail "A", figure 10). On 10-inch and 12-inch valves, the Disc can only be mounted as shown in figure (7).
7. Insert the rebuilt Shaft-Hinge-Disc assembly into the valve bonnet (407). Ensure the disc is facing the proper direction. Refer to figure (7) for proper positioning of 10-inch and 12-inch valve components.
8. Install the new O-rings as shown in figures (7 or 9). Installing the Inner Bushing O-rings can best be accomplished with a good set of small picks. Be careful not to cut the O-rings during installation.
9. Install the bushings in the valve bonnet (407) and tighten to 45-ft-lbs.
10. Install the rebuilt head assembly according to "REASSEMBLY AFTER INSPECTION" above.

* As of March 1st, 2008 on 3" through 8" valves, the Disc Lock Washer (423), and Disc Nut (401), are replaced by a new self locking Disc Nut (401).

PARTS AND SERVICE

For information on parts and service for your area contact American AVK. Make a note of the valve model number and size located on the valve and contact:

American AVK Company

2155 N. Meridian Blvd

Minden, NV 89423

PH: 775-552-1400

FAX: 775-783-1031

www.americanavk.com

**AMERICAN AVK COMPANY WARRANTY
SERIES 41/45-41/50 CHECK VALVES**

American AVK Company warrants its Series 41/45 and 41/50 Check Valves to be free from defects in workmanship and materials for a period of one (1) year from the date of shipment from American AVK Company. American AVK Company shall have no obligation under this warranty unless it is notified of claims hereunder promptly and in writing upon discovery thereof and within the warranty period, and unless the product is delivered to American AVK Company within thirty (30) days of such notice.

American AVK shall have the right to inspect said product before it is removed from installation. If the product is removed from installation prior to approval from American AVK this warranty shall be void. As to motors, gearing or accessory equipment purchased by American AVK Company from other manufacturers, and used or incorporated into American AVK Company's products, those manufacturers' warranties shall apply.

American AVK Company's sole responsibility shall be, in its sole discretion, to replace the product with the same or a similar product, repair the product, or refund the price paid for the product provided the product has been properly applied and used under normal service and under conditions for which it is designed.

American AVK Company shall not be liable for indirect, special, incidental, or consequential damage or penalties and does not assume any liability of purchase to others or to anyone for injury to persons or property.

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NOTES: