

Niezgodka GmbH

**Stainless steel self-actuating
pressure control valves**



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Niezgodka GmbH supply tailor-made solutions for various fields of industry, including industrial plant engineering and construction, oil and gas production, the foodstuffs and pharmaceuticals industries, ship operations technology and transport container construction.

Self-actuating pressure control valves are one of the specialities included in our wide range of products which we now take the opportunity of outlining.

Pressure-Reducing-Valves

Self-actuating pressure control valves serve to maintain an adjustable set-point pressure within certain levels in pipelines or vessels (tanks). They are self-actuating i.e. do not feature additional auxiliary energy, and are preferably used to control the pressure of fluids, gases and vapours in industrial, foodstuffs and pharmaceutical plants.

Self-actuating pressure control valves are the most uncomplicated and cheapest controllers available. The main advantage associated with this type of valve is that no additional auxiliary energy is necessary for moving the actuator, thus boosting the realisation of simple pressure control systems at relatively low cost.

Self-actuating pressure control valves are pure P-controllers (proportional controllers). In conjunction with a random controlled section, P-controllers always display permanent deviation from the preset reference value which is mainly determined by the size of the P-range (proportional range).

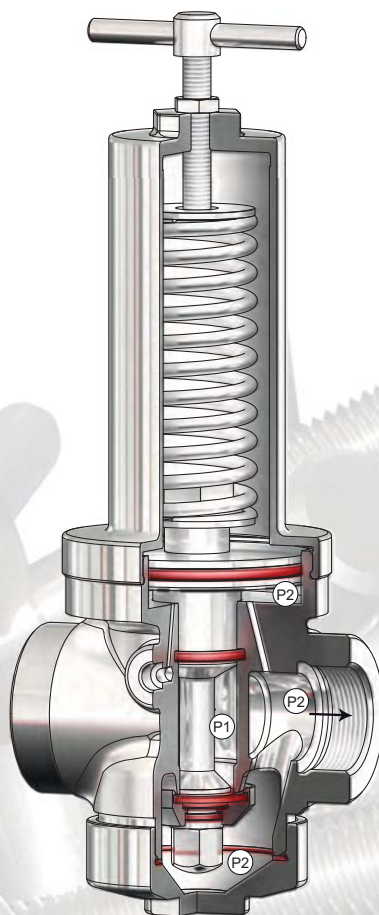
Self-actuating pressure control valves are primarily designed as pressure reducing valves and primary pressure controllers. These, however, are complemented by a range of differential pressure controllers and vacuum control valves.

Depending upon the pressure range of the control valves, either spring or air loaded membrane or piston controlled proportional controllers are used. Because of the larger membrane effective surface areas achievable, the membrane controlled proportional valves are employed for very small pressures (millibars), and the piston controlled valves at pressures ranging from several tenths of a bar up to 80 bars.

Pressure-Reducing-Valves types 70.2, 71.2, 74.2, 75.2 for industrial plants and types 70 series SKM, SKK, SKS, SKG, SMK and SMS for the foodstuffs and pharmaceutical industries are primary pressure-relieved proportional controllers and, depending on the minimum pressure range, either spring loaded or air loaded piston or membrane-controlled.

They are used to keep the outlet pressure P2 at a constant adjustable reference value with fluctuating primary pressures P1 and fluctuating flow volumes.

Nominal pressures	: PN 1.6 to PN 180
Connections	: G 1/8 to G 2 1/2 or DN 8 to DN 100
Process connections	: normal commercial thread, screw, clamp or flange connections
Materials	: 1.4301, 1.4571, 1.4404, 1.4435, as well as elastomer and thermo plastic element seals
Kvs values	: 0.63 to 53 m ³ /h
Minimum pressure range P2	: 0.005 bars to max. 80 bars
Flow mediums	: gases, steam and liquids

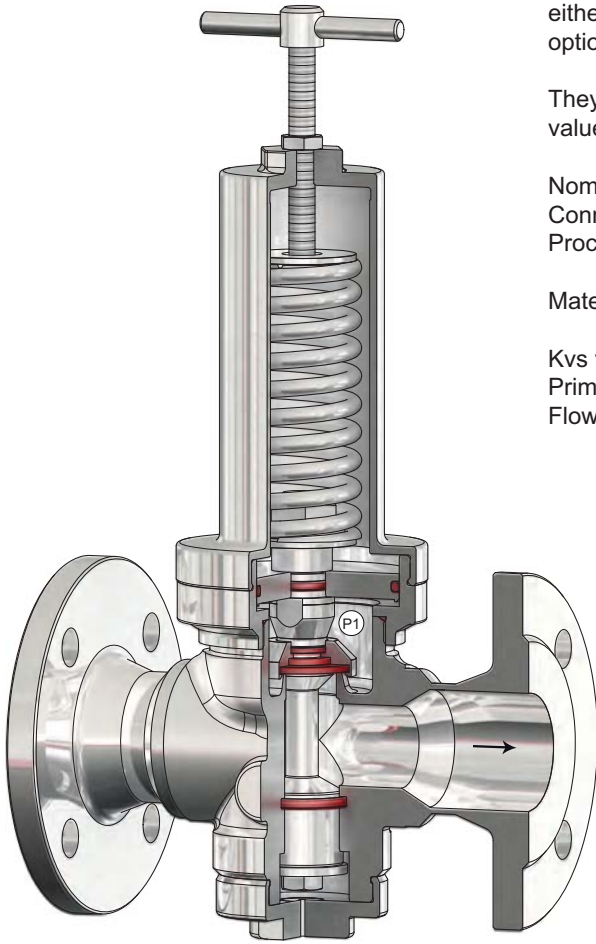


Initial-Pressure-Controller

Initial-Pressure-Controller of the types 80.2, 81.2, 84.2, 85.2 for industrial plant and type 80 of the series SKK, SKS, SMK and SMS for foodstuffs and pharmaceutical equipment are vac pressure relieved and depending on the primary pressure range either piston or membrane controlled proportional valves with spring load or optionally air load.

They are used to keep the outlet pressure P2 at a constant adjustable reference value with fluctuating primary pressures P1 and fluctuating flow volumes.

Nominal pressures	: PN 1.6 to PN 180
Connections	: G 1/4 to G 2 1/2 or DN 8 to DN 80
Process connections	: normal commercial thread, screw, clamp or flange connections
Materials	: 1.4301, 1.4571, 1.4404, 1.4435, as well as elastomer and thermo plastic element seals
Kvs values	: 1.2 to 28.5 m ³ /h
Primary pressure ranges P2	: 0.005 bars to max. 60 bars
Flow mediums	: gases, steam and liquids



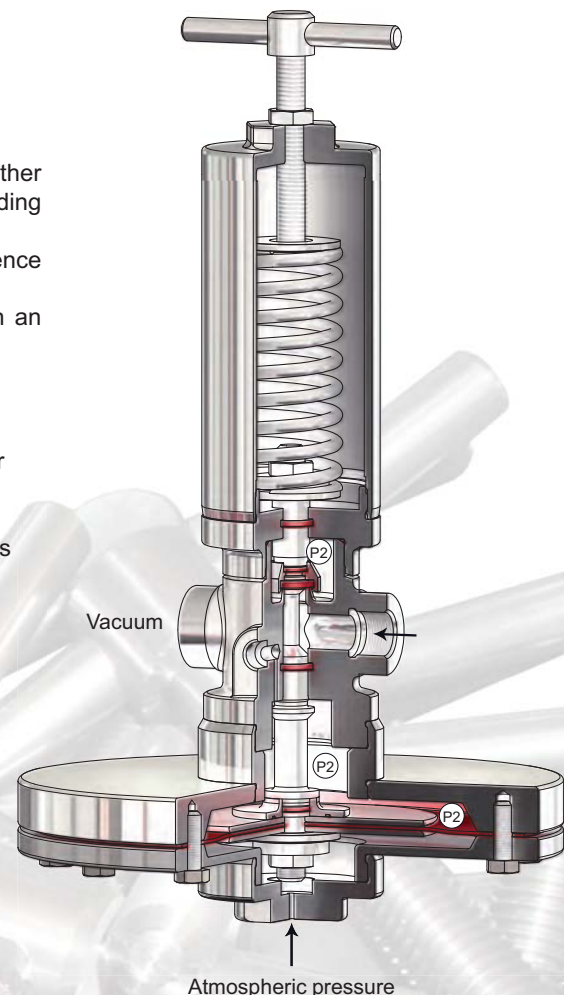
Vacuum-Control-Valves

Vacuum-Control-Valves for industrial, foodstuffs and pharmaceutical plant are either piston or membrane controlled proportional valves with spring loading, depending upon the vacuum range.

They are used to keep the vacuum pressure P2 at a constant adjustable reference value with fluctuating flow volumes.

Vacuum controllers are special design differential pressure control valves with an opening function.

Nominal pressures	: PN 1.6 to PN 16
Connections	: G 1/4 to G 2 1/2 or DN 10 to DN 80
Process connections	: normal commercial thread, screw, clamp or flange connections
Materials	: 1.4301, 1.4571, 1.4404, 1.4435, as well as elastomer and thermo-plastic element seals
Kvs values	: 1.2 to 28.5 m ³ /h
Primary pressure ranges P2	: -0.005 bars to -0.95 bars
Flow mediums	: gases, steam



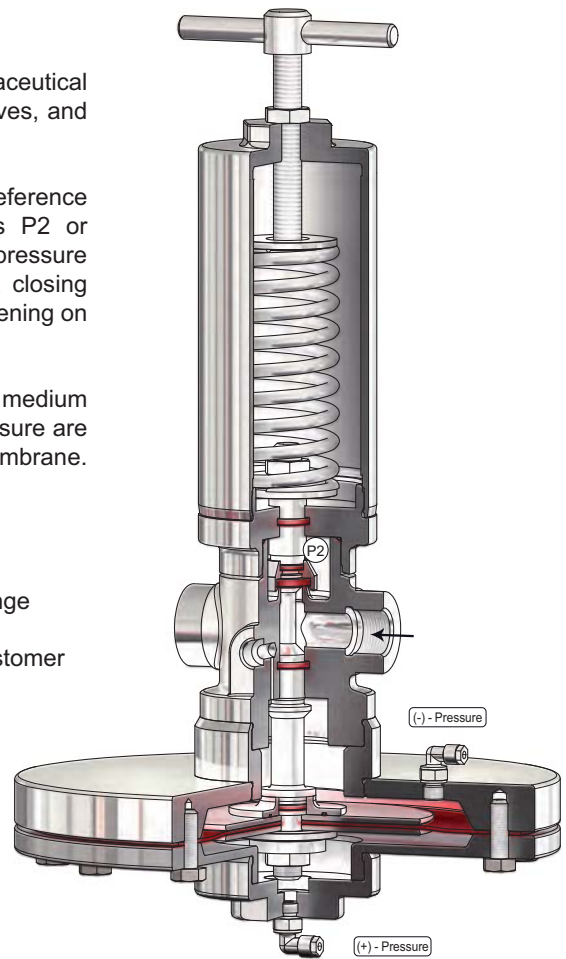
Differential pressure control valves

Differential pressure control valves for industrial, foodstuffs and pharmaceutical plants are fully relieved either piston or membrane control proportional valves, and spring loaded depending on the differential pressure range.

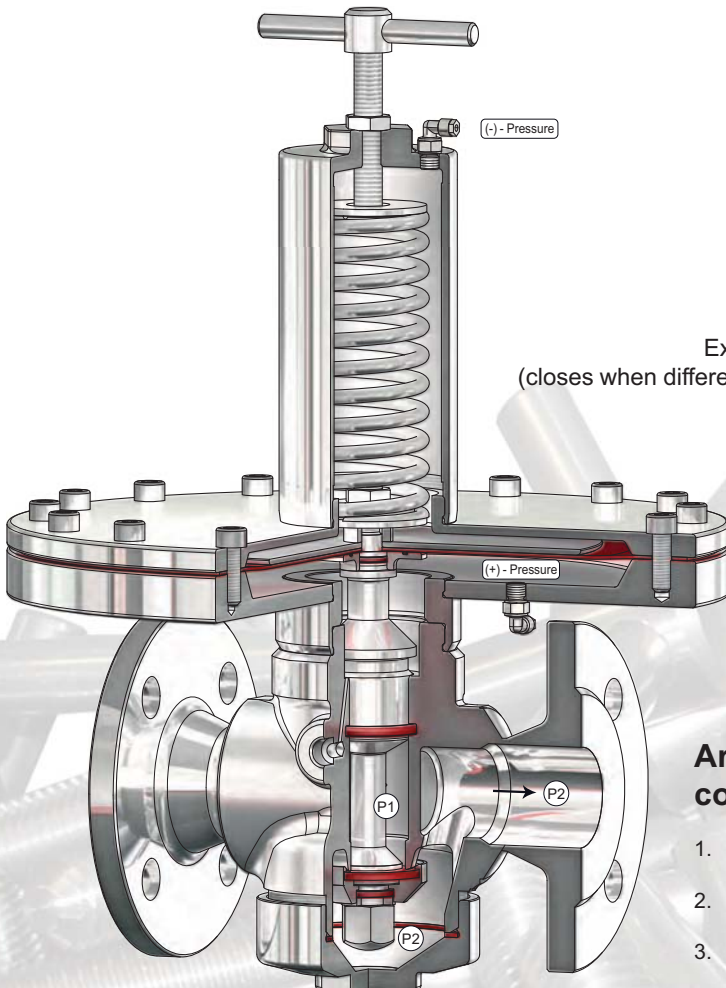
They are used to keep the differential pressure ΔP at a constant adjustable reference value at fluctuating primary pressures P_1 , fluctuating outlet pressures P_2 or fluctuating flow volumes. Differential pressure control valves are based on pressure reducing valve and primary pressure control valve design and feature a closing function (closing on increasing differential pressure) or opening function (opening on increasing differential pressure).

In this case, the piston plate or membrane area is sealed off from the flow medium and the spring hood made pressure tight. The (+) pressure and the (-) pressure are directed by means of screw connections to one side of the piston plate or membrane. The (-) pressure must always be connected to the spring side.

Nominal pressures	: PN 1.6 to PN 16
Connections	: G 1/4 to G 2 1/2 or DN 10 to DN 80
Process connections	: normal commercial thread, screw, clamp or flange connections
Materials	: 1.4301, 1.4571, 1.4404, 1.4435, as well as elastomer and thermo-plastic element seals
Kvs values	: 1.2 to 28.5 m ³ /h
Primary pressure ranges P2	: 0.005 bars to max. 8 bars
Flow mediums	: gases, vapours and fluids



Example:
(opens when differential pressure increases)



Example:
(closes when differential pressure increases)

Areas of application Differential pressure control valves:

1. Volume governor combined with a pressure transducer upstream to the valve.
2. Flow governor combined with a pressure transducer located at another part of the system.
3. Pressure controller for impulse reduction from another part of the system.

Controlling vessel (tank) pressure using self-actuating Pressure-Reducing-Valves

Keeping vessel pressure at a constant level is one of the most frequent technical tasks confronting the beverages industry. In spite of the effects of disturbances such as fluctuating primary pressures, filling or/and emptying of the tank, heating or cooling of the tank content, the pressure is maintained at a constant level within specified limits.

The simplest and cheapest method of controlling vessel pressures is to use self-actuating control valves. This involves using a pressure reducing valve to reduce the pressure of the medium in the pipeline (air, nitrogen, CO₂) to the desired pressure when emptying the vessel and a primary pressure control valve (overflow control valve, pressure maintenance valve) for discharging the gaseous medium when filling the vessel with fluid, and when the set pressure is exceeded. The pressure reducing valve simultaneously assumes the task of pre-tensioning the empty vessel.

The self-actuating pressure control valves (pressure reducing valves / primary pressure control valves) are supplied in appropriate designs to meet individual technical requirements.

They can, for example, be designed to be dampened for controlling tank pressures i.e. SIP or optionally ZIP compliant.

Vessel pressures can be selected appropriate to the setting ranges of the pressure reducing valves and primary pressure control valves from min. approx. 10 mbars to max. 80 bars.

Depending on the position of the pressure gauge, vessel head pressure control or outlet pressure control can be accomplished. Pressure control in the head of the tank is the most frequent approach and maintains the gas pressure at a constant level, regardless of content level.

The outlet pressure is kept constant at the vessel outlet point. The static pressure of the varying fluid column (full vessel / empty vessel) is registered and must be compensated by the gas pressure in the vessel head ($P_{\text{outlet}} = P_{\text{fluid}} + P_{\text{gas}} = \text{constant}$). Differences in content levels result in severe changes to the gas pressure in the vessel head. Vessel outlet pressure control is only possible through the use of external impulse pipes which register the vessel outlet pressure and feed it to the control piston area of the pressure-reducing valve and primary pressure control valve. Depending on hygiene requirements, the external impulse pipes can be directly attached to the pipeline, or the product pressure is converted by means of a 1:1 pressure transducer to a proportional air pressure (CIP design).

Additionally, the reference value settings for the vessel pressure on the pressure reducing valve (feed pressure) and on the primary pressure control valve (discharge pressure) are adjusted mechanically - either individually and separate from one another - or a pneumatic reference value is specified for both valves. The reference value of the primary pressure control valve is to be set higher than that of the pressure reducing valve by means of a pre-tensioning spring in the primary pressure control valve. The pneumatic reference value default is limited to pressures of max. 8 bars.

In controlling the pressure of the vessel, the reference value on the primary pressure control valve should be set higher than that of the pressure reducing valve to avoid medium loss, at a minimum by the amount of deviation expected on the pressure reducing valve. This is necessary since if the reference values are too close to one another the gas coming in through the pressure reducer will immediately flow out through the primary pressure control valve.

In the event that no great demands are made in respect of accuracy i.e. in the event of larger pressure differences between the minimum and maximum acceptable pressure levels, the primary pressure control valve can, if necessary, be replaced by a relief valve.



Representatives

Großbritannien & Irland
Flowstar (U.K) Ltd.
Web: www.flowstar.co.uk

Norwegen
Perlwitz Armaturen GmbH
Web: www.perlwitz.de

Schweden
Gustaf Fagerberg AB
Web: www.fagerberg.se

Finnland, Estland & Lettland
Oy Konwell AB
Web: www.konwell.fi

Slowenien
Armstrong Kobilsek D.O.O.
Web: www.armstrong-kobilsek.si

Tschechische Republik
Bickel & Wolf spol. s.r.o.
Web: www.bickelwolf.cz

Slowakei
Bickel & Wolf Bratislava s.r.o.
Web: www.bickelwolf.sk

GUS-States
EKS
EvropaKomplektServis GmbH
Web: www.ekoms.ru

Litauen
Lukrida UAB
Web: www.lukrida.lt

NL Armaturen

Geographical coordinates 53° 37' 29,76" N (northern latitude)
10° 09' 33,67" E (eastern longitude)

Niezugodka GmbH

Bargkoppelweg 73
D-22145 Hamburg

Phone: +49 (0) 40 679 469-0
Fax: +49 (0) 40 679 469-59

www.niezugodka.de
E-mail: ni@niezugodka.de