



INSTALLATION & MAINTENANCE INSTRUCTIONS - ORIGINAL VERSION

AVK HIGH PRESSURE DRY BARREL HYDRANT, MODERN SERIES 27

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1. INTRODUCTION

The AVK series 27 dry barrel hydrant is designed to be trouble free and easy to maintain. This manual will provide you with the information needed to properly install and maintain the fire hydrant and to ensure a long service life.

Features of the AVK series 27 dry barrel hydrant include an EPDM encapsulated one piece main valve and a stainless steel upper stem. The series 27 is rated for a working pressure of 17 bar, it is UL, ULC listed and FM approved, as well as meets or exceeds the requirements of AWWA C502 - the standard for dry barrel fire hydrants (where applicable).

The AVK series 27 hydrant and hydrant tools are designed so that one person can perform all repairs and maintenance outlined in this manual.

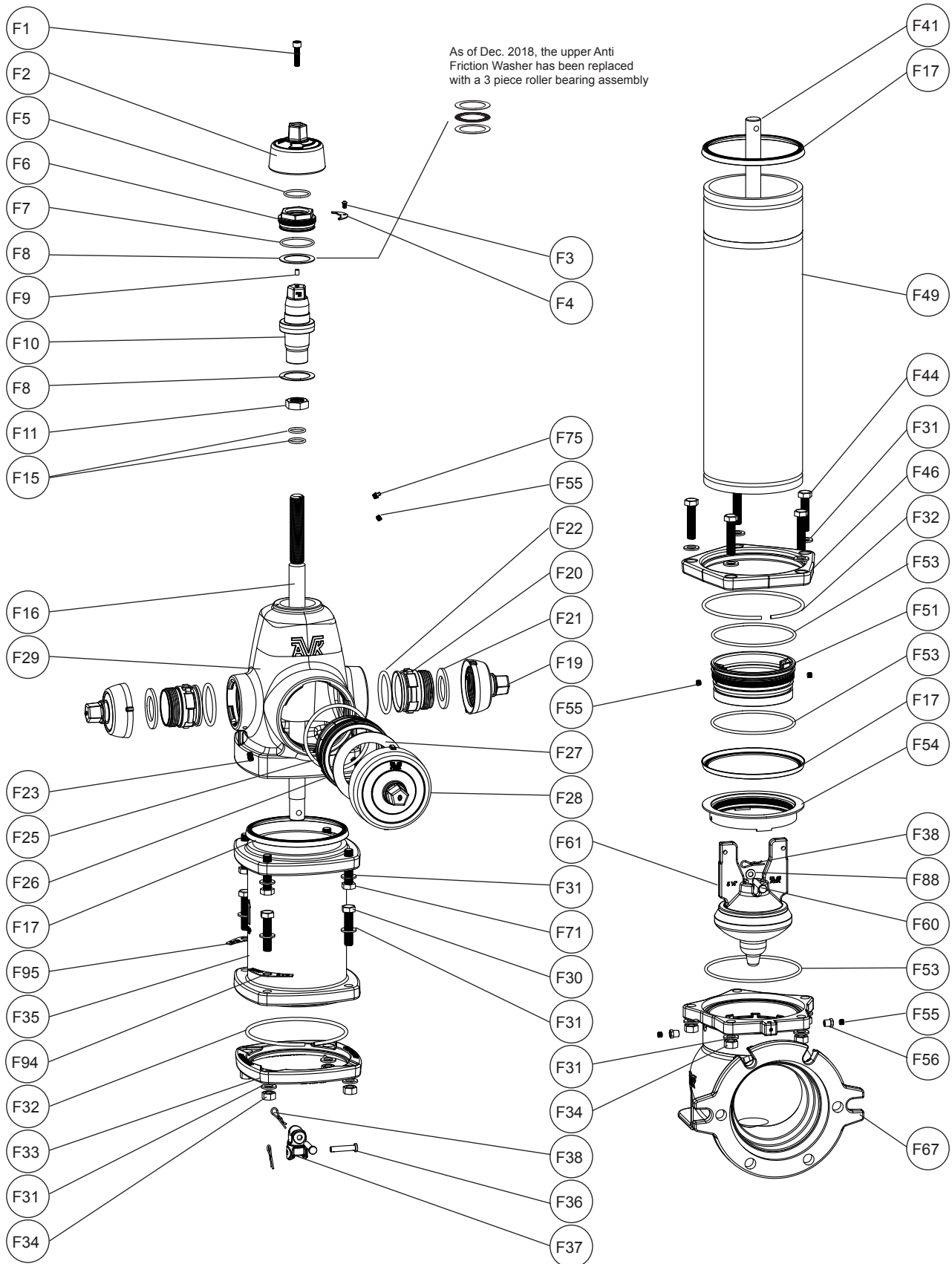
2. STORAGE

Hydrants should remain clean and dry, and the main valve should be closed until installed to prevent weather related damage. For long term storage the hydrants should be stored indoors.

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3. EXPLODED VIEW BREAKDOWN



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Item No.	Description	Material
F1	Weathershield Bolt	304 Stainless steel
F2	Weathershield	Grey Iron, ASTM126, Class "B"
F3	Lockplate Bolt	304 Stainless steel
F4	Lock Plate	304 Stainless steel
F5	Inner Thrust Nut O-ring	NBR
F6	Thrust Nut	Copper Alloy
F7	Outer Thrust Nut O-ring	NBR
F8	Anti Friction Washer	Nylon
F9	Lubrication Hole Seal	NBR
F10	Operating Nut	Copper Alloy
F11	Stop Nut	Zinc plated steel
F12*	Bonnet Bolt	Zinc plate, 304, 316 Stainless steel
F13*	Bonnet Washer	Zinc plate, 304, 316 Stainless steel
F14*	Bonnet	Ductile Iron, ASTM A536
F15	Stem Seal O-rings	NBR
F16	Upper Stem Rod	304 Stainless steel, Epoxy coated steel
F17	Barrel Gasket	NBR with stainless steel insert
F18*	Bonnet Nut	Zinc plate, 304, 316 Stainless steel
F19	Hose Nozzle Cap	Grey Iron, ASTM126, Class "B"
F20	Hose Nozzle	Copper Alloy
F21	Hose Nozzle Cap Gasket	NBR
F22	Hose Nozzle O-ring	NBR
F23**	Set Screw - (Nozzle)	304 Stainless steel
F24*	Chain Assembly	Zinc Plated Steel
F25	Pumper Nozzle O-ring	NBR
F26	Pumper Nozzle	Copper Alloy
F27	Pumper Cap Gasket	NBR
F28	Pumper Cap	Grey Iron, ASTM126, Class "B"
F29	Nozzle Section	Ductile Iron, ASTM A536
F30	Nozzle Section Bolt	Zinc plate, 304, 316 Stainless steel
F31	Nozzle Section Washer	304 Stainless steel
F32	Lock Ring	304 Stainless steel
F33	Breakable Flange	Ductile Iron, ASTM A536
F34	Nozzle Section Nut	304 Stainless steel
F35	Upper Barrel	Ductile Iron, ASTM A536
F36	Coupler Pin	420 Stainless steel
F37	Breakable Stem Rod Coupling	431 Stainless steel
F38	Spring Pin	304 Stainless steel
F41	Lower Stem Rod	Mild Steel, 304 Stainless steel
F42*	Extension Coupling	304 Stainless steel
F43*	Extension Barrel	Ductile Iron, ASTM A536
F44*	Upper.Extension Barrel Bolt	Zinc plate, 304, 316 Stainless steel
F45	N/A	
F46	Standpipe Flange	Ductile Iron, ASTM A536
F47*	Monitor Elbow	Ductile Iron, ASTM A536
F48*	Extension Stem Rod	Mild Steel, 304 Stainless steel
F49	Lower Barrel	Ductile Iron, ASTM A536
F50	Lower Barrel O-ring	NBR
F51	Valve Seat Ring	Copper Alloy
F52	N/A	
F53	Valve Seat O-ring	NBR
F54	Drain Ring	Copper Alloy
F55	Brass Plug	Copper Alloy
F56	Brass Fitting	Copper Alloy
F57	Main Valve Flange	Ductile Iron, ASTM A536
F59	N/A	
F60	Main Valve Retaining Pin	420 Stainless steel
F61	Main Valve	EPDM, Encapsulated Ductile Iron
F62	Base Gasket	NBR
F63*	Straight Inlet	Ductile Iron, ASTM A536
F64	Stud Bolt	Zinc plate, 304, 316 Stainless steel
F65	N/A	
F66	N/A	
F67	Base	Ductile Iron, ASTM A536
F68	N/A	
F69***	Thrust Bearing Race	Hardened Steel
F70***	Thrust Bearing	Hardened Steel
F71*	Modern Nozzle Section Bolt	Zinc plate, 304, 316 Stainless steel
F72*	Base Gasket - Specify type	NBR
F73*	Storz Cap O-ring	EPDM
F74*	Cap/Cable Assembly	
F75	Zerk Fitting	Case Hardened Steel, Zinc Plated
F88	Main Valve Retaining Pin Washer	304 Stainless steel
F90*	Hose Nozzle Position Clip	300 Series Stainless
F91*	Pumper Nozzle Position Clip	300 Series Stainless
F92*	Inner Storz Cap O-ring	NBR
F93*	Storz Adaptor	Copper Alloy
F94	Bury Tag	Aluminum
F95	Extension Bury Tag	Aluminum

* Not Shown in Exploded Parts Breakdown

** As of July 2015, secondary Set Screws were added to all dry barrel nozzle outlets

*** As of Dec. 2018, the upper Anti Friction Washer has been replaced with a 3 piece roller bearing assembly comprised of 2, F69 Thrust Bearing Races and 1, F70 Thrust Bearing.

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4. INSTALLATION AND TESTING

NOTE: Be aware of any local standards for proper installation of hydrants.

WARNING: All water lines must be isolated or depressurized and drained before installing or maintaining fire hydrants. Failure to do so may cause pressure to be released resulting in severe injury or death.

4.1. INSTALLATION

Correct installation of the series 27 dry barrel hydrant is important for proper operation. The following steps are general installation guidelines for a standard AVK series 27 hydrant. Local conditions may require variations.

1. Before installing a hydrant, check to make sure all bolts are tight and all nozzles are properly installed (See nozzle installation). Clean any dirt and debris from inside the hydrant base and from the hydrant lead.
2. All hydrants shall be installed as plumb as possible.
3. Consult local codes and standard for hydrant placement. In general, the following guidelines should be observed. Locate hydrants to provide complete accessibility while minimizing the possibility of damage from vehicles or injury to pedestrians. The hydrant should be placed so that no part of the hydrant is closer than 60 cm to the curb. Make sure the pumper nozzle faces the street for easy connection. The centerline of the hydrant nozzles should be no less than half a meter above the ground to allow for attachment of hoses and to operate the hydrant wrench.
4. Always install auxiliary gate valve in the lateral between the hydrant and the main valve to permit inspection and repair of the hydrant.
5. On traffic hydrants, be sure the soil is firmly compacted around the barrel to support the lower barrel against side loading. If the soil is too sandy and will not support the loads, pour a concrete pad around the barrel at or near the bury line at least 15 cm thick and 60 cm in diameter to support the barrel.
6. Place clean coarse gravel or crushed stone from the bottom of the trench to at least 15 cm above the drain opening in the hydrant and to a distance of 30 cm around the elbow to provide drainage. For clay or other impervious soils, excavate a drainage sump 60 cm in diameter and 1 m deep below each hydrant. Fill the sump with clean coarse gravel or crushed stone to a level of 15 cm above the drain opening. Place a plastic sheet over the gravel to prevent dirt from clogging the drains.
7. Restrain hydrant movement with appropriate thrust blocking or restrained joint to prevent pipe joint separation.
8. When first installed, the hydrant should be operated from full closed to full open position and back to make sure no obstructions are present.
9. After the line and hydrant have been hydrostatically tested, the hydrant should be flushed and then checked for proper drainage.
10. Local standards may have further guidelines to assist with hydrant installation

4.2 TESTING

The AVK recommended hydrant testing procedure

4.2.1 PRESSURE TEST AT MAIN PRESSURE

1. Ensure that all nozzles are properly installed per section "NOZZLE INSPECTION"
2. Remove the highest outlet-nozzle cap and open the hydrant valve a few turns. Allow water to reach the bottom of the outlet nozzle. (If the hydrant is furnished with a tapped-plug air vent, then it is not necessary to remove the nozzle cap. Just open the air vent.)
3. Reinstall the outlet-nozzle cap and leave it loose to permit all air to escape, or close the tapped-plug air vent.
4. After all air has escaped, tighten the outlet-nozzle cap.
5. Open the hydrant completely. (Opening the hydrant fully before all air has escaped will compress the air and cause a safety hazard.)
6. Check for leakage at flanges, outlet nozzles, and the packing or O-rings around the stem.
7. If leakage is noted, repair or replace the faulty components or the entire hydrant (only after hydrant is closed and all pressure is bled off).
8. Repeat the test until results are satisfactory.

4.2.2 PRESSURE TEST AT PRESSURES ABOVE MAIN PRESSURE

1. Connect a pressure-test pump to one of the hydrant's outlet nozzles.
2. Open the highest outlet-nozzle cap. Open the hydrant valve a few turns. Allow the hydrant to fill until water is at the bottom of the outlet nozzle.
3. After all air has escaped, tighten the outlet-nozzle cap.
4. Open the hydrant completely.
5. Close the auxiliary valve.
6. Pump up to test pressure (usually 10 bar [1034 kPa]).
7. Check for leakage at flanges, outlet nozzles, and the packing or O-rings around the stem.

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4.2.3. DRAINAGE TEST

1. Remove one of the hose caps (F19, fig. 6A) and fill the hydrant with water.
2. With the hydrant in the closed position, place the palm of one hand over the open hose nozzle (F20, fig. 6A). As the water drains from the hydrant it should create a noticeable vacuum indicating proper drainage.

4.2.4 EXTERNAL DRAIN PLUGGING

AVK offers the option of external or internal drain facility plugging.

Prior to installation, for external plugging, visually verify for factory installed plugs or screw two brass plugs into the brass fittings located on the main valve flange using a 5 mm hexagon key.

5. OPERATION AND MAINTENANCE

5.1 HYDRANT TOOLS

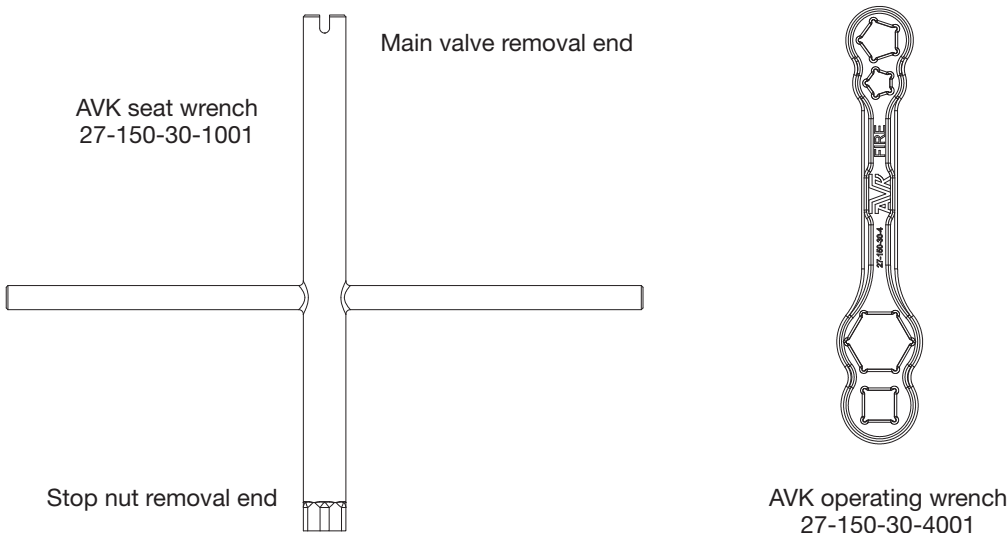
AVK offers a standard tool kit for routine maintenance requirements.

The kit is comprised of the following AVK specific tools.

- | | |
|-------------------------|---|
| 1. AVK seat wrench: | Part number: 27-150-30-1001
For use in removal and reinstallation of the main valve/seat assembly
One of the major benefits of the AVK design is that only one universal wrench is required regardless of bury depth. |
| 2. AVK operating wrench | Part number: 27-150-30-4001 |

5.1.1 METRIC AND INCH WRENCH REQUIREMENTS FOR AVK HYDRANTS

Part	Inch size	Metric size
Weathershield retaining bolt (allen)	5/16"	8 mm
Thrust nut retaining screw (allen)	5/32"	4 mm
Nozzle retaining screw	3/16"	5 mm
All other bolts and nuts	15/16"	24 mm



5.2 OPERATION

The AVK series 27 dry barrel hydrant is designed to be an easily operated, low torque, high flow fire hydrant. It will not require excessively high loads to operate. It is possible to damage the hydrant by forcing it beyond its normal operational limits.

The thrust bearing hydrant requires a minimum of torque to operate. It is possible to damage the hydrant by forcing it beyond its limits of travel with excess torque; therefore:

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1. Check direction of opening as marked on the hydrant weathershield (F2).
2. To open, turn the operating nut (F10) in the opening direction, indicated by an arrow on the weathershield (F2), until the main valve (F61, fig. 7J) is fully open (approximately 19 to 21 turns). The stop nut (F11) should prevent the hydrant from opening beyond the fully open position. Do not force the hydrant in the opening direction beyond full open as indicated by sudden resistance to turning. If water does not flow when the hydrant is open, it is probably due to a closed valve upstream from the hydrant.
3. To close, turn the operating nut until the main valve stops off the flow. It is not necessary to close this style of hydrant with great force. Once the flow has stopped, loosen the operating nut in the opening direction, 1/2 to 1 turn to take the strain off the operating parts of the hydrant and to make it easier to open the hydrant.

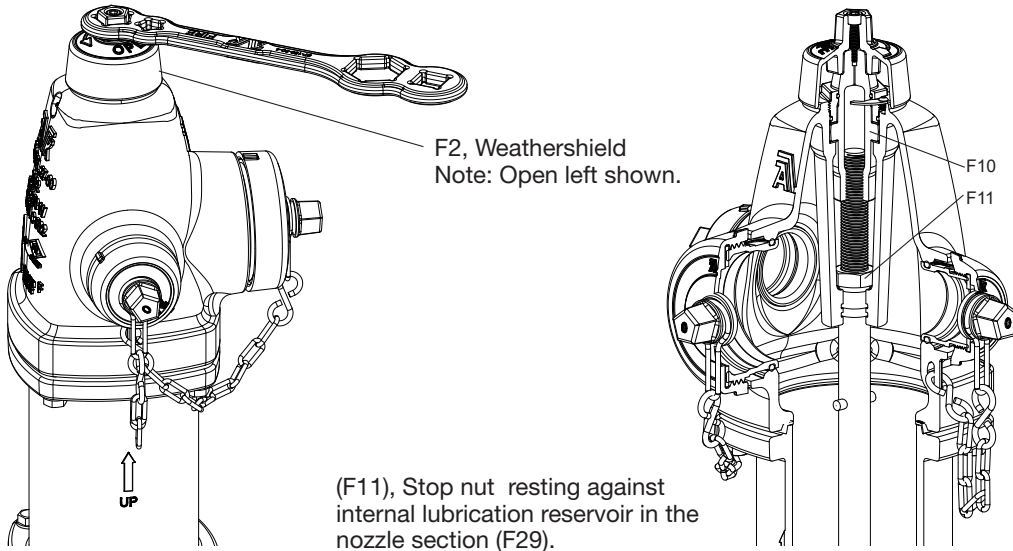


Fig. 3 Operation

5.3 MAINTENANCE PROCEDURES

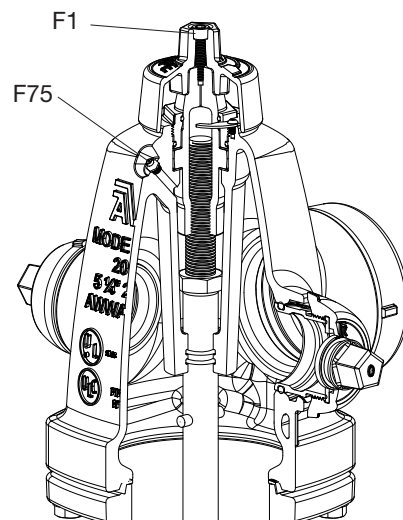
The AVK series 27 dry barrel hydrant is designed to be a trouble free, easy to maintain hydrant. The following steps are recommended to provide trouble free operation.

5.3.1 GREASE LUBRICATION

WARNING: On a partially disassembled hydrant under line pressure, pressing down on the stem could force open the main valve and allow it to slam shut, creating a water hammer. To prevent this during routine maintenance, first locate and be sure the supply valve is closed. Relieve the pressure on the main valve by momentarily opening and then closing the hydrant. Reopen the supply valve after the hydrant has been reassembled.

CAUTION: For grease servicing, ensure that the weathershield bolt has been loosened to prevent damage to the internal O-rings.

1. Refilling is performed by loosening the weathershield bolt (F1) with a 8 mm hexagon key.
2. Refill lubricant reservoir with a food grade grease using a grease gun on the zerk fitting (F75).
3. Tighten the weathershield bolt.



Grease lubrication for nozzle sections with zerk fittings

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5.4 NOZZLE INSPECTION

5.4.1 NOZZLE DISASSEMBLY FOR INSPECTION

If inspection of the hydrant is required, follow the DISASSEMBLY FOR INSPECTION instructions.

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

5.4.2 NOZZLE INSPECTION

NOTE: If the hydrant is leaking from any of the nozzles, first try to determine if they are leaking from the hose cap gasket (F21) or the hose nozzle O-ring (F22) and perform the applicable seal replacement procedure for the nozzle(s) in question.

5.4.2.1 Proper nozzle alignment:

1. Remove the hose nozzle cap (F19) or pumper nozzle cap (F28) using an AVK hydrant wrench or adjustable hydrant wrench.
2. Locate the nozzle retaining screw (F23) hole. It is located approximately 20 mm from the edge of the nozzle section and at about the 4:30 to 5:00 o'clock position when facing the nozzle.
3. If the retaining screw is missing, ensure that the nozzle is correctly installed as shown in fig. "6G" (for hose nozzles), "6J" (for pumper nozzles), then immediately replace it (F23 - nozzle retaining screw, M10mm x 16mm, 304 stainless steel).
4. For hose nozzles (F20) there should be a small "dimple" or punch mark on the hose nozzle. This mark should be in alignment with the nozzle retaining screw (F23) as shown in figure "6G".
5. For pumper nozzles, the "dimple" or punch mark is on the face of the cap end of the pumper nozzle as shown in figure "6J".
6. If the dimple is not in alignment with the retaining screw (F23) remove the retaining screw and rotate the nozzle until the alignment is correct.
7. Apply a drop of thread-locker (Loctite #242 or equal) to the end of the retaining screw, tighten it until it just contacts the nozzle. Do not back off the locking screw.
8. Reinstall the hose nozzle cap (F19).
9. If required, repeat steps 1 through 8 for the other nozzles.

AVK hydrants manufactured before 2005 may not have the position marks ("dimples" or punch marks) on the hose and pumper nozzles. In this case, follow the following steps to add the indicators to ensure correct nozzle positioning:

1. Remove the hydrant nozzle caps.
2. Using a 5 mm allen wrench, remove the nozzle retaining screws (F23).
3. Rotate the nozzles in a clockwise direction approximately 40 degrees until the nozzle slot aligns with lug opening on the nozzle section, located at the 6 o'clock position. See fig. "6F".
4. Pull the cap/nozzle assembly outward until the nozzle lugs are between the nozzle section lugs as shown in fig. "6C".
5. Loosen the cap, then finish removing the cap/nozzle assembly.

NOTE: AVK hydrants manufactured after 2004 have a "fifth lug" located at the 6 o'clock position in the outlets. This prevents the nozzles from being installed with the slotted lug in the wrong location.

6. Using a pointed punch and a hammer, stamp a small dimple into the surface of the nozzles as shown in figures "6F & 6J". The small dimple must be located on the center line of the "split" lug on the bronze nozzles.
7. Mark the dimples with a permanent ink marker to make the marks easily visible.
8. Follow the steps in "REASSEMBLY AFTER INSPECTION", to reinstall the nozzles and caps.

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

5.4.2.2 Nozzle leaking from around the Nozzle Cap:

1. Remove the hose nozzle cap (F19), or pumper nozzle cap (F28), using an AVK hydrant wrench or adjustable hydrant wrench.
2. Remove and replace the hose nozzle cap gasket (F22), or pumper nozzle cap gasket (F27), and reinstall the cap and gasket assembly.

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5.4.2.3 Nozzle leaking from around the nozzle O-ring area:

1. Remove the nozzle retaining screw (F23) using a 5 mm allen wrench.
2. Rotate the nozzle in a clockwise direction approximately 40 degrees until the nozzle slot aligns with lug opening on the nozzle section, located at the 6 o'clock position of the desired outlet. See fig. "6F".
3. Pull the cap/nozzle assembly outward until the nozzle lugs are between the nozzle section lugs as shown in fig. "6C".
4. Loosen the cap, then finish removing the cap/nozzle assembly. (See fig. 6E)
5. Remove the old hose nozzle O-ring (F22), or pumper nozzle O-ring (F25), and replace with a new one.
6. Lightly grease the O-ring with a food grade grease that contains no acetate or silicone.
7. Follow the steps in "NOZZLE REASSEMBLY AFTER INSPECTION", to reinstall the nozzles and caps.

5.4.3 NOZZLE REASSEMBLY AFTER INSPECTION

1. Insert the greased cap/nozzle assembly into the nozzle section outlet until the nozzle lugs are in line with the nozzle section lugs as shown in fig. 6C.
2. Tighten the cap on the nozzle. Insert the cap/nozzle assembly fully into the nozzle section and using a hydrant wrench, slowly rotate the cap/nozzle assembly counter clockwise, approximately 40 degrees, until the slotted nozzle lug aligns with the nozzle retaining screw hole. This can be verified by lining up the dimple with the nozzle retaining screw hole.
3. Apply a drop of thread-locker (Loctite #242 or equal) to the end of the retaining screw, and using a 5 mm allen wrench, tighten it until it just contacts the nozzle, do not back off the locking screw.
4. Verify that the cap has been secured.
5. Once the hydrant has been completely reassembled, turn on the supply valve and slowly open the hydrant to check for leaks.

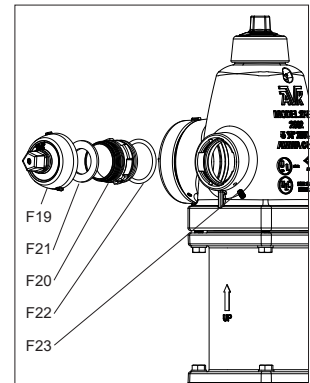


Fig. 6A

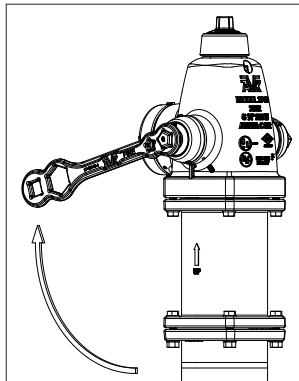


Fig. 6B

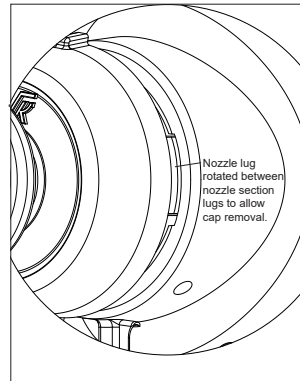


Fig. 6C

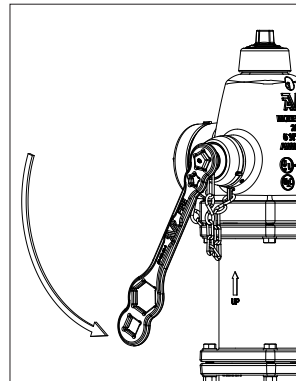


Fig. 6D

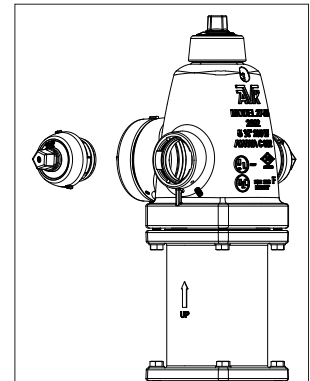


Fig. 6E

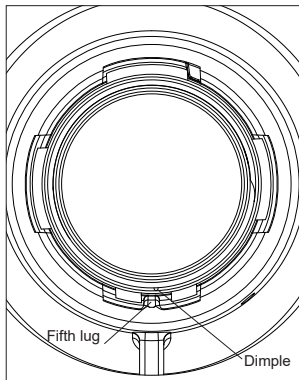


Fig. 6F

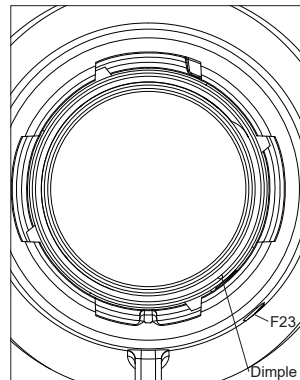


Fig. 6G

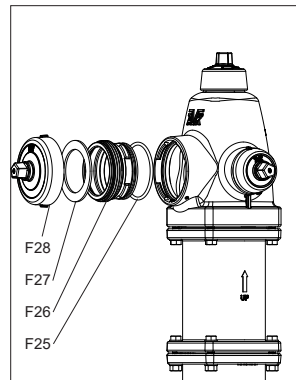


Fig. 6H

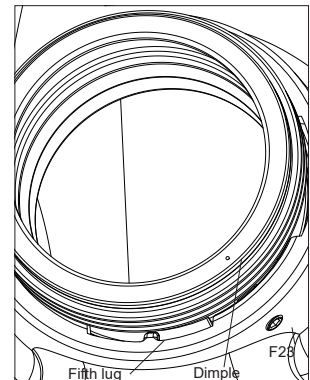


Fig. 6J

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5.5 MAIN VALVE INSPECTION

5.5.1 MAIN VALVE DISASSEMBLY FOR INSPECTION

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

AVK hydrants are designed to allow all internal components to be easily removed without displacing installation.

WARNING: On a partially disassembled hydrant under line pressure, pressing down on the stem could force open the main valve (F61) and allow it to slam shut, creating a water hammer. If the intention is to remove the main valve (F61) first locate and be sure the supply valve is closed. Relieve the pressure on the main valve (F61) by momentarily opening and then closing the hydrant. Reopen the supply valve after the hydrant has been reassembled.

1. Remove the weathershield bolt (F1) with a 8 mm hexagon key. Lift off the weathershield (F2) (see fig. 7A).
2. Remove the lock plate screw (F3) and lock plate (F4) with a 3 mm hexagon key.
3. Using the AVK operating wrench, or a large adjustable wrench, unscrew the thrust nut (F6) counterclockwise (see fig. 7A & 7B).
4. Remove the operating nut (F10) using the AVK operating wrench. Turn counterclockwise for "Open Left Hydrants", and clockwise for "Open Right Hydrants". Remove the anti friction washers (F8), and set aside with the operating nut (see fig. 7C).
5. Remove the stop nut (F11) with the deep socket located at the end of the AVK seat wrench.
CAUTION: Do not overtighten the stop nut (F11) during re-assembly (see fig. 7D)!
6. Remove the four modern nozzle section bolts (F71) and associated hardware using 24 mm wrenches. Lift the modern nozzle section (F29) over the upper stem rod (F16) and set aside.
7. To remove the valve seat ring (F51) and main valve assembly, slide the AVK seat wrench (fig. 7G) over the upper stem rod (F16) and engage the seat removal pin. Turn the tool counterclockwise (approximately 6 turns), until the valve seat ring has disengaged from the drain ring.

NOTE: For deeper buries, an optional AVK seat wrench alignment tool is available (see fig. 7G).

8. Remove tool and set aside. Lift and remove the upper stem rod/lower stem rod and main valve assembly from the lower barrel (F49) (see fig. 7H).
9. Inspect the main valve (F61), the valve seat ring (F51) and the valve seat O-rings (F53) for damage. Replace if necessary.
10. If any of the above parts are to be replaced, clamp the lower stem rod (F41) in a standard pipe vise (see fig. 7J). Remove the stop pins (F58) from the main valve (F61) and slide the valve seat ring (F51) off the ears of the main valve. To disconnect the main valve from the lower stem rod (F41) remove the spring pin (F38) and the main valve retaining pin washer (F88) from the main valve retaining pin (F60). Reverse the steps for reassembly. Lightly grease the main valve ears and main valve O-rings (F53), with a food grade grease that contains no acetate or silicone.

5.5.2 MAIN VALVE REASSEMBLY

CAUTION: Take care not to cross thread the seat ring (F51) during reassembly.

1. Using the AVK seat wrench, re-install the main valve and stem assembly.
2. Verify that the barrel gasket (F17) is in place on top of the upper barrel (F35) (see fig. 7F).
3. Carefully slide the nozzle section (F29) over the upper stem rod (F16) taking care not to dislodge the stem seal O-rings (F15) or barrel gasket.
4. Using 24 mm wrenches install the modern nozzle section bolts (F71) and washers hand tight.
5. Using the AVK seat wrench install the stop nut (F11). Do not over tighten!
6. If required, fill the lubrication reservoir with the appropriate food grade oil or grease that contains no acetate or silicone.
7. Place one anti friction washer (F8) on the top and bottom of the operating nut (F10) and thrust collar (see fig. 7A).
8. Install the operating nut and anti friction washers. Tighten the operating nut until the thrust collar just snugs up against the modern head.
9. Lightly grease the O-rings on the thrust nut (F6) and screw the thrust nut into the modern head completely, then back off the thrust nut 1/8 to 1/4 turn until the thrust nut lines up with the lockplate (F4).
10. Install the lockplate and secure it with the lockplate screw (F3) using a 3 mm hexagon key.
11. Tighten the modern head bolts/nuts to 110 Nm.
12. Install the weathershield and weathershield bolt using a 8 mm hexagon key.
13. After reassembly is complete, open the supply valve and test the hydrant for leaks.

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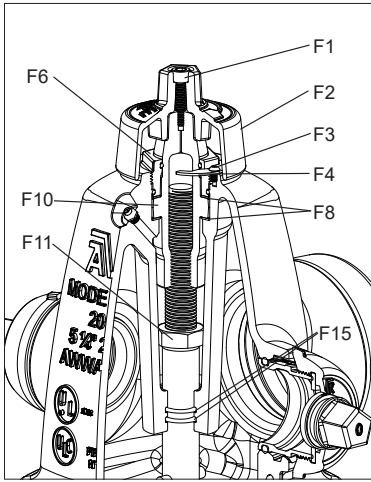


Fig. 7A

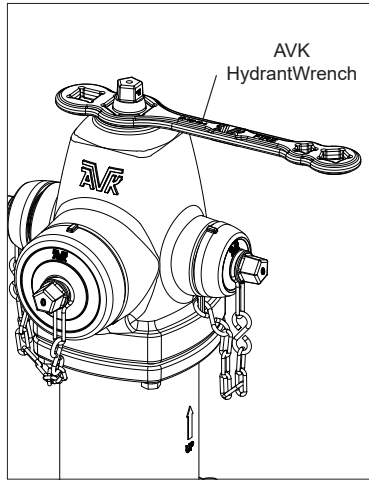


Fig. 7B

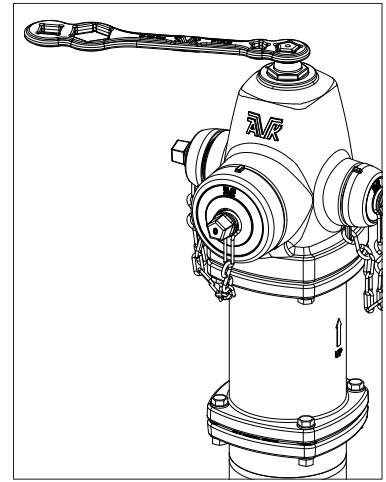


Fig. 7C

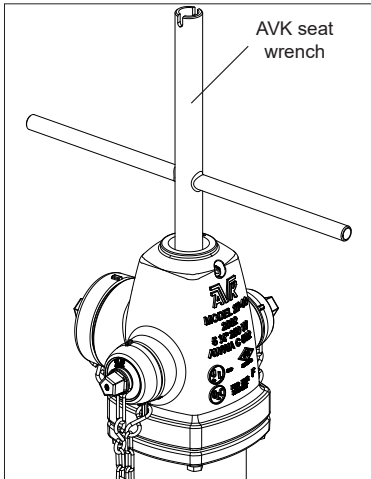


Fig. 7D

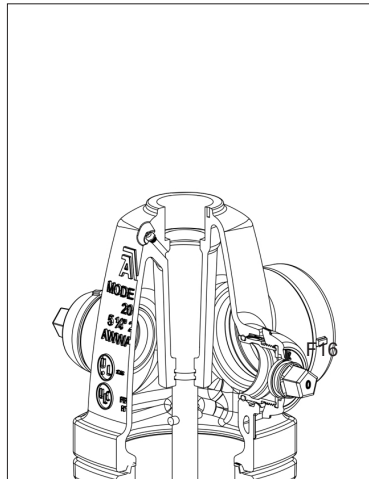


Fig. 7E

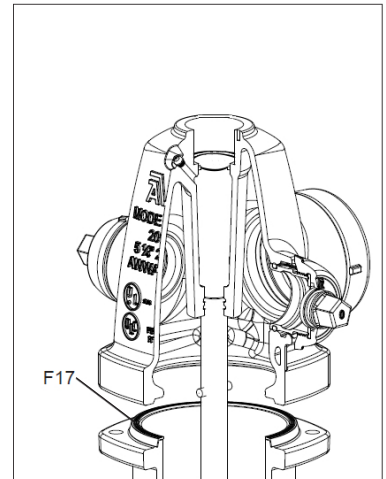


Fig. 7F

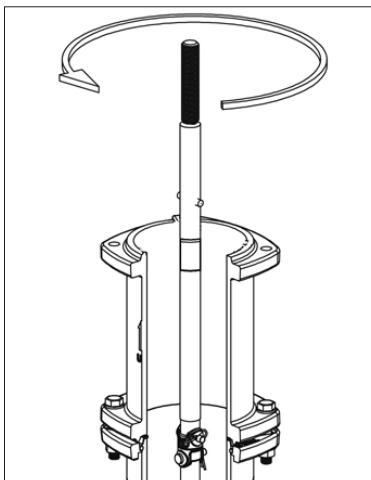


Fig. 7G

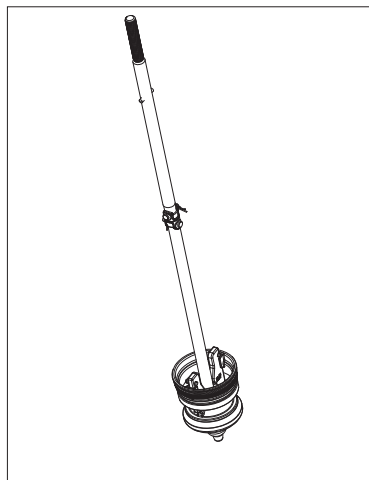


Fig. 7H

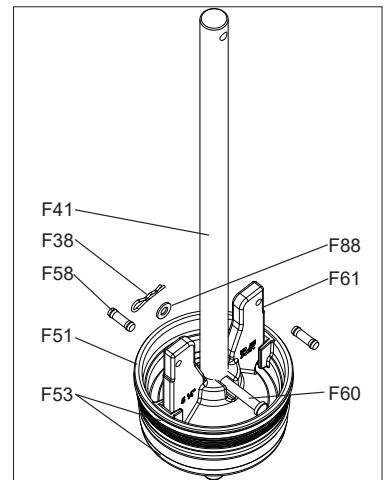


Fig. 7J

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6. TRAFFIC REPAIR PROCEDURES

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

AVK Dry barrel hydrants feature a safety breakable flange (F33) and breakable stem rod coupling (F37) design. This allows the hydrant head assembly to be struck by a vehicle and “break away” reducing the impact to the water main. In the event the hydrant head assembly has been broken away, the following repairs will be necessary.

WARNING: On a partially disassembled hydrant under line pressure, pressing down on the stem could force open the main valve (F61) and allow it to slam shut, creating a water hammer. In the event of a vehicle collision or break away, locate and be sure the supply valve is closed. After reassembly, relieve the pressure on the main valve (F61) by momentarily opening and then closing the hydrant. Reopen the supply valve after the hydrant has been reassembled.

1. Remove the hardware (F30, 31, 34) from the breakable flange (F33). Slide the lock ring (F32) off of the lower barrel (F49) (see fig. 8).
2. Remove the spring pins (F38) from the coupler pins (F36) in the upper stem rod (F16) and lower stem rod (F41). Remove and discard the broken breakable coupling (F37).
3. If required, remove the upper stem rod (F16) from the hydrant head assembly by following the warnings and steps 1 through 4 in the main valve inspection section on page 9.
4. Re-connect the upper stem rod (F16) to the lower stem rod (F41) with new coupler pins (F36) and new breakable stem rod coupling (F37). Secure with spring pins (F38).

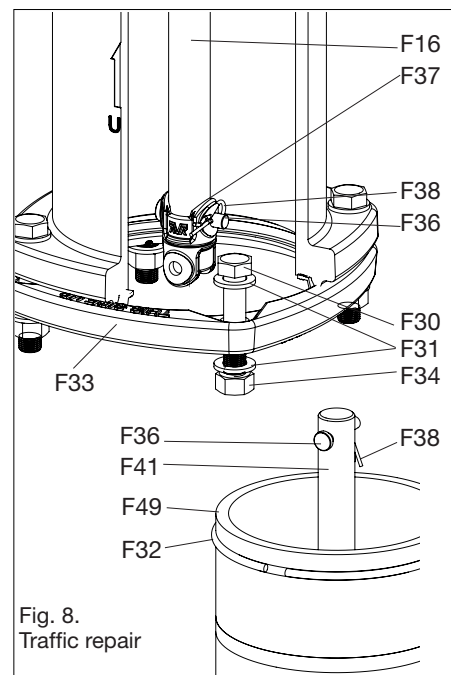


Fig. 8. Traffic repair

NOTE: For hydrants manufactured prior to Sept. 7, 2010, the breakable stem rod coupling should be replaced with the arrow pointing up. For hydrants manufactured after Sept. 7, 2010, there is no orientation (see fig. 9).

5. Slide a new breakable flange (F33) over the lower barrel (F49).

WARNING: Be sure the breakable flange (F33) is right side up, indicated with the text “This Side Up”, facing towards the nozzle section (See fig. 8 & 9). Slide a new lock ring (F32) into the groove on the lower barrel.

6. Clean the hydrant’s nozzle section/upper barrel and lower barrel flange face and install a new barrel gasket (F17).
7. Lift the hydrant modern head (F29) and upper barrel (F35) assembly over the upper stem rod (F16) taking care not to dislodge the stem seal O-rings (F15) or barrel gasket (F17).
8. Check for correct alignment of the barrel gasket (F17) and re-install the nozzle section mounting hardware (F30, 31, 34) finger tight.
9. Using the AVK seat wrench install the stop nut (F11). Do not over tighten the stop nut! Fill the lubrication reservoir with the appropriate food grade oil or grease that contains no acetate or silicone.
10. Place one anti friction washer (F8) on the top and bottom of the operating nut (F10) and the thrust collar (see fig. 7A).
11. Install the operating nut and anti friction washers.
12. Lightly grease the O-rings on the thrust nut (F6) and screw the thrust nut into the bonnet completely, then back off the thrust nut 1/8 to 1/4 turn, until the thrust nut lines up with the lockplate (F4).
13. Install the lockplate and secure it with the lockplate screw (F3) using a 3 mm hexagon key.
14. Tighten the nozzle section mounting hardware to 110 Nm.
15. Install the weathershield and weathershield bolt using a 8 mm hexagon key.
16. After reassembly is complete, open the supply valve and test the hydrant for leaks.

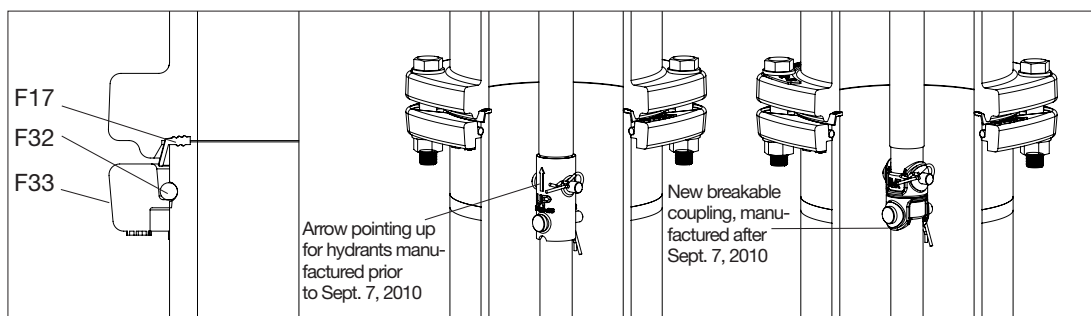


Fig. 9 Traffic repair

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7. OPTIONAL EQUIPMENT

7.1 EXTENSION KITS: Fig. 10

AVK hydrants have the capability of adjusting the lower barrel to the proper height due to changes in the finished grade. Extension kits are available from 150 mm to 2250 mm in 150 mm increments (longer upon request).

WARNING: On a partially disassembled hydrant under line pressure, pressing down on the stem could force open the main valve (F61) and allow it to slam shut, creating a water hammer. If the intention is to remove the main valve (F61) first locate and be sure the supply valve is closed. Relieve the pressure on the main valve (F61) by momentarily opening and then closing the hydrant.

NOTE: Only one extension kit of the proper size may be installed on a hydrant. Multiple extension kits on a single hydrant may impede hydrant operation. Only extension kits manufactured by AVK should be used on AVK fire hydrants. Non AVK extension kits may impede hydrant operation.

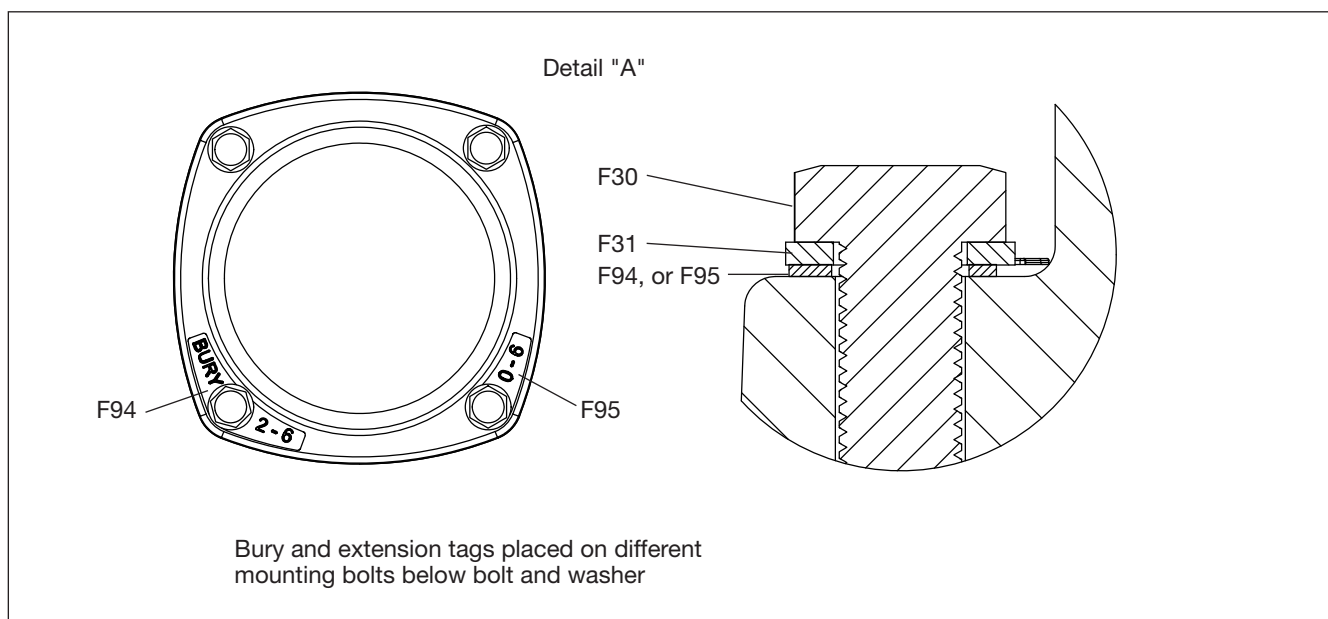
The installation is performed as follows:

1. Remove the weathershield retaining bolt (F1) with an 8 mm hexagon key. Lift off the weathershield (F2).
2. Remove the lock plate retaining screw (F3) and lock plate (F4) with a 3 mm hexagon key.
Note: Older hydrants may be equipped with a set screw instead of a lock plate. Remove the set screw and set aside for later use.
3. Remove the thrust nut (F6) using the AVK operating wrench and rotate counter clockwise. Remove the upper anti friction washer (F8).
4. Remove the operating nut (F10) using the AVK operating wrench. Turn counterclockwise for "Open Left Hydrants", and clockwise for "Open Right Hydrants". Remove the lower anti friction washer (F8) and set aside with the operating nut.
5. Using the socket wrench end of the AVK seat-wrench, remove the stop nut (F11) from the upper stem rod (F16).
6. Remove the four modern nozzle section bolts (F71) and the washers (F31), using 24 mm wrenches. Lift the nozzle section (F29) straight up over the upper stem rod (F16) carefully to avoid damage to the stem seal O-rings (F15).
7. Remove the barrel gasket (F17) and inspect it for damage. If damaged, replace.
8. Remove the four nozzle section bolts (F30), nuts (F34), and washers (F31) using 24 mm wrenches. Carefully lift the upper barrel (F35) off of the lower assembly.
NOTE: For series 27 dry barrel hydrants manufactured after Feb. 18, 2011, hydrants with buries from 1 to 2 m include hydrant bury tags (F94).
9. Remove the lower spring pin (F38) and slide the lower coupler pin (F36) from the lower stem rod (F41). Disconnect the upper stem rod (F16) along with the breakable stem rod coupling (F37) from the lower stem rod (F41). Inspect the breakable coupling for damage and replace if necessary.
10. Remove the breakable flange (F33) and lock ring (F32). Set aside for later re-assembly.
11. Install a standpipe flange (F46) from the extension kit and reinstall the lock ring (F32).
NOTE: Ensure the standpipe flange is oriented correctly with the recessed side towards the lock rings.
12. Install the extension stem rod (F48) on the lower stem rod (F41) with new spring pin (F38), coupler pin (F36), and extension stem rod coupling (F42).
13. Clean the top of the lower barrel (F49) and install a barrel gasket (F17).
14. If not already done, install a lock ring (F32) onto the lower groove of the extension barrel (F43). The top of the extension barrel is marked with a bury line.
15. Place the extension barrel (F43) onto the lower barrel (F49), making sure that the barrel gasket (F17) stays in place. Slide the standpipe flanges (F46) until rest against the lock rings (F32).
16. Align the bolt holes on the two standpipe flanges (F46) and install the extension barrel bolts (F44), nuts (F34), and washers (F31) as shown in figure 10. Tighten to 110 Nm.
17. Slide the breakable flange (F33) onto the extension barrel (F43). NOTE: The breakable flange must be installed so that the wording "THIS SIDE UP" cast on the breakable flange is facing up.
18. Reinstall the lock ring (F32) onto the extension barrel (F43).
19. NOTE: The following procedure is for hydrants manufactured prior to Sept. 7, 2010: Connect upper stem rod (F16) to extension stem rod (F48) with spring pin (F38) and coupler pin (F36), and breakable stem rod coupling (F37). Position the groove of the breakable stem rod coupling (F37) on the bottom, arrow pointing up (see "Detail B").
20. For hydrants manufactured after Sept. 7, 2010, the new style breakable coupling is used and there is no orientation requirement (see "Detail C").
21. Clean the top of the extension barrel (F43) and place a new barrel gasket (F17) on top.
22. Carefully place the upper barrel (F35), with the arrows pointing up, on top of the extension barrel (F43) so that the barrel gasket (F17) is not moved or damaged.
23. Slide the breakable flange (F33) against the lock ring (F32) (see "Detail D"), and align with the holes in the upper barrel (F35). Reinstall the bolts, nuts, and washers removed in step 6.
NOTE: For series 27 dry barrel hydrants manufactured after Feb. 18, 2011, hydrants with buries from 1-2 m include hydrant bury tags (F94). Extension kits up to 1½ m also include an extension bury tag (F95) (see "Detail A") for installation locations. Tighten just hand tight.
24. Clean the top of the upper barrel and place a barrel gasket (F17) on top.
25. Carefully place the modern nozzle section (F29) over the upper stem rod (F16) taking care not to displace the stem seal O-rings (F15). Install the four modern nozzle section bolts (F71) and washers (F31) removed in step 6, finger tight.

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26. Rotate the modern nozzle section/upper barrel to align the nozzles to the desired position. Take care not to displace the two barrel gaskets. Tighten the nozzle section bolts connecting the lower barrel to the breakable flange to 110 Nm.
27. Using the socket portion of the AVK seat-wrench, reinstall the stop nut (F11). Spin the stop nut down until it stops, and then snug it about 1/4 turn tighter.
28. Reinstall the anti friction washer (F8) in the oil reservoir of the modern nozzle section head (F29).
29. If required, refill the lubrication reservoir in the modern nozzle section (F29) reservoir with a food grade oil or grease that contains no acetate or silicone.
30. Reinstall the operating nut (F10). Tighten the operating nut all the way until it is snug against the lower anti friction washer.
31. Verify that there is a lubrication hole seal (F9) installed in the threaded hole on the operating nut. Replace if missing.
32. Reinstall the anti friction washer (F8) on top of the operating nut (F10).
33. Lightly grease the thrust nut O-rings (F5 & F7), and reinstall the thrust nut (F6). Tighten the thrust nut until it is just snug against the anti friction washer (F8), then back off the thrust nut 1/8 to 1/4 to the first location at which the lock plate (F4) can be installed. Note: Do not over tighten the thrust nut (F6).
34. Reinstall the lock plate (F4) and lock plate screw (F3). On hydrants equipped with a set screw, back off the thrust nut until the set screw can be reinstalled.
35. Tighten the modern nozzle section bolts (F71) to 110 Nm., using a star pattern.
36. Reinstall the weathershield (F2) and weathershield bolt (F1).
37. Operate the hydrant into fully open position and then close it fully prior to turning the lead valve on to allow the oil or grease to lubricate the operating nut.
38. Turn on the lead valve and operate the hydrant.



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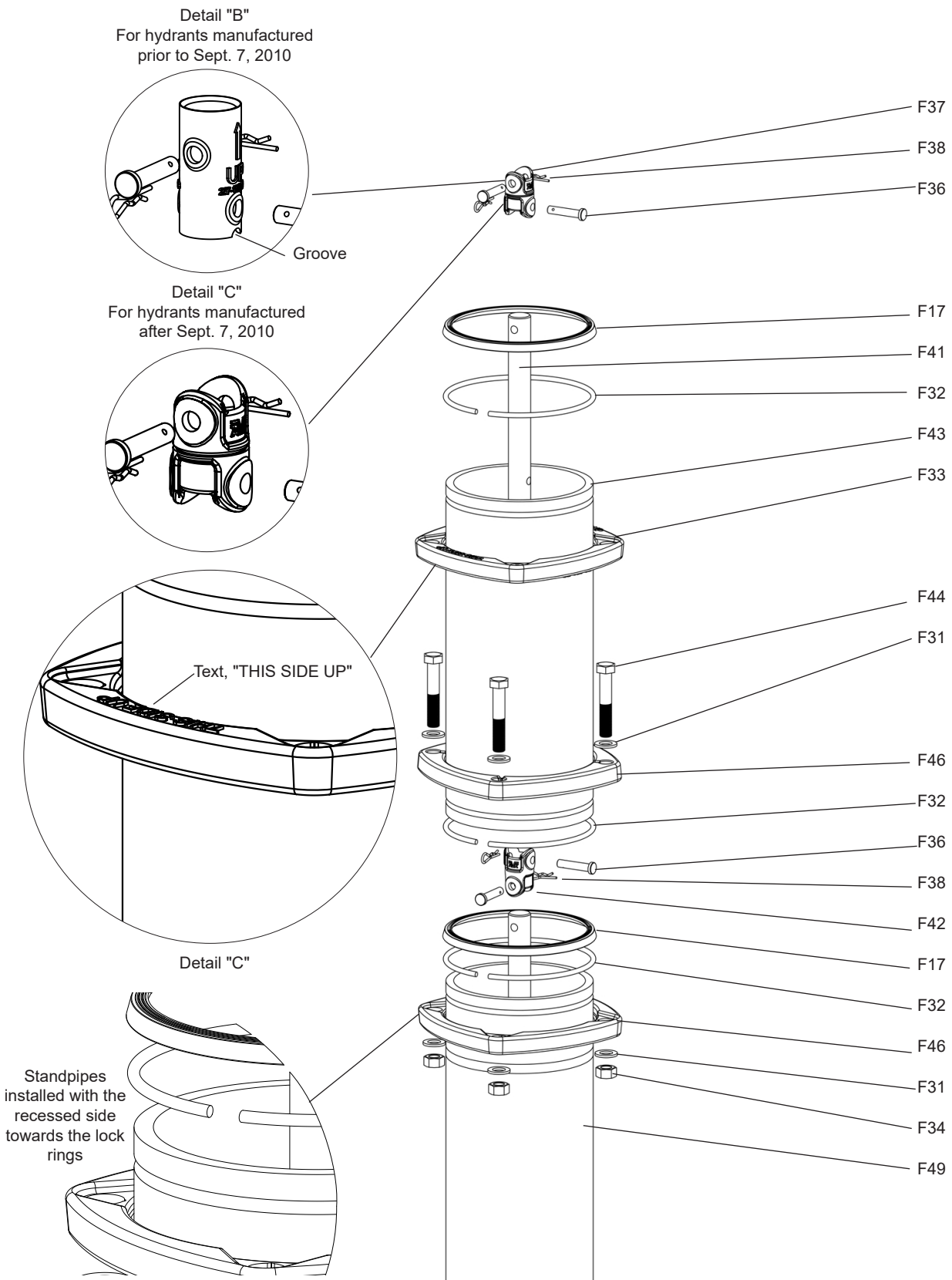


Fig. 10
Extension kit

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7.2 THRUST BEARING ASSEMBLY

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

NOTE: In some cases in water systems with extreme working water velocities, a thrust bearing assembly is installed to ease operation. If this is necessary, remove the old operating nut, and anti friction washers and replace with the following components.

1. Remove the weathershield bolt (F1) and weathershield (F2) using a 8 mm hexagon key.
2. Remove the lockplate screw (F3) and lockplate (F4) using a 5 mm hexagon key.
3. Use an AVK hydrant wrench or adjustable wrench to remove the thrust nut (F6) and it's O-rings, the inner thrust nut O-ring (F5), and the outer thrust nut O-ring (F7). Check O-rings for damage and replace if necessary.
4. Once the old operating nut and anti friction washers have been discarded, verify that the stop nut (F11) is secure at the bottom of the threads of the upper stem rod (F16). Use the AVK seat-wrench to ensure that the stop nut is not backed off.
5. Replace with the new operating nut (F10), and one anti friction washer (F8) placed below the operating nut shoulder.
6. Install the lubrication hole seal (F9), into the threaded hole in the top of the operating nut (F10).
7. Install the thrust bearing races (F69) and thrust bearing (F70) as shown in fig. 12.
8. Lightly grease the thrust nut O-rings (F5 & F7), and reinstall the thrust nut (F6). Tighten the thrust nut until it is just snug against the anti friction washer (F8), then back off the thrust nut 1/8 to 1/4 to the first location at which the lock plate (F4) can be installed.
Note: Do not over tighten the thrust nut (F6).
9. Reinstall the lock plate (F4) and lock plate screw (F3). On hydrants equipped with a set screw, back off the thrust nut until the set screw can be reinstalled.
10. Service the hydrant with a food grade grease or oil that contains no acetate or silicone.

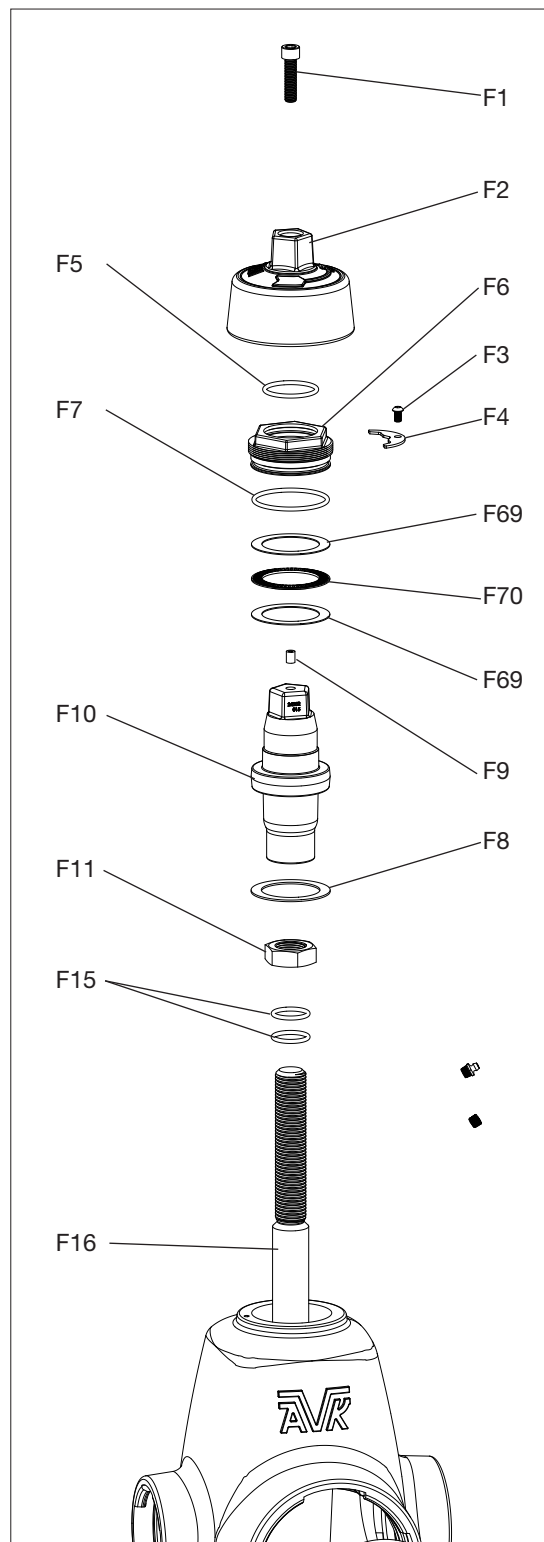


Fig. 12
Thrust bearing components

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7.3 MONITOR ELBOW INSTALLATION

WARNING: For all of the following repair procedures, the hydrant must be isolated or the system depressurized and drained before removing the hydrant components. Failure to do so may cause pressure to be released resulting in severe injury or death. AVK offers monitor elbows for Series 27 modern hydrants in both DN 80 and DN 100 or 3" / DN 80 and 4" / DN 100 outlet/flange sizes. Zinc plated hardware is standard with optional 304 or 316 stainless steel available upon request. ANSI drill patterns are standard with other drill patterns available upon request.

Refer to fig. 13 for the following procedures.

1. Remove the weathershield bolt (F1) with a 8 mm hexagon key. Lift off the weathershield (F2).
2. Remove the lock plate screw (F3) and lock plate (F4) with a 3 mm hexagon key.
3. Using the AVK operating wrench, or a large adjustable wrench, unscrew the thrust nut (F6) counterclockwise.
4. Remove the operating nut (F10) using the AVK operating wrench. Turn counterclockwise for "Open Left Hydrants", and clockwise for "Open Right Hydrants". Remove the anti friction washers (F8), and set aside with the operating nut.
5. Remove the stop nut (F11) with the deep socket located at the end of the AVK seat wrench. CAUTION: Do not overtighten the stop nut (F11) during re-assembly!
6. Remove the four modern nozzle section bolts (F71) and associated hardware using 24 mm wrenches. Lift the modern nozzle Section (F29) over the upper stem rod (F16).
7. Inspect the barrel gasket (F17). If damaged, replace during re-assembly.
8. Remove the lock ring (F32) and standpipe flange (F46), from the lower barrel (F35).
9. Remove the nozzle section bolts (F30), nuts (F34), and washers (F31), using 24 mm wrenches.
10. Lift the upper barrel (F35) straight up over the upper stem rod (F16). Note: The upper barrel will be replaced by the monitor elbow (F47) during re-assembly.
11. Clean the lower barrel (F49) and place a barrel gasket (F17) centered on top. Note: Use a new barrel gasket if necessary.
12. Carefully lower the monitor elbow (F47) over the upper stem rod (F16), taking care not to displace the barrel gasket (F17).
13. Slide the breakable flange (F33) up against the lock ring (F32), and install the nozzle section bolts (F30), nuts (F34), and washers (F31) hand tight.
14. Lightly grease the stem seal O-rings (F15), using a food grade grease that contains no acetate or silicone. Verify that they are properly located in their grooves in the modern nozzle section.
15. Carefully slide the modern nozzle section (F29) over the upper stem rod (F16), taking care not to displace the stem seal O-rings (F15).
16. Install the modern nozzle section bolts (F71) and washers (F31) into the modern nozzle section, hand tight.
17. Position the modern nozzle section (F29) with the pumper nozzle (F26) 180 degrees from the monitor elbow (F47). Rotate the nozzle section/monitor elbow so that the nozzles are in the desired position. Tighten the lower nozzle section bolts (F30) to 110 Nm.
18. Using the socket portion of the AVK seat-wrench, reinstall the stop nut (F11). Spin the stop nut down until it stops, and then snug it about 1/4 turn tighter.
19. Reinstall the anti friction washer (F8) in the oil reservoir of the modern nozzle section head (F29).
20. If required, refill the lubrication reservoir in the modern nozzle section (F29) reservoir with a food grade oil or grease that contains no acetate or silicone.
21. Reinstall the operating nut (F10). Tighten the operating nut all the way until it is snug against the lower anti friction washer.
22. Verify that there is a lubrication hole seal (F9) installed in the threaded hole on the operating nut. Replace if missing.
23. Reinstall the anti friction washer (F8) on top of the operating nut (F10).
24. Lightly grease the thrust nut O-rings (F5 & F7), and reinstall the thrust nut (F6). Tighten the thrust nut until it is just snug against the anti friction washer (F8), then back off the thrust nut 1/8 to 1/4 to the first location at which the lock plate (F4) can be installed. Note: Do not over tighten the thrust nut (F6).
25. Reinstall the lock plate (F4) and lock plate screw (F3). On hydrants equipped with a set screw, back off the thrust nut until the set screw can be reinstalled.
26. Tighten the modern nozzle section bolts (F71) to 110 Nm., using a star pattern.
27. Reinstall the weathershield (F2) and weathershield bolt (F1).
28. Operate the hydrant into the fully open position and then close it fully prior to turning the lead valve on to allow the oil or grease to lubricate the operating nut.
29. Turn on the lead valve and operate the hydrant.

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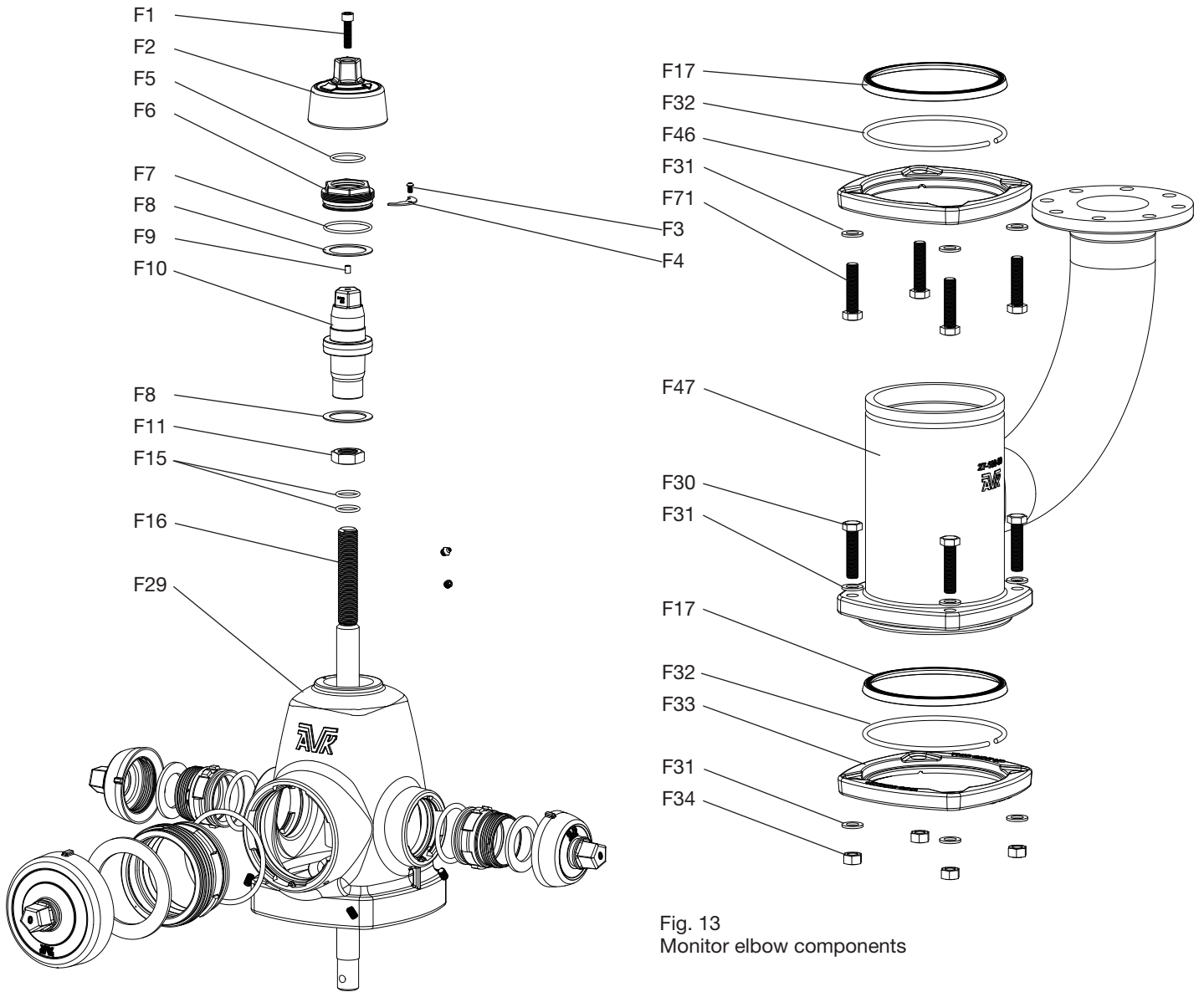


Fig. 13
Monitor elbow components

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8. TROUBLESHOOTING GUIDE

WARNING: The fire hydrant must be isolated before performing any maintenance. 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 hydrant.

PROBLEM: Hydrant slams shut while closing.

Probable cause: Play in stem rod assembly due to wear in stem rod couplings.

Corrective action: Inspect breakable coupling and extension coupling (if present) for wear and replace if necessary.

PROBLEM: Hydrant hard to operate.

Probable cause: Operating nut/thrust nut assembly too tight.

Corrective action: Remove the weathershield to access the lockplate and remove the lockplate. Tighten the thrust nut completely into the nozzle section then back off 1/8 to 1/4 turn until the thrust nut aligns with the first available notch in the lockplate. Re-install the lockplate and weathershield.

Probable cause: Operating nut not lubricated.

Corrective action: Disassemble the operating nut/thrust nut assembly. Clean and re-lubricate using a food grade grease.

PROBLEM: Nozzle facing the wrong direction.

Corrective action: Loosen the nozzle section hardware and carefully rotate the nozzle section to the desired position. Tighten the mounting hardware to 110 Nm.

PROBLEM: Hydrant opens but will not close.

Probable cause: The breakable coupling or extension coupling has broken or become disconnected.

Corrective action: Remove the nozzle section and replace the affected coupling.

Probable cause: Stem rod assembly has been over torqued, broken, or become disconnected from the main valve.

Corrective action: Contact an AVK Sales Representative for further troubleshooting and special tool requirements.

PROBLEM: Hydrant will not drain.

Probable cause: Drain holes may be plugged or blocked.

Corrective action: Loosen the hose nozzle cap and slowly open the hydrant until water escapes from the nozzle. Do not stand in front of the nozzle! Tighten the cap and force flush the drains. If the hydrant continues not to drain, the hydrant may have to be excavated to verify that the drains have not been blocked by concrete support.

PROBLEM: Hydrant flow is low.

Probable cause: Hydrant or supply valve is not fully open.

Corrective action: Verify that the hydrant is fully open. The AVK Series 2780 hydrant main valve fully opens in approximately 19-21 turns. Also locate and verify that the supply valve is fully open.

PROBLEM: Hydrant is leaking from a nozzle.

Probable Cause: Nozzle o-ring, or cap gasket is damaged.

Corrective action: Replace damaged o-ring or gasket.

PROBLEM: Hydrant is leaking from the operating Nut.

Probable Cause: Stem seal o-rings have failed.

Corrective action: Replace the stem seal o-rings and thrust nut o-rings if necessary. Refill hydrant with a food grade grease or oil that does not contain acetate or silicone.