



**PRESSURE REDUCING  
AND PRESSURE SUSTAINING  
CONTROL VALVES**

Expect... **AVR**



# OPTIMIZE WATER SUPPLY MANAGEMENT AND REDUCE WATER LOSS



Water is a scarce resource that we need to protect. We need to secure water for the next generations and a growing population. Control valves can help reduce water losses and contribute to efficient water supply management by regulating pressure, flow or level, regardless of changes in the supply network.

## Implications of water loss

From an environmental perspective, significant amounts of precious water are lost, and the energy used to treat and distribute the water lost is wasted as well.

For water utilities, non-revenue water that has been produced but “lost” before it reaches the customer through leaks, theft or metering inaccuracies is a source of unwanted cost.

## How control valves can help

Automatic control valves are used to provide optimum pressure and flow conditions resulting in:

- Reduced water loss through leakages
- Reduced risk of water hammer and pipe bursts
- Reduced energy consumption as less water needs to be pumped through the system
- Reduced disruption to consumers
- Reduced maintenance costs and depreciation due to longer lifespan of the network



## Main features of AVK control valves

The safe choice offering accurate regulation, easy maintenance and long durability:

- All non-coated metal parts of stainless steel AISI 316 as standard
- Fusion bonded GSK approved epoxy coating (300 micron)
- AVK's own drinking water approved rubber compounds
- Modular pilot system enables easy fitting to other applications without replacing the valve
- Adjustment of optimal regulation speed for full control
- Parabolic plug design provides precise regulation and stability at low flow
- Large diaphragm secures fast reaction to minor changes in pressure
- Lifted seat prevents damage inside the valve body due to cavitation
- AVK design and manufacture with 100% pressure test and 10-year warranty

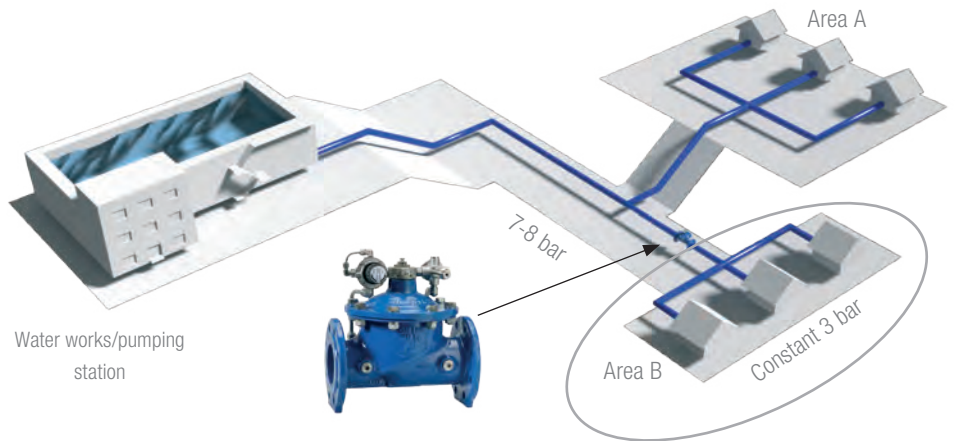


# PRESSURE CONTROL REDUCE OR SUSTAIN

## Pressure reducing control valve

A pressure reducing control valve automatically reduces a higher inlet pressure to a lower outlet pressure regardless of changes in flow rate or inlet pressure.

The pressure reducing pilot senses the outlet pressure through the connection on the valve outlet port. Under flowing conditions, the pressure reducing pilot reacts to small changes in the outlet pressure, controlling the valve position by modulating the pressure in the control chamber. When the outlet pressure changes according to the set-value of the pilot, the pilot modulates to ensure pressure control.

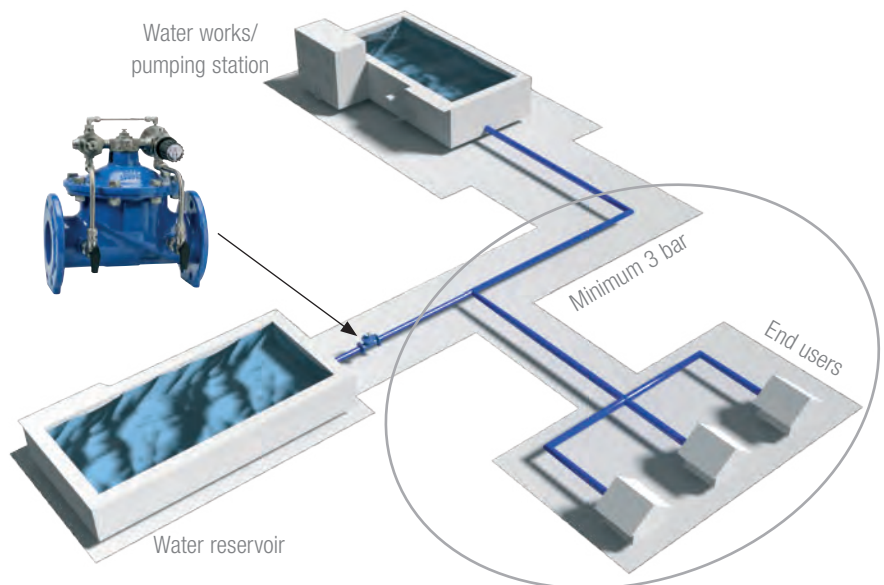


**Example:** The pressure is 7-8 bar, which is appropriate to supply the consumers in area A but too high for the consumers in area B. Therefore, a pressure reducing control valve is installed to reduce the pressure to 3 bar in area B.

## Pressure sustaining/relief control valve

A pressure sustaining control valve automatically maintains a minimum preset inlet pressure by relieving excess pressure, regardless of changes in flow rate.

The pressure sustaining pilot reacts to small changes in the inlet pressure, controlling the valve position. If the inlet pressure falls below the set point, the main valve closes or modulates to ensure a minimum inlet pressure. The sustaining valve holds a minimum back pressure on the inlet and normally allows flow. The relief valve normally remains closed and only opens when pressure exceeds a pre-determined set-point.

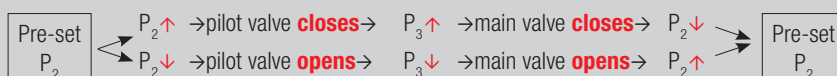


**Example:** When the water reservoir fills, the pressure drops, leaving the consumers without water. Therefore, a pressure sustaining control valve is installed to maintain the pressure for the consumers.

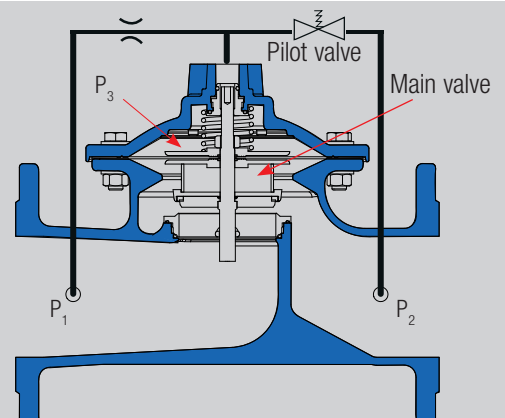
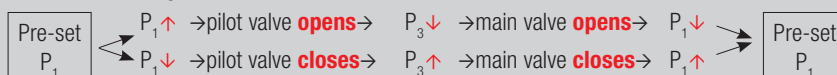
## Basic function of a control valve

P1: Inlet/upstream pressure P2: Outlet/downstream pressure P3: Control chamber pressure

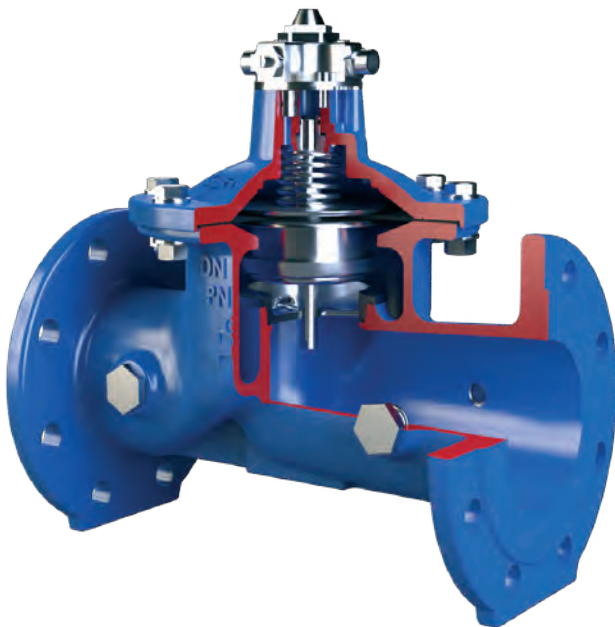
Pressure reducing control valve:



Pressure sustaining/relief control valve:



# AVK CONTROL VALVES DIAPHRAGM OPERATED



## The safe choice with 10-year warranty

AVK diaphragm operated control valves are designed according to EN 1074-5 and to provide network stability, accurate regulation, easy maintenance and long durability.

AVK control valves are available in DN 50-600, with reduced and with full bore. Control valves with reduced bore are appropriate for most applications, as the smaller bore often offers more accurate regulation. Control valves with full bore are recommended, if high Kv values are needed, e.g. in front of hydrants.

## High quality WRAS approved materials

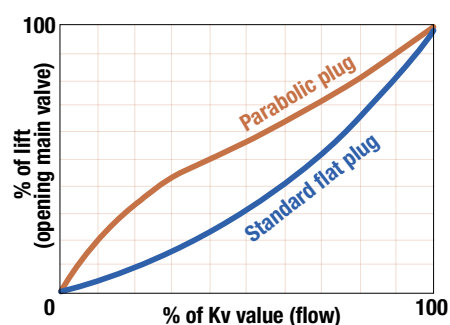
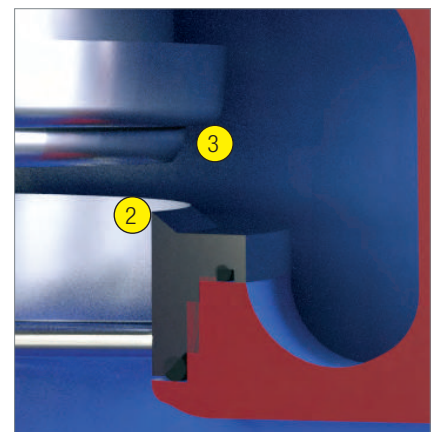
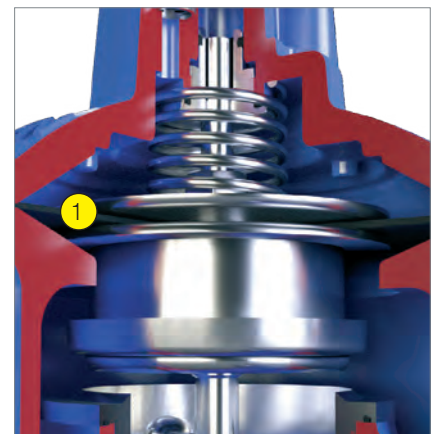
The body and bonnet are made of ductile iron with fusion bonded GSK approved epoxy coating.

The diaphragm is manufactured by AVK GUMMI and made of drinking water approved EPDM rubber with polyamide reinforcement.

All non-coated internals and externals metal parts are of stainless steel AISI 316 and all materials are WRAS approved.

## Design features of the valve

- Large diaphragm design (1) secures fast reaction to changes in pressure. Its asymmetric axial position gives less stress near closed position.
- Lifted seat design (2) prevents damage inside the valve body caused by cavitation.
- Parabolic plug design (3) provides precise regulation and stability at low flow. Furthermore, it reduces noise and vibration. See below characteristics, illustrating the performance compared to a standard flat plug design.



# PATENTED PILOT SYSTEM WITH UNIQUE FEATURES



Pressure reducing valve



Pressure sustaining/relief valve

## Modular pilot system

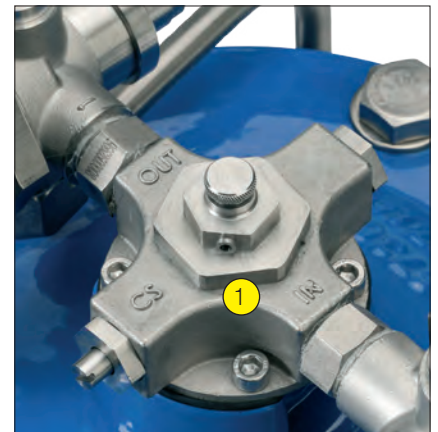
The modular design with interchangeable parts offers great flexibility as the pilot system is easily altered to fit other or multiple applications without replacing the valve. The pilot system consists of three main components:

- The distribution block (1) connects the pilot system to the main valve. As a unique feature, it offers adjustment of optimal regulation speed for full control, easily adjusted using standard tooling, and giving full control e.g. in situations, where water hammer may occur.
- The filter (2) features high capacity and easy maintenance. When using the optional flush valve it also offers easy access to cleaning, while the valve is in operation.
- The hydraulic control block (3) can be set up for different applications. It features easy hand adjustment of the balanced pilot valve which is capable of very precise settings.

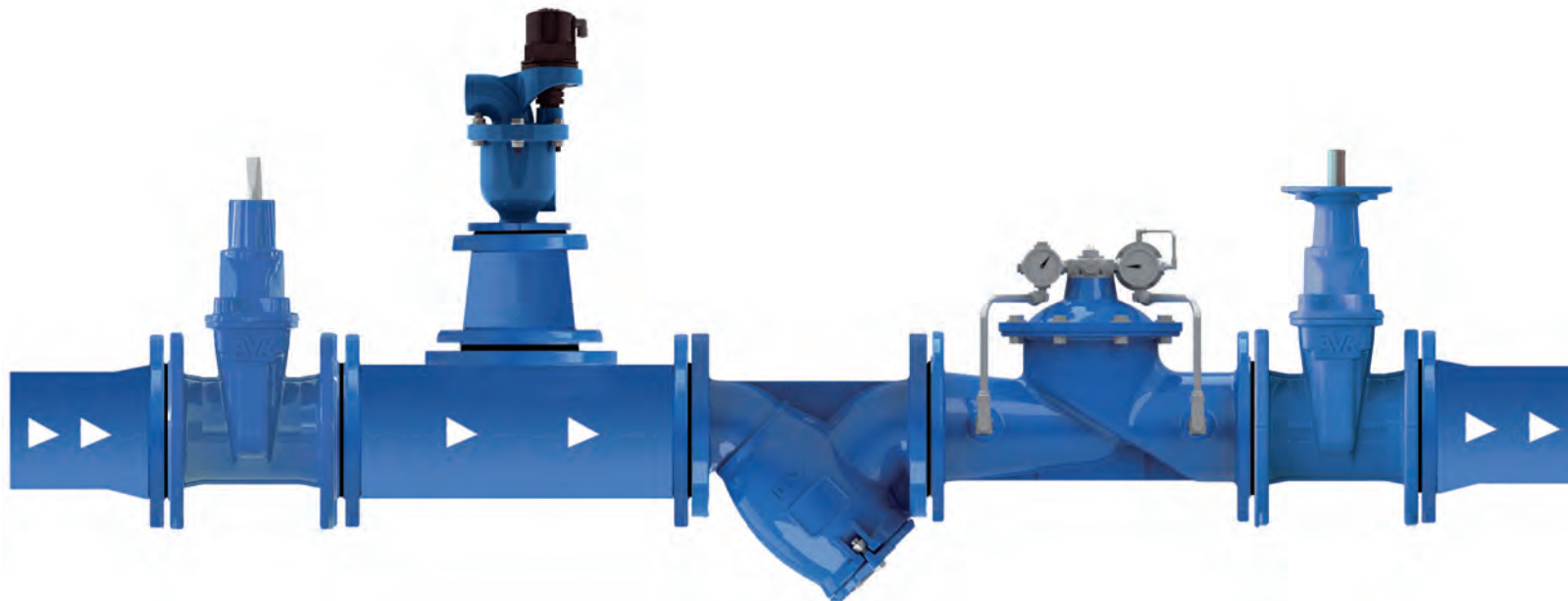
## Compact design

The external pipework takes up less space and is less vulnerable to damage during installation compared to many other control valves.

It is designed using components with standard threads offering easy sourcing of replacements as well as easy fitting using standard tools. All metal parts are of stainless steel AISI 316 as standard.



# PRODUCT SELECTION RECOMMENDATIONS



## Select the right control valve

The following conditions should be taken into consideration in order to select the right solution for your application:

- Working conditions
- Maximum flow
- Minimum flow
- Continuous flow
- Maximum inlet pressure
- Minimum inlet pressure
- Required outlet pressure
- Pipe size

AVK online sizing tool provides guidelines for the selection. Find it at [www.avkvalves.eu](http://www.avkvalves.eu), in the control valve section, under "insights".

## Strainers and isolating valves

It is highly recommended to install a protection strainer on the inlet side to filter out impurities that could damage the control valve. Isolating valves on each side of the control valve facilitate commissioning and maintenance.

AVK gate valves are available in a vast number of configurations. For isolating control valves, we recommend our standard flanged gate valve with short face-to-face length or the variant prepared for actuator.

Find in-depth information about AVK gate valves at [www.avkvalves.eu](http://www.avkvalves.eu) in the gate valve section, under "insights".

## Air valves

In many cases it is recommendable to install an air valve at the inlet of the control valve in order to avoid trapped air pockets in the system. Air pockets may cause increased energy consumption and operation costs, pressure loss and increased risk of water hammer.

AVK air valves are available in many variants. For control valve installations, we recommend our combination air valves of ductile iron or reinforced polyamide. Please refer to the datasheets found via product finder at [www.avkvalves.com.my](http://www.avkvalves.com.my).



859/000X-001  
Pressure reducing  
valve



859/001X-001  
Pressure sustaining/  
relief valve



910/21-001  
Y-strainer



21/36-001  
Flanged gate valve



21/38-001  
Flanged gate valve  
prepared for actuator



851/41-001  
Double orifice  
air valve



851/41-002  
Single orifice  
air valve

# VARIANTS AND CONFIGURATIONS



Pressure reducing, pressure sustaining/relief, and constant flow valves are part of our standard range. On request, we also offer control valve variants such as:

**Surge anticipation valve:** Automatically opens to relieve overpressure. It protects the pipe system against pressure surges, mainly happening at pump start-up or failures.

**Altitude valve:** Automatically controls the water levels in tanks or reservoirs using the water column as reference.

*One-way:* The altitude pilot senses the water level and opens to refill, once the level drops below set point.

*Two-way:* Like one-way, but furthermore, the valve opens for returning the flow in case the inlet pressure is lower than the tank/reservoir pressure.

**Float level valve:** Automatically controls the water levels in tanks or reservoirs using a remote ball float as pilot.

*Modulating:* The modulating float is remotely installed and controls the tank/reservoir level at a defined set point. The valve closes tightly at desired level and opens, if filling is needed.

*Non-modulating:* The non-modulating float keeps the valve closed until the tank/reservoir level reaches the minimum acceptable set point. Then the control valve opens fully to refill, until it reaches the maximum acceptable set point, and the valve closes.

**Solenoid control valve:** Automatically either closes or opens the main valve.

**Dual solenoid control valve:** Automatically controlled by electrical signals. The control valve offers full regulation of pressure, flow and level.

**Multi-function and solenoid override**  
Multi-function control valves, such as a combined pressure reducing and pressure sustaining control valve, are also part of the range. Furthermore, many of the variants are available with solenoid override, where an electric signal either closes or opens the main valve.

#### Optional configurations

AVK also offers accessories such as pressure gauges and position indicators as well as special configurations e.g. with PLC, electrical actuator, built-in anti-cavitation trim, lifting lugs and flush valve on the filter.

**Please contact AVK about these variants and configurations.**

#### AVK offers:

##### Pressure control valves

- Pressure reducing (standard)
- Pressure reducing with check valve
- Pressure reducing with isolating pilot
- Pressure sustaining/relief (standard)
- Surge anticipation

##### Level control valves

- One-way altitude
- Two-way altitude
- Float level (modulating)
- Float level (non-modulating)

##### Flow control valves

- Constant flow

##### Electronic control valves

- Solenoid control, open/close
- Dual solenoid control, regulating

##### Multi-function control valves

- Pressure reducing / pressure sustaining
- Float level (mod.) / pressure sustaining
- Float level (non-mod.) / pressure sustaining
- One-way altitude / pressure sustaining
- Pressure reducing / constant flow



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