Installation, operation & maintenance manual - original version

AVK gate valves for water and wastewater

Series 01, 02, 06, 12, 15, 18, 20, 26, 32, 33, 36, 38, 50, 55, 636 and 638



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1. AVK series 06/30 exploded view



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2. AVK series 06/30 parts list

Item	Description	Material
1	Wiper ring	NBR rubber
2	Bearing	Polyamide
3	O-ring	NBR rubber
4	O-ring	NBR rubber
5	Thrust collar	Brass, DZR CW602N
6	Manchette	EPDM rubber
7	Stop ring	Stainless steel
8	Stem	Stainless steel 1.4104 (430F)
9	Bonnet bolts	Stainless steel A2, sealed with hot melt
10	Bonnet	Ductile iron GJS-500-7 (GGG-50)
11	Bonnet gasket	EPDM rubber
12	Wedge	Ductile iron, EPDM encapsulated
13	Body	Ductile iron GJS-500-7 (GGG-50)

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4. Principle of operation

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, wastewater, or neutral liquids depending on the specified application stated in the datasheet for the relevant product. Working conditions must be limited by temperature and pressure as stated in the datasheet. Normally work conditions are temperatures between -20 °C and +70 °C, flow velocity at maximum 5 m/s 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.

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 instructions from actuator manufacturer.

5. Health and safety at work

Make sure all relevant health and safety issues and regulations are adhered to prior to and during installation or maintenance work carried out on this product. It is the end users responsibility to ensure that safe working practices are followed at all times.

Whenever AVK's products are installed, operated or maintained the inherent dangers of pressurised liquids and gasses must be addressed. Before work on a valve or other piping component is undertaken, that may involve the release of internal pressure, the valve or line must be fully isolated, depressurised and drained prior to commencing the work. FAILURE TO COMPLY WITH THIS MAY RESULT IN SEVERE INJURY OR DEATH.

All workers handling the product must be aware of the weight of the components or assemblies to be handled and manipulated during installation and maintenance. It is essential that staff undertaking these operations are adequately trained and it is the responsibility of the end user that only trained and competent staff undertake these duties.

This manual has been designed to assist, but it cannot replace quality training in the workplace. However, AVK's technical staff are always available to answer questions related to specific problems that may not be covered by this manual.

AVK's products are designed to be fit for purpose and to a high reliability standard. This provides a safe, low risk product when used correctly for the purpose for which it has been designed. However, this assumes that the equipment is used and maintained in accordance with this manual, and the user is advised to study it and to make it available to all staff that may need to refer to it. AVK cannot be held responsible for incidents arising from incorrect installation, operation or maintenance. The responsibility for this rests entirely with the end user.

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6. Receiving and storage

Unloading must be carried out carefully. The load must be put gently to the ground without dropping. Lift only by means of shackles in the flange bolt holes or slings around the body casting. If a forklift is used it shall have sufficient capacity to lift the required weight and have a valid inspection certificate.

All workers involved in the unloading shall be able to perform their functions. They shall wear safety boots, safety vest, safety goggles and hard hat.

All slings used for the lifting shall be of sufficient strength. A record shall document that they have been stored under cool, dry conditions away from sunlight and chemical atmosphere, and that they still perform according to their marked strength.

Immediately after unloading the item should be inspected for compliance with specifications and damage in shipment. Compliance with specification check shall as a minimum comprise size, pressure class, etc. Damage in shipment check shall as a minimum comprise: coating, seating and sealing surfaces etc. or accessories or any other evidence of mishandling during shipment. Each item should be operated through one complete open-close cycle in the position in which it is to be installed.

Storage shall be under dry, cool conditions, away from direct sunlight and corrosive or otherwise chemically active atmosphere. The valves must be stored in upright position and in an almost closed position to prevent long-term compression of the wedge rubber. Valves stored in cold storage must be protected against freezing. Series 36 gate valves with PE pipe connection have to be stored and handled carefully to avoid damage of the pipe. According to EN12007-2 the storage time for PE pipes is maximum 2 years from the production date (printed on the pipe). Therefore, the “first in, first out” principle is recommended.

6.1 Product marking

6.1.1 New generation of gate valves and series 636

Casting - valve side 1
- Product dimension (DN) / pressure class (PN)
- Material / design standard
- Part number

Label - valve side 1
- AVK logo
- Item number
- Dimension / pressure class / coating
- Standard
- Casting material / rubber material
- Stem material
- Closing direction / application / temperature
- QR code



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Casting - valve side 2
- AVK logo
- Date / year of production
- Supplier number

Label - valve side 2
- AVK logo
- Series number
- Item number
- EAN number and barcode
- Internal production order number
- Serial number

6.1.2 Other gate valves



Casting - valve side 1
- Body series number
- AVK logo
- Product dimension (DN)
- Pressure class (PN)
- Casting material
- Supplier number



Casting - valve side 2
- Casting material
- Casting date

Label - valve side 2
- AVK logo
- EAN number
- Item number
- Dimension / pressure class / coating
- Standard
- Casting material / stem material / rubber material
- Closing direction / application / temperature
- Year of production
- Internal production order number
- Serial number

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7. Installation and commissioning

WARNING: Prior to installation make sure that all pressurised lines involved in the installation are isolated, depressurised and drained before starting any work. Failure to do so may result in sudden pressure release and subsequent severe injury or death.

AVK gate valves must be protected from damage during transportation, loading and handling. Lifting by means of a crane or any other lifting device should only be done using the flange holes, lifting eyes or appropriate straps. Never suspend the valve in a handwheel, gearbox or actuator.

Before installation, a visual check must be performed. Special attention should be paid to checking the stem, valve seat area, flanges and coating. Look for defects, bended or out of place parts, dents, scratches and other damages. Actions should be taken to repair or replace the valves if any defects are detected.

AVK gate valves are supplied with a number of different connections to the pipeline. The use of flanges, sockets or spigot pipes depends on customers' specifications. For all connection types correct craftsmanship must be applied.

Gate valves with flanges must be installed using suitable gaskets, bolts, washers and nuts. Maiden flanges must be designed to adapt standard flange drillings appropriate to the specific flange drilling on the valve.

Bolts must be tightening in a criss/cross pattern and bolt torques must be applied according to the flange gasket manufacturer's recommendations. Actions should be taken to ensure that the valve flanges are aligned to ensure an even pressure on the gasket surface. See table 1 for bolt sizes.

Figure 1

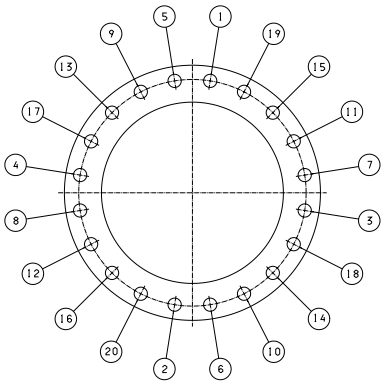

Table 1

DN	Bolt sizes: Working pressure (bar)		Quantity	
mm	PN 10	PN 16	PN 10	PN 16
40	M16	M16	4	4
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
450	M24	M27	20	20
500	M24	M30	20	20
600	M27	M30	20	20
700	M27	-	24	-
800	M30	-	24	-
900	M30	M36	28	28
1000	M33	M39	28	28

During installation in the pipeline system care must be taken to ensure that the connecting flanges of the pipeline getting in contact with the gate valve are arranged parallel to each other and are exactly aligned to avoid any tension loads acting upon the valve body. For the same reason, and to achieve a regular mounting of the flange sealings, it is also necessary to tighten the connecting bolts regularly in a cross pattern (see figure 1). The bolt tightening torques are to be informed by the gasket supplier.

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Gate valves with sockets must be installed according to pipe manufacturers' recommendations. Check that the outside diameter of the pipe corresponds to the inside diameter of the valve socket before installation. If gaskets are mounted in the valve, secure that the gasket is placed correct and is adequately lubricated.

Gate valves with spigot pipe ends are to be installed either by means of appropriate welding or the use of a suitable coupling. For welding procedures please refer to the pipe manufacturers' specifications. For choice of coupling please consult an AVK representative.

For Supa Maxi™ gate valves please also refer to separate mounting instruction for Supa Maxi™.

7.1 Pressure testing

After installation, perform a pressure test before the trench is closed. Secure the pipe and gate valve against movement. If the pipeline and valve are tested with water prior to gas/air tests, ensure that the pipeline and valve are drained to prevent frost damage. AVK valves are designed to resist a test pressure of 1.5 x PN.

8. Operation and maintenance

8.1 Operation

Gate valves in below ground installations are typically operated with an extension spindle. 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 DN350, installed in pipelines with a maximum flow according. to EN1074-1 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 torque by around 30%. This should be taken into 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.

Once the valve has reached its fully open position, it is recommended to turn the stem slightly towards the closing position in order to release any stress on the stem thread.

When closing the gate valve ensure that the appropriate torque and number of turns are applied to the valve. See table 2.

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Table 2

Max. torques					Max. torques – new generation of gate valves incl. series 636 and 638				
Valve dimension DN mm	Closing torque Nm	Free running torque Nm	Rupture torque Nm	Turns to open	Valve dimension DN mm	Closing torque Nm	Free running torque Nm	Rupture torque Nm	Turns to open
40	40	6	400	11	40	25	3	250	12
50	40	6	400	11	50	25	3	250	12
65	60	6	400	14	65	25	3	250	17
80	60	6	400	17	80	35	3	400	17
100	80	6	400	21	100	35	3	400	21
125	80	6	500	26	125	40	3	500	26
150	80	12	600	26	150	40	3	600	26
200	120/100[5]	12	800	33/35[5]	200	80	3	800	33
250	180	12	1000	37	250	90	6	1000	37
300	200	16	1200	44					
350	300	24	1400	59					
400	300	24	1600	59/50[4]					
450	300[1]/450[2]/500[3]	25	1600	59[1]/39[2]/39[3]					
500	300[1]/450[2]/500[3]	25	1600	59[1]/43[2]/43[3]					
600	500[2]/700[3]	25	1600	53[1]/52[2]/53[3]					
700	850	60	3000	60					
800	850	60	3000	70					
	6 bar/10 bar/16 bar								
900	800/800/1100	300	4000	85					
1000	800/800/1100	300	4000	85					

[1] series 02 and 20
[2] series 06 and 26
[3] series 55
[4] series 36
[5] series 15

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.

8.2 Maintenance

WARNING: Prior to any maintenance work that requires disassembly make sure that the pressurised line involved is isolated, depressurised and drained before starting any disassembly. Failure to do so may result in sudden pressure release and subsequent severe injury or death.

8.3 Replacement of stem seal nut

Gate valves designed with a replaceable stem sealing is part of the AVK product range. The stem sealing can be replaced regardless of the position of the valve. If it is necessary to replace the stem sealing under pressure, the following procedure must be followed:

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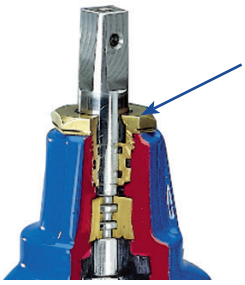

1. Unscrew the stem seal nut in counterclock direction.
2. Take off the stem seal nut
3. Replace the stem seal nut unit including O-rings with a new one ordered from AVK International
4. Lubricate the nut threads with locking liquid medium strength
5. Mount the new stem seal nut by tightening it firmly clock-wise with a torque of approx. 80 Nm

This goes for gate valves up to DN400. For larger dimensions please refer to separate maintenance instruction.

9. Recommended spare parts

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.

In cases where spare parts are needed for maintenance or repair, only genuine AVK spare parts should be used. AVK accepts no responsibility for damage caused by failing non-AVK parts.

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