INSTALLATION & MAINTENANCE INSTRUCTIONS - ORIGINAL VERSION

# AVK GATE VALVES FOR WATER AND FIRE PROTECTION

## SERIES 45 & 55

**TABLE OF CONTENT**



### 1. INTRODUCTION

AVK gate valves are designed for fully open or fully closed service installed in pipelines as isolating valves, and should not be used as control or regulating valves. The valves can be used for installation in potable water or neutral liquids depending on the specified application stated in the datasheet. Working conditions must be limited by temperature and pressure as stated, normally between -20 and +70 °C, maximum 5 m/s flow velocity and up to 16 bar differential pressure. AVK gate valves may not be installed and used as anchor points, and should at all times be kept free from stress arising from the pipeline or installation.

The AVK gate valve is designed with a cast body and bonnet assembled with countersunk bolts of stainless steel. It is operated with a stem of stainless steel and a wedge of ductile iron fully vulcanized with rubber. Materials and coating vary according to the application of the valve. Full material specifications are found in the datasheets. All valves are hydrostatically tested according to EN 12266.

Operation of the gate valve is performed doing an either clockwise to close (CTC) or clockwise to open (CTO) rotating motion of the stem. When operating the valve stem the wedge moves up- or downwards on the threaded part of the stem. AVK gate valves are designed to be self cleaning due to the full and straight bore. To get the full benefit of this AVK recommends to install the valve in upright position or in a 45 degree angle. Upside down installation is not recommended. Specific operation conditions may apply for valves equipped with an ISO flange for mounting gearbox or actuator, please refer to the actuator manufacturer's instructions.

As the gate valve is designed for installation directly in the ground, it is designed to be maintenance-free throughout the expected life time of the valve. Thus spare parts are not needed and repair of the valve in case of malfunction is not intended. To maintain full functionality of the valve throughout the expected life time frequent operation of the valve is recommended. Depending on the media flowing through the valve, the frequency of operation may vary from once a year to several times per month.

AVK gate valves for water applications comply with the requirements in the machinery directive 2006/42/EC.

## 2. RECEIVING AND STORAGE

### 2.1 Unloading

All valves should be unloaded carefully. Each valve should be carefully lowered from the truck to the ground; it should not be dropped. In the case of larger valves, forklifts or slings around the body of the valve or under the skids should be used for unloading. Only hoists and slings with adequate load capacity to handle the weight of the valve or valves should be used. Hoists should not be hooked into or chains fastened around yokes, gearing, motors, cylinders, or handwheels. AVK valve sizes DN 350 through DN 600 have lifting eyes for this purpose. Failure to carefully follow these recommendations is likely to result in damage to the valve or personal injury.

### 2.2 Inspection after unloading

Resilient-seated gate valves should be inspected at the time of receipt for damage in shipment. The initial inspection should verify compliance with specifications, direction of opening, size and shape of the operating nut, number of turns to open or close, and type of end connections. A visual inspection of the seating surfaces should be performed to detect any damage in shipment or scoring of the seating surfaces. Inspection personnel should look for bent stems, cracked parts, loose bolts, missing parts and accessories, and any other evidence of mishandling during shipment. Each valve should be operated through one complete opening-and-closing cycle in the position in which it is to be installed.

### 2.3 Storage

AVK gate valves should be stored in a location that protects the valve from any pollution or contamination. The valves must be stored in upright position and in an almost closed position to prevent long-term compression of the wedge rubber. The valve must be kept out of sunlight to prevent oxidation of the rubber and coating. Valves stored in cold storage must be protected against freezing.

## 3. INSTALLATION AND TESTING

### 3.1 Inspection prior to installation

1. Visually inspect each valve for any foreign material in the interior of the valve, and remove it if present.
2. Inspect each valve in a similar manner as described in the “2.2 Inspection after unloading” section of this manual.

### 3.2 Installation

1. All bolts should be checked for proper tightness and protected with a suitable paint or by a polyethylene wrapping.

2. Valves in water distribution lines shall, where practical, be located in easily accessible areas.

3. During installation there is the possibility of foreign materials inadvertently entering the valve. Foreign material can damage the internal working parts during operation of the gate valve. For this reason, gate valves should be installed in closed position. Each valve should be placed on firm footing in the trench to prevent settling and excessive strain on the connection to the pipe. Piping systems should be supported and aligned to avoid damage to the valve.

4. A valve box or vault should be provided for each valve in a buried-service application. The valve box should be installed so as to not transmit shock loads or stress to the valve. The valve box should be centered over the operating nut of the valve with the box cover flush with the surface of the finished area or such other level as directed by the owner. Valve boxes should be of such design that a traffic load on the top of the box is not transmitted to the valve.

5. Valves buried in unusually deep trenches should have special provisions for operating the valve. Either an extension spindle to permit use of a normal key or a notation on the valve records that a long key will be required.

6. When valves with exposed gearing or operation mechanisms are buried below ground, a vault designed to allow pipe clearance and prevent settling on the pipe should be provided. The operating nut should be accessible from the top opening of the vault with a valve key. The size of the vault should provide for easy removal of the valve bonnet and internal parts of the valve for purposes of repair. Consideration should be given to the possibility of groundwater and/or surface water and to the need to provide the disposal of such water.

**BOLT SIZES**

| DN mm | Working pressure (bar) PN 10 | PN 16 | Quantity PN 10 | PN 16 |
|---|---|---|---|---|
| 50 | M16 | M16 | 4 | 4 |
| 65 | M16 | M16 | 4 | 4 |
| 80 | M16 | M16 | 8 | 8 |
| 100 | M16 | M16 | 8 | 8 |
| 150 | M20 | M20 | 8 | 8 |
| 200 | M20 | M20 | 8 | 12 |
| 250 | M20 | M24 | 12 | 12 |
| 300 | M20 | M24 | 12 | 12 |
| 350 | M24 | M24 | 16 | 16 |
| 400 | M24 | M27 | 16 | 16 |

**Table 1**

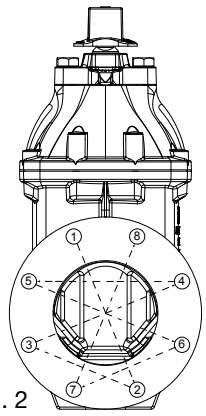

Fig. 2

7. Valves installed above ground or in a plant piping system should be supported and aligned to avoid damage to the valves. Valves should not be used to correct the misaligned piping.

8. If installing a larger valve that uses a smaller bypass valve, install a second valve box over the bypass valve operating nut.

9. Tighten the bolts and nuts in the crossover method shown in fig. 2, to load the pipe and valve evenly and prevent stress on the joints.

### 3.3 Testing after installation

In order to prevent time searching for leaks, it is recommended that valve excavations are not backfilled until after pressure tests have been made. After installation it is desirable to test newly installed piping sections, including valves, at some pressure above the system designed pressure. The test pressure should not exceed the rated working pressure of the valve. After the test, steps should be taken to relieve any trapped pressure in the body of the valve. The resilient-seated gate valve should not be operated in either the opening or closing direction at differential pressures above the rated working pressure. It should be noted that valves seat better at or near the rated working pressure of the valve. It is also recognized that wear or foreign
material may damage valve seating surfaces and may cause leakage.

On completion of the installation, valve location, size, make, type, date of installation, number of turns to open, direction of opening, and other information deemed pertinent should be entered on permanent records.

### 3.4 Application hazards

1. Resilient-seated gate valves should not be installed in lines where service pressure will exceed the rated working pressure of the valve.
2. Resilient-seated gate valves should not be used for throttling service unless the design is specifically recommended for that purpose or approved in advance by the manufacturer.
3. Resilient-seated gate valves should not be used in applications that are exposed to freezing temperatures unless sufficient flow is maintained through the valve or other protection is provided to prevent freezing.
4. Pipe, fittings, and valves installed in underground pipelines are generally joined with push-on or mechanical joints. These joints are considered unrestrained-type joints since no considerable restraint against longitudinal separation is provided.
5. Gate valves should not be installed in a dead end or near a bend in a pipeline without proper and adequate restraint to support the valve and prevent it from blowing off the end of the line.
6. It is good engineering practice to consider during the design whether or not thrust blocks, restrained joints, or other means of restraint are needed on or adjacent to valves on pipelines and/or where unusual conditions exist, such as high internal pressures, adjacent fittings, or unsuitable soils.

## 4. OPERATION AND MAINTENANCE

### 4.1 Tools

The following tool requirements are listed in both standard “metric” sizes as well as “inch” sizes.

| Part | Metric | Inch |
|---|---|---|
| Wrench nut/handwheel retaining bolts | | |
| DN 50 - DN 100 valves | 13 mm | 1/2” |
| DN 150 - DN 300 valves | 17 mm | 11/16” |
| DN 350 - DN 400 valves | 19 mm | 3/4” |
| Gland flange/post indicator retaining bolts | | |
| DN 50 - DN 100 valves | 24 mm | 15/16” |
| DN 150 - DN 400 valves | 30 mm | 1 1/4” |
| Gland follower/yoke retaining nuts | | |
| DN 50 - DN 100 valves | 24 mm | 15/16” |
| DN 150 - DN 400 valves | 30 mm | 1 1/4” |
| All sizes, bonnet bolts | 10 mm | 3/8” |

### 4.2 Operation

Gate valves are typically operated with an extension spindle in below ground installations. In manholes or in above ground installations handwheels or electric actuators may be used. Ensure proper sizing of the handwheel and/or operating keys, extension spindles and actuators. Please refer to AVK datasheets for further information. When installing gate valves mounted with electric actuators, please observe closing torques and number of turns from the datasheet. When the valve is installed in a chamber with an extension spindle going to above ground level, ensure that no vertical force from the extension spindle presses down directly on the valve stem top. The extension spindle must be supported by wall mounts or similar to prevent vertical forces and thereby supporting the weight of the extension spindle.

For gate valves in sizes larger than DN 350, installed in pipelines with a maximum flow acc. to EN1074-1 Table-2, and a differential operating/test pressure exceeding 10 bars, the opening torque needed to release the wedge from the valve seat may exceed the closing torques by around 30 %. This should be taken in to account when installing and sizing the actuation of the valve. Please contact AVK for further information regarding options/solutions to reduce or eliminate excessive opening torques.

When closing the gate valve ensure that the appropriate torque and number of turns are applied to the valve. See the following-table.

**AVK non-rising stem valves - turns to open**

| Valve dimension DN mm | Turns to open |
|---|---|
| 25 | 7 |
| 40 | 9 |
| 50 | 11 |
| 65 | 11-13* |
| 80 | 11 |
| 100 | 13 |
| 125 | 14 |
| 150 | 21 |
| 200 | 26 |
| 250 | 32 |
| 300 | 38 |
| 350 | 51 |
| 400 | 51 |
| 450 | 42 |
| 500 | 42 |
| 600 | 51 |

**AVK OS&Y (Outside Stem and Yoke) valves - turns to open**

| Valve Size | Turns to Open |
|---|---|
| 2.5” | 17 |
| 3” | 20 |
| 4” | 21 |
| 6” | 26 |
| 8” | 35 |
| 10” | 37 |
| 12” | 44 |
| 14” | 50 |
| 16” | 56 |

* 11 for FLxFL, 13 for IPSxIPS

### 4.3 Inspection

Each valve should be operated through one complete cycle. If the stem action is tight as a result of “hard water” buildup on the stem threads, the operation should be repeated several times until the opening and closing actions are smooth and free. With the gate in the partially open position, a visual inspection should be performed, where practical, to check for leakage at all joints, connections, and areas of packing or seals. If leakage is observed, all defective O-rings, seals, gaskets, or end-connection sealing should be replaced. If the leakage can not be corrected immediately, the nature of the leakage should be reported promptly to those who are responsible for repairs. If the valve is inoperable or irreparable, its location should be clearly established to save time for repair crews. The condition of the valve, and if possible, the gate position, should be reported to personnel responsible for repairs. In addition, fire departments and other municipal departments should be informed that the valve is out of service.

### 4.4 Record keeping

In order to carry out a meaningful inspection and maintenance program, it is essential that the location, make, type, size, and date of installation of each valve is recorded. Depending on the type of record system used, other information may be entered in the permanent record. When a resilient-seated gate valve is inspected, an entry should be entered in the permanent record indicating the date of inspection and condition of the valve. If repair work is necessary, it should be indicated. On completion of the work, the nature of the repairs and date completed should be recorded.

## 5. REPAIR PROCEDURES

Leakage, broken parts, hard operation, and other major defects should be corrected by a repair crew as soon as possible after the defect has been reported.

If repairs are to be performed in the field, the repair crews should take a full complement of spare parts to the jobsite. Provisions should be made to isolate the defective valve from water pressure and relieve internal trapped pressure prior to performing any corrective maintenance. Disassembly of the valve should be accomplished in accordance with the procedure supplied in the following sections.

After repairing the valve, the operating mechanism should be cycled through one complete operating cycle. With full line pressure applied to the valve in the open position, an inspection should be made to detect leakage in the areas around the seal plate, bonnet, packing gland, and body-end connections.

A record should be made to indicate that the valve has been repaired and is in working condition. Any marking that the valve is inoperable should be removed. In addition, fire department and other appropriate municipal departments should be informed of satisfactory repair of the valve.

### 5.1 Non-Rising Stem valves repairs

#### 5.1.1 Wrench nut handwheel repair

WARNING: Although some of the following procedures can be performed under full working line pressure, it is recommended that any partial disassembly or maintenance is performed with the water main supply line shut off!

1. Remove the wrench nut/ handwheel bolt (F220) and wrench nut/handwheel washer (F221) using a 13 mm wrench for DN 65 to DN 100 valve sizes and a 17 mm wrench for DN 150 to DN 300 valve sizes. Remove the wrench nut (F225) or NRS handwheel (F222), and replace with a new one. (See fig. 3A, and fig. 3B)

2. Replace the wrench nut/ handwheel bolt (F220) and wrench nut/handwheel washer (F221) using a 13 mm wrench, for DN 65 to DN 100 valve sizes, and a 17 mm wrench for DN 150 to DN 300 valve sizes

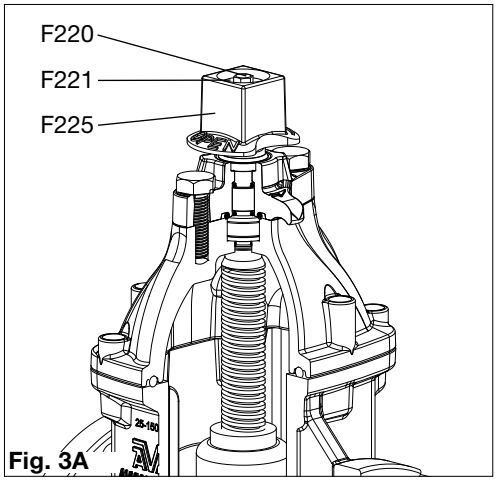

Fig. 3A

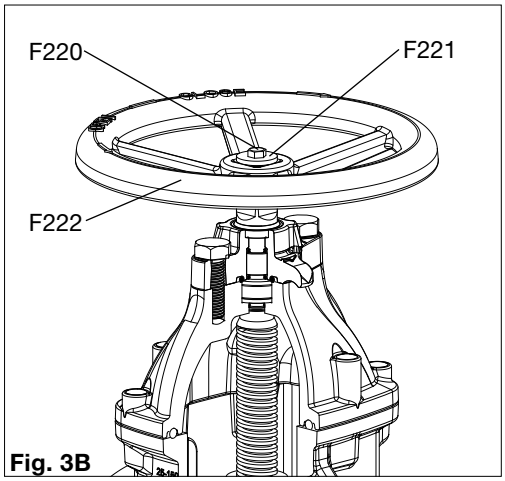

Fig. 3B

### 5.1.2 Upper stem seal components

CAUTION: With the valve in the fully “OPEN” position, the following procedures can be performed under full working pressure, with no need to shut down the system.

1. Remove the wrench nut/handwheel bolt (F220) and washer (F221) using a 13 mm wrench for DN 65 - DN 100 valve sizes and a 17 mm wrench for DN 150 - DN 300 valve sizes. Remove the wrench nut (F225) or non-rising stem handwheel.
2. Remove the two gland flange bolts (F227) using a 24 mm wrench for valve sizes DN 65 to DN 100, or a 30 mm wrench for valve sizes DN 150 to DN 300.
3. Remove the gland flange (F228) with wiper ring (F226) attached.

NOTE: The wiper ring (F226) is a “factory installed” press fit and therefore must be reordered as an assembly along with the gland flange (F228).

4. When performing step 3, verify the location of the upper stem seal O-rings, quantity 2, (F230) and the stem seal bushing (F231). They may be located on the stem (F233) (see fig. 4A), or in the counterbore of the gland flange (F228) (see fig. 4B).
5. There is a groove in the bottom of the gland flange (228), for the gland O-ring (F229) (See fig. 4B).
6. Inspect and replace any damaged parts. Use a food grade grease that contains no acetate or silicone, on the O-rings. Re-assemble in reverse order.

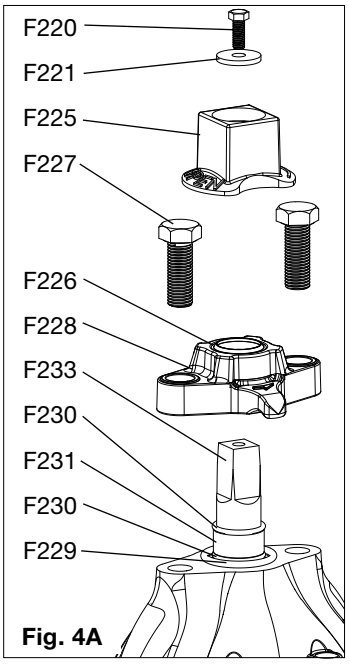

Fig. 4A

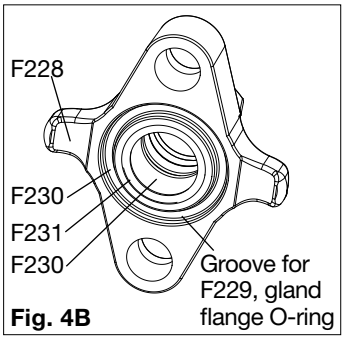

Fig. 4B

### 5.1.3 Stem/wedge assembly replacement

WARNING: To perform the following steps, be sure the water main supply line has been shut off, and that the pressure has been bled off! Also provide sufficient clearing around the valve so that no soil or debris may fall into it.

1. Complete steps 1 through 4 in section “5.1.2 Upper stem seal component”.
2. Turn the stem (F233), in a closing direction until it disengages from the wedge (F237), and remove from valve.
3. If applicable, for low zinc stems, remove the lower anti-friction washer (F235) from the recess in the bonnet (F217). For stainless steel stems, the stem collar and anti-friction washers are replaced by a two-piece thrust collar (F234). No anti-friction washers are necessary or present. The lower stem seal O-ring (F232) should be present on the stem and in it’s own groove, located directly above the threads.

NOTE: On stainless steel stems, the upper three grooves are for locating the thrust collar.

4. Inspect and replace any damaged parts.

NOTE: Use a food grade grease that contains no acetate or silicone on the new O-rings.

5. Using a small, flat bladed screwdriver, remove the hot melt glue that covers the bonnet bolts (F216).
6. Once the hot melt glue has been removed, use a 10 mm allen wrench to remove the bonnet bolts (F216). Remove the bonnet (F217) and bonnet gasket (F218) and set aside.
7. To remove the wedge (F237) it is sometimes helpful to thread the stem (F233) back into the wedge and use the stem as a handle or lever to extract the wedge. This is helpful with the larger sizes (DN 250 and DN 300) valves.
8. Carefully inspect the interior of the valve body and remove any debris.
9. Inspect and replace any damaged parts and re-assemble in reverse order, torquing the bonnet bolts to 60 Nm., in a diametrically opposed (180 degrees apart) pattern.
10. To replace the protective hot melt glue over the bonnet bolts, use any EPA approved caulk, or hot melt glue.

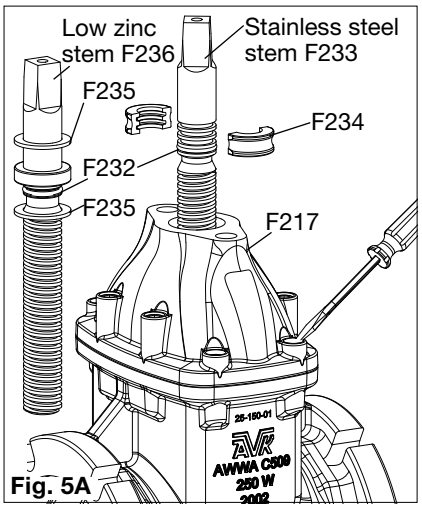

Fig. 5A

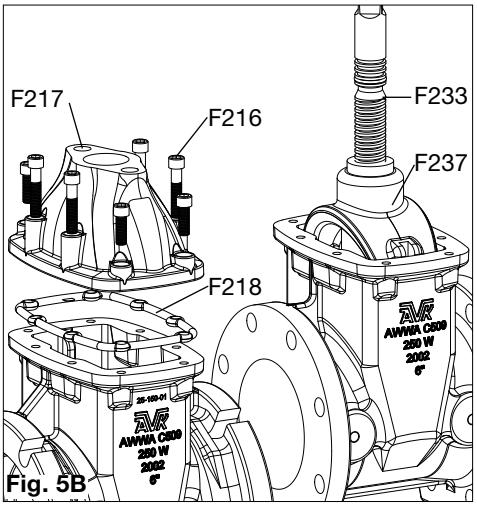

Fig. 5B

Expect… AVK

### 5.2 OS&Y (OUTSIDE STEM & YOKE) VALVE REPAIRS

#### 5.2.1 Handwheel replacement (figs. 6A & 6B)

WARNING: To perform the following steps, be sure the water main supply line has been shut off, and that the pressure has been bled off! Also provide sufficient clearing around the valve so that no soil or debris may fall into it.

NOTE: As most OS&Y valves are used in fire protection applications, verify that any alarm systems have been disabled prior to performing any maintenance or repairs.

1. Remove the two upper gland follower/yoke nuts (F206), using a 24 mm wrench for valve sizes DN 65 - DN 100, or a 30 mm wrench for valve sizes DN 150 - DN 300, and associated washers (F207). Lift the gland follower (F208) of the stud bolts (F210).
2. Remove the two lower gland follower/yoke nuts (F206) and associated washers (F207) from the stud bolts (F210).
3. Turn the remaining part of the handwheel (F202) in the closing direction. This will lift the yoke (F204) up the stud bolts until the upper half of the stem nut (F201) comes off of the stem assembly (F215).
4. Remove the upper half of the stem nut (F201) from the handwheel and place it in the “new handwheel” (F202).

NOTE: The stem nut pair are keyed with different sized lugs. Be sure to align the lugs in the correct location! (See fig. 6B)

CAUTION: Do not over tighten the upper pair of gland follower/yoke nuts (F206). Over tightening can cause the gland (F209) to fracture. Tighten the nuts evenly so the gland follower applies even and level pressure on the gland. If the gland follower is assembled at an angle, leaks may occur.

5. Perform steps 1 through 4 in reverse order to re-assemble. Turn the handwheel a few additional turns after the yoke has seated on the bonnet (F217). This will help prevent undue strain placed on the gland (F209) when replacing the upper nuts and washers.
6. Repressurize the system. At this time, if there is a leak around the gland (F209) be sure that the upper gland follower/yoke nuts (F206) are screwed down evenly on the stud bolts (F210). Tighten the nuts 1/4 turn each until the leak stops.

NOTE: Since UL, ULC and FM Approvals are for the manufacturer, this procedure will have no effect on listings or approvals.

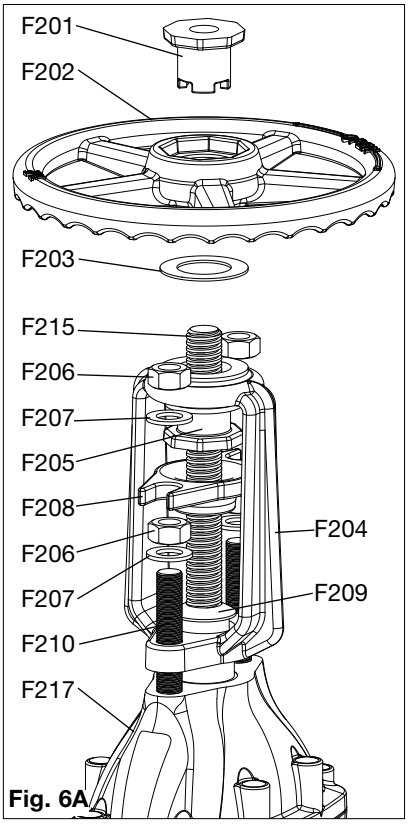

Fig. 6A

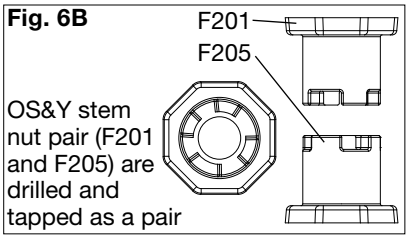

Fig. 6B

#### 5.2.2 Stem seal O-ring replacement (figs. 7A & 7B)

WARNING: To perform the following steps, be sure the water main supply line has been shut off, and that the pressure has been bled off! Also provide sufficient clearing around the valve so that no soil or debris may fall into it.

NOTE: As most OS&Y valves are used in fire protection applications, verify that any alarm systems have been disabled prior to performing any maintenance or repairs.

1. Remove the two upper gland follower/yoke nuts (F206) and associated washers (F207). Lift the gland follower (F208) up off of the stud bolts (F210) (see fig. 7A).
2. Lift the gland (F209) to access the three stem seal O-rings (F211).

NOTE: These O-rings are split-type O-rings. When replacing them, ensure that the splits do not align. Rotate the splits at approximately 30 degree intervals (see fig. 7B).

3. Reverse steps 2 and 3 for re-assembly.

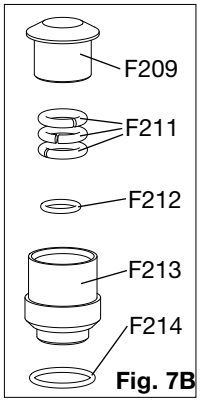

Fig. 7B

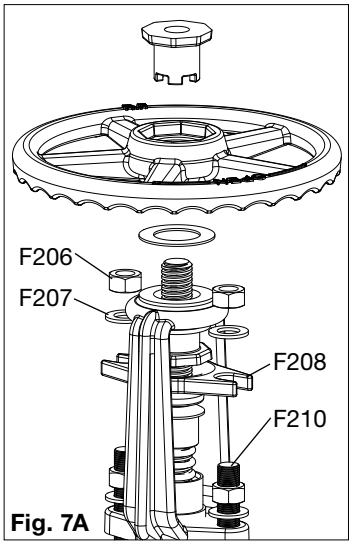

Fig. 7A

CAUTION: Do not over tighten the upper pair of gland follower/yoke nuts (F206). Over tightening can cause the gland (F209) to fracture. Tighten the nuts evenly so the gland follower applies even and level pressure on the gland. If the gland follower is assembled at an angle, leaks may occur.

4. Repressurize the system. At this time, if there is a leak around the gland (F209) be sure that the upper gland follower/yoke nuts (F206) are screwed down evenly on the stud bolts (F210). Tighten the nuts 1/4 turn each until the leak stops.

### 5.2.3 Stem/wedge assembly replacement (figs. 8A & 8B)

WARNING: To perform the following steps, be sure the water main supply line has been shut off, and that the pressure has been bled off! Also provide sufficient clearing around the valve so that no soil or debris may fall into it.

NOTE: As most OS&Y valves are used in fire protection applications, verify that any alarm systems have been disabled prior to performing any maintenance or repairs.

1. Remove the two upper gland follower/yoke nuts (F206), using a 24 mm wrench for valve sizes DN 65 - DN 100, or a 30 mm wrench for valve sizes DN 150 - DN 300, and associated washers (F207). Lift the gland follower (F208) of the stud bolts (F210).
2. Remove the two lower gland follower/yoke nuts (F206) and associated washers (F207) from the stud bolts (F210).
3. Turn the remaining part of the handwheel (F202) in the closing direction. This will lift the yoke (F205) up the stud bolts until the upper half of the stem nut (F201) comes off of the stem assembly (F215).
4. Remove the upper half of the stem nut (F201) from the handwheel and place it in the “new handwheel” (F202).

NOTE: The stem nut pair are keyed with different sized lugs. Be sure to align the lugs in the correct location! (See fig. 8B)

5. Line up the new handwheel and upper half of the stem nut (F201), with the correct slots on the lower half of the stem nut (F205). Carefully turn the handwheel and stem nut to begin threading them onto the stem (F215).
6. Turn the handwheel a few additional turns after the yoke has seated on the bonnet (F217). This will help prevent undue strain placed on the gland (F209) when replacing the upper nuts and washers.

CAUTION: Do not over tighten the upper pair of gland follower/yoke nuts (F206). Over tightening can cause the gland (F209) to fracture. Tighten the nuts evenly so the gland follower applies even and level pressure on the gland. If the gland follower is assembled at an angle, leaks may occur.

7. Replace the two lower gland follower/yoke nuts (F206) and associated washers (F207), gland follower (F208), and upper washers and nuts.
8. Repressurize the system. At this time, if there is a leak around the gland (F209) be sure that the upper gland follower/yoke nuts (F206) are screwed down evenly on the stud bolts (F210). Tighten the nuts 1/4 turn each until the leak stops.

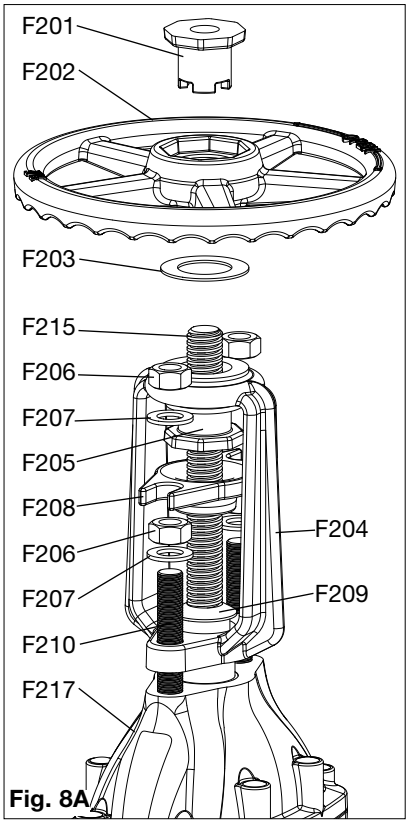

Fig. 8A

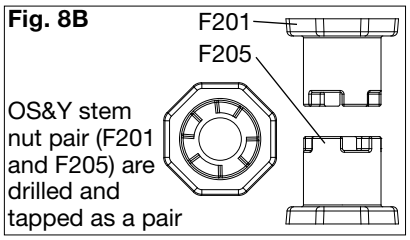

Fig. 8B

NOTE: Since UL, ULC and FM Approvals are for the manufacturer, this procedure will have no effect on listings or approvals.

## 6. OPTIONAL EQUIPMENT

### 6.1 Actuator adapters (figs. 9A & 9B)

AVK offers gear adapters for both NRS and OS&Y valves. Gear adapters for NRS valves are available in sizes DN 65 through DN 600. OS&Y valves are available in sizes DN 65 through DN 300. Flange sizes are listed in “Table 1”.

Table 1

| DN 65 | DN 75 | DN 100 | DN 150 | DN 200 | DN 250 | DN 300 | DN 350 | DN 400 | DN 450 | DN 500 | DN 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FA10 | FA10 | FA10 | FA10 | FA10 | FA14 | FA14 | FA14 | FA14 | FA16 | FA16 | FA16 |

Fig. 9A lists the parts that differ from standard valves.

F245 Gland bolts (adapter plate)
F246 Actuator adapter gland
F247 Stem key
F248 Actuator stem

Fig. 9B shows an OS&Y adaptor yoke (F249). Note that when an OS&Y adaptor yoke is configured, the OS&Y handwheel, stem nut pair, and anti friction washer are not used.

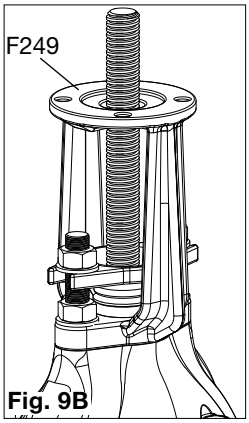

Fig. 9B

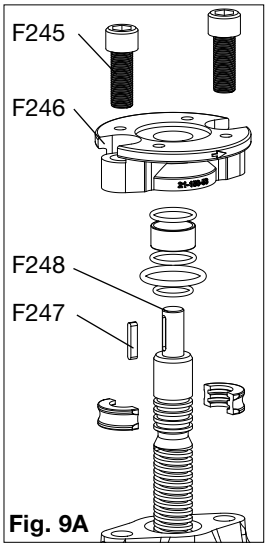

Fig. 9A

### 6.2 Post indicator plates (fig. 10)

NRS valves are available with post indicator plates in valve sizes DN 100 through DN 400. The valves can be ordered from the factory pre-configured, or can be re-configured in the field.

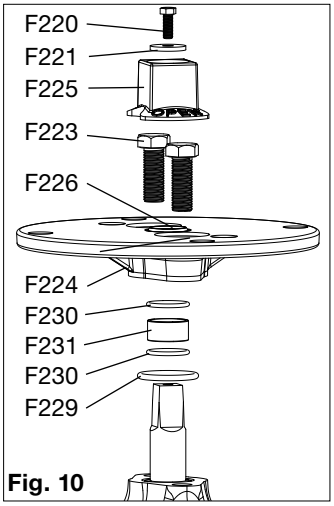

Fig. 10

CAUTION: With the valve in the fully “OPEN” position, the following procedures can be performed under full working pressure, with no need to shut down the system.

1. Remove the wrench nut/handwheel bolt (F220) and wrench nut/handwheel washer (F221) using a 13 mm wrench, for DN 65 to DN 100 valve sizes, and 17 mm wrench for DN 150 to DN 300 valve sizes. Remove the wrench nut (F225).
2. Remove the two gland flange bolts using a 24 mm wrench for valve sizes DN 65 - DN 100, or a 30 mm wrench for valve sizes DN 150 - DN 300.
3. Remove the gland flange (F228, see fig. 4A)) with wiper ring (F226) attached.

NOTE: The wiper ring (F226) is a “factory installed” press fit and therefore must be reordered as an assembly along with the post indicator plate (F224).

4. Take the two upper stem seal O-rings (F230) and the stem seal bushing (F231) from the old assembly and install them into the post indicator plate. Lightly grease the O-rings with a food grade grease that contains no acetate or silicone.
5. Install the gland O-ring (F229) into the groove in the bottom of the post indicator plate and carefully slide the assembly over the stem, onto the valve bonnet. Secure with the new post indicator plate bolts (F223).

NOTE: The post indicator plate bolts are longer than the gland flange bolts.

6. Replace the wrench nut and secure it with the wrench nut bolt and washer.

## 7. TROUBLESHOOTING GUIDE

WARNING: The valve 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 valve.

**PROBLEM: Valve leaking around stem/ gland flange.**
Probable cause: Damaged or worn O-rings.
Corrective action: Refer to the upper and lower seal component repair sections of this manual and replace the O-rings

**PROBLEM: Valve leaking around bonnet and body.**
Probable cause: Bonnet bolts loose.
Corrective action: Tighten bonnet bolts.

Probable cause: Damaged bonnet gasket.
Corrective action: Replace bonnet gasket

**PROBLEM: Valve leaking around pipe connections.**
Corrective action: Tighten flange hardware.
Corrective action: Verify gasket is not damaged. Replace if necessary.

**PROBLEM: Valve hard to operate.**
Probable cause: Gland bolts too tight or tightened unevenly.
Corrective action: Loosen then re-tighten gland bolts evenly.

Probable cause: If the valve has not been operated over a prolonged period of time, build-up may occur on the internal parts.
Corrective action: Open or close the valve one turn at a time until fully opened or closed. Repeat the process a few times then flush the system to remove any debris.

Probable cause: Pressure build-up in system.
Corrective action: Relieve pressure and bleed off any air build-up.