

Installation, Operation and Maintenance Manual

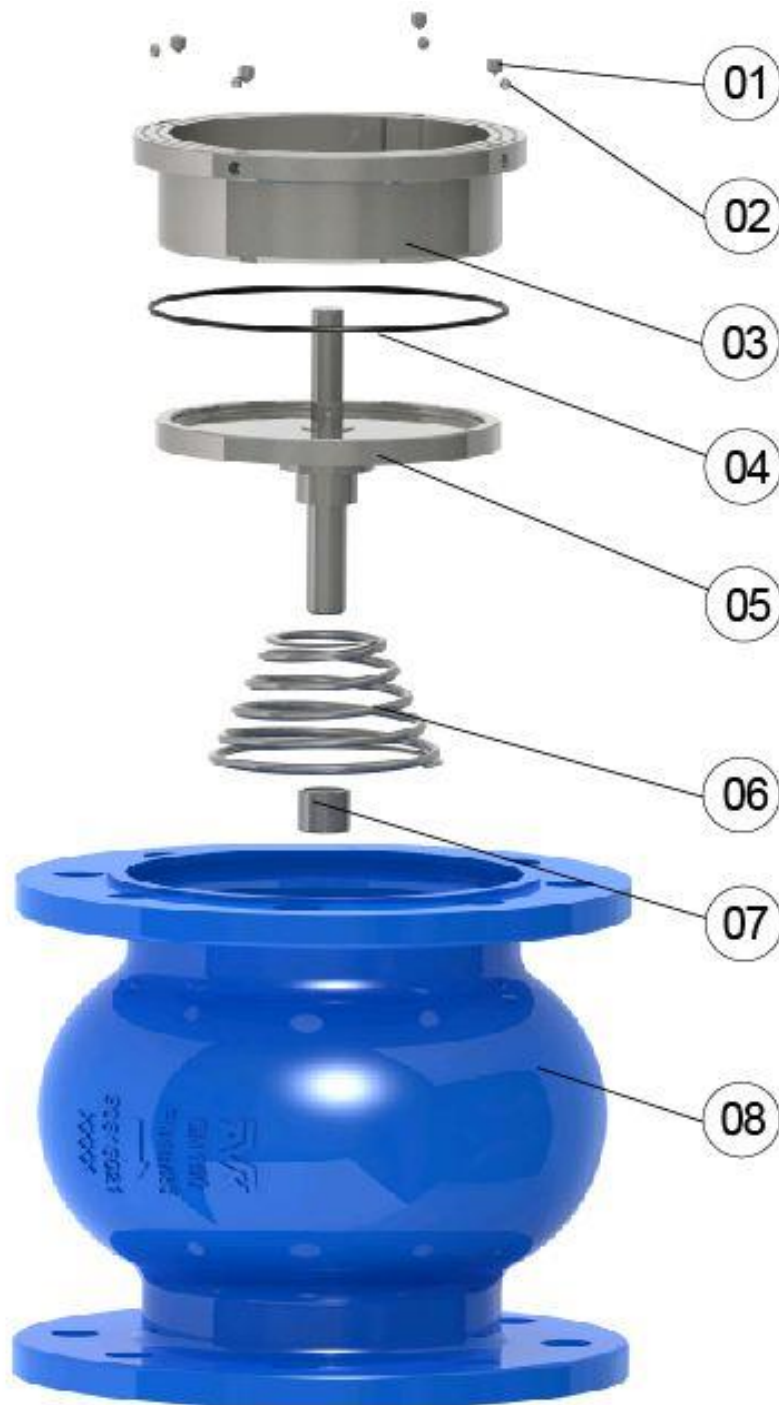
AVK Series 903 Silent Check Valve

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AVK Series 903 Silent Check Valve exploded view



1. Parts List

<u>No.</u>	<u>Description</u>	<u>Material</u>
1	Set screw	Stainless steel
2	Lock ball	Stainless steel
3	Seat	Stainless steel
4	O-ring	EPDM
5	Disc	Stainless steel
6	Spring	Stainless steel
7	Bushing	Stainless steel
8	Valve housing	Ductile Iron

2. Introduction

AVK silent check valves are designed for installation in HVAC or other water systems to make sure the water flows in only one direction and to carry out this task without causing water hammer.

The moving element is a flat disc pressed against the valve seat by a central spring. In normal operation the water flow compresses the spring and keeps the valve open, but by sudden changes, like a pump stop, the spring will press the valve shut so quickly that the water flow will not have time to reverse. Having the flow stopped by the valve itself before reverse flow can cause it to close reduces the risk of water hammer effectively.

3. Health and safety

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 pressurized 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 relating 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 was 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 Valves cannot be held responsible for incidents arising from incorrect installation, operation or maintenance. The responsibility for this rests wholly with the end user.

4. Receiving and storage

Unloading

All valves should be unloaded carefully.

Each valve should be carefully lowered from the truck to the ground without dropping. 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.

Failure to follow these recommendations is likely to result in damage to the valve or personal injury.

Inspection after unloading

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, end connection type and colour.

Damage in shipment check shall as a minimum comprise: coating, seating surfaces, bent stems or shafts, cracked or missing parts 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

Storage shall be under dry, cool conditions, away from direct sunlight and corrosive or otherwise chemically active atmosphere.

5. Installation and commissioning

General caution

When installing the valve the inherent dangers of pressurized liquids and gasses must be addressed. Before work is undertaken, that may involve the release of internal pressure or large amounts of water, the 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.

A silent check valve can be installed in horizontal or vertical position; the location must allow sufficient space for maintenance work.

Do not install closer than 6 pipe diameters downstream of tees or elbows or other irregularities as this can cause violent turbulence and cavitation inside the valve that reduces its performance and durability.

Make sure that only qualified and experienced workers install and commission the valve.

- Remove all special packaging material and check the function of the valve by pressing the center shaft.
- Check that all sealing faces are free from damage and that the piping is free from debris.
- Select the correct type of gasket for the medium concerned.
- The direction of flow in the pipeline should be consistent with the arrow on the valve housing.
- Fit bolts of the correct size and tighten them in a criss-cross pattern to the correct torque.
- In case condensation is likely to occur, e.g. when handling glycol at low temperature, corrosion protection should be applied to the bolts, e.g. paint, polyethylene wrapping, grease or other means.
- When the pipe has been pressurized, inspect for leaks and adjust as necessary.
- Dirt, external debris, foreign matter, etc. should be cleaned off from the external surface of the valve and paint that may have been damaged during installation should be touched up.

6. Application hazards

Following are examples of applications that are possible, but should be avoided or dealt with:

- Do not install in pipelines where the pressure exceeds the valve's rated pressure – even if only for short periods of time.
- Applications with corrosive media, like brine, may destroy the trim materials unless they are specially suited for the specific medium. Contact AVK for information about alternative materials.
- Applications with glycol at low temperature are likely to cause condensation. Valve housing and trim are sufficiently protected, but make sure proper corrosion protection is applied to the fastening bolts.
- Do not use with hydrocarbons of any kind.

7. Operation

The operation is automatic and requires no external action.

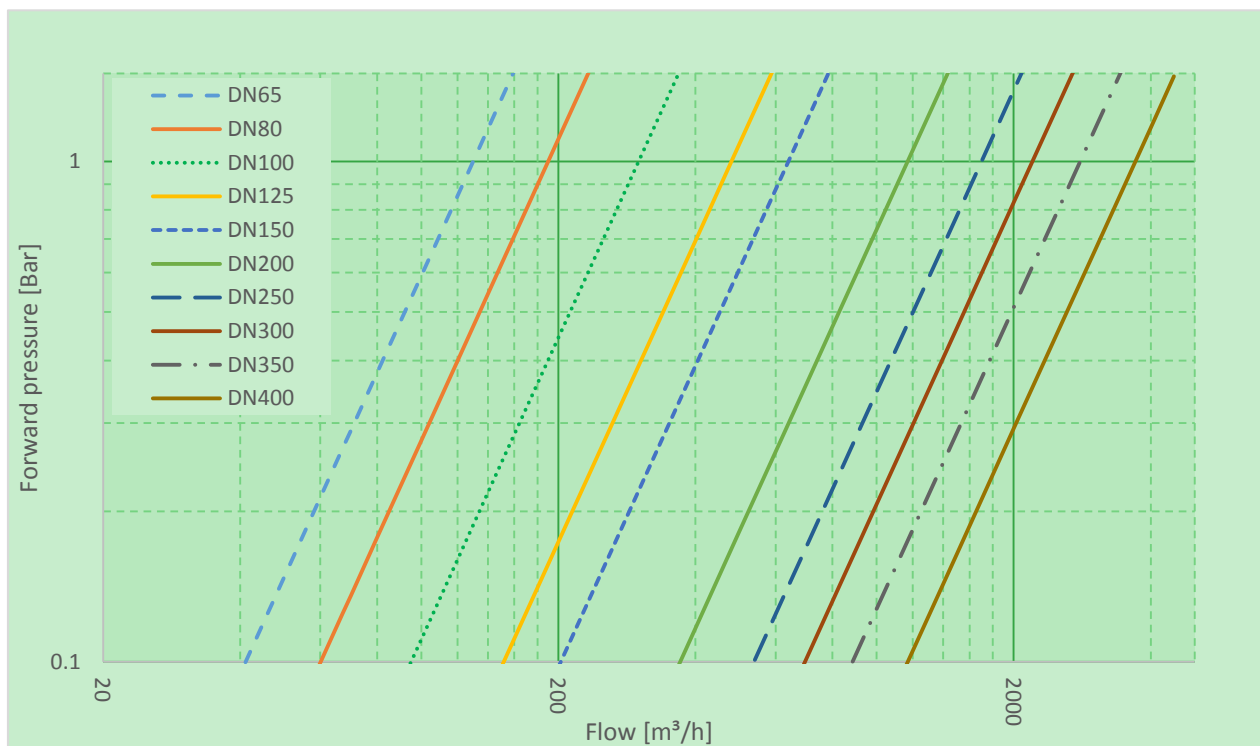
Pressure rating is expressed in the PN-number which gives the maximum system pressure in bar.

Temperature range is -10°C to 110°C with clean water or HVAC-water mixed with various percentages of glycol.

The forward pressure to overcome the spring pre-tension and open the valve less than 1 mWC or 0.1 Bar.

Kv values are approximately as below:

DN [mm]	Kv [m ³ /h/bar]
65	130
80	190
100	300
125	480
150	640
200	1170
250	1700
300	2200
350	2800
400	3700



8. Maintenance

Before work is undertaken, that may involve the release of internal pressure or cause large amount of water to flow out, the valve or line in question must be fully isolated, depressurised and drained prior to commencing the work. FAILURE TO COMPLY WITH THIS MAY RESULT IN SEVERE INJURY OR DEATH.

No maintenance is required as long as the valve operates satisfactorily.

If the valve stops functioning properly it may be necessary to take it apart for repair:

1. Isolate, depressurise and drain the line.
2. Remove the flange bolts and take down the valve
3. Remove the set screws (01).
NOTE: this will release the pre-tension of the spring and make the seat suddenly jump free. Larger valves (>DN100) might require a fixture to compress the spring and contain the pre-tension while removing the set screws.
4. Remove the valve seat (03); be careful not to loose the lock balls (02).
5. Remove the rest of the moving parts.

Inspect and replace damaged parts.

Re-assemble in reverse order; make sure the lock balls catch the groove in the valve housing.

9. Trouble shooting

Symptom: Water hammer from valve
Cause: Broken spring
Cure: Replace spring

Symptom: Reverse flow in the line
Cause: Valve seat or disc worn or damaged
Cure: Replace the defective part
Check for abrasive particles in the water

Symptom: Noisy operation
Cause: Worn shaft or bushing
Cure: Replace worn parts

Symptom: Leak from flange connection
Cause: O-ring (04) defective
Cure: Replace O-ring

Symptom: Leak from flange connection
Cause: Gasket defective, bolts broken or not tightened properly
Cure: Replace gasket and tighten bolts to correct torque

10. Spare parts list

Seat (03)
O-ring (04)
Disc (05)
Spring (06)
Bushing (07)