

The sliding gate valve principle by Schubert & Salzer

This is how easy control can be. Over 25 years ago, Schubert & Salzer Control Systems took a new approach in control valves. We developed the sliding gate control valve: a handy, light and highly accurate valve. It operates based on a principle that had already excited Leonardo Da Vinci. Even today, it satisfies the most exacting requirements that are placed on a control valve.

The alternative when the demands are high

The sliding gate valve series controls liquid, vapour and gaseous media precisely, quickly and economically. A sealing plate (2) fixed in the body (1) at right angles to the flow direction has a certain number of crossways slots (3) of equal height. A rotationally fixed disc (4) with the same arrangement of slots is moved at right angles to this, thereby changing the flow cross section. The prevailing differential pressure presses the moving disc (4) against the fixed disc (2) and seals it.

Sliding gate valves are used to control gases, vapours and liquids

- Chemical and pharmaceutical industries
- Steel and aluminium plants
- Food and drinks industries
- Brewery fittings
- Textile manufacturing
- Car and truck tyre production
- Plastics production
- Test bench technology
- Polysilicon production
- etc.

fast

accurate

innovative



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pedidos@suministrosrado.com www.suministrosrado.com

Positioner

Pilot line

Diaphragm shell

Diaphragm disc

Coupling

Adjusting nut

Packing tube

Conical seal

Bellows

Column

Valve stem

Body cover (1)

Coupling ring

Moving disc (4)

Fixed disc (2)

Body (1)



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The advantages of sliding gate valves

Fits into tight spaces

Compact construction for minimum use of space and ease of installation

Variable K_{VS} values

A simple exchange of the operating unit is all that's needed to change the K_{VS} value at any time - Possible range of K_{VS} = 0.04 to 910

Excellent leak tightness

due to pressure from the media against the sealing disc, even as temperatures $> 200^{\circ}\text{C}$, using a surface seal instead of an annular seal

Extremely low leakage rate

$< 0.0001\%$ of the K_{VS} value due to the self-lapping action of the moving disc

Outstanding positioning ratio

40:1 to 80:1

Significantly reduced energy consumption

Short stroke requires very little actuation energy

Optimal flow control

Avoids cavitation problems in the valve and operates quietly by lowering turbulence

Easy to install and maintain

Thanks to the compact construction, the low weight (e.g. DN 150 with actuation a mere 14.2kg) and the clever seal disc design make light work of installation and maintenance

Minimal wear

Related to the effect of the force which is applied at 90° to the direction of flow and minimised by the highly effective pairing of the materials used for the moving and fixed discs

Maximum differential pressures

Using its unique compact design and low energy consumption, the GS valve gives accurate control of high differential pressures up to 160 bar



Size comparison between a normal seat valve and a Schubert & Salzer sliding gate valve.

In the example, the nominal size of both is identical.



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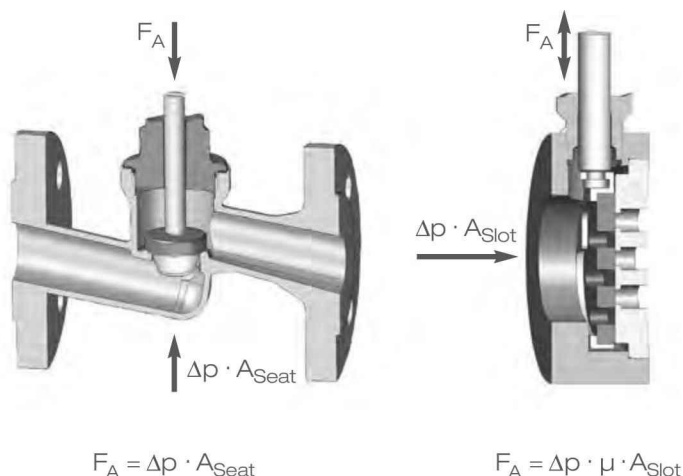
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$$\frac{F_{a, \text{Sliding gate valve}}}{F_{a, \text{Seat valve}}} = \frac{\Delta p \cdot \mu \cdot A_{\text{Slot}}}{\Delta p \cdot A_{\text{Seat}}} \approx 10\%$$



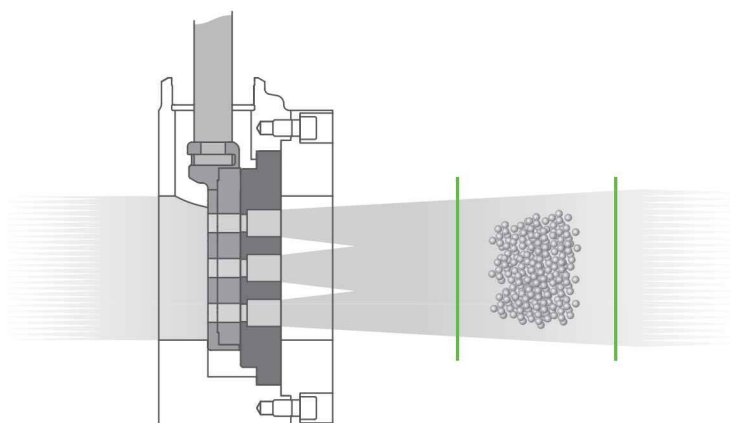
Efficiency

The outstanding feature of the sliding gate valve is the actuating force which is about just 10% of that needed to actuate a seat globe valve of the same nominal size and the same differential pressure. This permits the use of much smaller actuators even though both designs of the same nominal size have about the same flow rate!

This beneficial feature stems from the fact that, in the sliding gate valve, closure is transverse to the direction of flow and not against it, as with the seat globe unit.

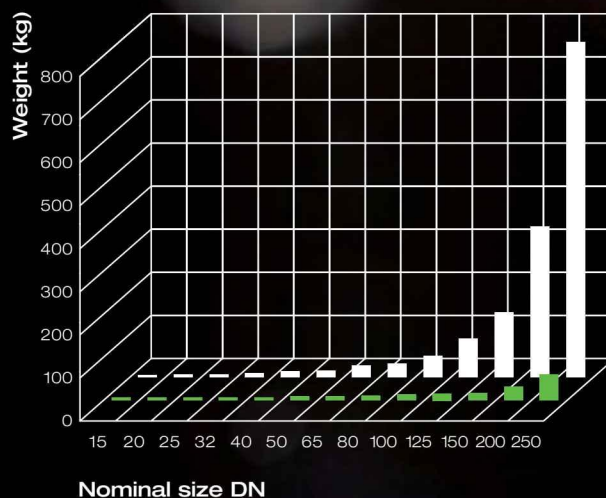
Cavitation

A high rate of flow through the narrowest cross section of a valve will lower the local pressure below the vapour pressure of the liquid. Vapour bubbles form which then break in the regions of higher pressure. When they come into contact with solid boundaries (valve body), the imploding bubbles can cause damage. In the case of a sliding gate valve, these dangerous cavitation zones are external, or more accurately, they are located about **1-2 m** beyond the valve. The cavitation bubbles then collapse around the centre of the pipeline where they can cause no harm.



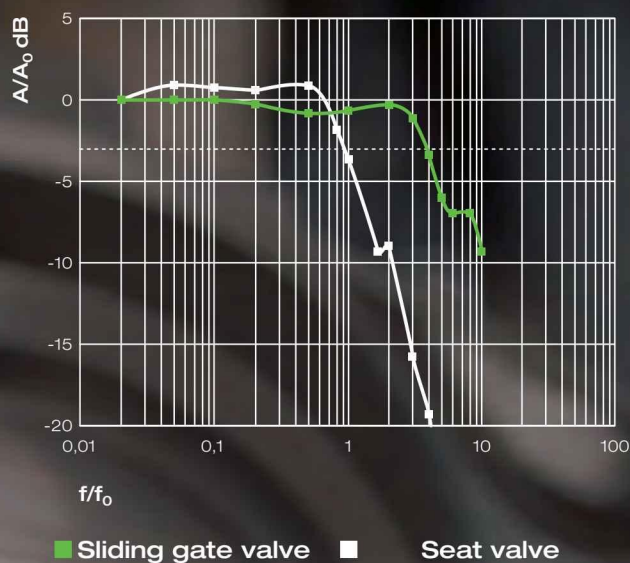
Weight

The low actuating force and short stroke allow the use of smaller actuation drives. Coupled with the space-saving by installing between flanges, weight and installation dimensions are minimised, particularly in the mid to large nominal sizes. This translates into about 150 kg for a seat globe valve, whereas a sliding gate valve of the same nominal size weighs a mere 14 kg!



Vitality

Sliding gate valves are significantly "faster" than conventional control valves. This can be shown using the frequency response when the set point value to an installed positioner is taken as the input value and the resulting stroke amplitude as the output value. The progression of the frequency response affects the standard of control of the entire control circuit.





Sliding gate control valve 8021

Nominal size: DN 15 - 250
 Nominal pressure: PN 10 - 100,
 ANSI # 150 - 600
 Media temperature: -60°C to +350°C,
 optional -196°C to +530°C
 Material: carbon steel, stainless steel,
 Hastelloy
 Positioner: pneumatic, analogue electro-
 pneumatic, digital electro-pneumatic,
 Ex-i version, AS-i bus connection



Sliding gate control valve 8020

Nominal size: DN 15 - 250
 Nominal pressure: PN 10 - 100,
 ANSI # 150 - 600
 Media temperature: -60°C to +350°C,
 optional -60°C to +530°C
 Material: carbon steel, stainless steel
 Obtainable with or without positioner
 Positioner: pneumatic,
 analogue electro-pneumatic,
 digital electro-pneumatic,
 Ex-Version
 Special versions available!



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Sliding gate motor valve 8230

Nominal size: DN 15 - 50
 Nominal pressure: PN 10 - 40,
 ANSI # 150 - 300
 Media temperature: -60°C to +350°C,
 optional -196°C to +530°C
 Material: carbon steel, stainless steel
 Actuation: On/off and control actuation,
 optional positioning control and
 position feedback plus limit switch



Sliding gate control valve 8043/44

Nominal size: DN 15 - 100
 Nominal pressure: PN 10 - 40,
 ANSI # 150 - 300
 Media temperature: -60°C to +350°C
 Material: carbon steel, stainless steel
 Positioner: pneumatic,
 analogue electro-pneumatic,
 digital electro-pneumatic,
 Ex-i version, AS-i bus connection



Sliding gate motor valve 8036

Nominal size: DN 15 - 250
 Nominal pressure: PN 10 - 100,
 ANSI # 150 - 600
 Media temperature: -60°C to +350°C
 Material: carbon steel, stainless steel
 Actuation: On/off and control actuation,
 optional positioning control and
 position feedback plus limit switch



Sliding gate pressure controller 8011

Nominal size: DN 15 - 150
 Nominal pressure: PN 10 - 40
 Media temperature: -60°C to +300°C
 Pressure ranges: 0.5 to 10 bar
 Material: Stainless steel
 Self-operated pressure controller
 Enclosed spring housing



Sliding gate motor valve 8037

Nominal size: DN 15 - 250
 Nominal pressure: PN 10 - 100,
 ANSI # 150 - 600
 Media temperature: -60°C to +350°C
 Power supply: 24 ... 230 V AC/DC
 (Multi-zone power pack)
 Explosion-protected (gas version):
 II 2G Ex de [ia] IIC T6/T5
 Protection class: IP 66
 Actuation optionally also with 3-point
 control + position electronics obtainable



Sliding gate stop valve 8040/41

Nominal size: DN 15 - 200
 Nominal pressure: PN 10 - 40
 Media temperature: -60°C to +350°C
 Control pressure: maximal 10 bar
 Material: carbon steel, stainless steel
 Accessories: metal bellows, pilot valve,
 limit switch, stroke limit



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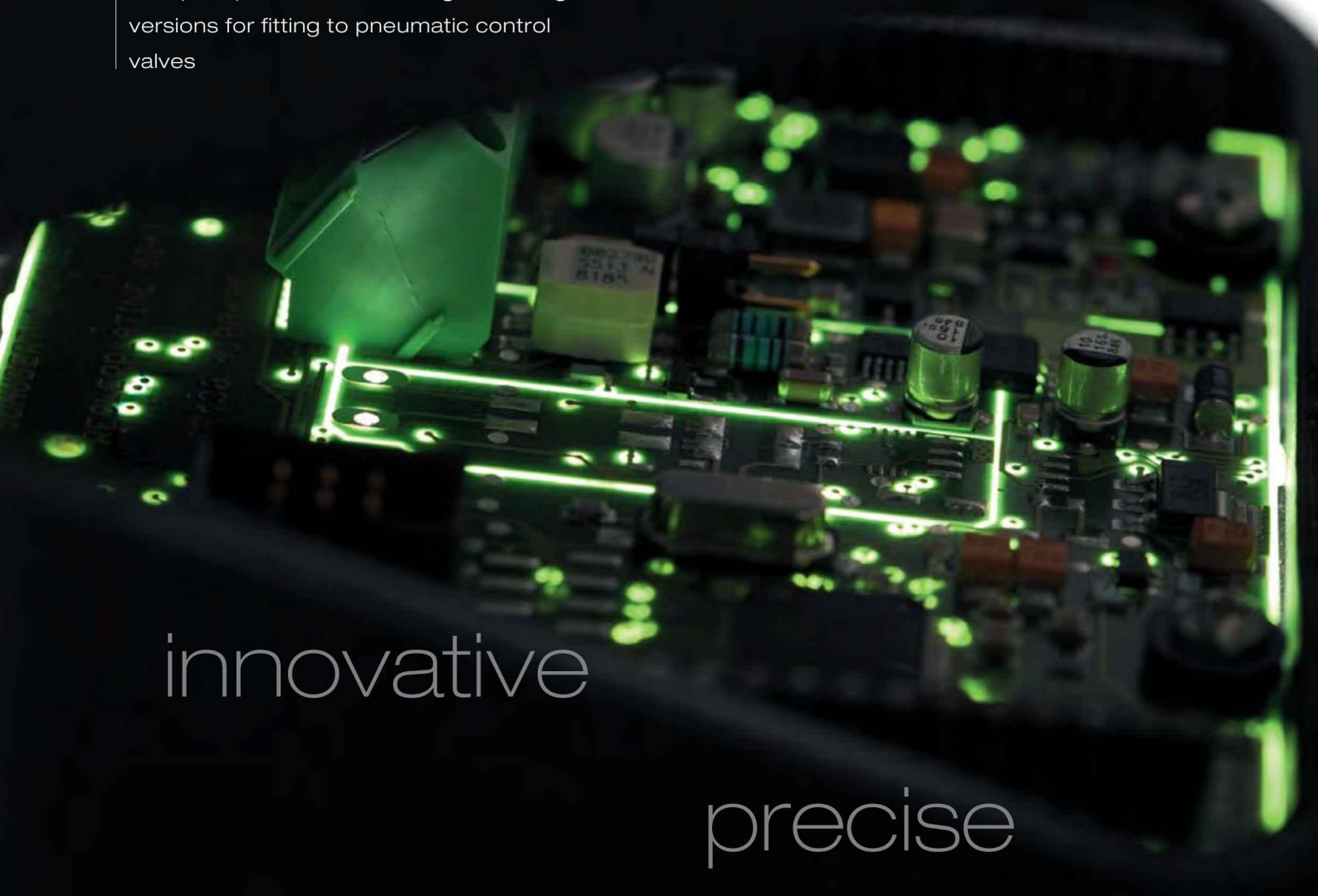


digital

Positioners by Schubert & Salzer

Compact positioners in analogue and digital
versions for fitting to pneumatic control
valves

- By incorporating the positioner into the valve actuation, no moving parts (stroke return) are accessible from the outside. This increases operating efficiency, eliminating the risk of accidents
- Compact dimensions, saving space when integrating into systems
- Suitable even for short strokes
- Visual display of position possible between positioner and valve actuation



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Digital Positioner 8049

Connections: G 1/8", NPT 1/8"
 Input signal: 0/4 - 20 mA,
 optional 0/2 - 10 V
 Adaptation to actuator:
 self-learning
 Stroke range: 3 - 28 mm
 Versions: 2- and 4-wire
 Configuration: via PC software
 Ambient temperature:
 -20°C to +75°C
 Also in ATEX version
 Optional feedback module available
 Version for rotational actuation
 available
 Accessories: Set point signal
 AS-i profile



Digital Positioner 8049 (Stainless steel)

Entirely in stainless steel
 Connections: G 1/8", NPT 1/8"
 Accessories: Set point signal
 AS-i profile
 Input signal: 0/4 - 20 mA,
 optional 0/2 - 10 V
 Adaptation to actuator:
 self-learning
 Stroke range: 3 - 28 mm
 Versions: 2- and 4-wire
 Configuration: via PC software
 Ambient temperature:
 -20°C to +75°C
 Also in ATEX version



Digital Positioner 8049 IPC

Positioner with
 process controller integrated
 Input signal: 0/4 - 20 mA,
 PT-100
 Sampling rate: ca. 50 ms
 Set point setting: external/internal
 Configuration: via PC software
 Ambient temperature:
 -20°C to +75°C



Positioner 8047 i/p

Input signal range:
 electro-pneumatic 0/4 - 20 mA
 Stroke range: 5 - 22 mm
 (depending on stroke return spring)
 Pilot energy: 3 - 6 bar
 Hysteresis: < +/- 1%
 Air consumption: 400 - 600 NI/h
 (depending on air supply)
 Also in ATEX version



Positioner 8047 p/p

Input signal range:
 pneumatic 0.2 - 1 bar
 Stroke range: 5 - 22 mm
 (depending on stroke return spring)
 Pilot energy: 3 - 6 bar
 Hysteresis: < +/- 1%
 Air consumption: 400 - 600 NI/h
 (depending on air supply)



System controller 2600

Freely programmable control and
 measuring device with 32 bit
 floating point signal processor
 Digital interfaces:
 8 digital outputs, 24 V SPC-comp.
 8 digital inputs, 24 V SPC-comp.
 Expandable with slot cards
 Power supply: 24 VDC, approx. 8 W



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