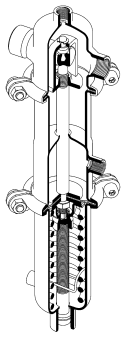
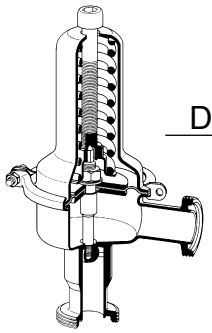
Pressure Reducing Valves for Steam



Small capacity, available in various capacities DM 505Z

all stainless steel SST 316 construction

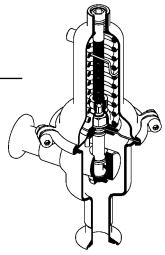
PN..... 250 DN..... 15 - 25
p_2..... 0.005 - 20 bar G..... 1/2
K_{VS}..... 0.15, 0.4 oder 0.9 m^3/h T..... 200 °C



DM 152 Hygienic applications, small capacity

virtually pocket-free, can be electropolished
all stainless steel SST 316 construction

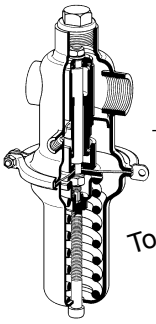
PN..... 16 DN..... 15 - 50
p_2..... 0.3 - 5 bar T..... 180 °C
K_{VS}..... 2 - 5.2 m^3/h



Hygienic applications, large capacity DM 462

virtually pocket-free, can be electropolished
all stainless steel SST 316 construction

PN..... 16 - 40 DN..... 25 - 50
p_2..... 0.3 - 5 bar T..... 180 °C
K_{VS}..... 4.4 - 50 m^3/h

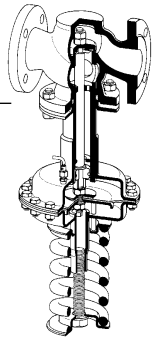


DM 652 Universal valve, normal to sterile steam

Top Seller

all stainless steel SST 316 construction

PN..... 16 - 40 DN..... 15 - 50
p_2..... 0.02 - 12 bar G..... 1/2 - 2
K_{VS}..... 4 - 18 m^3/h T..... 190 °C

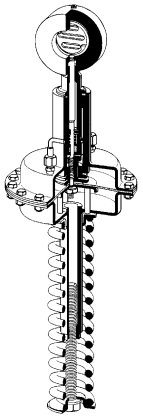


Standard valve, cast body DM 603

604

DM 604 up to 250 °C, DM 603 up to 350 °C
body grey cast iron, spheroidal cast iron, cast steel

PN..... 16 - 40 DN..... 15 - 150
p_2..... 0.02 - 10 bar T..... 250/350 °C
K_{VS}..... 4 - 160 m^3/h

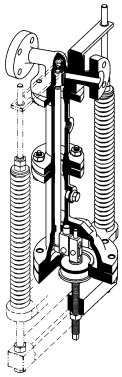


DM 307 High capacity, only for small pressure drops

308

sliding gate, sandwich design
DM 307 features open spring, DM 308 has a closed spring cap
body carbon steel, stainless steel

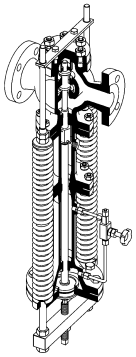
PN..... 10 - 40 DN..... 15 - 150
p_2..... 0.1 - 10 bar T..... 300 °C
K_{VS}..... 2 - 338 m^3/h



High pressure, small capacity DM 701

for high temperatures and high pressures
body GS-C 25, GS 17 CrMo 55

PN..... 16 - 315 DN..... 15 - 50
p_2..... 0.5 - 40 bar T..... 530 °C
K_{VS}..... 0.2 - 5.5 m^3/h



DM 401 High pressure, large capacity

double seat valve, as smoot blower with damping
body GS-C 25, GS 17 CrMo 55

PN..... 16 - 250 DN..... 25 - 250
p_2..... 1.5 - 40 bar T..... 530 °C
K_{VS}..... 6 - 360 m^3/h

Special versions on request. All the pressure has always been indicated as overpressure. We reserve the right to alter technical specifications without notice.

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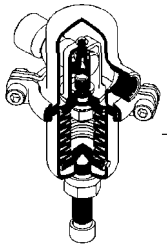
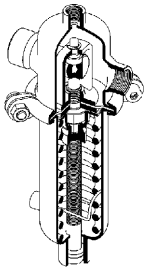
Pressure Reducing Valves for Liquids and Gases



DM 506 Small pressure reducing valve

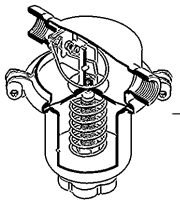
controls even smallest volumes
all stainless steel SST 316 construction
PN..... 315 G..... 1/4
p_2..... 0.3 - 20 bar T..... 130 °C
K_{vs}..... 0.15 m^3/h



Small capacity, available in various capacities DM 505

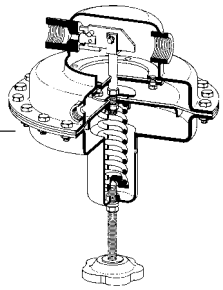
all CrNiMo-steel construction
PN..... 250 DN..... 15 - 25
p_2..... 0.005 - 20 bar G..... 1/2
K_{vs}..... 0.12, 0.4 oder 0.9 m^3/h T..... 130 °C

Top Seller



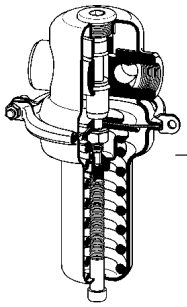
DM 765 Tank blanketing, small capacity

small economical millibar control valve
all stainless steel SST 316 construction
PN..... 16 G..... 1/2
p_2..... 0.03 - 0.8 bar T..... 130 °C
K_{vs}..... 0.2 m^3/h



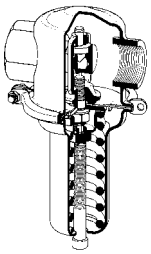
Tank blanketing, high precision DM 762

millibar control valve
all stainless steel SST 316 construction
PN..... 16 DN..... 15 - 50
p_2..... 0.002 - 0.52 bar G..... 1/2 - 2
K_{vs}..... 0.2 - 3.6 m^3/h T..... 130 °C



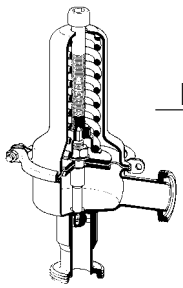
DM 662 Universal valve, medium capacity

all stainless steel SST 316 construction
PN..... 100 DN..... 15 - 25
p_2..... 0.02 - 12 bar G..... 1/2 - 1
K_{vs}..... 3.2 - 3.6 m^3/h T..... 130 °C



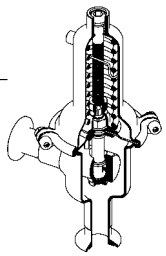
Standard valve, stainless steel and brass DM 502

especially recommended for CO_2
body stainless steel SST 316, internal components brass
PN..... 100 G..... 1/2 - 2
p_2..... 0.02 - 16 bar T..... 130 °C
K_{vs}..... 0.6 - 4.2 m^3/h



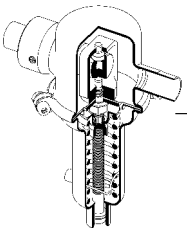
DM 152 Hygienic applications, large capacity

angled design, virtually pocket-free, can be electropolished
all stainless steel SST 316 construction
PN..... 16 DN..... 15 - 150
p_2..... 0.3 - 5 bar T..... 180 °C
K_{vs}..... 2 - 5.2 m^3/h



Hygienic application, large capacity DM 462

angled design, virtually pocket-free, can be electropolished
all stainless steel SST 316 construction
PN..... 16 - 40 DN..... 25 - 50
p_2..... 0.8 - 12 bar T..... 200 °C
K_{vs}..... 3.7 - 16 m^3/h



DM 505P Special valve for high purity media

virtually pocket-free, can be electropolished
all stainless steel SST 316 construction
PN..... 250 DN..... 15 - 50
p_2..... 0.005 - 12 bar T..... 130 °C
K_{vs}..... 0.1 - 3.6 m^3/h

Special versions on request. All the pressure has always been indicated as overpressure. We reserve the right to alter technical specifications without notice.

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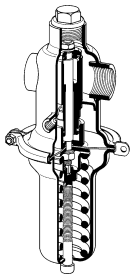
Pressure Reducing Valves for Liquids and Gases

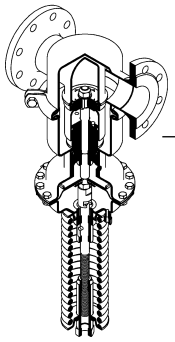


Universal valve, for all media — DM 652

for all applications
all stainless steel SST 316 construction

PN..... 16 - 40
p_2..... 0.02 - 12 bar
K_{VS}..... 4 - 18 m^3/h
DN..... 15 - 50
G..... 1/2 - 2
T..... 130 °C

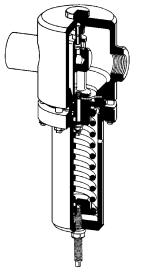
Top Seller



DM 664 High capacity

all stainless steel SST 316 construction

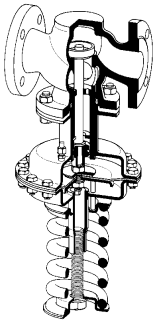
PN..... 16
p_2..... 0.02 - 8 bar
K_{VS}..... 32 - 100 m^3/h
DN..... 50 - 100
T..... 130 °C



High pressure, up to 315 bar inlet pressure — DM 510 bis 518

body carbon steel, stainless steel

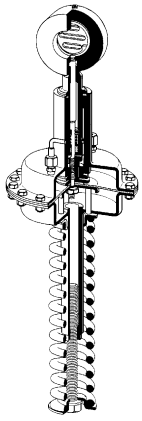
PN..... 16 - 315
p_2..... 0.005 - 160 bar
K_{VS}..... 0.2 - 5.5 m^3/h
DN..... 15 - 50
G..... 3/8 - 2
T..... 130/400 °C



DM 613 Standard valve, cast body

for all applications
body grey cast iron, spheroidal cast iron, cast steel

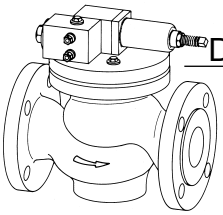
PN..... 16 - 40
p_2..... 0.02 - 10 bar
K_{VS}..... 4 - 160 m^3/h
DN..... 15 - 150
T..... 130 °C



High capacity, only for small pressure drops — DM 307 308

sliding gate, sandwich design
DM 307 features open spring, DM 308 has a open spring cap
body carbon steel, stainless steel

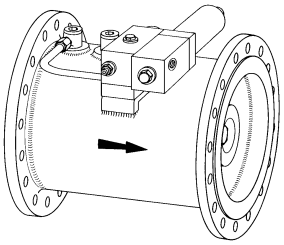
PN..... 10 - 40
p_2..... 0.1 - 10 bar
K_{VS}..... 2 - 338 m^3/h
DN..... 15 - 150
T..... 300 °C



DM 810 High capacity, for high pressures

pilot-controlled valve, cast body
body spheroidal cast iron, cast steel

PN..... 16 - 160
p_2..... 1 - 40 bar
K_{VS}..... 20 - 900 m^3/h
DN..... 40 - 400
T..... 130 °C



High capacity, inline valve — DM 814 815

pilot-controlled
body steel welded, stainless steel SST

PN..... 16 - 25
p_2..... 1 - 20 bar
K_{VS}..... 60 - 2100 m^3/h
DN..... 100 - 800
T..... 130 °C

Sheet no. DM/14.1.081.3 - issue 06.02.2008

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Know How • Pressure reducing valves

Pressure reducing valves reduce a high and frequently fluctuating pressure to an adjustable constant pressure downstream of the valve. A spring keeps the valve open and this closes as the outlet pressure rises.

Selecting valve type and nominal diameter

Using your maximum operating data and the smallest differential pressure Dp, you should calculate the characteristic performance figure K_v (see leaflet Calculation of Pressure Regulators). Select a valve whose K_{vs} value is 30% greater than the calculated K_v figure. Additional allowances must be made for high-viscosity liquids or liquids which vaporise when depressurised.

You should also note the reduction ratio i.e. inlet pressure p_1 divided by outlet pressure p_2. The inlet pressure acting on the cone causes the valve to open whereas the outlet pressure acting on the diaphragm/spring system causes it to close. If the reduction ratio calculated from the operating data is greater than the quoted ratio, the valve will not close.

Pressure reducing valves should not be overdimensioned. Their optimum working range is within 10% to 70% of their K_{vs} value.

Selecting rated pressure and valve material

The rated pressure must exceed the maximum system pressure, irrespective of safety allowances. Please note also the effect of the temperature (see DIN 2401).

Selecting the setting range

For good control accuracy you should select a setting range which places the required outlet pressure near its upper limit. If, for example, the controlled outlet pressure is to be 2.3 bar, you should select the 0.8 to 2.5 bar setting range, not 2 to 5 bar. If the available setting range is not wide enough you may go below the bottom limit of the setting range provided that the valve loading is kept low and a high control accuracy not required.

Selecting elastomer materials

You should select elastomers according to the operating temperature and the requirements of the medium. High-pressure gases, for example, can diffuse into the elastomer and cause damage when being depressurised.

Flow velocity

Depending on pressure drop and permitted maximum noise level, we recommend the following flow velocities:

Liquids	1	-	5	m/s
Saturated steam	10	-	40	m/s
Superheated steam	15	-	60	m/s
Gases up to 2 bar	2	-	10	m/s
Gases above 2 bar	5	-	40	m/s

Sense line (control line)

You should install a sense line if the selected pressure reducer is designed for sense line operation. The sense line should be connected at a distance of not less than 10 times nominal diameter downstream of the pressure reducing valve.

No isolating valves should be installed in the sense line to avoid an excessive pressure differential between valve body and diaphragm.

To attenuate any oscillations occurring in the pipeline system, the sense line may be fitted with a restrictor which must never be fully closed during operation.

In the case of steam and liquids the sense line must be installed so as to fall towards the valve. Under special operating conditions, for example intermittent operation with dry steam, an compensation vessel must be installed. The sense line must be rigid as elastic hoses can induce oscillations.

Protecting your system

To protect your system you should install a safety valve downstream of the pressure reducer to prevent the maximum permitted operating pressure (normally 1.5 x maximum set pressure) being exceeded. The safety valve operating pressure should be set approximately 40% above the maximum set pressure of the pressure reducer to avoid blow-off during slight pressure fluctuations. For example: if the pressure reducer setting range is 2 - 5 bar the safety valve operating pressure must be 1.4 x 5 bar = 7 bar.

Protecting the pressure reducing valve

To protect the pressure reducer against damage from solid particles carried in the pipeline, a strainer or filter should be fitted and serviced at regular intervals.

With steam as medium, the pressure reducer should be preceded by a water trap, which is also called steam dryer, to protect it from cavitation (see below chapter "Steam Operation").

Valve seat leakage

Pressure reducers are control valves which are not required to provide a leak-proof seal (VDI/VDE Guideline 2174). Normally pressure reducers leave the factory with perfectly leakproof valve seats. During operation, however, solid particles often cause damage and seat leakage. Any low leakage requirement must be expressly specified when ordering. Valve leakage can be considerably reduced by special measures such as lapping the valve seat, using special cone seals and increasing the control (diaphragm) surfaces.

Cut-off

For the purpose of installation, servicing and isolation of the valve, shut-off valves should be installed upstream and downstream of the pressure reducer. When closing the shut-off valves the upstream valve must always be closed first. A by-pass line may be necessary to maintain emergency operation.

Stellited seat and cone

In the case of abrasive media or liquids with pressure drops (inlet pressure minus outlet pressure) of more than 25 bar the valve cone must be stellited; for pressure drops above 150 bar the seat must be stellited as well.

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Know How • Pressure reducing valves

Pressure reducing valves reduce a high and frequently fluctuating pressure to an adjustable constant pressure downstream of the valve. A spring keeps the valve open and this closes as the outlet pressure rises

Leakage line
If toxic or hazardous media are used the valve must feature a sealed spring cap (including setting spindle seal) fitted with a leakage line connection. When the pressure reducer is installed on site a leakage line must be fitted capable of safely and pressureless draining the escaping medium in case the control valve should become defective.

Mounting position
For gases a pressure reducing valve can normally be fitted in horizontal pipelines with the spring cap at the bottom or at the top. Installation in vertical pipe runs is possible but can result in increased wear and loss of control accuracy owing to increased friction. In the case of liquids a pressure reducer should be installed with the spring cover at the bottom. Thus gas traps upstream of the valve are avoided which would cause the valve to oscillate. For steam a pressure reducer should likewise be installed with its spring cover at the bottom to protect the diaphragm against overheating by means of a layer of condensate.

Start-up
Pressure reducers should be started up and operated without pressure surges, if possible. A sudden operation of upstream or downstream valves should be avoided.

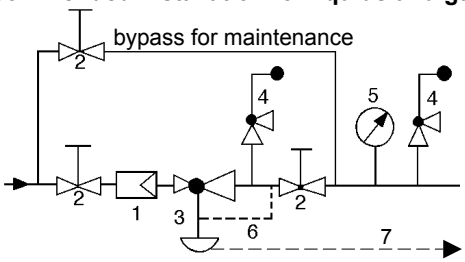
Steam operation
If a pressure reducer is installed in a steam plant the diaphragm water reservoir must be filled before the plant is started up. There must be no danger of overheating at the installation site caused by excessive ambient temperatures or insufficient heat dissipation. Pressure regulators must not be insolated. In some cases an insulating of the body is permitted, but only with cast bodies. Never insulate diaphragm housing, mid section and spring cap (or open springs). Overheating caused by insulating destroys the elastomere of the control unit.
Many steam generators send a lot of water through the piping together with the steam. Even an initial overheating can get lost through piping heat losses, so that the steam gets "wet". A piping speed of up to 25 m/s is normal for "dry steam", whilst wet steam already has the effect of a sandblasting machine at this speed, and the condensate and/or the water droplets eat holes into pipings and valve seats. In addition, water obstructs heat transition especially in heat exchangers. To avoid it, the water should be removed by a water trap, also called steam dryer, as quickly as possible and without steam losses.

Setting the pressure
Pressure reducing valves are normally supplied by us with a relaxed spring. This means that a valve is set at the factory to the minimum outlet pressure. The required pressure should be set under operating conditions.

Maintenance
Pressure reducers must be cleaned and serviced regularly.

Valves free of oil and grease or silicone
Please pay attention to order an fit only spares free of oil and grease resp. free of silicone.

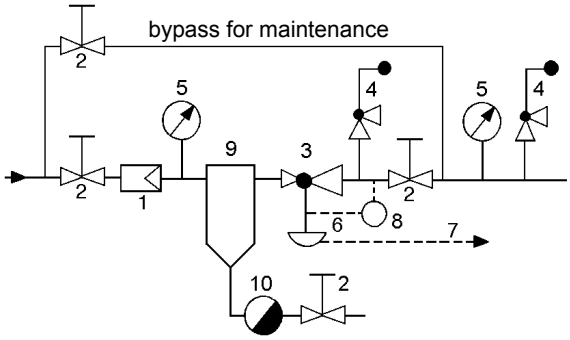
Recommended installation for liquids and gasses



1	Strainer or Filter	3	Pressure Reducer	6	Sense Line
2	Shutoff Valves	4	Safety Valves	7	Leakkage Line
		5	Pressure Gauge		

Sense line connection 10 - 20 x DN behind the valve

Recommended installation for steam



1	Strainer	5	Pressure Gauge	9	Water Trap (Steam Dryer)
2	Shutoff Valves	6	Sense Line	10	Steam Trap
3	Pressure Reducer	7	Leakage Line		
4	Safety Valves	8	Expansion Tank		

Sense line connection 10 - 20 x DN behind the valve

Please consult our engineer if extreme operating conditions apply or whenever you are in doubt.

Notes on Safety, Operating Instruction etc." MUST be followed.

Sheet no.: DM/13.1.081.2 - issue 21.02.2008

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Calculation of Pressure Regulators

Instruction

Designing and selecting pressure regulating valves is not a secret science mastered only by a handful of experts. The procedure described below allows the user to select a suitable valve for a particular application with relatively little effort. The calculations based on the so-called K_v value method have been considerably simplified compared with the very accurate calculations given in IEC 534; they produce, however, results which for our purposes are sufficiently accurate.

The K_v value is the flow coefficient which corresponds to a water flow rate -given in m³/h- at a differential pressure of 1 bar and a water temperature between 5 and 30 °C.

The American system uses the flow coefficient C_v which corresponds to a water flow rate -given in USgal/min- at a pressure difference of 1 psi and a water temperature of 60 °F. The relationship between K_v and C_v is: $K_v = 0.86 \times C_v$.

The Kvs value quoted in technical documentation is the K_v value at nominal valve lift for a specific series of valves. The K_{vs} value allows the maximum throughput to be calculated for a valve.

The methods of calculating the K_v value described here have been, as mentioned above, considerably simplified. Many factors have been excluded from the calculation. By treating steam as an ideal gas and excluding the specific volume, a maximum error of 5% may result which, however, in view of the allowances used, is acceptable.

The calculations are simple; a knowledge of basic arithmetic and finding roots is sufficient. Tables or diagrams are not absolutely necessary but can be helpful if available.

The operating pressures and setting ranges specified in our design examples are given as pressures above atmospheric [barg = bar], as is customary. The calculations, on the other hand, are based on absolute pressures [bara]. For instance, if an outlet pressure of 7 bar is specified an absolute pressure of 7 + 1 = 8 bara must be used in the calculation.

Flow rate and density should be specified for liquids in their operating state and for gases in their standard state (0°C, 1013 mbar).

Sheet no. A/2.1.041.1 - issue 26.04.2004

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Calculation of the K_V-value

To design or select a valve you should firstcalculate the K_v value from the operating data at which the valve is to operate

$$K_V = Q\sqrt{\frac{\rho}{1000 \cdot \Delta p}}$$

K_v	Flowe Coeffficient	m^3/h
Q	Volume Flow	m^3/h
ρ	Density	kg/m^3
p_1	Inlet Pressure (abs.)	bar
p_2	Outlet Pressure (abs.)	bar
Δp	Differential Pressure (p_1 - p_2)	bar

Example:

We are looking for a pressure reducing valve for 2-7 m^3/h of methanol having a density of 790 kg/m^3; the inlet pressure varies between 9 and 12 bar and the outlet pressure is to be maintained at 4 bar.

In our calculation we use the maximum flow rate and the minimum pressure drop

$$K_V = 7\sqrt{\frac{790}{1000 \cdot 5}} = 2.78 \ m^3/h$$

To the K_v - value calculated from the operating data we add an allowance of 30 % and thus obtain the minimum K_{vs} - value which the valve should have

K_{vs} value $\geq$ 1.3 x K_v value = 1.3 x 2.78 = 3.61 m^3/h

Additional allowances are required if evaporation occurs as the pressure drops, which is the case especially where the pressure drops are large and the temperatures high. The value of Δp to be used in the formula can be calculated. Frequently the data required for this calculation are, however, difficult to obtain. For the sake of simplicity we therefore recommend that a pressure difference should be used in the formula which does not exceed 0.6 times the absolute inlet pressure, i.e.

$\Delta p \leq 0.6 \times p_1$ [bara]

If this is not feasible we suggest that you contact us for advice; the same applies to other extreme operating conditions such as high-viscosity liquids, abrasive media as well as high pressures and temperatures.

Calculating the nominal diameter

To keep pressure drop and noise within acceptable limits, certain flow velocities in the pipelines should not be exceeded e.g.

- suction side of centrifugal pumps 2 m/s
- suction side of reziprocating pumps 1 m/s
- delivery side of pumps 5 m/s
- local drinking water supplies 1 m/s
- water or fuel trunk pipelines 3 m/s
- high-viscosity liquids 1 m/s

Pipeline diameter can be calculated as follows

$$d = 18.8\sqrt{\frac{Q}{w}}$$

d	Pipeline Diameter	mm
Q	Volume Flow	m^3/h
w	Flow Velocity	m/s

If in our Example we permit a maximum flow velocity of 2 m/s, the required pipeline diameter wil be

$$d = 18.8\sqrt{\frac{7}{2}} = 35.2 \text{ mm}$$

In this case we wouldselect a pipe of 40 mm nominal diameter (DN 40).

For a given pipeline diameter the flow velocity can be calculated as follows

$$w = 354\frac{Q}{d^2}$$

In our example the flow velocity for a DN 40 pipeline and a flow rate of 7 m^3/h would be

$$w = 354\frac{7}{40^2} = 1.55 \ m/s$$

For certain operating conditions a control valve may be selected whose nominal diameter is one or two sizes smaller than the nominal pipeline diameter; this applies especially to valves with sense line.

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Selecting a suitable valve

Our selection tables and data sheets contain all the technical data needed to select MANKENBERG valves.

The K_{vs} value of the selected valve should be equal to the calculated K_v value plus the required allowance. Most valves operate most efficiently within 10 to 70 % of their K_{vs} values; small non-balanced valves such as our pressure reducers DM 502, 505, 506, 510, 762 and 765, will operate satisfactorily even at minimum flow rates.

You should select a setting range which places the required control pressure at the top end. If, for instance, the pressure to be controlled is 2.3 bar, you should select the 0.8-2.5 bar range rather than the 2-5 bar range, as with the latter the control errors would be considerably greater. If in special cases the standard setting range is not wide enough, a lower setting range may be selected provided the valve operates at low capacity and the control accuracy is of minor importance. Under such conditions, for instance, a pressure reducer featuring a setting range of 0.8-2.5 bar may still operate satisfactorily at 0.5 bar.

You should select the materials in accordance with the operating requirements by using the material resistance table.

Let us return to our example:

Based on the operating data we had calculated a minimum K_{vs} value of 3.61 m³/h. According to our selection table several valve types meet this requirement. In view of the properties of the fluid to be handled we select pressure reducer DM 652, DN 25, K_{vs} value 6 m^3/h, setting range 2-5 bar, spring cap with leakage line connection. In its standard version this valve is manufactured from materials which are compatible with methanol. Additional features are high control accuracy, low weight, good surface quality and a price which is remarkably low for a stainless steel valve.

Here is another example:

We are looking for a overflow valve (back pressure regulator) capable of discharging 250 m³/h of drinking water into an open reservoir at a pressure of 10 bar.

First we calculate the K_V value corresponding to the operating data. Although the pressure drop (p_1 - p_2) is 10 bar, we shall use for our calculation a pressure drop of only

0.6 x p_1 [bara] = 6.6 bar

because of the evaporation which occurs across the valve Thus:

$$K_V = 250\sqrt{\frac{1000}{1000 \cdot 6.6}} = 97.3\ m^3/h$$

Hence the K_{VS} value of the valve should be at least

K_{VS} value = 1.3 x K_v value = 1.3 x 97.3 = 126.5 m³/h

We select the pilot operated overflow valve UV 824, DN 200, K_{vs} value 180 m³/h, setting range 4–12 bar, a relatively economical, lightweight and very accurate control valve made from steel or better stainless steel.

Let us give another example:

We are looking for a CIP pressure reducing valve capable of reducing the pressure of demineralized water from 2-4 bar to 0.7 bar at a rate of 1-3 l/min. The pipeline has a nominal diameter of 25 mm and Tri Clamp connection.

Based on the operating data we again calculate the K_v value as follows:

$$K_V = 0.003 \times 60\sqrt{\frac{1000}{1000 \cdot 1.3}} = 0.16\ m^3/h$$

Hence th K_{vs} valueof the valve should be at least

K_{VS} value = 1.3 x K_v value =1.3 x 0.16 = 0.21 m^3/h

We select the pressure reducer DM 152, DN 25, K_{vs} value 3.5 m^3/h, setting range 0.8-2.5 bar, an angled stainless steel valve which can be polished. We have selected this valve, although its K_{vs} value is relatively high and the required outlet pressure is outside the specified setting range, because extensive bench testing has shown that this valve is ideal for the above-mentioned operating conditions.

We have used this example to demonstrate that in special cases valves can be used outside the parameter ranges specified in the catalogue provided that the user has a good knowledge of the operating characteristics of the valve.

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Calculation of the K_V value

The selection of a valve first of all that the K_v value is determined from the operating data under which the valve is to operate.

For subcritical pressure drops, i.e. if

$$\Delta p < \frac{p_1}{2}$$

use formula

$$K_V = \frac{Q_N}{514}\sqrt{\frac{\rho_N(t_1+273)}{\Delta p \times p_2}}$$

or for supercritical pressure drops, i.e. if

$$\Delta p > \frac{p_1}{2}$$

use formula

$$K_V = \frac{Q_N}{257 \times p_1}\sqrt{\rho_N(t_1+273)}$$

K_v	Flow Coefficient	m^3/h
Q_N	Volume Flow	m^3/h
Q_1	Volume Flow Upstream of the Valve	m^3/h
Q_2	Volume Flow Downstream of the Valve	m^3/h
ρ_N	Density	kg/m^3
Δp	Differential Pressure(p_1 - p_2)	bar
p_1	Inlet Preessure	bar
p_2	Outlet Pressure (abs.)	bar
t_1	Temperature at Inlet	°C
t_2	Temperature at Outlet	°C
w_1	Velocity inside Pipeline before the Valve	m/s
w_2	Velocity inside Pipeline behind the Valve	m/s
d_1	Nominal Diameter before the Valve	mm
d_2	Nominal Diameter behind the Valve	mm

Example:

We are looking for a stainless steel pressure reducing valve for Q_N max. 1200 m³/h CO_2, operating temperature 20 °C, density 2 kg/m³, inlet pressure 10-12 bar above atmospheric, controlled outlet pressure 7 bar above atmospheric.

The pressure drop is subcritical, as

$$\Delta p < \frac{p_1}{2} \text{ namely } 3 < \frac{11}{2}$$

Hence

$$K_V = \frac{1200}{514}\sqrt{\frac{2(20+273)}{3\times 8}} = 11.54 \text{ m}^3/\text{h}$$

To the K_v value calculated from the operating data we add an allowance of 30 % and thus obtain the minimum K_v value which the valve to be selected should have.

K_{vs} value $\geq$ 1.3 K_v value = 1.3 x 11.54 = 15 m³/h

Calculating the Nominal Diameter

To keep pressure drop and noise within acceptable limits, certain flow velocities in the pipelines should not be exceeded.

- up to 10 mbar 2 m/s
- up to 100 mbar 4 m/s
- up to 1 bar 10 m/s
- up to 10 bar 20 m/s
- above 10 bar 40 m/s

If no values have been specified we recommend the following: These rough guidelines apply to pipe diameters from DN 80 up. For smaller diameters lower flow velocities should be used. To calculate the flow velocity we need the flow rate figure under operating conditions. This may be calculated as follows:

$$Q = \frac{Q_N(273+t)}{p \times 273}$$

Accordingly in our example the flow rates upstream and downstream of the valve are as follows:

$$Q_1 = \frac{1200(273+20)}{11\times 273} = 117{,}1 \text{m}^3/\text{h}$$

$$Q_2 = \frac{1200(273+20)}{8\times 273} = 161 \text{ m}^3/\text{h}$$

The pipeline diameter can be calculated as follows:

$$d = 18.8\sqrt{\frac{Q}{w}}$$

If in our example maximum flow velocities of 20 m/s upstream and 15 m/s downstream of the valve have been specified, the following pipeline diameters will be required

$$d_1 = 18.8\sqrt{\frac{117{,}1}{20}} = 45.5 \text{ mm}$$

$$d_2 = 18.8\sqrt{\frac{161}{15}} = 59.6 \text{ mm}$$

Consequently we would recommend a DN 50 pipeline upstream and a DN 65 pipeline downstream of the valve.

For a given nominal diameter the flow velocity can be calculated as follows

$$w = 354\frac{Q}{d^2}$$

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In our example we would thus obtain the following flow velocities

$$w_1 = 354 \frac{117.1}{50^2} = 16.6 \text{ m/s}$$

$$w_2 = 354 \frac{161}{65^2} = 13.5 \text{ m/s}$$

For certain operating conditions a control valve may be selected whose nominal diameter is one or two sizes smaller than the nominal pipeline diameter. Downstream of the valve the pipeline diameter may be increased by one or two sizes depending on the flow velocity; this applies especially to valves with sense line.

Selecting a suitable valve

Our selection tables and data sheets contain all the technical data needed to select MANKENBERG valves.

The K_{vs} value of the selected valve should be equal to the calculated K_v value plus the required allowance. Most valves operate most efficiently within 10 to 70 % of their K_{vs} values; small non-balanced valves such as our pressure reducers DM 502, 505, 506, 510, 762 and 765, will operate satisfactorily even at minimum flow rates.

You should select a setting range which places the required control pressure at the top end. If, for instance, the pressure to be controlled is 2.3 bar, you should select the 0.8-2.5 bar range rather than the 2-5 bar range, as with the latter the control errors would be considerably greater. If in special cases the standard setting range is not wide enough, a lower setting range may be selected provided the valve operates at low capacity and the control accuracy is of minor importance. Under such conditions, for instance, a pressure reducer featuring a setting range of 0.8-2.5 bar may still operate satisfactorily at 0.5 bar.

You should select the materials in accordance with the operating requirements by using the material resistance table.

If toxic or flammable fluids are to be handled a sealed spring cover – possibly with sealed setting screw - should be used and a leakage line connection (threaded connection at spring cover) provided so that any fluid leaking as a result of a defective control mechanism can be drained safely.

Let us return to our example:

Based on the operating data we had calculated a minimum K_{vs} value of 15 m^3/h. According to our selection table several valve types meet this requirement. We select pressure reducer DM 652, DN 50, K_{vs} value 18 m^3/h, setting range 4-8 bar. In its standard version this valve is manufactured from materials which are suitable for the application. Additional features are high control accuracy, low weight, good surface quality and a price which is remarkably low for a stainless steel valve.

Let us take another example:

We are looking for an overflow valve capable of discharging 2000 m³/h of 60°C warm air to atmosphere at 4 bar.

The pressure drop is supercritical because

$$\Delta p > \frac{p_1}{2} \quad \text{namely } 4 > \frac{5}{2}$$

Hence

$$K_V = \frac{2000}{257 \times 5} \sqrt{1.293 \times (60 + 273)} = 32.3 \text{ m}^3/\text{h}$$

To the K_v value calculated from the operating data we add an allowance of 30 % and thus obtain the minimum K_{vs} value which the valve should have.

K_{vs} value $\geq 1.3 \times K_v$ value = 1.3 x 32.3 = 42 m³/h

The flow rate under operating conditions is

$$Q_1 = \frac{2000(273 + 60)}{5 \times 273} = 488 \text{ m}^3/\text{h}$$

and accordingly, given a maximum permitted flow velocity of 20 m/s, the minimum pipeline diameter is

$$d_1 = 18.8 \sqrt{\frac{488}{20}} = 93 \text{ mm}$$

On the basis of the calculated data and taking into account the properties of the medium, we select the MANKENBERG overflow valve UV 4.1, DN 100, K_{vs} value 100 m^3/h, setting range 2-5 bar; a relatively economical and accurate valve very suitable for the application.

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Calculation of th K_V value

The selection of a valve requires first of all that the K_v value is determined from the operating data under which the valve is to operate.

As in most cases a table or diagram giving the specific volume of steam is not available, the formulae given below, which treat steam as an ideal gas, can be used to arrive at a sufficiently accurate result.

For subcritical pressure drops i.e. if

$$\Delta p < \frac{p_1}{2}$$

use formula

$$K_V = \frac{G}{461}\sqrt{\frac{t_1+273}{\Delta p \times p_2}}$$

or for supercritical pressure drops, i.e. if

$$\Delta p > \frac{p_1}{2}$$

use formula

$$K_V = \frac{G}{230 \times p_1}\sqrt{t_1+273}$$

The temperature of steam in its saturated state (saturated steam) may be roughly calculated using the formula

$$t_s \approx \sqrt[4]{p_1} \text{ x } 100$$

K_v	Flow Coeffizient	m^3/h
G	Mass Flow	kg/h
Q_1	Volume Flow Upstream of the Valve	m^3/h
Q_2	Volume Flow Downstream of the Valve	m^3/h
Δp	Differential Pressure (p_1 - p_2)	bar
p_1	Inlet Pressure (abs.)	bar
p_2	Outlet Pressure (abs.)	bar
t_1	Temperature at Inlet	°C
t_s	Temperature of Saturated Steam	°C
w_1	Velocity Inside of the Pipeline before the valve	m/s
w_2	Velocity Inside of the Pipeline behind the valve	m/s
d_1	Nominal Diameter before the Valve	mm
d_2	Nominal Diameter behind the Valve	mm

Example:

We are looking for a stainless steel pressure reducing valve capable of reducing the pressure of 1100 kg/h of saturated steam from 7 to 4 bar.

The pressure drop is subcritical because

$$\Delta p < \frac{p_1}{2} \text{ namely } 3 < \frac{8}{2}$$

As we do not know either the specific volume nor the temperature, we use the formula

$$K_V = \frac{G}{461}\sqrt{\frac{t_1+273}{\Delta p \times p_2}}$$

Having calculated the temperature

$$t_s \approx \sqrt[4]{p_1} \text{ x } 100 = \sqrt[4]{8} \text{ x } 100 = 168\ ^\circ C$$

we calculate

$$K_V = \frac{1100}{461}\sqrt{\frac{168+273}{3 \times 5}} = 12.9\ m^3/h$$

To the K_{vs} value calculated from the operating data we add an allowance of 30 % and thus obtain the minimum $K_{vs\ S}$ value which the valve to be selected should have

K_{vs} value $\geq$ 1.3 x K_v value = 1.3 x 12.9 = 16.8 m^3/h

Calculating the nominal diameter

To keep pressure drop and noise within acceptable limits, certain flow velocities in the pipelines should not be exceeded.

If no values have been specified we recommend the following:

- Exhaust steam 25 m/s
- Saturated steam 40 m/s
- Super heated steam 60 m/s

These rough guidelines apply to pipe diameters from DN 80 up. For smaller diameters lower flow velocities should be used.

As in most cases the specific volume is not known, we use the following sufficiently accurate formula to calculate the volume:

$$Q = \frac{G \times (t+273)}{p \times 219}$$

Accordingly in our example the flow rates upstream and downstream of the valve are as follows (not taking into account the temperature drop caused by the pressure drop):

$$Q_1 = \frac{1100(168+273)}{8 \times 219} = 277\ m^3/h$$

$$Q_2 = \frac{1100(168+273)}{5 \times 219} = 443\ m^3/h$$

Pipeline diameter can be calculated using following formula

$$d = 18.8\sqrt{\frac{Q}{w}}$$

If in our example a maximum flow velocity of 25 m/s has been specified, the required pipeline diameters will be as follows:

$$d_1 = 18.8\sqrt{\frac{277}{25}} = 63 \text{ mm}$$

$$d_2 = 18.8\sqrt{\frac{443}{25}} = 79 \text{ mm}$$

We would therefore recommend pipes DN 65 upstream and pipes DN 80 downstream of the valve.

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For a given nominal diameter the flow velocity can be calculated as follows:

$$w = 354 \frac{Q}{d^2}$$

In our example the flow velocities in the pipeline would be

$$w_1 = 354 \frac{277}{65^2} = 23 \text{ m/s}$$

$$w_2 = 354 \frac{443}{80^2} = 24 \text{ m/s}$$

For certain operating conditions a control valve may be selected whose nominal diameter is one or two sizes smaller than the nominal pipeline diameter. Downstream of the valve the pipeline diameter may be increased by one or two sizes depending on the flow velocity; this applies especially to valves designed for sense line operation.

Selecting a suitable valve

Our selection tables and data sheets contain all the technical data needed to select MANKENBERG valves.

The K_{vs} value of the selected valve should be equal to the calculated K_v value plus the required allowance. Most valves operate most efficiently within 10 to 70 % of their K_{vs} values; small non-balanced valves such as our pressure reducers DM 152, 505 and 701, will operate satisfactorily even at minimum flow rates.

You should select a setting range which places the required control pressure at the top end. If, for instance, the pressure to be controlled is 2.3 bar, you should select the 0.8-2.5 bar range rather than the 2-5 bar range, as with the latter the control errors would be considerably greater. If in special cases the standard setting range is not wide enough, a lower setting range may be selected provided the valve operates at low capacity and the control accuracy is of minor importance. Under such conditions, for instance, a pressure reducer featuring a setting range of 0.8-2.5 bar may still operate satisfactorily at 0.5 bar.

You should select the materials in accordance with the operating requirements by using the material resistance table.

Let us return to our example:

Based on the operating data we had calculated a minimum K_{vs} value of 16.8 m³/h. According to our selection table several valve types meet this requirement. We select pressure reducer type 652, DN 50, K_{vs} value 18 m³/h, setting range 2-5 bar. In its standard version this valve is manufactured from materials which are suitable for the application. Additional features are high control accuracy, low weight, good surface quality and a price which is remarkably low for a stainless steel valve.

Here is another example:

We are looking for a pressure reducing valve capable of reducing the pressure of 8 t/h of 460°C superheated steam from 100 bar to 20 bar for the purpose of soot blowing.

The pressure drop is supercritical because

$$\Delta p > \frac{p_1}{2} \text{ namely } 80 > \frac{101}{2}$$

As we do not know the specific volume at the moment, we calculate

$$K_V = \frac{8000}{230 \times 101} \sqrt{460 + 273} = 9.33 \text{ m}^3/\text{h}$$

To the K_v value calculated from the operating data we add an allowance of 30 % and thus obtain the minimum K_{vs}-value which the valve to be selected should have.

K_{vs} value $\geq$ 1.3 K_v value = 1.3 x 9.33 = 12.1 m³/h

Under operating conditions the volume flow rates are

$$Q_1 = \frac{8000(460 + 273)}{101 \times 219} = 265 \text{ m}^3/\text{h}$$

$$Q_2 = \frac{8000(460 + 273)}{21 \times 219} = 1275 \text{ m}^3/\text{h}$$

Pipeline diameter can be calculated using following formula:

$$d = 18.8 \sqrt{\frac{Q}{w}}$$

If in our example a maximum permitted flow velocity of 50 m/s has been specified, the required pipeline diameter will be as follows:

$$d_1 = 18.8 \sqrt{\frac{265}{50}} = 43.3 \text{ mm}$$

$$d_2 = 18.8 \sqrt{\frac{1275}{50}} = 94.5 \text{ mm}$$

Consequently we would recommend a DN 50 pipeline upstream and a DN 100 pipeline downstream of the valve.

Using the calculated data and taking into account the special operating conditions, we select the twin seat pressure reducer type 401 ZK, DN 50/80, K_{VS} value 16 m³/h, setting range 15-25 bar, complete with adjustable damper unit and stellited cones - a design which has proved reliable in many soot blowing systems.

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Selection • Pressure Reducing Valves

for Steam

PN	Outlet pressure bar	T °C	K_{VS}-Value m^3/h	Connection screwed	Connection flanged DN	*	SS	Notes	Type
16	0.3 - 5	180	2 - 5.2		15 - 50	*	•	CIP, SIP, elbow design, electropolished available	152
16	0.8 - 5	180	4,4 - 50		25 - 100	*	•	CIP, SIP, globe or elbow design, electropolished available	462
40	0.005 - 12	200	0.15 - 0.9	1/2	15 - 25	*	•	small flow rates, sterile applications	505Z
40	0.02 - 10	350	4 - 160		15 - 150			standard steam valve	603
40	0.02 - 10	250	4 - 160		15 - 150			the most economical steam valve	604
40	0.02 - 12	190	4 - 18	1/2 - 2	15 - 50	*	•	our most popular valve, can be used anywhere, also for clean steam	652
40	0.1 - 10	300	1.7 - 338		15 - 150	*		sandwich design, large flow rates at low pressure drops	307/308
100	0.5 - 10	280	32 - 1200		50 - 400			large flow rates, weight loaded, high accuracy	3 / 4
250	0.1 - 40	530	6 - 360		25 - 250			large flow rates, high temperatures, high pressures	401/402
315	0.5 - 40	530	0.2 - 5.5		15 - 50			small flow rates, high temperatures, high pressures	701

* other connections available • stainless steel deep drawn

for Liquids

PN	Outlet pressure bar	T °C	K_{VS}-Value m^3/h	Connection screwed	Connection flanged DN	*	SS	Notes	Type
16	2 - 0.52	130	0.2 - 3.6	1/2 - 2	15 - 50	*	•	low pressure regulator	762
16	0.03 - 0.8	130	0.2	1/2		*	•	low pressure regulator, laboratory application	765
16	0.3 - 5	180	2 - 5.2		15 - 50	*	•	CIP, SIP, elbow design, electropolished available	152
16	0.8 - 5	180	4.4 - 50		25 - 100	*	•	CIP, SIP, globe or elbow design, electropolished available	462
25	0.1 - 21	100	47 - 3205		50 - 600			for drinkingwater epoxy coated, pilot controlled	E2115
25	1 - 20	130	60 - 2100		100 - 800			large flow rate, inline-valve, pilot controlled	814/815
40	0.02 - 8	130	32 - 100		50 - 100	*	•	economical stainless steel valve	664
40	0.02 - 10	130	4 - 160		15 - 150			economical valve with cast body	613
40	0.02 - 12	130	4 - 18	1/2 - 2	15 - 50	*	•	our most popular valve, can be used anywhere	652
40	0.1 - 10	300	1.7 - 338		15 - 150			sandwich design, high flow rates at low pressure drops	307/308
40	4 - 10	130	20 - 50		50 - 100	*		for high purity applications	212P
100	0.02 - 12	130	3.2 - 3.6	1/2 - 1	15 - 25	*	•	if PRV 505 is too small and 652 too big	662
100	0.02 - 16	130	0.6 - 4.2	1/2 - 2		*	•	economic stainless steel valve, inner parts made of brass	502
100	0.02 - 12	130	0.15 - 3.6	1/2 - 2	15 - 50	*	•	for high purity applications	505P
100	0.5 - 10	280	32 - 1200		50 - 400			large flow rates, weight loaded, high accuracy	3 / 4
160	1 - 40	130	20 - 900		40 - 400	*	•	large flow rate, pilot controlled	810
250	0.005 - 20	130	0.15 - 0.9	1/2	15 - 25			for small flow rates, also for sterile applications	505
315	0.005 - 100	400	0.2 - 5.5	3/8 - 2	15 - 50	*		high pressure valves	510 - 518
315	0.3 - 20	130	0.15	1/4	15	*	•	for very small flow rates	506

* other connections available • stainless steel deep drawn

for Gases

PN	Outlet pressure bar	T °C	K_{VS}-Value m^3/h	Connection screwed	Connection flanged DN	*	SS	Notes	Type
16	0.002 - 3.00	130	0.2 - 3.6	1/2 - 2	15 - 50	*	•	low pressure regulator, tank blanketing	762
16	0.03 - 0.8	130	0.2	1/2		*	•	low pressure regulator, laboratory application	765
16	0.3 - 5	180	2 - 5.2		15 - 50	*	•	CIP, SIP, elbow design, electropolished available	152
16	0.8 - 5	180	4.4 - 50		25 - 100	*	•	CIP, SIP, globe or elbow design, electropolished available	462
25	1 - 20	130	60 - 2100		100 - 800			large flow rate, inline-valve, pilot controlled	814/815
40	0.02 - 8	130	32 - 100		50 - 100	*	•	economical stainless steel valve	664
40	0.02 - 10	130	4 - 160		15 - 150			economical valve with cast body	613
40	0.02 - 12	130	4 - 18	1/2 - 2	15 - 50	*	•	our most popular valve, can be used anywhere	652
40	0.1 - 10	300	1.7 - 338		15 - 150			sandwich design, high flow rates at low pressure drops	307/308
40	4 - 10	130	20 - 50		50 - 100	*		for high purity applications	212P
100	0.02 - 12	130	3.2 - 3.6	1/2 - 1	15 - 25	*	•	if PRV 505 is too small and 652 too big	662
100	0.02 - 16	130	0.6 - 4.2	1/2 - 2		*	•	economic stainless steel valve, inner parts made of brass	502
100	0.02 - 12	130	0.15 - 3.6	1/2 - 2	15 - 50	*	•	for high purity applications	505P
100	0.5 - 10	280	32 - 1200		50 - 400			large flow rates, weight loadd, high accuracy	3 / 4
160	1 - 40	130	20 - 900		40 - 400			large flow rates, pilot controlled	810
250	0.005 - 20	130	0.15 - 0.9	1/2	15 - 25	*	•	for small flow rates, also for sterile applications	505
315	0.005 - 100	400	0.2 - 5.5	3/8 - 2	15 - 50	*		high pressure valves	510 - 518
315	0.3 - 20	130	0.15	1/4	10 - 15	*	•	for very small flow rates	506

* other connections available • stainless steel deep drawn

Special designs on request. The pressure has always been indicated as overpressure.
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Sheet no. DM/11.1.063.1 - issue 12.09.2006

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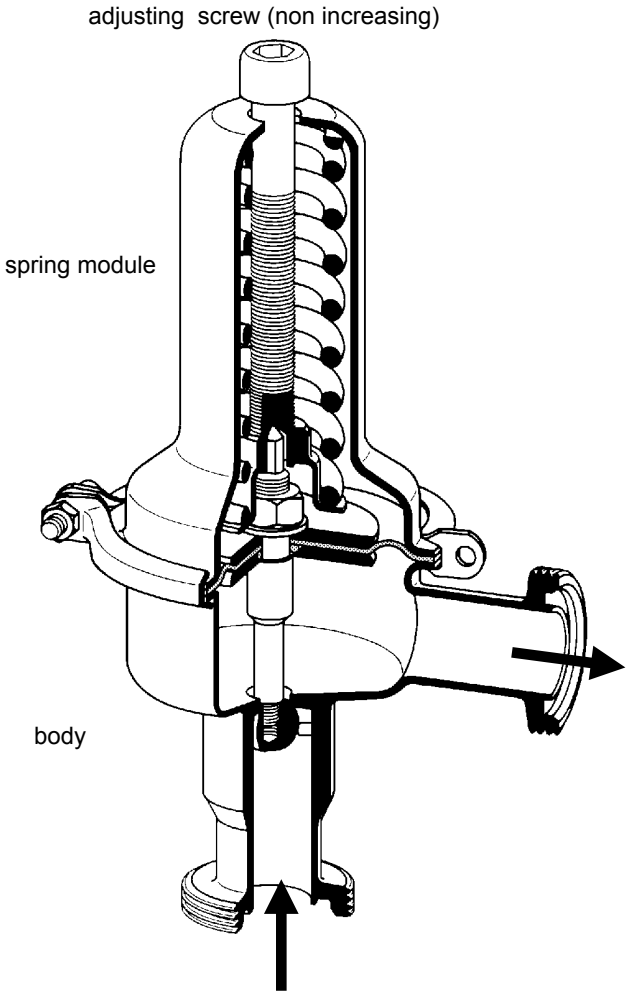
Pressure Control Valves DM 152

Pressure reducer for liquids and gases up to 130°C, steam up to 180 °C
CIP/SIP design for sanitary use

Technical Data

Connection	DN 15 - 50 clamps other connections on request
Nominal Pressure	PN 2.5 - 10 (see table below)
Inlet Pressure	up to 8 bar
Outlet Pressure	0.3 - 5 bar in 3 setting ranges
K_{VS}-Value	2 - 5.2 m³/h
Tightness	in acc. to VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{VS}-value)



Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 152 pressure reducing valve is a diaphragm-controlled spring-loaded proportional control valve which is primarily used for hygienic applications in the food processing and pharmaceutical industries. A PTFE protective foil renders the diaphragm physiologically safe and steamproof up to 180 °C. The valve does not require an external pilot line.

This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. It contains virtually no dead pockets and is suitable for use in CIP and SIP systems. The angled design allows complete draining.

The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance. Changing the control pressure setting does not affect the height of the valve (non increasing adjusting screw).

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

STANDARD EQUIPMENT

- All stainless steel construction
- Non increasing adjusting screw
- Quick-release body clamp ring
- Diaphragm protectd by PTFE foil

OPTIONS

- Polished version for food, pharmaceutical and superclean applications, surface roughness Ra ≤ 0.25 or 0.4 or 0.8 µm
- Metal diaphragm
- soft seal
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

K_{VS}-Values [m³/h]							
nom. diam.	DN	15	20	25	32	40	50
K_{VS}-value	m³/h	2	3	3.5	4	4.5	5.2

Setting Ranges [bar] and Nominal Pressure PN			
outlet press. bar	1 - 5	0.8 - 2.5	0.3 - 1.1
nom. diam.	15 - 50	15 - 50	15 - 50
PN	10/10	10/6	10/2.5

Operating instructions, Know How and Safety instructions must be observed.

All the pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

Sheet no. DM 152/2.1.071.1 - issue 07.06.2007

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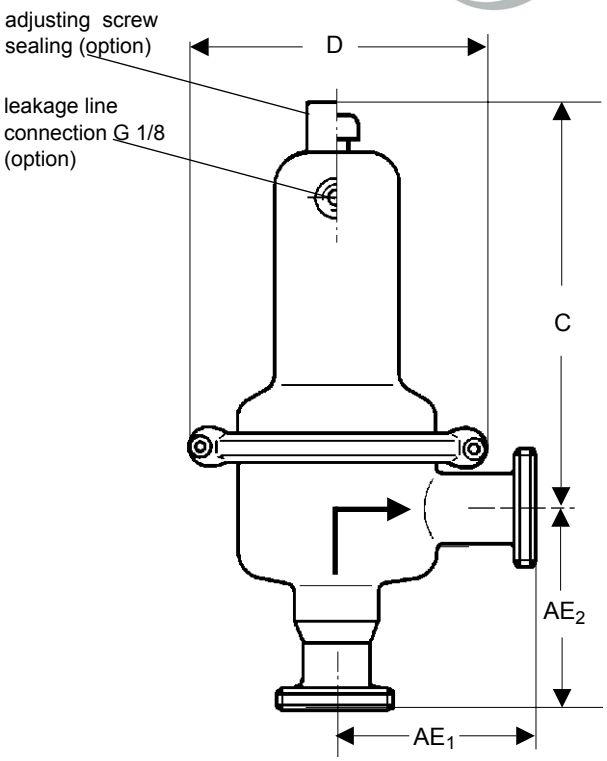
Pressure Control Valves DM 152

Pressure reducer for liquids and gases up to 130°C, steam up to 180 °C
CIP/SIP design for sanitary use

Materials	
Body, Bonnet, Internals	CrNiMo-steel
Spring	CrNi-steel
Valve Seal	CrNiMo-steel optional soft seal
Diaphragm	FPM
Protection Foil (for diaphragm)	PTFE



Dimensions [mm]							
pressure range [bar]	size	nominal diameter DN					
		15	20	25	32	40	50
0.8-2.5 2-5	AE_1	90	90	90	120	120	120
	AE_2	90 / 100 / 110 *		90	120	120	120
	C	200	200	200	200	200	200
	D	138	138	138	138	138	138

* size can vary according to type of connection, please inquire

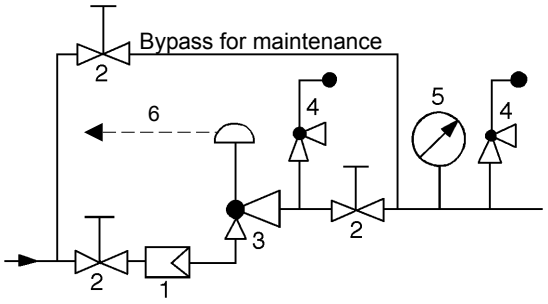
Dimensions [mm]							
pressure range [bar]	size	nominal diameter DN					
		15	20	25	32	40	50
0.3-1.1	AE_1	120	120	120	120	120	120
	AE_2	120 / 140 *		120	120	120	120
	C	200	200	200	200	200	200
	D	200	200	200	200	200	200

* size can vary according to type of connection please inquire

Weights [kg]						
pressure range	nominal diameter DN					
[bar]	15	20	25	32	40	50
0.8 - 2.5	2	2	2	2.5	2.5	3
1 - 5	2	2	2	2.5	2.5	3
0.3 - 1.1	3	3	3	3.5	3.5	4

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended installation



1 Strainer
2 Shutoff valves
3 Pressure reducer
4 Safety valve
5 Pressure gauge
6 Leakage line G 1/8 (option)

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Pressure Control Valves DM 307, 308

Pressure reducer sandwich design,
for liquids, gases and steam up to 300 °C

Technical Data

Connection	DN 15 - 150
Nominal Pressure	inlet PN 40
	outlet PN 1 - 16
Inlet Pressure	up to 40 bar
Outlet Pressure	0.1 - 10 bar
	in 6 setting ranges
K_{VS}-Value	1.7 - 338 m³/h
Tightness	acc. to VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)
Design	DM 307 with open spring,
	DM 308 with closed spring cap

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.
The DM 307 and DM 308 pressure reducing valves are spring-loaded proportional control valves for large volumes providing the following special features:

- space-saving installation between flanges
- low weight (especially for the large valve sizes)
- valve body geometry common to all pressure ranges PN 10-40
- high Kvs ratings
- low leakage
- low-noise operation

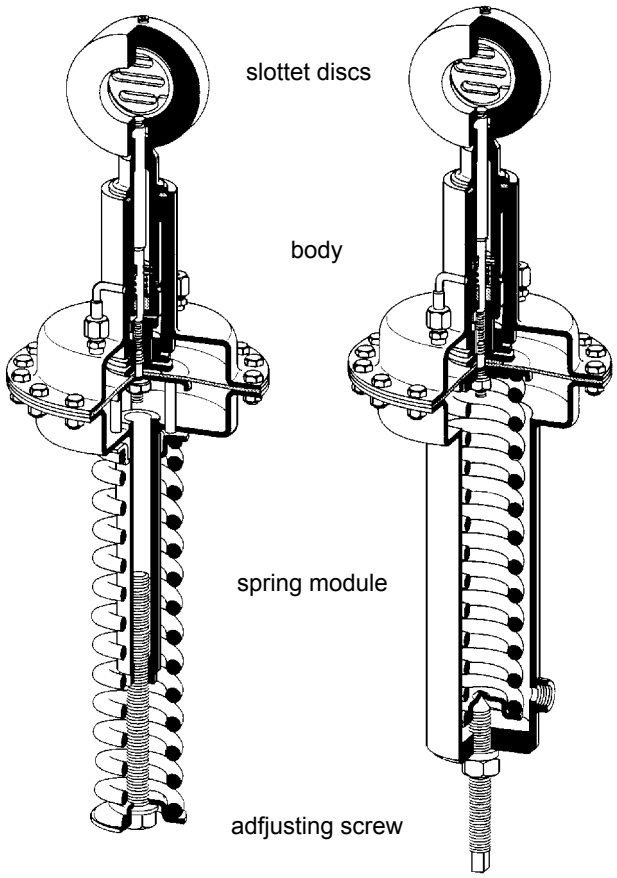
Two slotted discs which slide and seal against each other are operated by a medium-controlled spring-loaded diaphragm drive mechanism. When the system is depressurised the valve spring keeps the slots in “open” position. As the pressure rises the fluid flows from the inlet side through the slots and acts on the diaphragm/spring mechanism from the outlet side (outlet pressure) via the pilot line. The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the slots narrow and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.
The pressure reducers DM 307 and DM 308 require a pilot line (to be installed on-site).
We recommend that the pilot line be fitted with an expansion tank.

OPTIONS

- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

DM 307 **DM 308**



K_{VS}-values [m³/h] and max.ΔP [bar]							
nom. diam.	DN	15	20	25	32	40	50
Kvs-value	m³/h	4 (1.7)	6,4	11 (4)	16	26 (11)	45 (20)
max.ΔP	bar	40	40	32	40	35	20

lower Kvs-values price supplement

K_{VS}-values [m³/h] and max.ΔP [bar]						
nom. diam.	DN	65	80	100	125	150
Kvs-value	m³/h	52	92 (40)	154 (62)	237 (95)	338
max. ΔP	bar	15	9	6	4	3

lower Kvs-values price supplement

Setting Ranges [bar], Nominal Pressure PN					
0.1 - 0.3	0.2 - 0.6	0.5 - 1.2	1 - 2.5	2 - 5	4 - 10
PN 40/1	PN 40/1	PN 40/2.5	PN 40/6	PN 40/10	PN 40/16

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Pressure Control Valves DM 307, 308

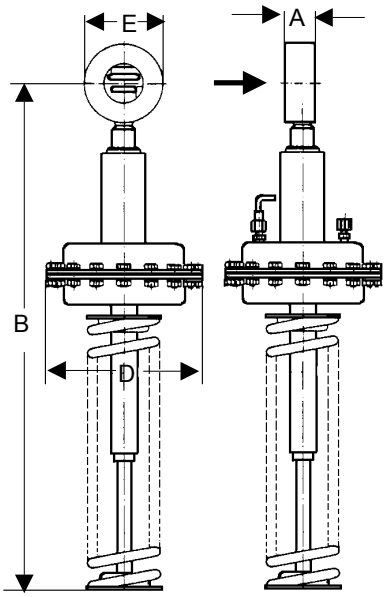
Pressure reducer sandwich design,
for liquids, gases and steam up to 300 °C

Materials			
Design	standard	medium wetted CrNiMo-steel	completely CrNiMo-steel
Body	C-steel	CrNiMo-steel	CrNiMo-steel
Diaphragm Housing	C-steel	CrNiMo-steel	CrNiMo-steel
Bonnet	C-steel	C-steel	CrNiMo-steel
Spring	spring steel C	spring steel C	CrNiMo-steel
Plates (valve seal)	CrNiMo-steel, special carbon material, metallic impregnation		
Diaphragm	CR optional FPM, EPDM or PTFE		

Dimensions [mm]

pressure range [bar]	size	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150
all ranges	øE	53	62	72	82	92	108	127	142	164	194	219
	A	33	33	33	33	33	43	46	46	52	56	56
0.1 - 0.3	B*	550	555	560	680	685	695	705	715	725	740	755
	D	360	360	360	500	500	500	500	500	500	500	500
0.2 - 0.6	B*	550	555	560	680	685	695	705	715	725	740	755
	D	270	270	270	360	360	360	360	360	360	360	360
0.5 - 1.2	B*	550	555	560	680	685	695	705	715	725	740	755
	D	220	220	220	270	270	270	270	270	270	270	270
1.0 - 2.5	B*	530	535	540	680	685	695	705	715	725	740	755
2 - 5 / 4 - 10	D	175	175	175	220	220	220	220	220	220	220	220

*max. size with stressless spring
DM 308 (closd spring cap) size C + 200 mm

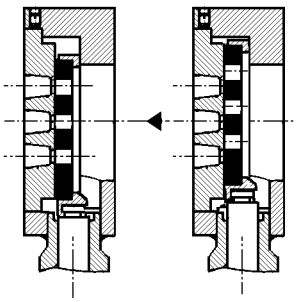


D = diaphragm ø
control line connection ø 8/6 Ermeto

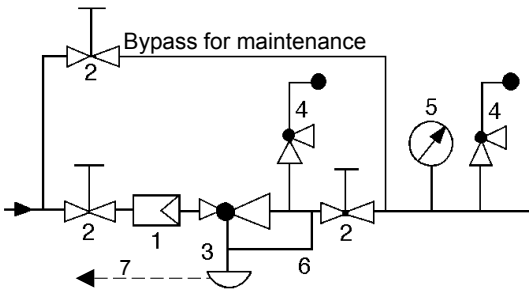
Weights [kg]

pressure range [bar]	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150
0.1 - 0.3	19.7	19.8	19.9	23	23.1	24.2	24.7	25.4	25.6	28.4	30.4
0.2 - 0.6	16.7	16.8	16.9	22	22.1	23.2	23.7	24.4	24.6	27.4	29.4
0.5 - 1.2	23.7	23.8	13.9	19	19.1	20.2	20.7	21.4	22.6	24.4	26.4
1.0 - 10	12.7	12.8	12.9	16	16.1	17.2	17.7	18.4	19.6	21.4	23.4

valve closing principle



Recommended Installation



1 Strainer
2 Shutoff valves
3 Pressure reducer
4 Safety valve
5 Pressure gauge
6 Sense Line ø 8/6 Ermeto
7 Leakage line (option)

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Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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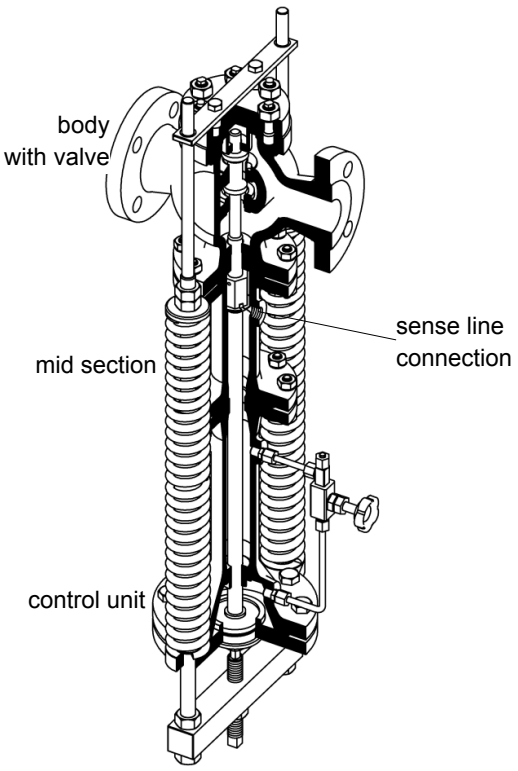
Pressure reducing valve for steam
up to 530 °C

Technical Data

Connection	DN 25 - 250
Nominal Pressure	up to PN 250/100
Inlet Pressure	up to 160 bar
Outlet Pressure	1,5 - 32 bar in several ranges
K_{VS}-value	6 - 360 m^3/h
Tightness	acc. to VDI/VDE-guideline 2174 (leakage rate ≤ 0.5% of K_{VS}-value)



Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 401 pressure reducing valve is a diaphragm or piston-controlled spring-loaded proportional control valve with pressure relief for large flow rates at low pressure drops. The valve cone is fitted with a metallic seal.

The outlet pressure to be controlled is balanced across the controlunit by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

The DM 401 pressure reducer requires a pilot line (to be installed on-site).

STANDARD

- Open spring
- Pilot line connection

OPTIONEN

- Mid section for higher temperatures (400 - 530 °C)
- Hydraulic damping
- Enlarged outlet
- Cone stellited for pressure drops > 25 bar
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]						
DN	25	32	40	50	65	80
m^3/h	6	11	16	25	42	65

K_{VS}-values [m^3/h]					
DN	100	125	150	200	250
m^3/h	80	120	170	230	360

Sheet no. DM 603/2.1.061.1 - issue 25.09.2006

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Pressure reducing valve for steam
up to 530 °C

Materials DM 401 PN 16	
Temperature	300°C
Body	cast iron
Bottom Part	cast iron
Spring	spring steel C
Internals	on request
Diaphragm	CR

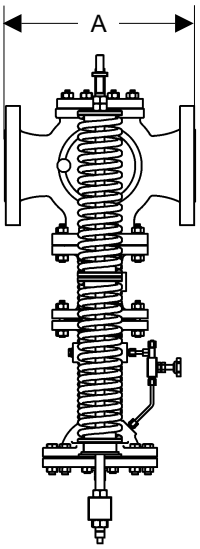
Materials DM 401 PN 25 - 40			
Temperature	300°C	350°C	400°C
Body	cast iron	cast iron	GS 17 CrMo 55
Bottom Part	cast iron	cast iron	cast iron
Mid Section	-	-	GS 17 CrMo 55
Spring	spring steel C	spring steel C	spring steel C
Internals	on request		
Diaphragm	CR	Cr	Cr
O-ring	NBR	NBR	NBR

Materials DM 401 PN 63 - 100			
Temperature	350°C	400°C	530°C
Body	cast iron	GS 17 CrMo 55	cast iron
Bottom Part	cast iron	cast iron	cast iron
Mid Section	-	GS 17 CrMo 55	GS 17 CrMo 55 oder 10 CrMo 9-10
Spring	spring steel C	spring steel C	spring steel C
Internals	on request		
Diaphragm	CR	Cr	Cr
O-ring	NBR	NBR	NBR

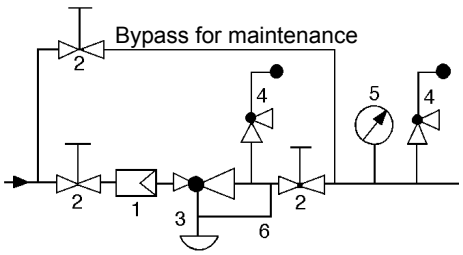
Dimensions [mm]												
		nominal diameter DN										
	size	25	32	40	50	65	80	100	125	150	200	250
A	PN 16 - 40	-	180	200	230	290	310	350	400	480	600	730
	PN 63 - 100	230	-	260	300	330	380	430	500	-	-	-

As the DM 401 pressure reducing valve is designed specifically for your operating data and may vary considerably in terms of construction, we are unable at this stage to give any dimensions or weights. Please contact us if you have specific queries.

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.



Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line

sense line connection 10 - 20 x DN behind the valve

Sheet no. DM 603/3.1.061.1 - issue 25.09.2006

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Pressure Control Valves DM 462

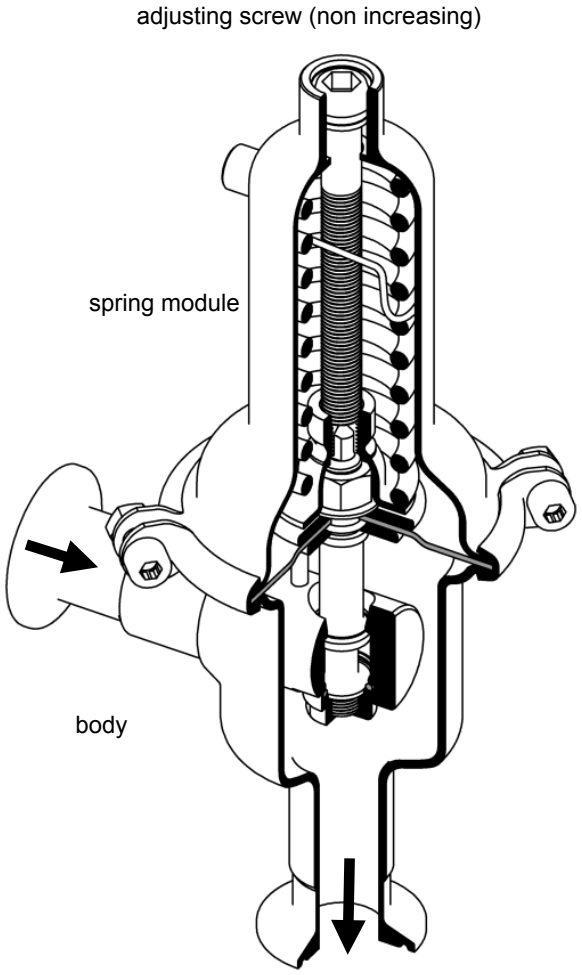
Pressure reducer for liquids and gases up to 130°C, steam up to 180 °C
CIP/SIP design for sanitary use

Technical Data

Connection	DN 25 - 100 clamps other connections on request
Nominal Pressure	PN 2.5 - 10 (see table below)
Inlet Pressure	up to 8 bar
Outlet Pressure	0.3 - 5 bar in 3 setting ranges
K_{VS}-Value	4.4 - 50 m^3/h
Tightness	acc. to VDI/VDE-guideline 2174 (leakage rate ≤ 0.5% of K_{VS}-value)

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.
The DM 462 pressure reducing valve is a twin seat diaphragm-controlled spring-loaded proportional control valve which is primarily used for hygienic applications in the food processing and pharmaceutical industries. A PTFE protective foil renders the diaphragm physiologically safe and steamproof up to 180 °C. The valve does not require an external pilot line.
This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. It contains virtually no dead pockets and is suitable for use in CIP and SIP systems. The angled design allows complete draining.
The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance. Changing the control pressure setting does not affect the height of the valve (non increasing adjusting screw).
The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.



STANDARD EQUIPMENT

- All stainless steel construction
- Non increasing adjusting screw
- Quick-release body clamp ring
- Diaphragm protectd by PTFE foil

OPTIONS

- Polished version for food, pharmaceutical and superclean applications, surface roughness Ra ≤ 0.25 / 0.4 / 0.8 /1.6 µm
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-Values [m^3/h]					
nominal diameter DN					
25	40	50	65	80	100
4.4	14	16	40	45	50

Setting Ranges [bar] and Nominal Pressure PN		
Nennweite DN		
40 - 100	25 - 100	25 - 100
0.3 - 1.1	0.8 - 2.5	2 - 5
PN 10/2.5	PN 10/6	PN 10/10

Setting Ranges [bar] and Nominal Pressure PN		
nominal diameter DN		
65 - 100		
0.3 - 1.1	0.8 - 2.5	2 - 5
PN 10/2,5	PN 10/6	PN 10/10

Sheet no. DM 462/2.1.072.1 - issue 07.06.2007

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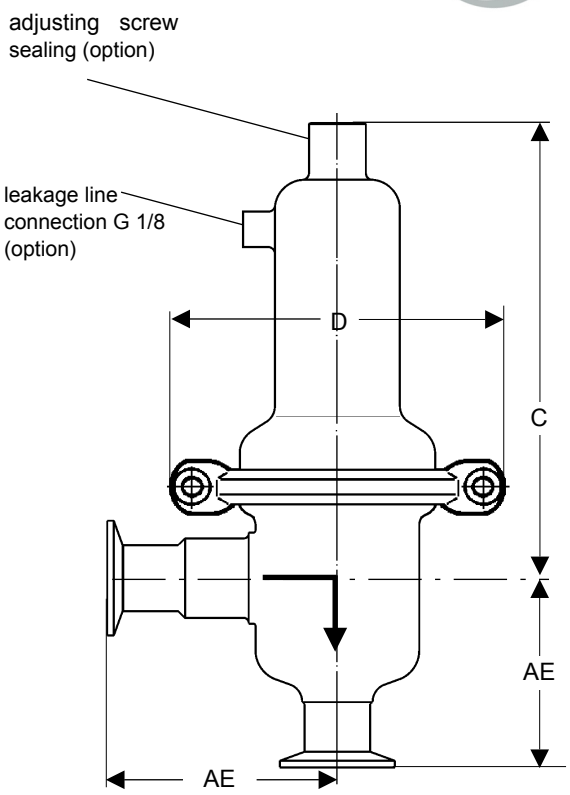
Pressure Control Valves DM 462

Pressure reducer for liquids and gases up to 130°C, steam up to 180 °C
CIP/SIP design for sanitary use

Materials		
Temperature	130 °C	180 °C
Body, Bonnet, Internals	CrNiMo-steel	CrNiMo-steel
Valve Seal	EPDM	FEPM
Spring	CrNi-steel	CrNi-steel
Diaphragm	EPDM	FPM
Protection Foil for Diaphragm	(option)	PTFE

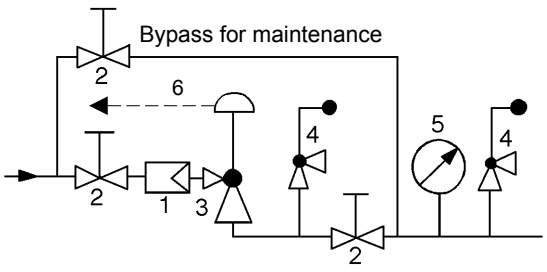


Dimensions [mm]						
	nominal diameter DN (clamping flanges)					
size	25	40	50	65	80	100
AE	100	115	125	175	175	175
C	205	230	230	510	510	510
D	138	200	200	265	265	265

Weights [kg]					
nominal diameter DN (clamping flanges)					
25	40	50	65	80	100
2.5	6.5	6.5	26	26	26

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended installation



1 Strainer
2 Shutoff valves
3 Pressure reducer
4 Safety valve
5 Pressure gauge
6 Leakage line G 1/8 (option)

use MANKENBERG-products

Sheet no. DM 462/3.1.072.1 - issue 07.06.2007

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Pressure Control Valves DM 502

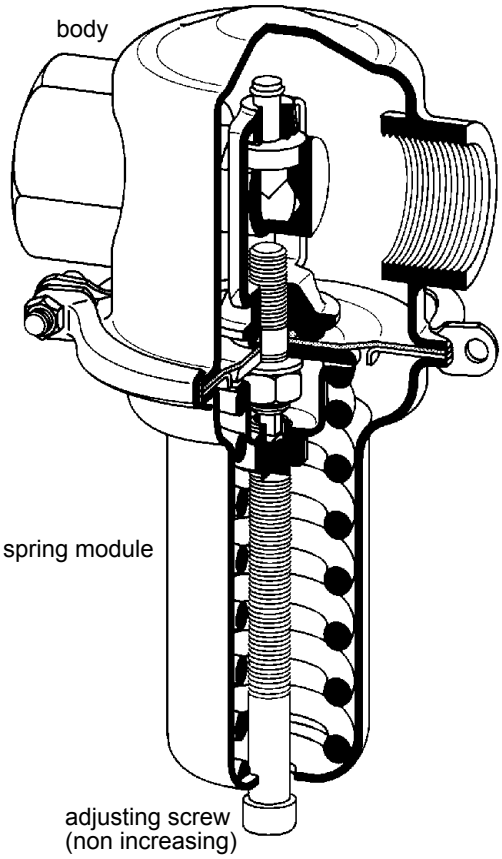
Pressure reducer for liquids and gases up to 130 °C, especially for CO_2, body stainless steel, internals made of brass

Technical Data

Connection	G 1/2 - 2
Nominal Pressure	inlet PN 100
	outlet PN 1 - 16
Inlet Pressure	up to 100 bar
Outlet Pressure	0.02 - 16 bar
	in several setting ranges
K_{VS}-Value	0.6 - 4.2 m^3/h
Valve Seal	soft seal
Tigntness	acc. to VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05% of K_{VS}-value)

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.
The DM 502 pressure reducing valve is a diaphragm-controlled spring-loaded proportional control valve specially designed for CO2.
This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.
The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance. Changing the control pressure setting does not affect the height of the valve (non-increasing adjusting screw).
The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.
A pilot line is required for outlet pressures ≤ 1.1 bar (to be installed on-site).



STANDARD EQUIPMENT

- Body and bonnet made of stainless steel
- Non increasing adjusting screw
- Quick-release body clamp ring
- Pilot line connection (only for outlet pressures ≤ 1.1 bar)

OPTIONS

- Pressure gauge connection
- Drain hole provided at bottom of spring cover for draining condensate
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure ha always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]						
nom. diameter	1/2	3/4	1	1 1/4	1 1/2	2
m^3/h	0.6	0.9	1.5	2.8	3.6	4.2

Setting Ranges [bar]							
0.02 - 0.12	0.1 - 0.5	0.3 - 1.1	1 - 2.5	2 - 5	4 - 8	6 - 12	10 - 16

Permissible Reduction Ratio (max. p_1/p_2)						
nom. pressure	1/2	3/4	1	1 1/4	1 1/2	2
setting range 0.02 - 0.12 bar						
ratio p_1/p_2	810	750	530	280	230	185
setting range 0.1 - 0.5 bar						
ratio p_1/p_2	220	200	140	75	60	50
setting range 0.3 - 1.1 bar						
ratio p_1/p_2	100	90	65	35	25	20
setting range 1 - 2.5 bar						
ratio p_1/p_2	55	50	35	20	15	10
setting range 2 - 5, 4 - 8 and 6 - 12 bar						
ratio p_1/p_2	25	25	15	10	8	6
setting range 10 - 16 bar						
ratio p_1/p_2	20	15	13	7	5	4

The reduction ratio is used to calculate the minimuum outlet pressure for a given pressure.

Sheet no. DM 502/2.1.071.1 - issue 09.01.2007

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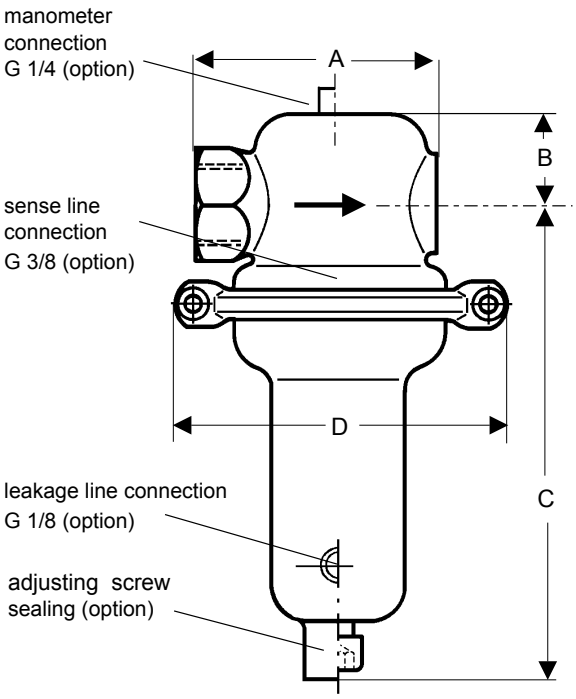
Pressure Control Valves — *DM 502*

Pressure reducer for liquids and gases up to 130 °C, especially for CO_2, body stainless steel, internals made of brass

Materials		
Temperature	80 °C	130 °C
Body, Bonnet	CrNiMo-steel	CrNiMo-steel
Internals	brass, CR-steel	brass, CR-steel
Spring	CrNi-steel	CrNi-steel
Valve Seal	EU	FPM optional EPDM oder PTFE
Diaphragm	CR	FPM or EPDM
Protection Foil for Diaphragm	PTFE (option)	PTFE (option)

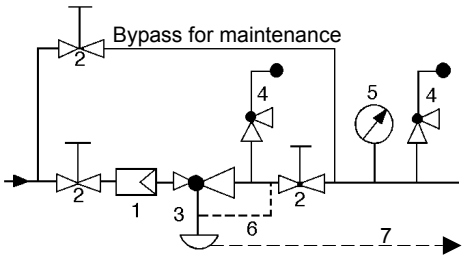


Dimensions [mm]								
pressure range [bar]		size	nominal diameter (G) 1/2	3/4	1	1 1/4	1 1/2	2
all ranges		A	85	95	105	120	130	150
		B	37	48	45	43	50	56
0,02	0,12	C	260	265	270	270	270	285
		D	360	360	360	360	360	360
0,1	0,5	C	260	265	270	270	270	285
		D	264	264	264	264	264	264
0,3	1,1	C	260	265	270	270	270	285
		D	200	200	200	200	200	200
1	16	C	195	200	200	205	205	220
		D	138	138	138	138	138	138

Weights							
pressure range [bar]		nominal diameter (G) 1/2	3/4	1	1 1/4	1 1/2	2
0.3	1.7	22	22	23	29	30	31
1.5	7.0	12	12	13	18	19	20
4.0	16	10	10	11	15.5	16.5	18

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 3/8 (option)
7 Leakage Line G 1/8 (option)

Sense line connection 10 - 20 x DN behind the valve

Sheet no. DM 502/3.1.071.1 - issue 09.01.2007

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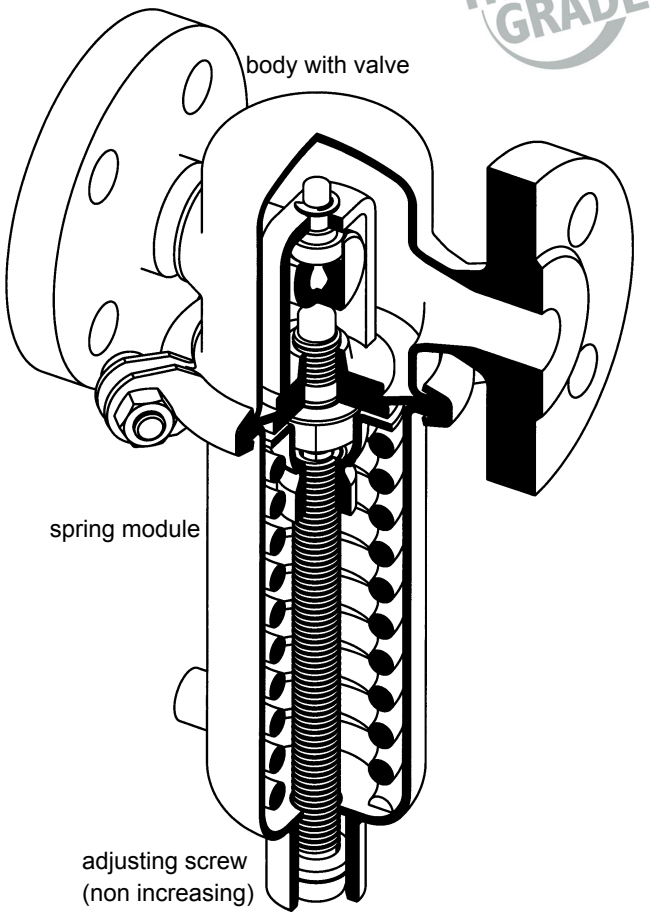
Pressure Control Valves DM 505, 505Z

DM 505 for liquids and gases up to 130 °C, DM 505Z for steam up to 200 °C
for low flow rates

Technical Data

Connection	G 1/2
	DN 15 - 25
Nominal Pressure	Inlet PN 250
	Outlet PN 1 - 25
Inlet Pressure	up to 250 bar
Outlet Pressure	DM 505: 0.005 - 20 bar in 8 ranges
	DM 505Z: 0.005 - 12 bar in 7 ranges
K_{VS}-Value	0.15 - 0.9 m^3/h
Sense Line	DM 505: setting range 0.005 - 1.1 bar
	DM 505Z: all setting ranges
Tightness	acc. to VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05% of K_{VS}-value)



Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 505 pressure reducing valve is a diaphragm-controlled spring-loaded proportional control valve for small volumes.

This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The tubular inlet spigot of the valve body accommodates the seat aperture. The soft-sealing valve cone is guided in the seat assembly and connected with the control diaphragm by means of a stirrup which surrounds the seat assembly.

The valve type 505 Z, recommended for temperatures up to 200 °C, is identical in its design apart from the metallic cone seal and water-cooled thermal protection between body and diaphragm.

The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance. Changing the control pressure setting does not affect the height of the valve (non increasing adjusting screw).

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusjting screw clockwise increases the outlet pressure.

DM 505 Z requires a pilot line (to be installed on-site); for outlet pressures ≤ 1.1 bar DM 505 also requires a pilot line.

STANDARD EQUIPMENT

- All stainless steel construction
- Non increasing adjusting screw
- Quick-release body clamp ring
- Pilot line connection
  (in the case of DM 505 only for outlet pressures ≤ 1.1 bar)

OPTIONS

- Pressure gauge connection
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]			
for all body sizes, please select	0.15	0.4	0.9

DM 505 setting ranges [bar]							
0.005-0.025	0.02-0.12	0.1-0.5	0.2-1.1	0.8-2.5	1-5	4-12	10-20

DM 505Z setting ranges [bar]						
0.005-0.025	0.02-0.12	0.1-0.5	0.2-1.1	0.8-2.5	1-5	4-12

Permissible Reduction Ratio (max. p_1/p_2) max. p_1 = 250 bar			
setting ranges 0.005 - 0.025 and 0.02- 0.12 bar			
K_{VS}-value	0.15	0.4	0.9
ratio p_1/p_2	1485	1000	750
setting range 0.1 - 0.5 bar			
K_{VS}-value	0.15	0.4	0.9
ratio p_1/p_2	405	280	210
setting range 0.2 - 1.1 bar			
K_{VS}-value	0.15	0.4	0.9
ratio p_1/p_2	185	125	100
setting range 0.8 - 2.5 bar			
K_{VS}-value	0.15	0.4	0.9
ratio p_1/p_2	105	70	50
setting range 1 - 5 bar, 4 - 12 bar, 10 - 20 bar			
K_{VS}-value	0.15	0.4	0.9
ratio p_1/p_2	39	27	20

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Pressure Control Valves DM 505, 505Z

DM 505 for liquids and gases up to 130 °C, DM 505Z for steam up to 200 °C
for low flow rates

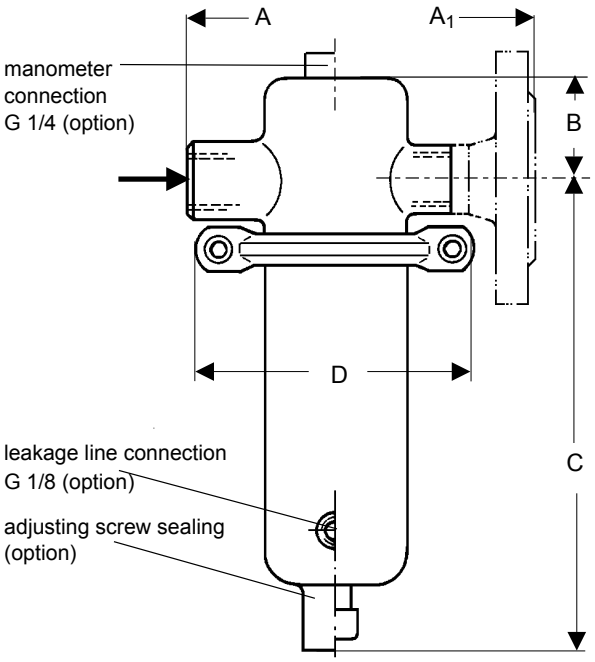
Materials			
Type	DM 505		DM 505Z
Temperature	80 °C	130 °C	200 °C
Body	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Spring Cap			
Internals			
Set Screw			
Spring	CrNi-steel	CrNi-steel	CrNi-steel
Valve Seal	EU	FPM optional EPDM or PTFE	CrNiMo-steel
Diaphragm	CR	FPM oder EPDM	EPDM
Protection Foil	PTFE (option)	PTFE (option)	PTFE (option)

Dimensions [mm]						
pressure range [bar]	size	DM	G 1/2	flanges acc. to DIN 2635 DN 15	DN 20	DN 25
all ranges	A/A_1	505 + 505Z	100	130	150	160
	B	505 + 505Z	53	53	53	53
0.005 - 0.025 0.02 - 0.12	C	505	257	257	257	267
	C	505Z	387	387	387	297
	D	505 + 505Z	360	360	360	360
0.1 - 0.5	C	505	257	257	257	267
	C	505Z	387	387	387	297
	D	505 + 505Z	264	264	264	264
0.2 - 1.1	C	505	257	257	257	257
	C	505Z	387	387	387	387
	D	505 + 505Z	200	200	200	200
0.8 - 2.5	C	505	196	196	196	196
	C	505Z	326	326	326	326
	D	505 + 505Z	138	138	138	138
1 - 5 4 - 12 10 - 20	C	505	190	190	190	190
	C	505Z	320	320	320	320
	D	505 + 505Z	114	114	114	114

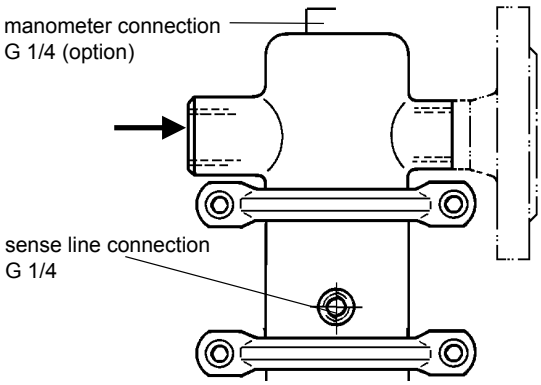
Weights [kg]					
pressure range [bar]	DM	G 1/2	flanges acc. to DIN 2635 DN 15	DN 20	DN 25
0.005 - 0.025 0.002 - 0.12	505	6	7.5	7.5	8
	505Z	6.5	8	8	8.5
0.1 - 0.5	505	5.5	7	7	7.5
	505Z	6	7.5	7.5	8
0.2 - 1.1	505	4.5	6	6	6.5
	505Z	5	6.5	6.5	7
0.8 - 2.5	505	2	3.5	3.5	4
	505Z	2.5	4	4	4.5
1 - 5 4 - 12 10 - 20	505	1.5	3	3	3.5
	505Z	2	3.5	3.5	4

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

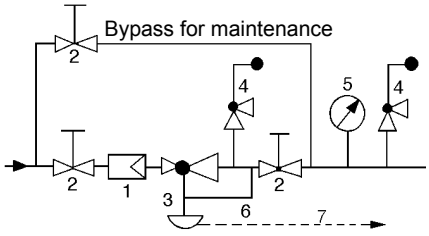
DM 505



DM 505Z
dimensions see DM 505



Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 1/4 (DM 505Z)
7 Leakage Line G 1/8 (option)

Sense line connection 10 - 20 x DN behind the valve

Sheet no. DM 505/3.1.061.1 - issue 12.06.2006

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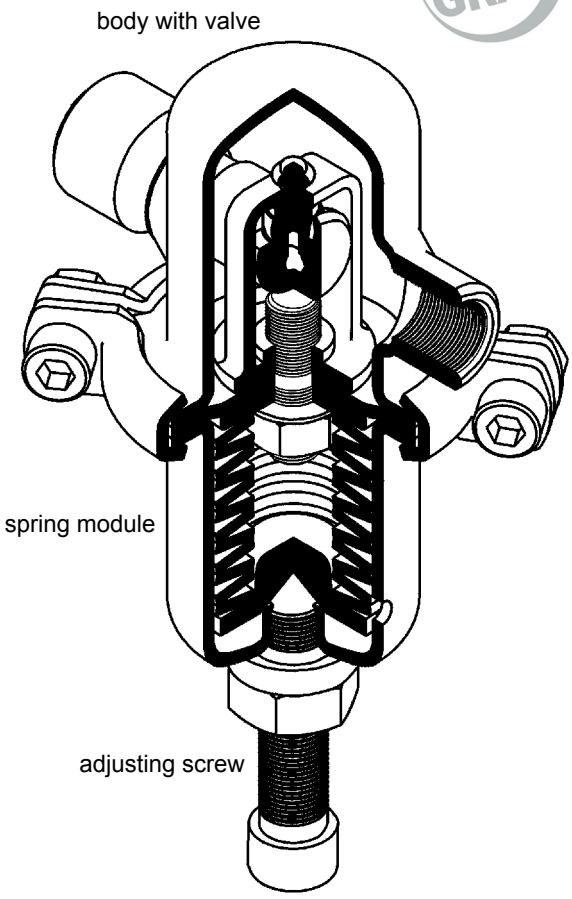
Pressure Control Valves DM 506

für liquids und gases bis 80 / 130 °C

Technical Data

Connection	G 1/4 DN 15 (DIN 2635)
Nominal Pressure	Inlet PN 315 Outlet PN 2.5 - 25
Inlet Pressure	up to 250 bar
Outlet Pressure	0.3 - 20 bar in 3 setting ranges
K_{VS}-value	0.15 m^3/h
Tightness	acc. to VDI/VDE-guideline 2174 (leakage rate ≤ 0.05% of K_{VS}-value)



Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 506 pressure reducing valve is a diaphragm-controlled spring-loaded proportional control valve for small volumes and high inlet pressures.

This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.

The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance.

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

Setting Ranges, K_{vs}-Values, Permissible Reduction Ratio (max.p_1/p_2)

K_{vs}-value	m^3/h	0.15		
outlet pressure	bar	0.3 - 1.5	1 - 6	5 - 20
nom. pressure	PN	315 / 2.5	315 / 10	315 / 25
ratio P_1/P_2		20		

STANDARD EQUIPMENT

- All stainless steel construction
- Non increasing adjusting screw
- Quick-release body clamp ring

OPTIONS

- Pressure gauge connection
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. DM 506/2.1.061.1 - issue 12.06.2006

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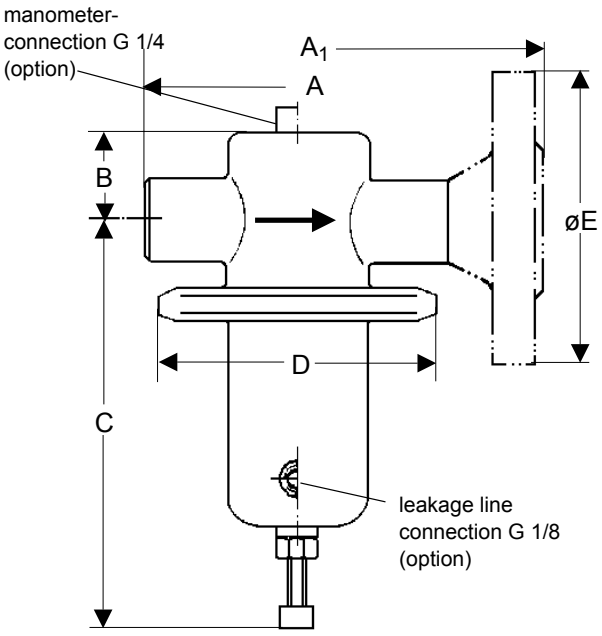
Pressure Control Valves DM 506

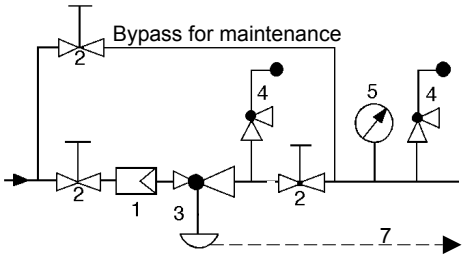
für liquids und gases bis 80 / 130 °C

Materials		
Temperature	80 °C	130 °C
Body Bonnet Internals Adjusting Screw	CrNiMo-steel	CrNiMo-steel
Spring	CrNi-steel	CrNi-steel
Valve Seal	EU	FPM optional FFKM, EPDM, PTFE
Diaphragm	NBR	FPM optional EPDM
Protection Foil	PTFE (option)	PTFE (option)



Dimensions [mm]		
	nominal diameter	
size	G 1/4	DN 15
A/A_1	75	130
B	28	28
C	~105	~105
D	80	80
øE	-	95

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
7 Leakage Line G 1/8 (option)

Weights [kg]	
nominal diameter	
G 1/4	DN 15
0.75	2.5

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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Pressure Control Valves DM 510 - 518

Only for pressure reducer DM 510, 511, 514, 515, 516 and 518
DM 512, 513 and 517 see separate data sheet

Technical Data

Connection	DM 510	G 3/8 - 2	
	DM 511	DN 15 - 50	
	DM 514	G 1/2 - 1	
	DM 515	DN 15 - 25	
	DM 516	DN 15 - 50 welding ends	
	DM 518	DN 15 - 25 welding ends	
Inlet Press.	up to 315 bar		
Outlet Press.	DM 510	2 - 100 bar in 10 ranges	
	DM 511	2 - 100 bar in 10 ranges	
	DM 514	40 - 160 bar in 2 ranges	
	DM 515	40 - 160 bar in 2 ranges	
	DM 516	2 - 100 bar in 10 ranges	
	DM 518	40 - 160 bar in 2 ranges	
K_{vs}-value	0.2 - 5,5 m^3/h		
Limits	diaphragm	130 °C	P2 20bar
	piston	130 °C	P2 160 bar
	bellow	400 °C	P2 160 bar
Tightness	acc. to VDI/VDE-guideline 2174		
	(leakage rate ≤ 0.05% of K_{vs}-value)		

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 510, DM 511, DM 514, DM 515, DM 516 and DM 518 pressure reducing valves are diaphragm, piston or bellows-controlled spring-loaded proportional control valves for high inlet and outlet pressures. They can be supplied with three types of connections: sockets, flanges and welding spigots. Each size of valve may be fitted with three different seats (see data sheet DM 510/ 2.0.061.2). The valve cone may be fitted with a soft or metallic seal.

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

OPTIONS

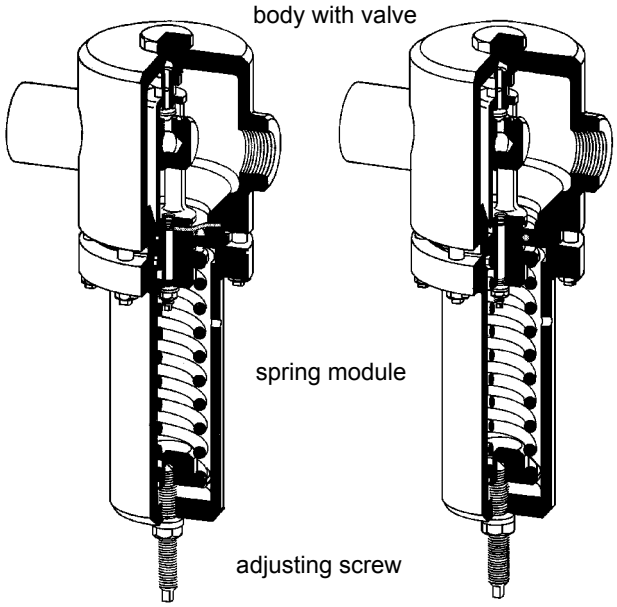
- Pressure gauge connection
- Valve cone and seat armoured
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has alxays been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

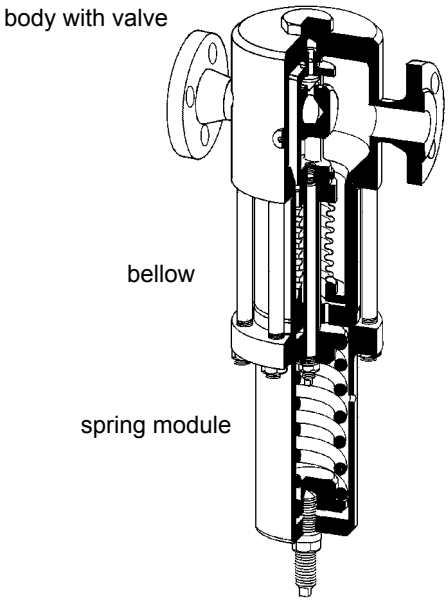
examples of design

DM 510
diaphragm controled

DM 510
piston controled



DM 510
bellow controled



Nominal Pressure, K_{vs}-Values, Setting Ranges and Permissible Reduction Ratio see sheet no. DM 510/2.1.061.2

Sheet no. DM 510/2.1.061.1 - issue 12.06.2006

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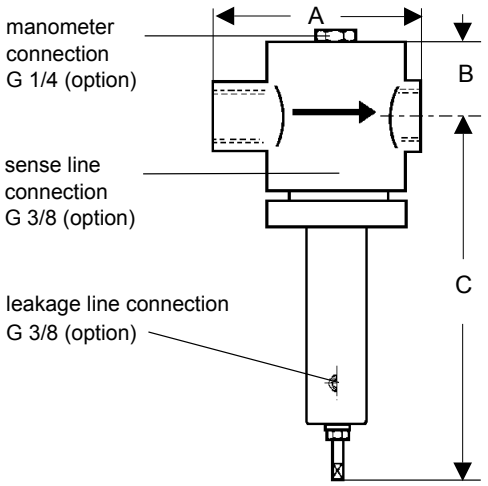
Pressure Control Valves DM 510 - 518

Only for pressure reducer DM 510, 511, 514, 515, 516 and 518
DM 512, 513 and 517 see separate data sheet

Materials			
Temperature	80 °C	130 °C	400 °C
Body	G 3/8 - 1, DN 15 - 25 = C 22.8 G 1 1/4 - 2, DN 32 - 50 = steel welded optional CrNiMo-steel for all body sizes		
Bonnet	steel welded optional CrNiMo-steel		
Internals	Ms optional CrMo-St or CrNiMo-St		CrNiMo-steel
Spring	CrNi-steel	CrNi-steel	CrNi-steel
Valve Seal	EU	FPM optional EPDM or PTFE	-
Metallic Sealing	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Diaphragm	CR	FPM optional EPDM	-
Protection Foil	PTFE (option)	PTFE (option)	PTFE (option)
O-Ring for Piston	NBR	FPM optional EPDM or PTFE	-
Bellow	-	-	CrNiMo-steel

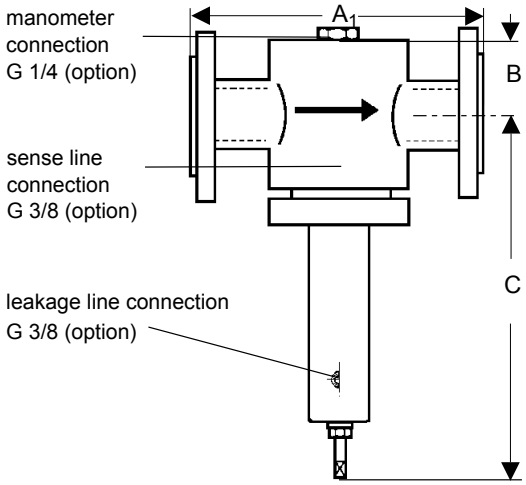
DM 510
DM 514
DM 516
DM 518



Dimensions [mm] DM 510, DM 511 and DM 516					
		nominal diameter			
type	size	G 3/8 - 1/2 DN 15	G 3/4 - 1 DN 20 - 25	G 1 1/4 - 1 1/2 DN 32 - 40	G 2 DN 50
510	A	140	170	250	250
511	A_1	220	220	280*	300*
516	A / A_1	220	220	acc. to DIN 3202 - S14	
all	B	80	80	110	110
all	C	< 520	< 520	< 800	< 800

*with nominal pressure ≥ PN 63 on request

DM 511
DM 515

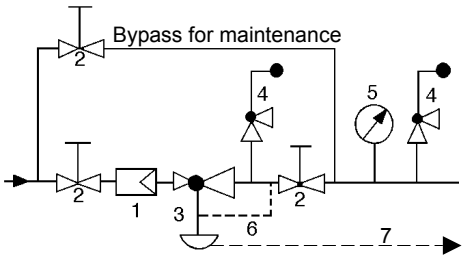


Dimensions [mm] DM 514, DM 515 and DM 518	
size	all diameters
A / A_1	220
B	90
C	< 530

Weights [kg] for DM 510, all other on request						
nominal diameter						
3/8	1/2	3/4	1	1 1/4	1 1/2	2
13	13	14	15	21	21	21

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 3/8 (option)
7 Leakage Line G 3/8 (option)

Sense line connection 10 - 20 x DN behind the valve

Sheet no. DM 510/3.1.061.1 - issue 12.06.2006

Pressure Control Valves DM 510 - 518

for pressure reducing valves DM 510, 511, 512, 513, 514, 515, 516, 517 und 518

K_{vs}-values [m³/h], (3 diff. K_{vs}-values for each body size)								
		nominal diameter						
	G	3/8	1/2	3/4	1	1 1/4	1 1/2	2
	DN		15	20	25	32	40	50
seat	I	0,2	0.2	0.25	0.25	0.4	0.4	1
	II	0.9	0.9	0.9	0.9	2.5	2.5	3.5
	III	1.7	1.8	2	2.2	3.9	3.9	5.5

Setting Ranges [bar], Nominal Pressure DM 510, 511, 516				
2 - 4	4 - 7	7 - 10	5 - 16	10 - 20
PN 315/6	PN 315/16	PN 315/16	PN 315/25	PN 315/25
10 - 25	20 - 35	35 - 50	45 - 63	60 - 100
PN 315/40	PN 315/40	PN 315/63	PN 315/100	PN 315/100

Setting Range [bar], Nominal Pressure DM 512, 513, 517			
0.005 - 0.07	0.02 - 0.1	0.05 - 0.4	0.1 - 0.4
PN 100/1	PN 100/1	PN 100/1	PN 100/1
0.4 - 0.8	0.3 - 1	1 - 2	
PN 100/1,6	PN 100/1,6	PN 100/6	

Setting Range [bar], Nominal Pressure DM 514, 515, 518	
40 - 100	80 - 160
PN 315/100	PN 315/160

Permissible Reduction Ratio (max. p_1/p_2) DM 510, 511, 516				
setting range bar	seat	nominal diameter G 3/8 - 1 DN 15 - 25	G 1 1/4 - 1 1/2 DN 32 - 40	G 2 DN 50
2 - 4	I	100	80	60
	II	30	29	18
	III	15	15	12
4 - 7	I	80	52	39
	II	30	19	12
	III	15	10	8
7 - 10	I	80	38	28
	II	30	14	8
	III	15	7	6
5 - 16	I	32	45	33
	II	21	16	10
	III	9	8	7
10 - 20	I	32	38	28
	II	21	14	8
	III	9	7	6
10 - 25	I	20	25	18
	II	17	9	6
	III	7	4.5	4
20 - 35	I	16	20	15
	II	13	7	4.5
	III	4	3.5	3
35 - 50	I	9	15	11
	II	9	5.5	3
	III	4	3	2.5
45 - 63	I	7	11	8
	II	7	4	2.5
	III	3	2	1.5
60 - 100	I	6	8	5.5
	II	6	2.5	1.5
	III	2.5	1.5	1.2

Permissible Reduction Ratio (max. p_1/p_2) DM 512, 513, 517				
setting range bar	seat	nominal diameter G 3/8 - 1 DN 15 - 25	G 1 1/4 - 1 1/2 DN 32 - 40	G 2 DN 50
5 - 0.07	I	4000	6570	4865
	II	1500	2390	1490
	III	600	1200	1010
0.02 - 0.1	I	200	1950	1445
	II	800	710	440
	III	300	355	300
0.05 - 0.4	I	1000	1020	755
	II	400	370	230
	III	150	185	155
0.1 - 0.4	I	700	510	375
	II	200	185	115
	III	90	90	75
0.4 - 0.8	I	700	510	375
	II	200	185	115
	III	90	90	75
0.3 - 1	I	300	280	205
	II	100	100	60
	III	40	50	40
1 - 2	I	300	280	205
	II	100	100	60
	III	40	50	40

Permissible Reduction Ratio (max. p_1/p_2) DM 514, 515, 518			
setting range bar	seat	nominal diameter G 3/8 - 2	DN 15 - 50
all ranges	I	4	
	II		
	III		

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. DM 510/2.1.061.2 - issue 12.06.2006

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Pressure Control Valves DM 512, 513, 517

Pressure reducer for liquids and gases up to 130 °C, for high inlet pressure
For outlet pressure higher than 2 bar see data sheet DM 510

Technical Data

Connection	DM 512 G 3/8 DM 513 DN 15 DM 517 DN 15
Nominal Pressure	Inlet PN 100 Outlet PN 1 - 6
Inlet Pressure	up to 100 bar
Outlet Pressure	0.005 - 2 bar in 7 setting ranges
K_{vs}-Value	0.2 - 5.5 m^3/h
Tightness	acc. VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{vs}-value)

Description

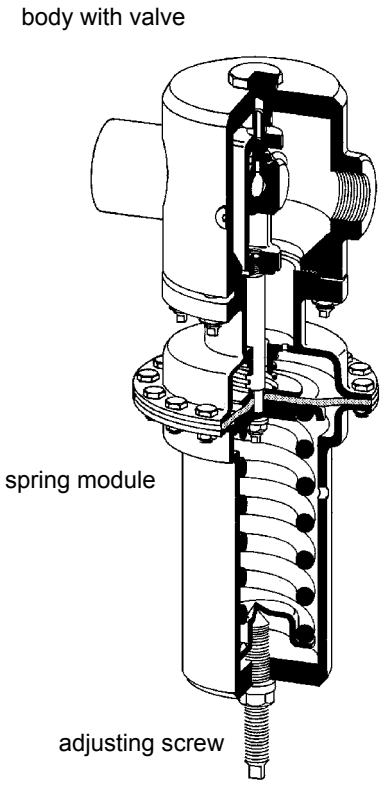
Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 512, DM 513 and DM 517 pressure reducing valves are diaphragm-controlled spring-loaded proportional control valves for high inlet and low outlet pressures. They can be supplied with three types of connections: sockets, flanges and welding spigots. Each size of valve may be fitted with three different seats (see data sheet DM 510/2.0.061.2). The valve cone may be fitted with a soft or metallic seal.

When the pipeline is depressurised the valve spring keeps the cone in “open” position. As the pressure rises the fluid flows from the inlet side through the valve seat into the body and acts on the diaphragm/spring mechanism from the outlet side (outlet pressure).

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

These valves require a 3/8 inch pilot line (to be installed on-site).



Nominal Pressure, K_{vs}-Values, Setting Ranges and Permissible Reduction Ratio see sheet no. DM 510/2.1.061.2

OPTIONS

- Pressure gauge connection
- Valve cone and seat armoured
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw).
  Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. DM 512/2.1.061.1 - issue 12.06.2006

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Pressure Control Valves DM 512, 513, 517

Pressure reducer for liquids and gases up to 130 °C, for high inlet pressure
For outlet pressure higher than 2 bar see data sheet DM 510

Materials		
Temperature	80 °C	130 °C
Body	G 3/8 - 1, DN 15 - 25 = C22.8 G 1 1/4 - 2, DN 32 - 50 = steel welded optional CrNiMo-steel for all body sizes	
Bonnet	steel welded optional CrNiMo-steel	
Internals	brass optional CrMo-steel or CrNiMo-steel	
Spring	CrNi-steel	CrNi-steel
Soft Seal	EU	FPM optional EPDM, PTFE
Metallic Seal	CrNiMo-steel	CrNiMo-steel
Diaphragm	CR	FPM optional EPDM
Protection Foil	PTFE (option)	PTFE (option)

Dimensions DM 512 [mm]

pressure range [bar]	size	nominal diameter G 3/8 - 1/2	G 3/4 - 1	1 1/4 - 2
all ranges	A	140	170	250
	B	80	80	110
	C	470	470	max. 720
0.005 - 0.07	D	500	500	850
0.02 - 0.1	D	360	360	500
0.05 - 0.4	D	270	270	360
0.1 - 0.8	D	220	220	270
0.3 - 2	D	175	175	220

Dimensions DM 513 [mm]

pressure range [bar]	size	nominal diameter DN 15 - 25	DN 32-40	DN 50
all ranges	A_1	220	280*	300*
	B	80	110	110
	C	470	max. 720	max. 720
0.005 - 0.07	D	500	850	850
0.02 - 0.1	D	360	500	500
0.05 - 0.4	D	270	360	360
0.1 - 0.8	D	220	270	270
0.3 - 2	D	175	220	220

Dimensions DM 517 [mm]

pressure range [bar]	size	nominal diameter G 3/8 - 1	G 1 1/4 - 1 1/2	2
all ranges	A	220	270	300
	B	80	110	110
	C	470	max. 720	max. 720
0.005 - 0.07	D	500	850	850
0.02 - 0.1	D	360	500	500
0.05 - 0.4	D	270	360	360
0.1 - 0.8	D	220	270	270
0.3 - 2	D	175	220	220

Weights DM 512, 517 [kg]

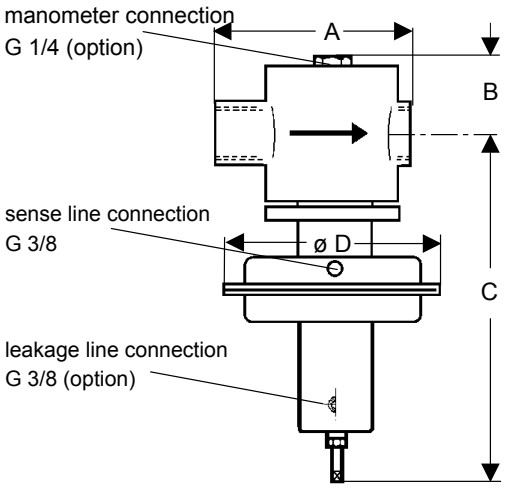
pressure range [bar]	nominal diameter G 3/8	G 1/2	G 3/4	G 1	G 1 1/4	G 1 1/2	G 2
0.005 - 0.07	36	36	37	38	75	75	75
0.02 - 0.1	40	40	41	42	47	47	47
0.05 - 0.4	37	37	38	39	39	39	39
0.1 - 0.8	25	25	26	27	37	37	37
0.3 - 2	19	19	20	21	35	35	35

Weight of 1 flange for PRV 513 [kg]
Weight of PRV 513 = PRV 512 + weight of 2 flanges

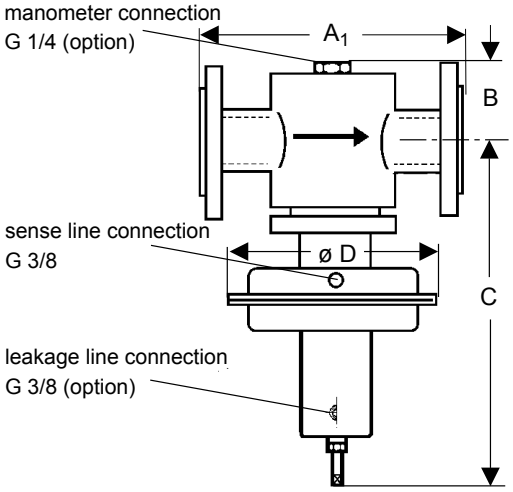
nom. pressure PN	nominal diameter DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
16 - 40	1.5	1.6	1.8	2.4	2.9	3.4
63	1.7		3.2		4.8	5.2
100	1.7		3.2		4.8	7.7
160	1.7		3.2		4.8	8
250	3		4		7.2	8.8
315	3.5		5.5		8.7	11.3

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

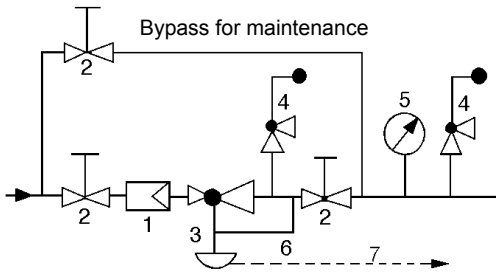
DM 512
DM 517



DM 513



Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 3/8
7 Leakage Line G 3/8 (option)

Sense line connection 10 - 20 x DN behind the valve

Sheet no. DM 512/3.1.061.1 - issue 12.06.2006

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Pressure reducer for steam
up to 350 °C

Technical Data

Connection	DN 15 - 150
Nominal Pressure	Inlet PN 16 - 40 Outlet PN 16
Inlet Pressure	up to 40 bar
Outlet Pressure	0.02 - 10 bar in 6 setting ranges
K_{VS}-Value	4 - 160 m^3/h
Tightness	acc. VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{VS}-value)

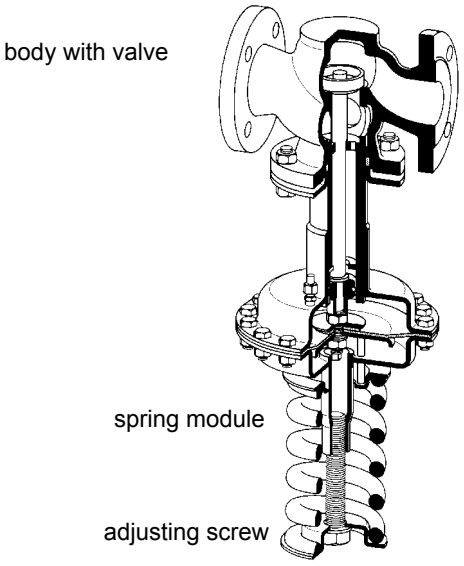
Description

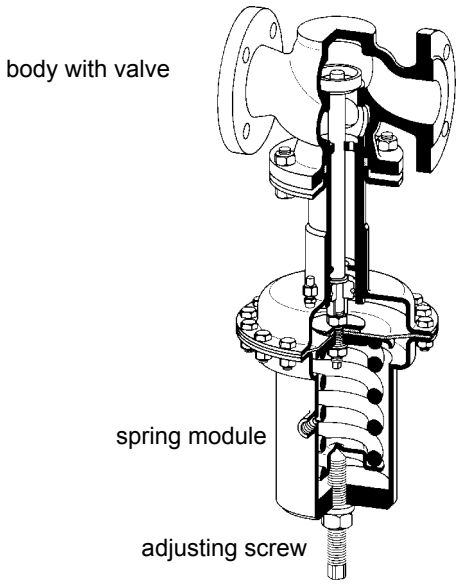
Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 603 pressure reducing valve is a diaphragm-controlled spring-loaded proportional control valve for high temperatures and large volumes. The valve cone is fitted with a metallic seal (up to 350 °C).

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

The DM 603 pressure reducer requires a pilot line (to be installed on-site).





STANDARD EQUIPMENT

- Open spring
- Pilot line connection

OPTIONS

- Sealed bonnet
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]										
DN	15	20	25	40	50	65	80	100	125	150
m^3/h	4	5	6	20	32	50	80	100	140	160

Setting Ranges[bar]						
DN 15-50	0.02 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 5	4.5 - 10
DN 65-100	0.02 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 5	4 - 8
DN 125+150	0.05 - 0.5	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 3.5	2 - 5
PN	40/1	40/1	40/2.5	40/6	40/10	40/16

Sheet no. DM 603/2.1.062.1 - issue 12.06.2006

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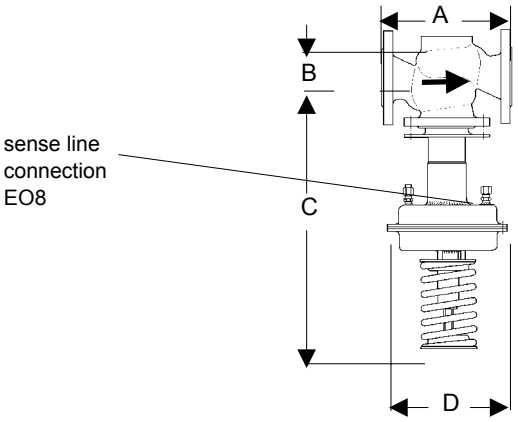
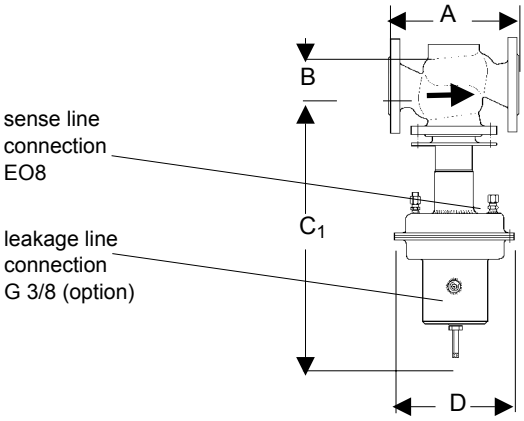
Pressure reducer for steam
up to 350 °C

Materials			
Temperature		300 °C	350 °C
Body	PN 16	up to DN 25 grey cast iron from DN 40 spheroidal cast iron	
	PN 25 /40	cast steel	cast steel
	PN 16 - 40	CrNiMo-steel	CrNiMo-steel
Diaphragm Housing		steel welded optional CrNiMo-steel	
Bonnet		steel welded optional CrNiMo-steel	
Spring		spring steel C optional CrNi-steel	
Diaphragm		CR	EPDM
O-ring (balance)		NBR	EPDM





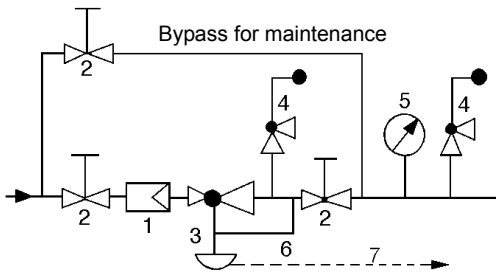
Dimensions [mm]											
size	pressure range bar	nominal diameter DN 15	20	25	40	50	65	80	100	125	150
A	0.02 - 5/8/10	130	150	160	200	230	290	310	350	400	480
B		55	55	55	75	75	105	105	105	220	220
C	4.5 - 8/10	690	690	690	830	930	880	880	880	1040	1040
C_1	2 - 3.5/5	820	820	820	990	990	1040	1040	1040	1200	1200
D	0.8 - 2.5	175	175	175	220	220	220	220	220	220	220
C	0.2 - 1.2	710	710	710	830	830	880	880	880	940	940
C_1		840	840	840	990	990	1040	1040	1040	1100	1100
D		220	220	220	270	270	270	270	270	270	270
C	0.1 - 0.6	710	710	710	830	830	880	880	880	940	940
C_1		840	840	840	990	990	1040	1040	1040	1100	1100
D		270	270	270	360	360	360	360	360	360	360
C	0.02 / 0.05 - 0.25	710	710	710	710	710	760	760	760	940	940
C_1		840	840	840	870	870	920	920	920	1100	1100
D		360	360	360	360	360	360	360	360	500	500

E = max. size with stressless spring

Weights [kg]											
nom. pressure	pressure range bar	nominal pressure DN 15	20	25	40	50	65	80	100	125	150
PN 16	0.8 - 5/8/10	18	18	19	33	36	61	64	68	110	130
	0.2 - 1.2	20	20	21	35	38	63	66	70	112	132
	0.1 - 0.6	24	24	25	39	42	67	70	74	116	136
	0.02/0.05 - 0.25	24	24	25	37	40	65	68	72	122	142
PN 25/40	0.8 - 5/8/10	19	19	20	36	38	64	68	71	118	143
	0.2 - 1.2	21	21	22	38	40	66	70	73	120	145
	0.1 - 0.6	25	25	26	42	44	70	74	77	124	149
	0.02/0.05 - 0.25	25	25	26	40	42	68	72	75	130	155

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line EO8
7 Leakage Line G 3/8 (option)

Sense line connection 10 - 20 x DN behind the valve

Sheet no. DM 603/3.1.062.1 - issue 12.06.2006

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Pressure reducer for steam
up to 250 °C

Technical Data

Connection	DN 15 - 150
Nominal Pressure	Inlet PN 16 - 40
	Outlet PN 1 - 16
Inlet Pressure	up to 40 bar
Outlet Pressure	0.02 - 10 bar in 6 setting ranges
K_{VS}-value	4 - 160 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

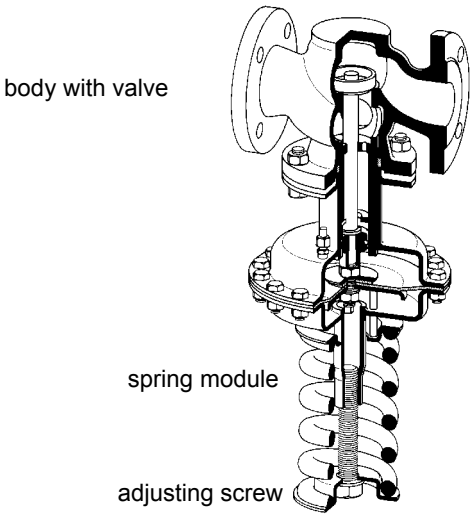
Description

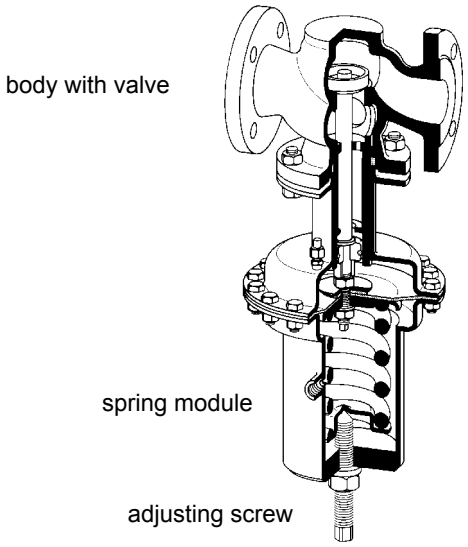
Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 604 pressure reducing valve is a diaphragm-controlled spring-loaded proportional control valve for high temperatures and large volumes. The valve cone is fitted with a metallic seal (up to 250 °C).

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

The DM 604 pressure reducer requires a pilot line (to be installed on-site).





STANDARD EQUIPMENT

- Open spring
- Pilot line connection

OPTIONS

- Sealed bonnet
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]										
DN	15	20	25	40	50	65	80	100	125	150
m^3/h	4	5	6	20	32	50	80	100	140	160

Setting Ranges[bar]						
DN 15-50	0.02 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 5	4.5 - 10
DN 65-100	0.02 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 5	4 - 8
DN 125+150	0.05 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 3.5	2 - 5
PN	40/1	40/1	40/2.5	40/6	40/10	40/16

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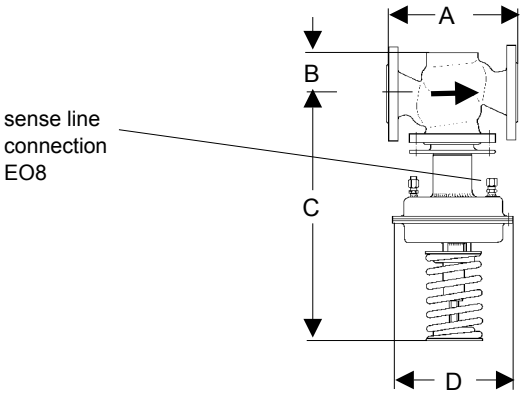
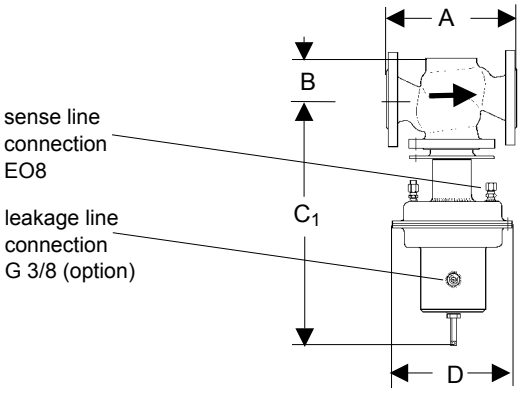
Pressure Control Valves DM 604

Pressure reducer for steam
up to 250 °C

Materials		
Temperature		250 °C
Body	PN 16	up to DN 25 grey cast iron from DN 40 spheroidal cast iron
	PN 25 /40	cast steel
	PN 16 - 40	CrNiMo-steel
Diaphragm Housing		steel welded optional CrNiMo-steel
Bonnet		steel welded optional CrNiMo-steel
Spring		spring steel C optional CrNi-steel
Diaphragm		EPDM
O-ring (balance)		FXM





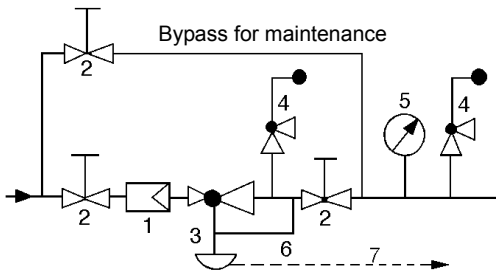
Dimensions [mm]											
size	pressure range bar	nominal diameter DN 15	20	25	40	50	65	80	100	125	150
A	0.02 - 5/8/10	130	150	160	200	230	290	310	350	400	480
B		55	55	55	75	75	105	105	105	220	220
C	4.5 - 8/10	530	530	530	560	560	640	640	640	940	940
C_1	2 - 3.5/5	660	660	660	720	720	800	800	800	1100	1100
D	0.8 - 2.5	175	175	175	220	220	220	220	220	220	220
C		540	540	540	560	560	640	640	640	840	840
C_1	0.2 - 1.2	670	670	670	720	720	800	800	800	1000	1000
D		220	220	220	270	270	270	270	270	270	270
C		540	540	540	560	560	640	640	640	840	840
C_1	0.1 - 0.6	670	670	670	720	720	800	800	800	1000	1000
D		270	270	270	360	360	360	360	360	360	360
C	0.02 / 0.05 - 0.25	510	540	540	560	560	640	640	640	840	840
C_1		670	670	670	720	720	800	800	800	1000	1000
D		360	360	360	360	360	360	360	360	500	500

E = max. size with stressless spring

Weights [kg]											
nominal pressure	pressure range bar	nominal pressure DN 15	20	25	40	50	65	80	100	125	150
PN 16	0.8 - 5/8/10	17	17	18	30	33	55	58	62	100	120
	0.2 - 1.2	19	19	20	32	35	57	60	64	102	122
	0.1 - 0.6	23	23	24	36	39	61	64	68	106	126
	0.02/0.05 - 0.25	23	23	24	34	37	59	62	66	112	132
PN 25/40	0.8 - 5/8/10	18	18	19	33	35	58	62	65	108	133
	0.2 - 1.2	20	20	21	35	37	60	64	67	110	135
	0.1 - 0.6	24	24	25	39	41	64	68	71	114	139
	0.02/0.05 - 0.25	24	24	25	37	39	62	66	69	120	145

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line EO8
7 Leakage Line G 3/8 (option)

Sense line connection 10 - 20 x DN behind the valve

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Pressure reducer for liquids and gases
up to 130 °C

Technical Data

Connection	DN 15 - 150
Nominal Pressure	Inlet PN 16 - 40
	Outlet PN 1 - 16
Inlet Pressure	up to 40 bar
Outlet Pressure	0.02 - 10 bar in 6 setting ranges
K_{VS}-value	4 - 160 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

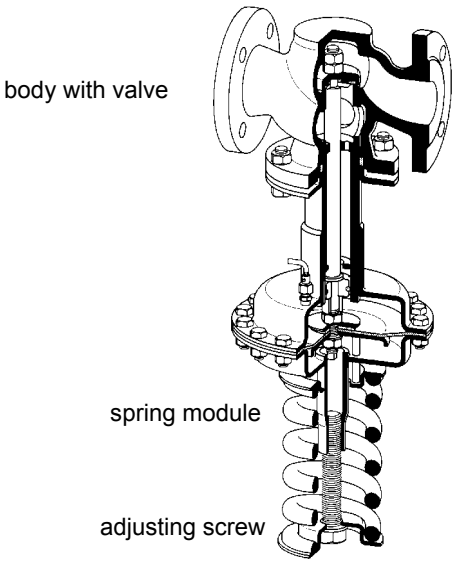
Description

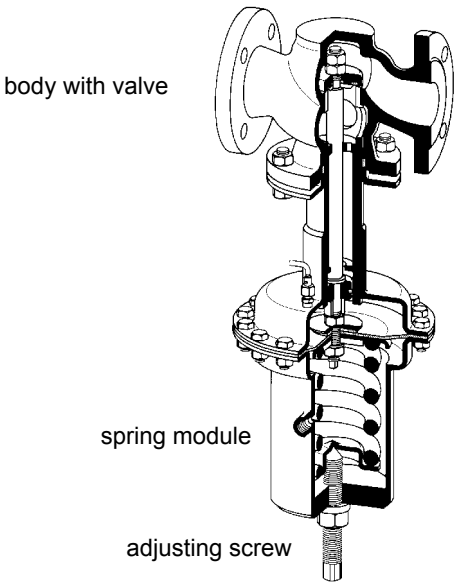
Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 613 pressure reducing valve is a diaphragm-controlled spring-loaded and balanced proportional control valve for large volumes. The valve body is made of cast iron, the control mechanism is a welded assembly. The valve cone is fitted with a soft seal (up to 80/130 °C).

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

The DM 613 pressure reducer requires a pilot line (to be installed on-site).





STANDARD EQUIPMENT

- Open spring
- Pilot line connection

OPTIONS

- Sealed bonnet
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has been always indicated as overpressure.

We reserve the right to alter technical specifications without notice.

K_{VS}-value [m^3/h]										
DN	15	20	25	40	50	65	80	100	125	150
m^3/h	4	5	6	20	32	50	80	100	140	160

Setting Ranges [bar]						
DN 15-50	0.02 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 5	4.5 - 10
DN 65-100	0.02 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 5	4 - 8
DN 125+150	0.05 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 3.5	2 - 5
PN	40/1	40/1	40/2.5	40/6	40/10	40/16

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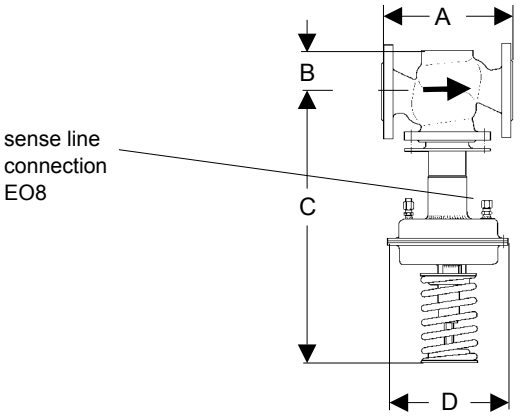
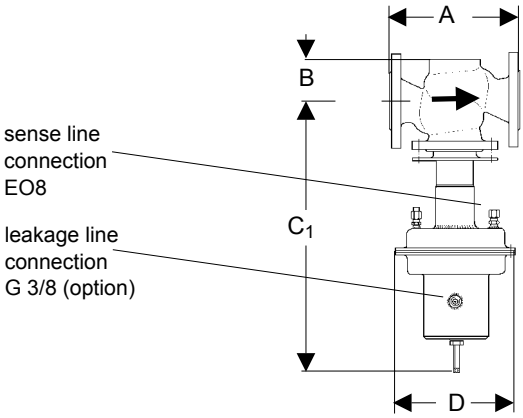
Pressure Control Valves DM 613

Pressure reducer for liquids and gases
up to 130 °C

Materials			
Temperature		80 °C	130 °C
Body	PN 16	up to DN 25 grey cast iron ab DN 40 spheroidal cast iron	
	PN 25 /40	cast steel	cast steel
	PN 16 - 40	CrNiMo-steel	CrNiMo-steel
Diaphragm Housing		steel welded optional CrNiMo-steel	
Bonnet		steel welded optional CrNiMo-steel	
Spring		spring steel C optional CrNi-steel	
Valve Seal		NBR	EPDM optional FPM
Diaphragm		CR	EPDM optional FPM
O-ring (balance)		NBR	EPDM optional FPM



Dimensions [mm]											
	pressure range	nominal diameter DN									
size	bar	15	20	25	40	50	65	80	100	125	150
A	0.02 - 5/8/10	130	150	160	200	230	290	310	350	400	480
B		55	55	55	75	75	105	105	105	220	220
C	4.5 - 8/10	520	520	520	680	680	760	760	760	940	940
C_1	2 - 3.5/5	650	650	650	840	840	920	920	920	1100	1100
D	0.8 - 2.5	175	175	175	220	220	220	220	220	220	220
C	0.2 - 1.2	540	540	540	680	680	760	760	760	840	840
C_1		670	670	670	840	840	920	920	920	1000	1000
D		220	220	220	270	270	270	270	270	270	270
C	0.1 - 0.6	540	540	540	680	680	760	760	760	840	840
C_1		670	670	670	840	840	920	920	920	1000	1000
D		270	270	270	360	360	360	360	360	360	360
C	0.02 / 0.05 - 0.25	540	540	540	560	560	640	640	640	840	840
C_1		670	670	670	720	720	800	800	800	1000	1000
D		360	360	360	360	360	360	360	360	500	500

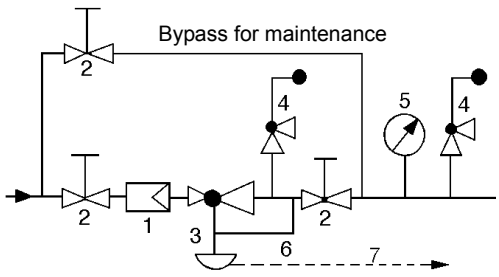


E = max. size with stressless spring

Weights [kg]											
nominal	pressure range	nominal diameter DN									
pressure	bar	15	20	25	40	50	65	80	100	125	150
PN 16	0.8 - 5/8/10	17	17	18	30	33	55	58	62	100	120
	0.2 - 1.2	19	19	20	32	35	57	60	64	102	122
	0.1 - 0.6	23	23	24	36	39	61	64	68	106	126
	0.02/0.05 - 0.25	23	23	24	34	37	59	62	66	112	132
PN 25/40	0.8 - 5/8/10	18	18	19	33	35	58	62	65	108	133
	0.2 - 1.2	20	20	21	35	37	60	64	67	110	135
	0.1 - 0.6	24	24	25	39	41	64	68	71	114	139
	0.02/0.05 - 0.25	24	24	25	37	39	62	66	69	120	145

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line EO8
7 Leakage Line G 3/8 (option)

Sense line connection 10 - 20 x DN behind the valve

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Pressure Control Valves DM 652

Pressure reducer for steam up to 190 °C, liquids and gases up to 130 °C

Technical Data

Connection	G 1/2 - 2
	DN 15 - 50
Nominal Pressure	Inlet PN 16 - 40
	Outlet PN 1 - 16
Inlet Pressure	up to 40 bar
Outlet Pressure	0.02 - 12 bar in 7 setting ranges
K_{VS}-value	4 - 18 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

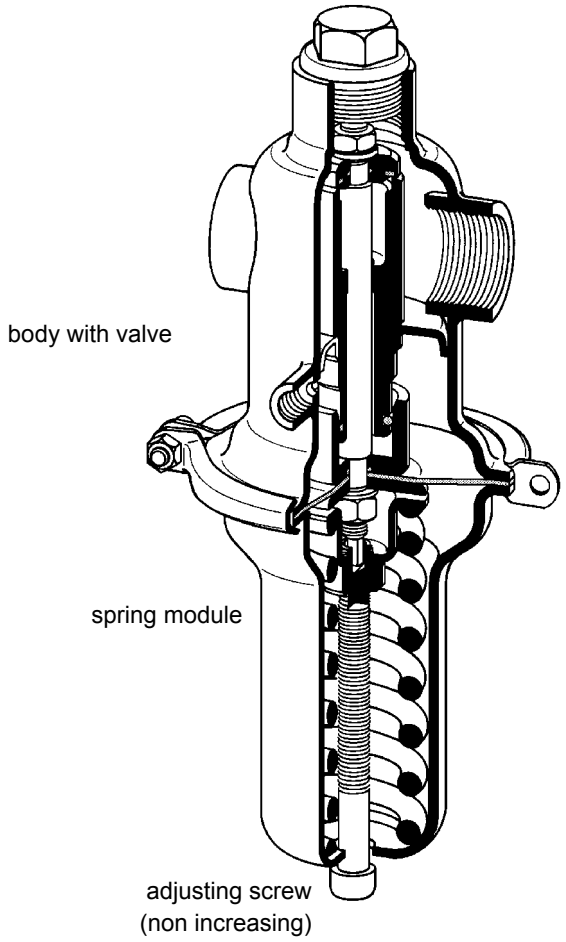
The DM 652 pressure reducing valve is a diaphragm-controlled spring-loaded and balanced proportional control valve for universal application.

This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.

The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance.

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

The DM 652 pressure reducer requires a pilot line (to be installed on-site).



STANDARD EQUIPMENT

- All stainless steel construction
- Non increasing setting spindle
- Quick-release body clamp ring
- Pilot line connection
- Diaphragm protectd by PTFE foil (only for pressure ranges 0.8 - 12 bar)

OPTIONS

- Pressure gauge connection
- Internal pilot line
- Oil and grease-free version for oxygen
- Clean gas version with special connections
- Water-cooled thermal protection for steam up to 220 °C
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]							
nominal	G	1/2	3/4	1	1 1/4	1 1/2	2
diameter	DN	15	20	25	32	40	50
K_{VS}-value	m^3/h	4	5	6	12	16	18

Setting Ranges [bar], Nominal Pressure			
0.02-0.12	0.1-0.5	0.3-1.1	0.8-2.5
PN 16-40/1	PN 16-40/1	PN 16-40/2.5	PN 16-40/6

Setting Ranges [bar], Nominal Pressure		
2 - 5	4 - 8	6 - 12
PN 16-40/10	PN 16-40/16	PN 16-40/16

Permissible Reduction Ratio (max. p_1/p_2)		
	nominal diameter	
setting range bar	G 1/2 - 1 DN 15 - 25	G 1 1/4 - 2 DN 32 - 50
0.02 - 0.12	80	50
0.1 - 0.5	40	25
0.3 - 1.1	30	18
0.8 - 12	20	12

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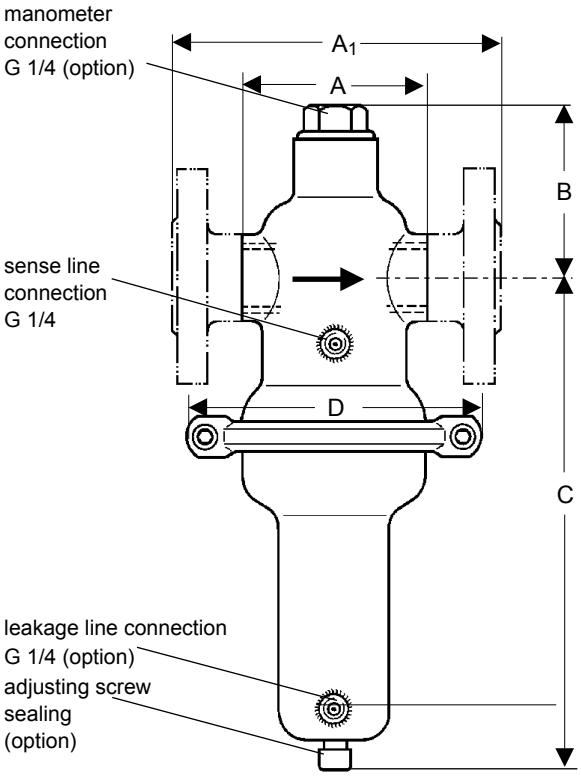
Pressure Control Valves DM 652

Pressure reducer for steam up to 190 °C, liquids and gases up to 130 °C
balanced valve with high flow rates and low leakage depending of soft seal

Materials		
Temperature	130 °C	for steam 190 °C
Body, Bonnet, Internals, Screws	CrNiMo-steel	CrNiMo-steel
Spring	CrNi-steel	CrNi-steel
Valve Seal	FEPM optional EPDM or FPM	FEPM optional PTFE
Diaphragm	EPDM optional FPM	EPDM
Protection Foil	PTFE pressure range 0.8 - 12 bar with FEPM-softseal: standard other pressure ranges and softseals: option	

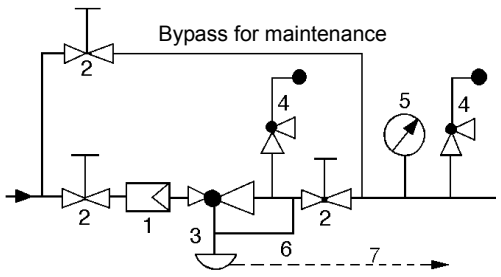


Dimensions [mm]							
pressure range [bar]		nominal diameter G 1/2	G 3/4	G 1	G 1 1/4	G 1 1/2	G 2
	size	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
all ranges	A	85	91	85	130	145	185
	A_1	130	150	160	180	200	230
	B	76	76	76	90	90	90
0.02 - 0.12	C	300	300	300	300	300	300
	D	360	360	360	360	360	360
0.1 - 0.5	C	300	300	300	300	300	300
	D	264	264	264	264	264	264
0.3 - 1.1	C	300	300	300	300	300	300
	D	200	200	200	200	200	200
0.8 - 2.5	C	235	235	235	235	235	235
	D	138	138	138	138	138	138
2 - 5	C	235	235	235	235	235	235
	D	138	138	138	138	138	138
4 - 8	C	235	235	235	235	235	235
	D	138	138	138	138	138	138
6 - 12	C	235	235	235	235	235	235
	D	138	138	138	138	138	138

Weights [kg]						
pressure range [bar]	nominal diameter G 1/2	3/4	1	1 1/4	1 1/2	2
0.02 - 0.12	13,5	13,5	13,5	14,4	14,4	14,4
0.1 - 0.5	7,1	7,1	7,1	8	8	8
0.3 - 1.1	6,1	6,1	6,1	7	7	7
0.8 - 12	3,1	3,1	3,1	4	4	4

Weights [kg]						
pressure range [bar]	nominal diameter DN 15	20	25	32	40	50
0.02 - 0.12	15,3	15,3	15,3	18,4	18,4	18,4
0.1 - 0.5	8,9	8,9	8,9	12	12	12
0.3 - 1.1	7,9	7,9	7,9	11	11	11
0.8 - 12	4,9	4,9	4,9	8	8	8

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 1/4
7 Leakage Line G 1/4 (option)

Sense line connection 10 - 20 x DN behind the valve

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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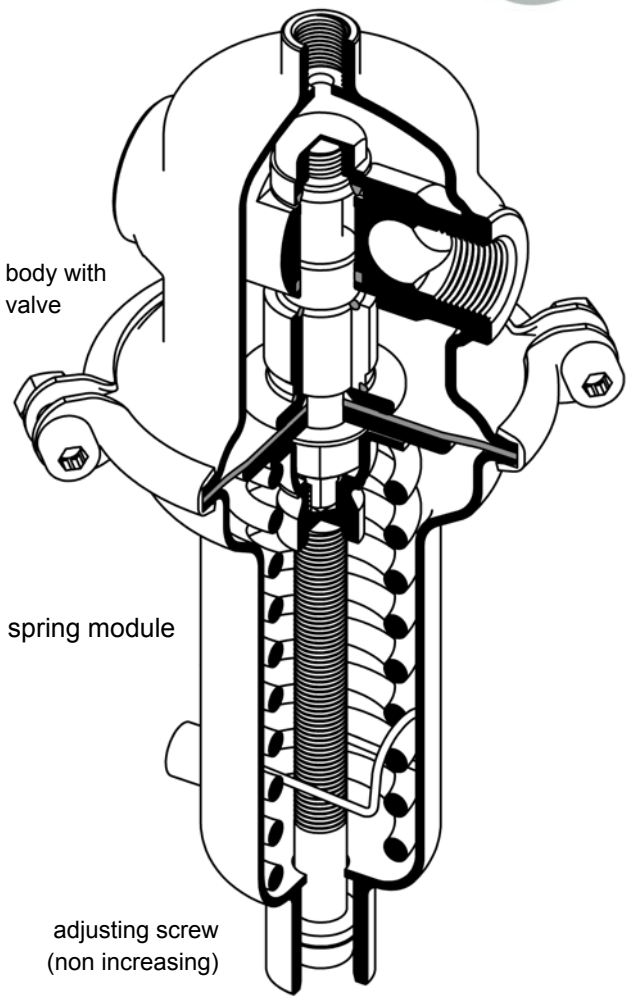
Pressure Control Valves DM 662

Pressure reducer for liquids and gases up to 130 °C

Technical Data

Connection	G 1/2 - 1	
	DN 15 - 25	
Nominal Pressure	Inlet	PN 100
	Outlet	PN 1 - 16
Inlet Pressure	up to 100 bar	
Outlet Pressure	0.02 - 12 bar in 7 setting ranges	
K_{vs}-value	3.2 - 3.6 m^3/h	
Tightness	acc. VDI/VDE-guideline 2174	
	(leakage rate K 0.05 % of K_{vs}-value)	



Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.
The DM 662 pressure reducing valve is a diaphragm-controlled spring-loaded and balanced proportional control valve for universal application and medium volumes.
This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.
The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance.
The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.
For outlet pressures ≤ 1.1 the DM 662 pressure reducer requires a pilot line (to be installed on-site).

STANDARD EQUIPMENT

- All stainless steel construction
- Non increasing adjusting screw
- Quick-release body clamp ring
- Pilot line connection (only for outlet pressures ≤ 1.1 bar)

OPTIONS

- Pressure gauge connection
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{vs}-values [m^3/h]				
nominal diameter	DN	15	20	25
	G	1/2	3/4	1
K_{vs}-value	m^3/h	3.2	3.5	3.6

Setting Ranges [bar], Nominal Pressure [PN]				
setting range	6 - 12	4 - 8	2 - 5	0.8 - 2.5
nominal pressure	100/16	100/16	100/10	100/6

Setting Ranges [bar], Nominal Pressure [PN]			
setting range	0.3 - 1.1	0.1 - 0.5	0.02 - 0.12
nominal pressure	100/2.5	100/1	100/1

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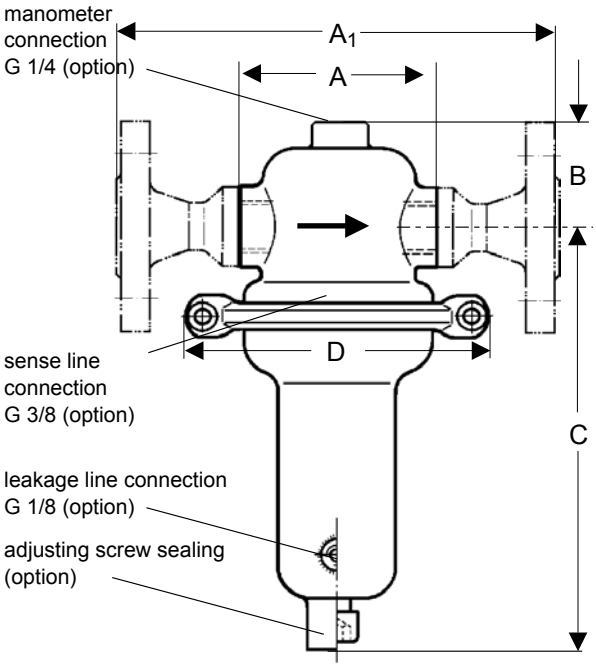
Pressure Control Valves DM 662

Pressure reducer for liquids and gases up to 130 °C

Materials	
Temperature	130 °C
Body, Bonnet, Spring, Diaphragm Housing Internals, Screws	CrNiMo-steel
Valve Seal	EPDM optional FPM
Diaphragm	EPDM optional FPM
O-ring	EPDM optional FPM

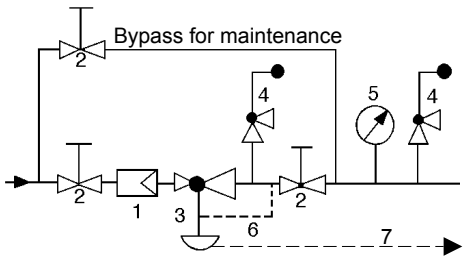


Dimensions [mm]				
pressure range [bar]	size	nominal diameter G 1/2 DN 15	G 3/4 DN 20	G 1 DN 25
all ranges	A	90	90	136
	A_1	200	200	200
	B	40	40	40
0.02 - 0.12	C	270	270	270
	D	360	360	360
0.1 - 0.5	C	270	270	270
	D	264	264	264
0.3 - 1.1	C	270	270	270
	D	200	200	200
0.8 - 2.5	C	205	205	205
	D	138	138	138
2 - 5	C	205	205	205
	D	138	138	138
4 - 8	C	205	205	205
	D	138	138	138
6 - 12	C	205	205	205
	D	138	138	138

Weights [kg]							
pressure ranges [bar]		nominal diameter G 1/2	3/4	1	nominal diameter DN 15	20	25
0.02 - 0.12		13	13	13	14	14	14
0.1 - 0.5		6.5	6.5	6.5	7.5	7.5	7.5
0.3 - 1.1		5.5	5.5	5.5	6.5	6.5	6.5
0.8 - 12		2.5	2.5	2.5	3.5	3.5	3.5

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 3/8 (option)
7 Leakage Line G 1/8 (option)

Sense line connection 10 - 20 x DN behind the valve

Sheet no. DM 662/3.1.061.1 - issue 12.06.2006

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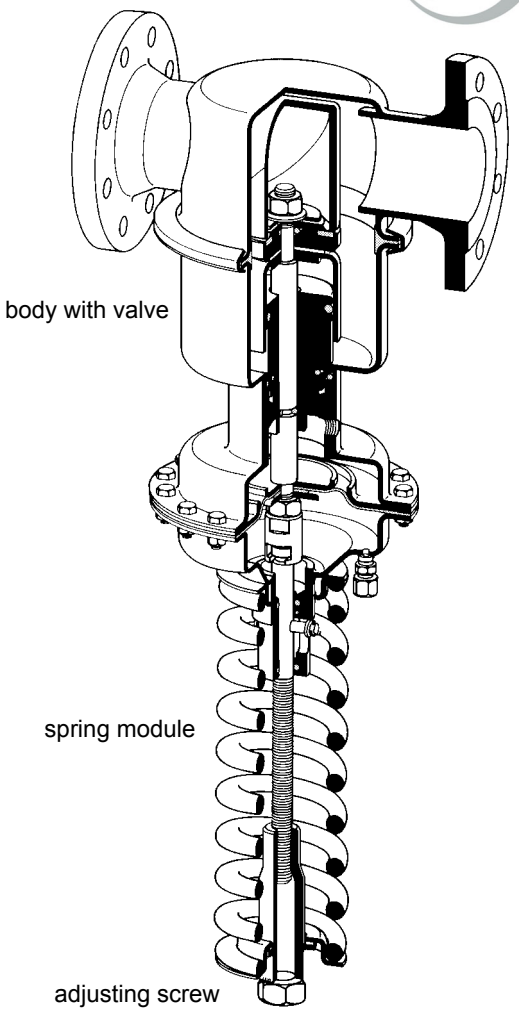
Pressure Control Valves DM 664

Pressure reducer for liquids and gases up to 130 °C

Technical Data

Connection	DN 50 - 100	
Nominal Pressure	Inlet	PN 16
	Outlet	PN 1 - 10
Inlet Pressure	up to 16 bar	
Outlet Pressure	0.02 - 5 bar in 6 setting ranges	
K_{VS}-value	32 - 100 m^3/h	
Tightness	acc. VDI/VDE-guideline 2174	
	(leakage rate ≤ 0.05 % of K_{VS}-value)	



Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 664 pressure reducing valve is a diaphragm-controlled spring-loaded and balanced proportional control valve for large volumes of non-hazardous media.

This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal (up to 130 °C).

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

The DM 664 pressure reducer requires a pilot line (to be installed on-site).

STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring
- Pilot line connection

OPTIONS

- Pressure gauge connection
- For toxic or hazardous media: additional leakage line connection. Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]			
nominal diameter DN			
50	65	80	100
32	50	80	100

Setting Ranges [bar], Nominal Pressure PN			
0,02 - 0,15	0,02 - 0,25	0,1 - 0,6	0,2 - 1,2
16/1	16/1	16/1	16/2,5

Setting Ranges [bar], Nominal Pressure PN		
0,8 - 2,5	2 - 5	4 - 8
16/6	16/10	16/16

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Pressure Control Valves DM 664

Pressure reducer for liquids and gases up to 130 °C

Materials	
Temperature	130 °C
Body, Diaphragm Housing, Internals	CrNiMo-steel
Spring	CrNi-steel
Valve Seal	EPDM optional FPM or PTFE
Diaphragm	EPDM optional FPM
O-ring	EPDM optional FPM

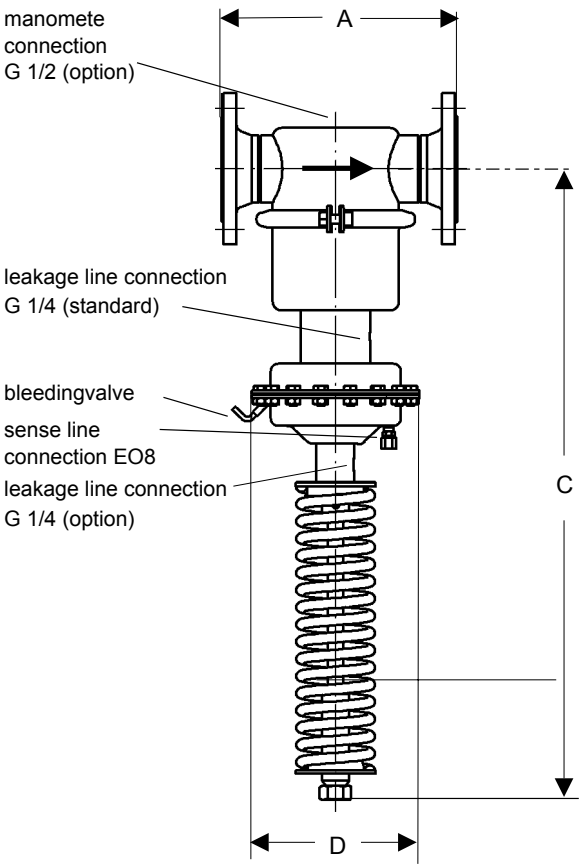
Dimensions [mm]

pressure range [bar]	size	nominal diameter DN 50	65	80	100
all ranges	A	230	290	310	350
0.02 - 0.15	C	650	700	700	700
	D	500	500	500	500
0.02 - 0.25	C	650	700	700	700
	D	360	360	360	360
0.1 - 0.6	C	740	790	790	790
	D	360	360	360	360
0.2 - 1.2	C	740	790	790	790
	D	270	270	270	270
0.8 - 2.5	C	740	790	790	790
	D	220	220	220	220
2 - 5	C	740	790	790	790
4 - 8	D	220	220	220	220

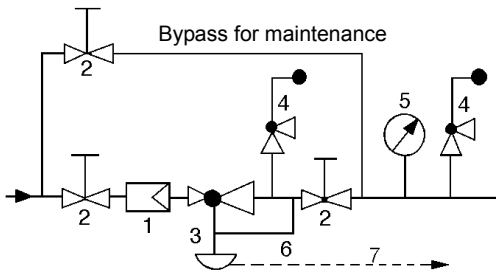
Weights [kg]

pressure range [bar]	nominal diameter DN 50	65	80	100
0.02 - 0.15	40	41	43	45
0.02 - 0.25	40	41	43	45
0.1 - 0.6	37	38	40	42
0.2 - 5 4 - 8	34	35	37	39

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.



Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line EO8
7 Leakage Line G 1/4 (option)

Sense line connection 10 - 20 x DN behind the valve

Sheet no. DM 664/3.1.062.1 - issue 12.06.2006

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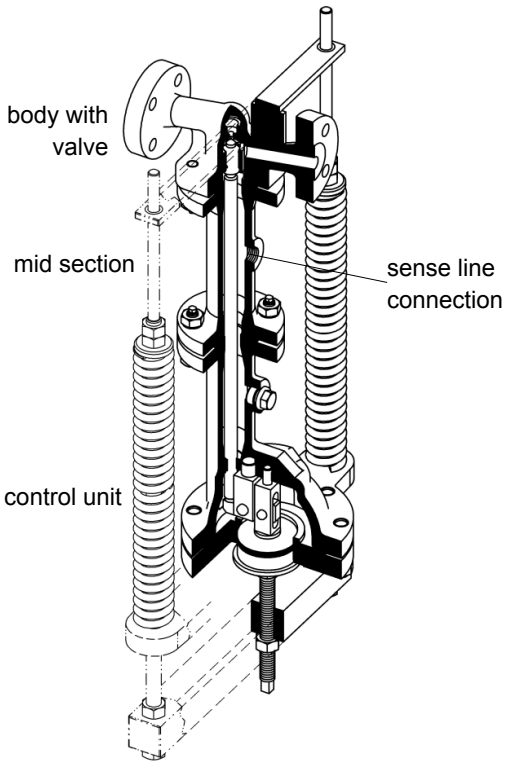
Pressure reducing valve for steam
up to 530 °C

Technical Data

Connection	DN 15 - 50
Nominal Pressure	PN 315
Inlet Pressure	up to 160 bar
Outlet Pressure	up to 40 bar in several ranges
K_{VS}-value	0,2 - 5,5 m^3/h
Tightness	acc. to VDI/VDE-guideline 2174 (leakage rate ≤ 0.05% of K_{VS}-value)



Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM 701 pressure reducing valve is a piston controlled, spring loaded proportional control valve for small capacities with small pressure drops. The valve cone is fitted with a metallic seal.

The outlet pressure to be controlled is balanced across the piston by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

The DM 701 pressure reducer requires a pilot line (to be installed on-site).

STANDARD

- Open spring
- Pilot line connection

OPTIONEN

- Mid section for higher temperatures (400 - 530 °C)
- Cone stellited for pressure drops > 25 bar
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-Value [m^3/h]						
	Nominal Pressure DN					
seat	15	20	25	32	40	50
I	0,2	0,25	0,25	0,4	0,4	1
II	0,9	0,9	0,9	2,5	2,5	3,5
III	1,8	2	2,2	3,9	3,9	5,5

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Pressure Control Valves DM 701

Pressure reducing valve for steam
up to 530 °C

Materials PN 16	
Temperature	300°C
Body	cast steel
Bottom Part	cast steel
Spring	spring steel C
Internals	on request
Piston	
O-ring	NBR or EPDM

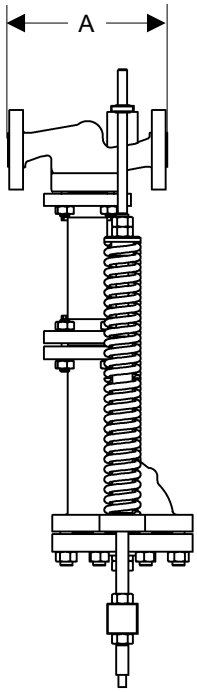
Materials PN 25 - 40			
Temperature	300°C	350°C	400°C
Body	cast steel	cast steel	cast steel
Bottom Part	cast steel	cast steel	cast steel
Mid Section	-	-	GS 17 CrMo 55
Spring	spring steel C	spring steel C	spring steel C
Internals	on request		
Piston			
O-ring	NBR or EPDM	NBR or EPDM	NBR or EPDM

Materials PN 63 - 315			
Temperature	350°C	400°C	530°C
Body	C 22 N	C 22 N	10 CrMo 9-10
Bottom Part	cast steel	cast steel	cast steel
Mid Section	-	GS 17 CrMo 55	GS 17 CrMo 55 or 10 CrMo 9-10
Spring	spring steel C	spring steel C	spring steel C
Internals	on request		
Piston			
O-ring	NBR or EPDM	NBR or EPDM	NBR or EPDM

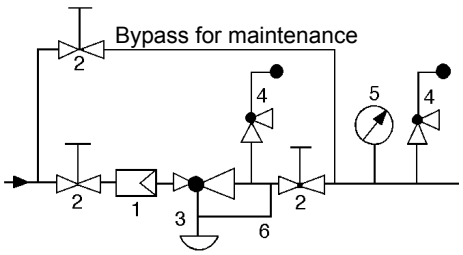
Dimensions [mm]							
		nominal diameter DN					
	size	15	20	25	32	40	50
A	PN 16 - 40	130	150	160	180	200	230
	PN 63 - 100	210	230	230	260	260	300
	PN 250 - 315	210	260	260	300	300	350

As the DM 701 pressure reducing valve is designed specifically for your operating data and may vary considerably in terms of construction, we are unable at this stage to give any dimensions or weights. Please contact us if you have specific queries.

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.



Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line (option)

sense line connection 10 - 20 x DN behind the valve

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Pressure Control Valves DM 762

Pressure reducer for liquids and gases up to 130 °C

Technical Data

Connection	G 1/2 - 2
	DN 15 - 50
Nominal Pressure	Inlet PN 16
	Outlet PN 1
Inlet Pressure	up to 16 bar
Outlet Pressure	0.002 - 0.52 bar in 16 setting ranges
K_{VS}-value	0.2 - 3.6 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-values)

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

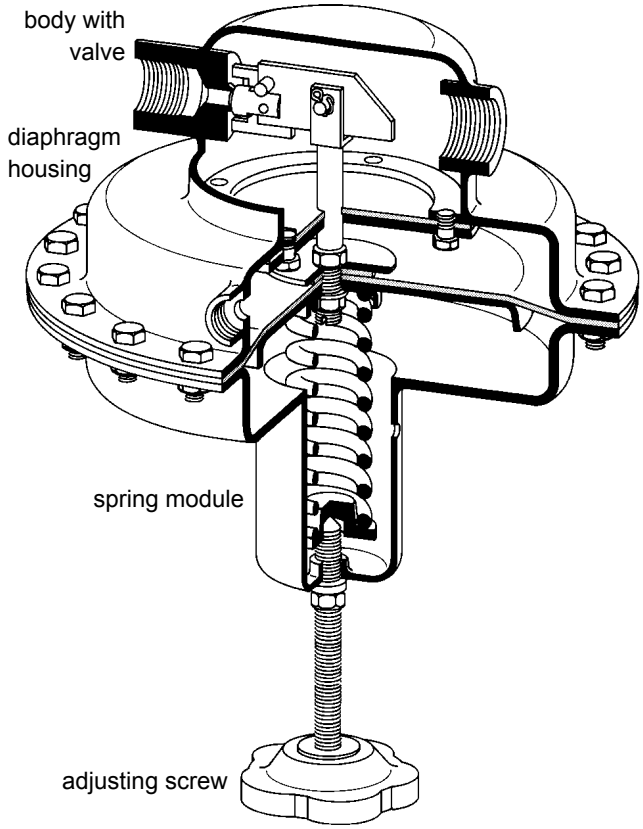
The DM 762 pressure reducing valve is a diaphragm-controlled spring-loaded proportional control valve for very small outlet pressures and large volumes.

This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.

The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.

The DM 762 pressure reducer requires a pilot line (to be installed on-site).

We recommend that G 1 and G 1½ or DN 25 and DN 40 connections be used.



STANDARD EQUIPMENT

- All stainless steel construction
- Pilot line connection

OPTIONS

- Pressure gauge connection
- Oil and grease-free version for oxygen
- Clean gas version with special connections
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h] for all body sizes					
0.2	0.9	1.5	2.2	2.8	3.6

Setting Ranges [bar] diaphragm diameter 500 mm			
0.002 - 0.003	0.003 - 0.015	0.008 - 0.03	0.012 - 0.07

Setting Ranges [bar] diaphragm diameter 360 mm			
0.004 - 0.006	0.005 - 0.032	0.015 - 0.06	0.025 - 0.14

Setting Ranges [bar] diaphragm diameter 270 mm			
0.008 - 0.016	0.015 - 0.065	0.02 - 0.12	0.05 - 0.28

Detting Ranges [bar] diaphragm diameter 220 mm			
0.015 - 0.030	0.025 - 0.125	0.05 - 0.22	0.1 - 0.52

Permissible Reduction Ratio (max. p_1/p_2)						
diaphragm	K_{VS}-value [m^3/h]					
diameter	0.2	0.9	1.5	2.2	2.8	3.6
500	15000	7500	4500	2200	1500	1100
360	8000	4000	2500	1200	800	650
270	4000	2000	1250	600	400	320
220	2200	1100	660	320	210	170

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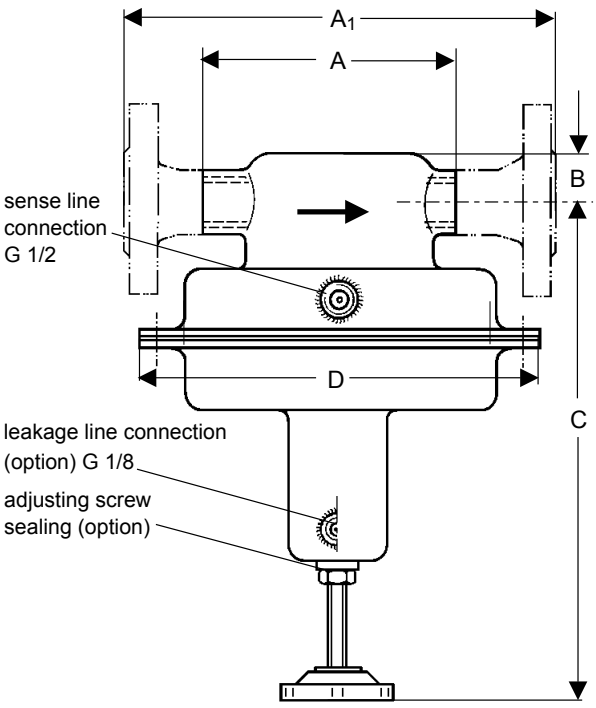
Pressure Control Valves — *DM 762*

Pressure reducer for liquids and gases up to 130 °C

Materials		
Temperature	80 °C	130 °C
Body, Bonnet, Internals, Screws	CrNiMo-steel	CrNiMo-steel
Adjusting Screw	CrniMo-steel M10 with handwheel made of Duroplast	
Spring	CrNi-steel	CrNi-steel
Valve Seal	FPM	FPM
Diaphragm	NBR	EPDM



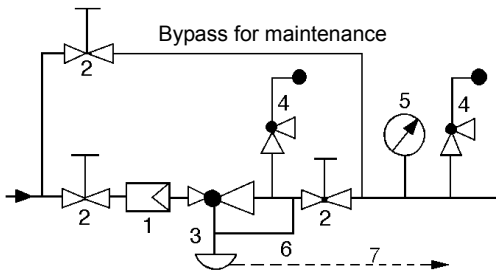
Dimensions [mm]						
size	nominal diameter G					
	1/2	3/4	1	1 1/4	1 1/2	2
A	165	170	170	180	180	180
B	35	35	35	40	45	50
C	320	330	330	340	350	360
D	= diaphragm diameter, see table pressure ranges					

Dimensions [mm]						
size	nominal diameter DN					
	15	20	25	32	40	50
A_1	240	240	250	250	260	260
B	35	35	35	40	45	50
C	320	330	330	340	350	360
D	= diaphragm diameter, see table pressure ranges					

Weights [kg]			
diaphragm-diameter	nominal diameter G 1/2 - 2	DN 15 - 25	DN 32 - 50
500	13	15	17
360	12.5	14.5	16.5
270	8	10	12
220	6	8	10

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line 1/2
7 Leakage Line G 1/8 (option)

Sense line connection 10 - 20 x DN behind the valve

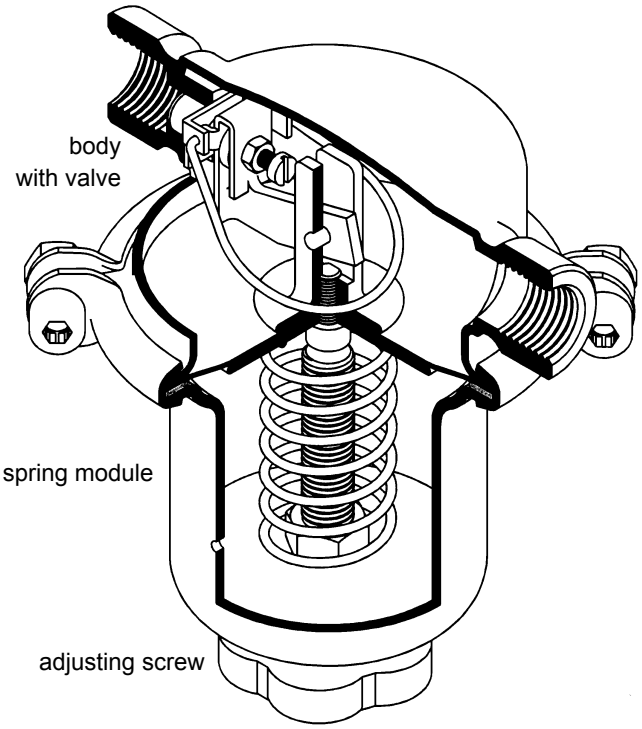
Sheet no. DM 762/3.1.061.1 - issue 12.06.2006

Pressure Control Valves DM 765

Pressure reducer for liquids and gases up to130 °C

Technical Data

Connection	G 1/2
Nominal Pressure	Inlet PN 16
	Outlet PN 2.5
Inlet Pressure	up to 8 bar
Outlet Pressure	0.03 - 0.8 bar in 3 setting ranges
K_{VS}-value	0.2 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)



Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.
The DM 765 pressure reducing valve is a diaphragm-controlled spring-loaded proportional control valve for very small outlet pressures and small volumes.
This pressure reducer is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.
The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance.
The outlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the outlet pressure rises above the pressure set using the adjusting screw, the valve cone moves towards the seat and the volume of medium is reduced. As the outlet pressure drops the valve control orifice increases; when the pipeline is depressurised the valve is open. Rotating the adjusting screw clockwise increases the outlet pressure.
For correct functioning the valve requires a minimum pressure drop of 1 bar (p1 - p2).
If a larger valve is needed, please select DM 762 (Kvs rating up to 3.6 m^3/h).

K_{VS}-values [m^3/h] for all body sizes
0.2

Setting Ranges [bar]		
0.03 - 0.12	0.08 - 0.32	0.02 - 0.8

STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring

OPTIONS

- Pressure gauge connection
- Oil and grease-free version for oxygen
- Clean gas version with special connections
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet No. DM 765/2.1.061.1 - issue 12.06.2006

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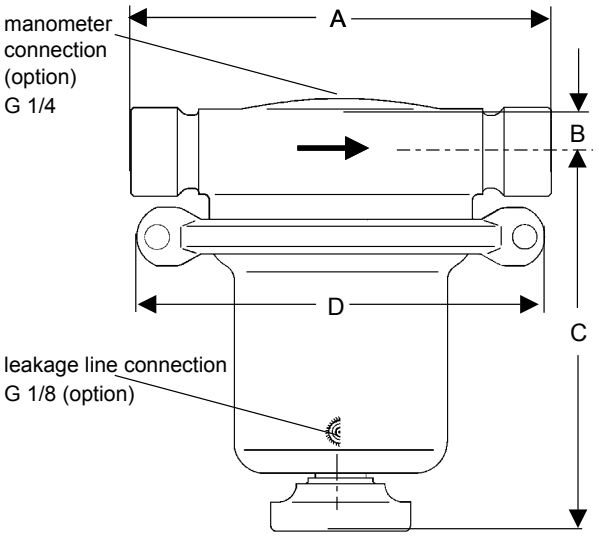
Pressure Control Valves DM 765

Pressure reducer for liquids and gases up to130 °C

Materials		
Temperature	80 °C	130 °C
Body, Bonnet, Internals, Screws	CrNiMo-steel	CrNiMo-steel
Spring	CrNi-steel	CrNi-steel
Valve Seal	FPM	FPM
Diaphragm	NBR	EPDM optional FPM

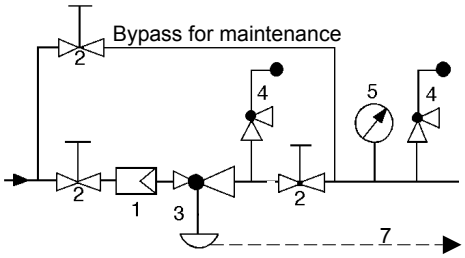
Dimensions [mm]	
size	nominal diameter G 1/2
A	140
B	~20
C	~130
D	138

Weights [kg]
1.5



Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
7 Leakage Line (option)

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Pressure reducer pilot-controlled for liquids up to 130 °C

Technical Data

Connection	DN 40 - 400
Nominal Pressure	Inlet PN 16 - 160
	Outlet PN 10 - 63
Inlet Pressure	up to 160 bar, above Δp 25 bar
	cone stellited
Outlet Pressure	1 - 40 bar in 4 setting ranges
K_{VS}-value	20 - 900 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The RP 810 pressure reducing valve is a pilot-controlled control valve consisting of a main valve, a pilot valve complete with restrictor assembly and built-in strainer mounted on the cover of the main valve, non-return valve and restrictor valves.

The valve cone is fitted with a metallic seal.

When the pipeline is depressurised the main valve is kept closed by a preloaded spring.

When the outlet pressure is below the set pressure the pilot valve is kept open by its spring. The control medium can flow towards the valve outlet. Restrictor D1 produces a pressure drop causing the outlet pressure to be almost equal to the pilot pressure in the main valve piston. The inlet pressure overcomes the outlet pressure and closing force of the spring and opens the main valve.

As soon as the outlet pressure has reached the set pressure, the pilot valve restricts the flow. This causes the pilot pressure to rise and push the main valve piston into a controlling position. The restrictors D1 and D2 are used to optimise the control characteristics. The bypass fitted with a non-return valve ensures quick closing.

When the outlet pressure exceeds the set pressure the pilot valve closes. The pilot pressure is equal to the inlet pressure. The main valve closes as the piston diameter is greater than the valve seat. The spring also forces the valve to close.

The G ½ pulse lines must be installed on-site.

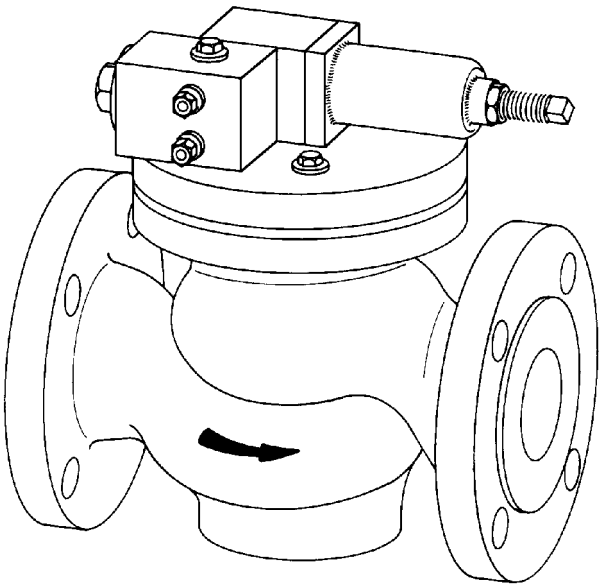
OPTIONS

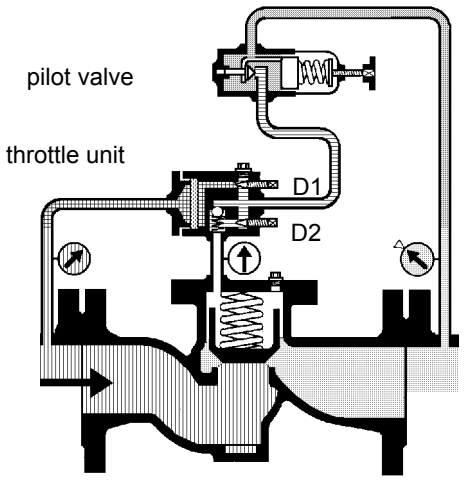
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.





K_{VS}-values [m^3/h]							
nom. diam.	DN	40	50	65	80	100	125
K_{VS}-value	m^3/h	20	32	50	60	70	150

K_{VS}-values [m^3/h]							
nom. diam.	DN	150	200	250	300	350	400
K_{VS}-value	m^3/h	250	350	500	600	700	900

Setting Ranges [bar], Nominal Pressure			
1 - 5	4 - 12	10 - 20	15 - 40
PN 16-160/10	PN 16-160/16	PN 16-160/40	PN 16-160/63

The pressure has always been indicated as overpressure.

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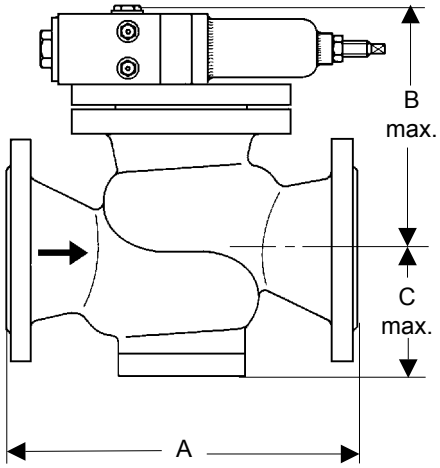
Pressure Control Valves RP 810

Pressure reducer pilot-controlled for liquids
up to 130 °C

Materials			
Temperature		80 °C	130 °C
Body	PN 16	spheroidal cast iron	spheroidal cast iron
	PN 160	cast steel	cast steel
	PN 16 - 160	CrNiMo-steel	CrNiMo-steel
Cover		steel optional CrNiMo-steel	
Internals		Cr-steel optional CrNi-steel or CrNiMo-steel	
Valve Seal		NBR	EPDM
O-ring		NBR	EPDM
Pilot Valve Throttle Unit		CrNiMo-steel	CrNiMo-steel



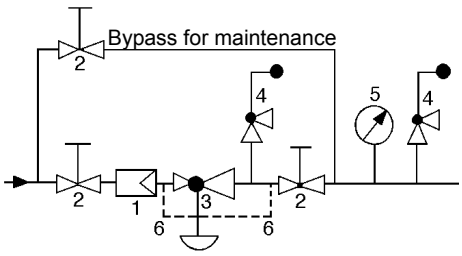
Dimensions [mm]							
nom. press.		nominal diameter DN					
PN	size	40	50	65	80	100	125
16	A	200	230	290	310	350	400
40	A	200	230	290	310	350	400
63 - 160	A	260	300	340	380	430	
all PN	B	200	220	250	260	280	290
all PN	C	140	160	180	220	220	230

Dimensions [mm]							
nom. press.		nominal diameter DN					
PN	size	150	200	250	300	350	400
16	A_1	480	600	730	850	980	1100
40	A_1	480	600	730	850	980	
63 - 160	A_1	550	650				
all PN	B	330	390	420	550	550	550
all PN	C	240	270	290	350	350	410

Weights [kg]												
nom. press.	nominal diameter DN											
PN	40	50	65	80	100	125	150	200	250	300	350	400
16	25	30	40	50	70	120	150	210	380	450	520	625
40	33	38	48	65	80	140	160	240	440	510	580	
63 - 160	40	45	55	80	110		165	290				

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 1/2

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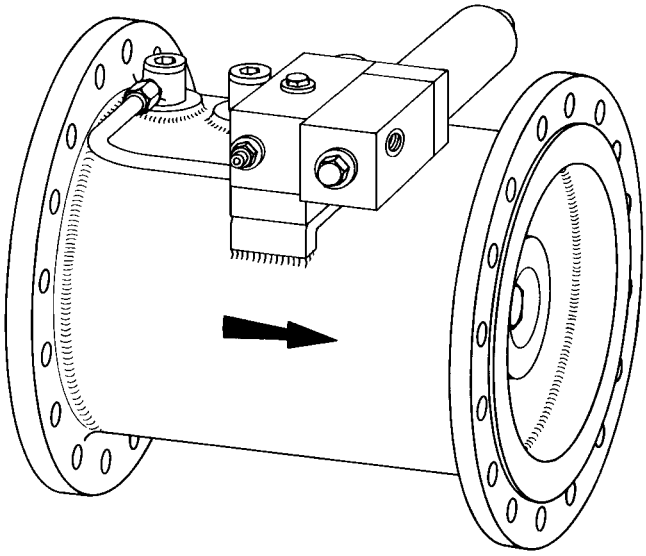
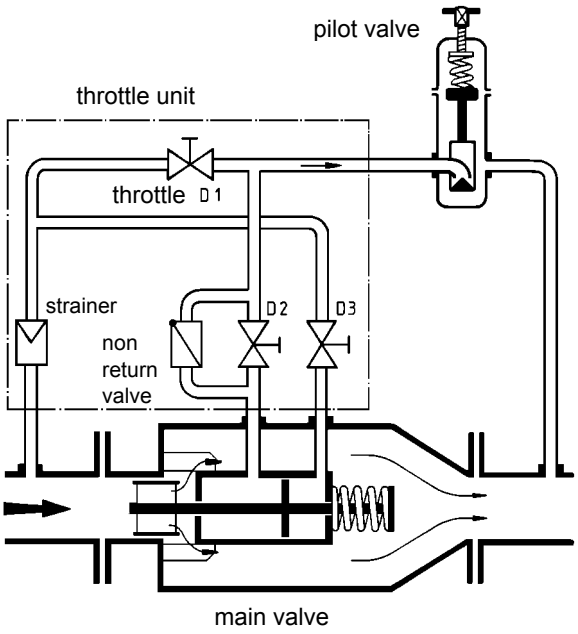
Pressure Control Valves RP 814, 815

Pressure reducer, pilot-controlled, inline-valve
for liquids up to 80 / 130 °C

Technical Data

Connection	RP 814: DN 100 - 800
	RP 815: DN 100 - 400
Nominal Pressure	PN 16 - 25
Inlet Pressure	up to 25 bar
Outlet Pressure	1 - 20 bar
	in 3 setting ranges
Differential Pressure	min. 2 bar
K_{VS}-vakue	60 - 2100 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)





Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The RP 814 and RP 815 pressure reducing valves are pilot-controlled control valves of tubular design consisting of a main valve, a pilot valve connected with the main valve via pipes and a restrictor assembly with built-in strainer.

The valve cone is fitted with a metallic seal.

When the pipeline is depressurised the main valve is kept closed by a preloaded spring. To open the valve a pressure difference (p1 – p2) of at least 2 bar is required.

When the outlet pressure is below the set pressure the pilot valve is kept open by its spring. The control medium can flow towards the valve outlet. Restrictor D1 produces a pressure drop causing the outlet pressure to be almost equal to the pilot pressure in the main valve. The inlet pressure overcomes the outlet pressure and closing force of the spring and opens the main valve.

As soon as the outlet pressure has reached the set pressure, the pilot valve restricts the flow. This causes the pilot pressure to rise and push the main valve piston into a controlling position in which opening and closing forces are in balance. When the outlet pressure exceeds the set pressure the pilot valve closes. The pilot pressure is equal to the inlet pressure. The forces acting on the piston are in equilibrium and the main valve is kept closed by its spring.

The restrictors are used to optimise the control characteristics. The bypass line around D2 which is fitted with a non-return valve, ensures quick closing.

The valve is piped internally. The G ½ pulse lines must be installed on-site.

The valve can be fitted with electrical limit switches.

The RP 814 and RP 815 pressure reducers differ from each other by their size and Kvs ratings.

OPTIONS

- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]						
	nominal diameter DN					
type	100	125	150	200	250	300
814	60	100	120	180	250	400
815	180	200	250	400	600	800

K_{VS}-values [m^3/h]							
	nominal diameter DN						
type	350	400	450	500	600	700	800
814	600	800	1100	1200	1800	2000	2100
815	1200	1800					

Setting Ranges [bar], Nominal Pressure		
1 - 5	4 - 12	10 - 20
PN 16 - 25/10	PN 16 - 25/25	PN 16 - 25/40

The pressure has always been indicated as overpressure.

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Pressure Control Valves RP 814, 815

Pressure reducer, pilot-controlled, inline-valve
for liquids up to 80 / 130 °C

Materials		
Temperature	80 °C	130 °C
Body	steel optional CrNiMo-steel welded	
Internals	CrNiMo-steel	CrNiMo-steel
Valve Seal	CrNiMo-steel	CrNiMo-steel
O-ring	NBR	EPDM
Pilot Valve Sene Lines Throttle Unit	CrNiMo-steel	CrNiMo-steel

Dimensions [mm] RP 814													
	nominal diameter DN												
size	100	125	150	200	250	300	350	400	450	500	600	700	800
A	300	325	350	400	450	500	550	600	650	700	800	900	1000
B max.	200	200	220	240	270	300	320	350	380	400	450	500	550
E max.	270	270	270	270	270	270	270	270	270	270	270	270	270

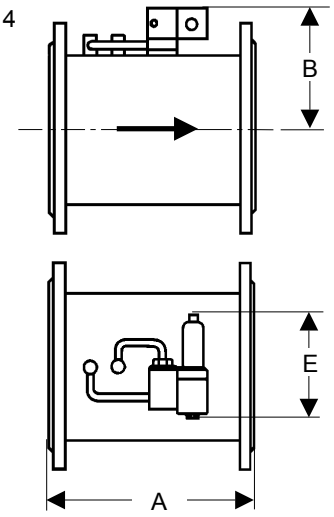
Weights [kg] RP 814													
	nominal diameter DN												
PN	100	125	150	200	250	300	350	400	450	500	600	700	800
16	60	60	65	75	120	150	190	240	300	360	420	480	540
25	75	75	80	90	135	165	220	280	360	400	460	580	720

Dimensions [mm] RP 815								
	nominal diameter DN							
size	100	125	150	200	250	300	350	400
A	350	400	480	600	730	850	980	1100
B max.	220	240	270	300	320	350	400	450
ø D max.	360	400	425	485	555	620	730	845
E max.	270	270	270	270	270	270	270	270

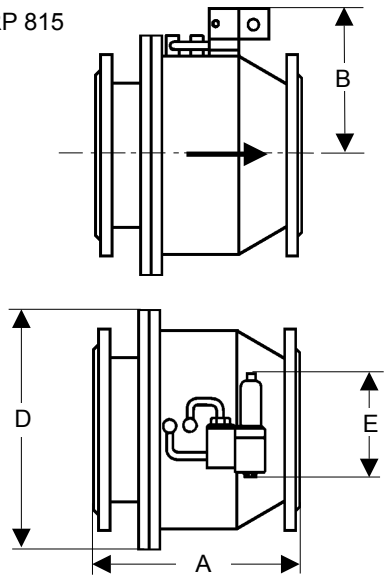
Weights [kg] RP 815								
	nominal diameter DN							
PN	100	125	150	200	250	300	350	400
16	85	110	125	170	220	270	340	400
25	90	115	135	180	240	300	370	430

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

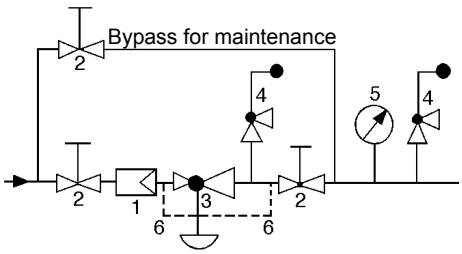
RP 814



RP 815



Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 1/2

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Pressure Control Valves RP 818

Pressure reducer, pilot-controlled, sandwich design,
for liquids and gases up to 80 / 130 °C

Technical Data

Connection	DN 65 - 150
Nominal Pressure	Inlet PN 10 - 40
	Outlet PN 16
Inlet Pressure	up to 40 bar
Outlet Pressure	0.02 - 10 bar
	in 7 setting ranges
K_{VS}-value	58 - 331 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The RP 818 pressure reducing valve is a pilot-controlled control valve designed for mounting between flanges, consisting of a main valve, a pilot valve connected with the main valve via pipelines, a restrictor assembly and a strainer.

The valve closing mechanism consists of two slotted discs which slide and seal against each other.

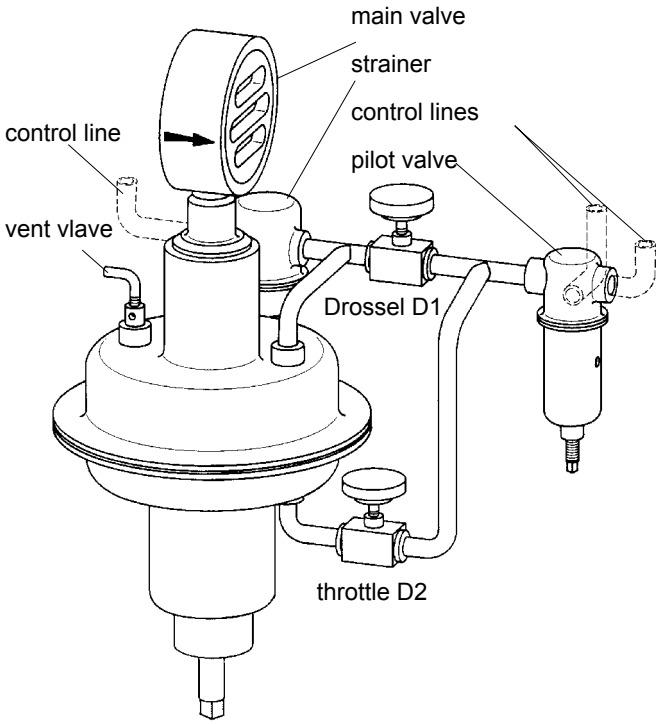
When the pipeline is depressurised the main valve is kept closed by a preloaded spring.

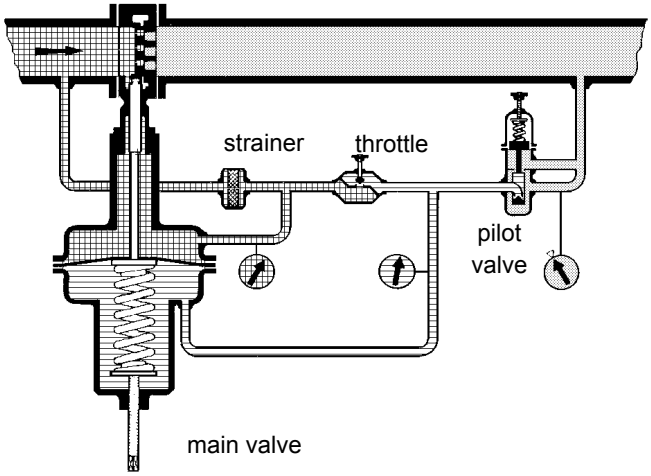
When the outlet pressure is below the set pressure the pilot valve is open. Restrictor D1 produces a pressure drop causing the outlet pressure to be almost equal to the pilot pressure in the main valve spring chamber. The inlet pressure overcomes the pilot pressure and closing force of the spring and opens the main valve.

As soon as the outlet pressure has reached the set pressure, the pilot valve restricts the flow. This causes the pilot pressure to rise and push the main valve diaphragm into a controlling position in which opening and closing forces are in balance.

When the outlet pressure exceeds the set pressure the pilot valve closes. The pilot pressure is equal to the inlet pressure. The forces acting on the diaphragm are in equilibrium and the main valve is kept closed by its spring.

The valve is piped internally. The G ½ and E015 pulse lines must be installed on-site.





OPTIONS

- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

K_{VS}-values / max. ΔP						
nom. dia.	DN	65	80	100	125	150
Kvs-value	m^3/h	58	89	146	241	331
max.Δp	bar	32	32	32	18	12

Setting Ranges [bar]						
0.02 - 0.1	0.1 - 0.3	0.2 - 0.6	0.5 - 1.2	1 - 2.5	2 - 5	4 - 10

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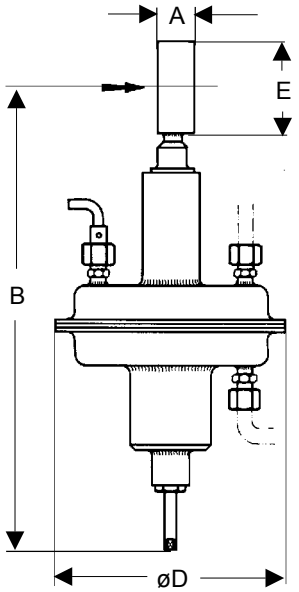
Pressure Control Valves RP 818

Pressure reducer, pilot-controlled, sandwich design,
for liquids and gases up to 80 / 130 °C

Materials		
Temperature	80 °C	130 °C
Body	steel optional CrNiMo-steel welded	
Internals	CrNiMo-steel	CrNiMo-steel
Valve Seal	CrNiMo-steel	CrNiMo-steel
O-ring	NBR	EPDM
Pilot Valve Sense Lines Throttle Unit	CrNiMo-steel	CrNiMo-steel

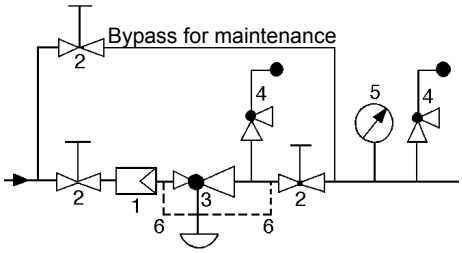
Dimensions [mm]					
size	nominal diameter DN				
mm	65	80	100	125	150
A	46	46	52	56	56
B	800	815	825	840	860
D max.	220	220	220	220	220
øE max.	127	142	164	194	219

Weights [kg]				
nominal diameter DN				
65	80	100	125	150
27	28	29	31	33



Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line G 1/2

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Pressure Control Valves DM EU115

Pressure reducer pilot-controlled for water up to 70 °C

Technical Data

Connection	DN 50 - 600
Nominal Pressure	PN 10 - 16
Inlet Pressure	up to 16 bar
Outlet Pressure	1.4 - 12 bar (standard)
	0.1 - 2.0 bar (special)
K_{vs}-Value	40 - 2550 m^3/h
Tightness	acc. to VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of the K_{vs}-value)

Description

Medium-controlled pressure reducers are simple control valves offering accurate control while being easy to install and maintain. They control the pressure downstream of the valve without requiring pneumatic or electrical control elements.

The DM EU115 pressure reducing valve is a pilot-controlled control valve consisting of main valve with position indicator, control unit, pilot valve, pressure gauge stop valves and connecting pipes. The main valve cone is fitted with a soft seal. This valve which has been specially developed for drinking water applications, features an electrostatically deposited coating on internal and external surfaces and meets the KTW recommendation of the German Ministry for Health.
When the pipeline is depressurised or inlet and outlet pressures are equal, the main valve is kept closed by its spring.

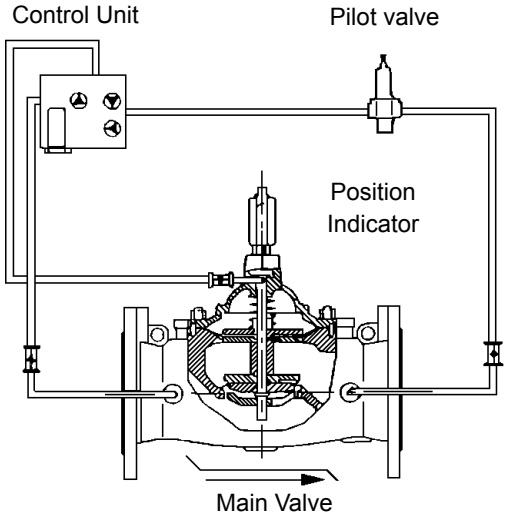
When the outlet pressure falls below the set pressure the control medium can flow towards the valve outlet via the open pilot valve. A restrictor in the control unit produces a pressure drop upstream of the diaphragm causing the inlet pressure to overcome the control pressure and spring force and open the main valve.

As soon as the outlet pressure has reached the set pressure, the pilot valve restricts the flow. This causes the pilot pressure to rise and push the main valve cone into a controlling position.

When the outlet pressure exceeds the set pressure the pilot valve closes. The pilot pressure continues to rise and the main valve also closes.

The control unit contains adjustable restrictors which allow the control characteristics of the pressure reducer to be matched to the system (closing, opening and response speeds).
The pressure reducer is completely piped. It does not require any additional pilot lines.

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{vs}-Values [m^3/h]								
Nom. Diam.	DN	50	65	80	100	125	150	200
K_{vs}-value	m^3/h	40	43	47	115	170	175	360

K_{vs}-Values [m^3/h]							
Nom. Diam.	DN	250	300	350	400	500	600
K_{vs}-value	m^3/h	560	1240	1290	1780	2490	2550

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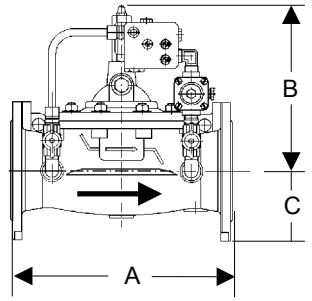
Pressure Control Valves — *DM EU115*

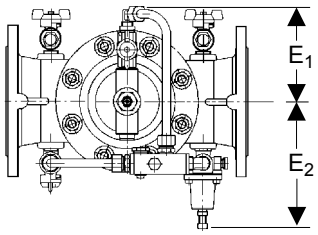
Pressure reducer pilot-controlled for water
up to 70 °C

Materials - Main Valve		
Temperature		70 °C
Body		spheroidal cast iron Epoxy-coated*
Cover		spheroidal cast iron Epoxy-coated*
Cap Bearing		bronze, self-lubricating
Internals		1.4401, 1.4305
Diaphragm-discs	DN 50 - 150	steel Epoxy-coated*
	ab DN 200	cast steel Epoxy-coated*
Spring		1.6900
Valve Seal		NBR Quad-ring
O-ring		Viton
Diaphragm		NBR-nylon-reinforced*

Materials - Pilot Circuit	
Control Unit	1.4305
Pilot Valve	bronze, 1.4305 / 1.4401, brass NBR diaphragm
Strainer	1.4404
Non-Return Valve	Hastoform, spring 1.4401
Pilot Line	1.4305
Pipe Unions	brass, nickel plated
Fittings	1.4301, 1.4401
Stop Valves	brass, nickel plated
Gauge Stop Valves	brass, nickel plated

* in accordance with KTW-recommendation



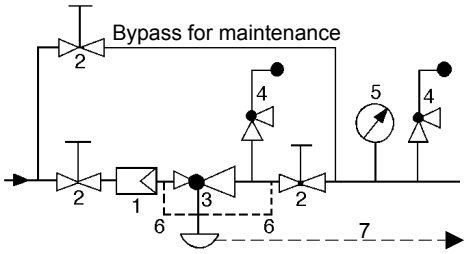


Dimensions [mm] and Weights [kg]								
nom. press.		nominal diameter DN						
PN	size	50	65	80	100	125	150	200
10/16	A	230	290	310	350	400	480	600
10/16	B	225	225	225	260	310	310	365
10/16	C	85	95	100	110	125	145	170
10/16	E_1	160	170	175	190	200	210	235
10/16	E_2	130	130	130	140	145	155	180
10/16	kg	20	23	25	36	50	61	110

Dimensions [mm] and Weights [kg]							
nom. press.		nominal diameter DN					
PN	size	250	300	350	400	500	600
10/16	A_1	730	850	980	1100	1250	1450
10/16	B	475	570	570	680	720	820
10	C	200	230	255	285	335	390
16		200	230	260	290	360	420
10/16	E_1	280	305	330	355	405	455
10/16	E_2	220	245	270	295	360	420
10/16	kg	225	390	485	580	820	1180

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Pressure Reducer
4 Safety Valve
5 Pressure Gauge
6 Sense Line (option)
7 Leakage Line (option)

sense line connection 10 - 20 x DN behind the valve

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Pressure reducer weighted lever-type
for liquids, gases and steam up to 280 °C

Technical Data

Connection	DN 50 - 400
Nominal Pressure	PN 16 - 40
Inlet Pressure	up to 8 bar
Outlet Pressure	0.5 - 10bar
K_{VS}-Value	32 - 1200 m^3/h
Tightness	acc. VDI/VDE-guideline 2174

Description

Pressure reducing valves control the pressure downstream of the valve.

The DM 3 and DM 4 pressure reducers are medium-controlled weighted-lever valves for medium to large volumes. These valves require no auxiliary energy. Thanks to their integral control characteristics they are very accurate. The time reponse is set by means of an oil-filled damper.

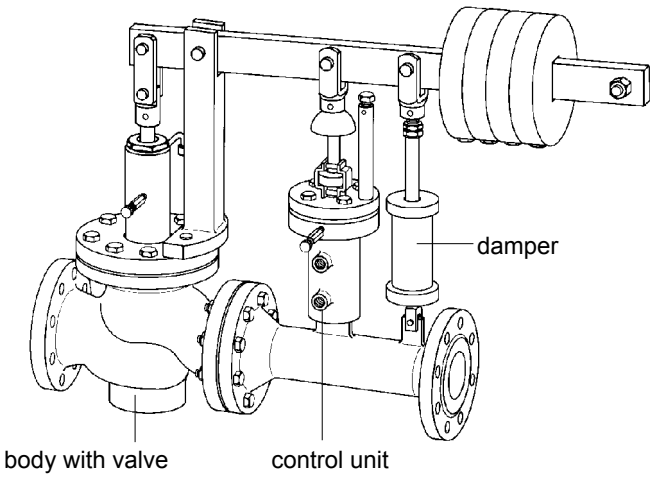
DM 3 is a single seat, DM 4 a twin seat valve; both are piston-controlled. The valves can be supplied with soft or hard seals. The valve seat leakage meets the VDI/VDE Guideline 2174.

When the pipeline is depressurised the valve cone is kept in open position by the weighted lever. As the outlet pressure rises a control piston is pressurised via a pilot line, lifting the lever and moving the valve cone towards the „closed“ position. During normal operation the opening force of the weight and the closing force of the piston balance each other and the pressure reducer operates continually. The outlet pressure is kept constant irrespective of inlet pressure and flow volume. The control pressure is set by changing the weight on the lever.

The maximum outlet pressure must not exceed 1.5 times the set pressure, unless specified otherwise.

In the case of toxic or hazardous media a leakage line must be installed to the control unit capable of draining leaking medium safely and without pressure if the control element should become defective.

The pressure reducers DM 3 and DM 4 require a pilot line (to be installed on-site).



Kvs-values [m^3/h]					
	nominal diameter DN				
type	50	65	80	100	125
3 (E)	32	50	75	100	140
4 (E)	40	65	100	150	180

Suffix E = enlarged outlet

OPTIONS

- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Kvs-values [m^3/h]						
	nominal diameter DN					
type	150	200	250	300	350	400
3 (E)	200	300	450	550	650	800
4 (E)	250	400	550	700	750	1200

Suffix E = enlarged outlet

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

Sheet no. DM 3/2.1.071.1 - issue 09.01.2007

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Pressure Control Valves DM 3, 4

Pressure reducer weighted lever-type
for liquids, gases and steam up to 280 °C

Materials		
Temperature	80 °C	
Nominal Pressure	PN 16	PN 40
Operating Pressure	max. 16 bar	max. 40 bar
Body	GG-20	GS-C25
Tubular Section	steel welded	
Internals	Cr-Stahl / CrNiMo-Stahl	
Valve Seal	NBR / FPM / EPDM / PTFE Cr-steel / CrNiMo-steel	
O-ring	NBR / FPM / EPDM / PTFE	

Materials		
Temperature	280 °C	
Nominal Pressure	PN 16	PN 40
Operating Pressure	max. 13 bar	max. 28 bar
Body	GG-20	GS-C25
Tubular Section	steel welded	
Internals	Cr-steel / CrNiMo-steel	
Valve Seal	Cr-steel / CrNiMo-steel	
O-ring	FXM / FFKM	

Dimensions [mm]

	nominal diameter DN					
size	50	65	80	100	125	150
A	580	630	670	750	850	980
B	120	200			260	
C*	650	850			900	
D*	750	1150			1500	

Dimensions [mm]

	nominal diameter DN				
size	200	250	300	350	400
A	1200	1430	1650	1800	2100
B	260	350			420
C*	900	1100			
D*	1500	2000			

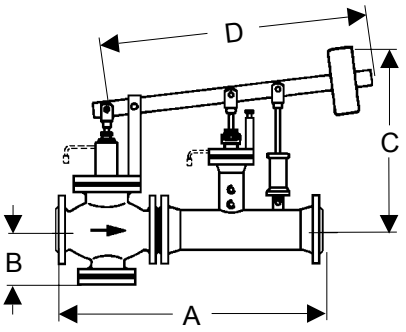
Dimensions [mm] (enlarged outlet)

	nominal diameter DN			
size	50/100	65/125	80/150	100/200
A	650	770	850	1000
B	120	180		230
C*	650	850		950
D*	750	1150		1300

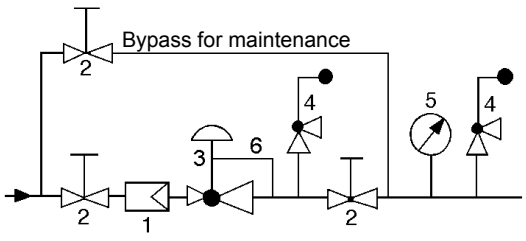
Dimensions [mm] (enlarged outlet)

	nominal diameter DN		
size	125/250	150/300	200/400
A	1200	1500	1650
B	230	260	280
C*	950	1130	1200
D*	1300	1700	1800

*) Dimensions C and D are reference dimensions.
The weighted lever (dim. D) may project beyond the valve outlet flange.



Recommended Installation



sense line connection: 10 - 20 x nominal diameter behind the pressure reducer.

1 Strainer *
2 Shut-off valves
3 Pressure reducing valve
4 Safety valves *
5 Pressure gauge *
6 Sense line G 1/2

* use MANKENBERG-products

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. DM 3/3.1.071.1 - issue 09.01.2007

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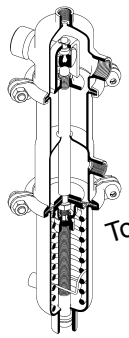
Pressure Control Valves

Overflow Valves for Steam

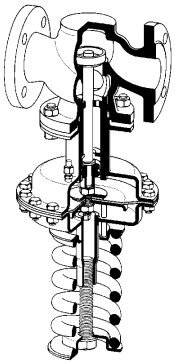


UV 3.5Z Small capacity, available in various capacities

Top Seller

all stainless steel SST 316 construction

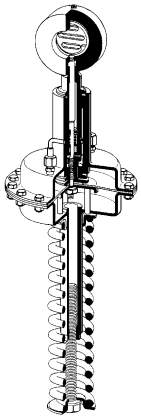
PN..... 1 - 25 DN..... 15 - 25
p_2..... 0.005 - 20 bar G..... 1/2
K_{vs}..... 0.15, 0.4 oder 0.9 m^3/h T..... 200 °C



Standard valve, cast body UV 4.1

for all applications
body grey cast iron, spheroidal cast iron, cast steel

PN..... 16 - 40 DN..... 15 - 150
p_1..... 0.02 - 10 bar T..... 200 °C
K_{vs}..... 4 - 160 m^3/h

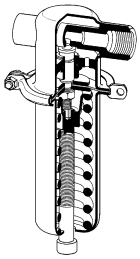


UV 6.7 / 6.8 High capacity, only for small pressure drops

sliding gate, sandwich design
body carbon steel, stainless steel

PN..... 10 - 40 DN..... 15 - 150
p_1..... 0.1 - 10 bar T..... 300 °C
K_{vs}..... 4 - 338 m^3/h

Overflow Valves for Liquids and gases

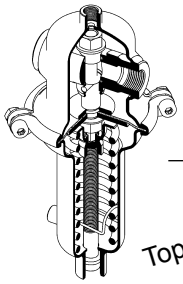


Small capacity, available in various capacities UV 3.5

Top Seller

all stainless steel SST 316 construction

PN..... 1 - 25 DN..... 15 - 25
p_1..... 0.005 - 20 bar G..... 1/2
K_{vs}..... 0.15, 0.4 oder 0.9 m^3/h T..... 130 °C

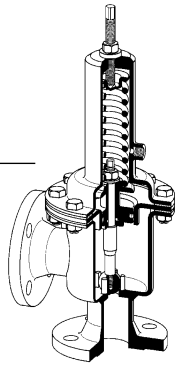


UV 5.1 Universal valve, for all media

Top Seller

all stainless steel SST 316 construction

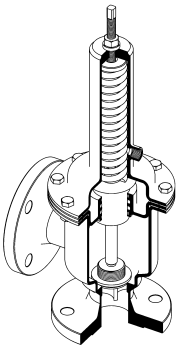
PN..... 16 DN..... 15 - 50
p_1..... 0.02 - 12 bar G..... 1/2 - 2
K_{vs}..... 3.2 - 18 m^3/h T..... 130 °C



Hygienic applications UV 3.8

virtually pocket-free, can be electropolished
all stainless steel SST 316 construction

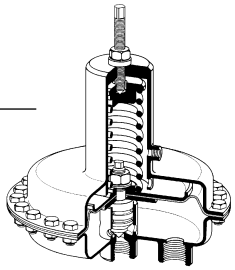
PN..... 16 DN..... 15 - 50
p_1..... 2 - 16 bar G..... 1/2 - 2
K_{vs}..... 0.2 - 5.5 m^3/h T..... 200 °C



UV 1.8 Hygienic applications, for high-viscisity media

for simple control duties
virtually pocket-free, can be electropolished
body stainless steel SST 316

PN..... 16 DN..... 25 - 100
p_1..... 2 - 16 bar G..... 1 - 2
K_{vs}..... 6 - 80 m^3/h T..... 130/300 °C



Tank blanketing UV 3.9

millibar control valve
all stainless steel SST 316 construction

PN..... 1 - 2,5 DN..... 15 - 50
p_1..... 0.01 - 1.1 bar G..... 1/2 - 2
K_{vs}..... 0.2 - 28 m^3/h T..... 130 °C

Special versions on request. All the pressure has always been indicated as overpressure. We reserve the right to alter technical specifications without notice.

Sheet no. UV/14.1.081.1 - issue 06.02.2008

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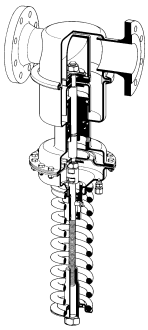
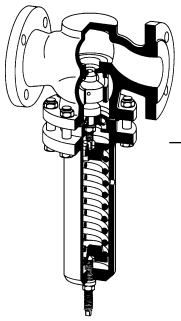
Overflow Valves for Liquids and Gases



High capacity, stainless steel — UV 4.7 / 4.8

all stainless steel SST 316 construction

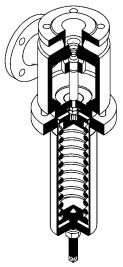
PN..... 16
DN..... 50 - 100
p_1..... 0.02 - 10 bar
T..... 130 °C
K_{vs}..... 32 - 100 m^3/h



UV 3.1 For constant operating condition

simple and economical valve, cast body
body grey cast iron, spheroidal cast iron, cast steel

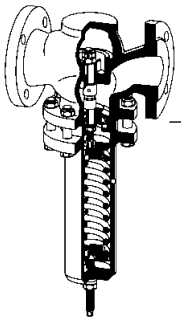
PN..... 16 - 40
DN..... 15 - 50
p_1..... 0,005 - 10 bar
T..... 130 °C
K_{vs}..... 0.5 - 5.5 m^3/h



High pressure, up to 100 bar inlet pressure — UV 8.2

body carbon steel, stainless steel

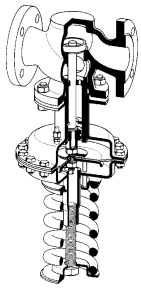
PN..... 100
DN..... 15 - 50
p_1..... 2 - 100 bar
G..... 3/8 - 2
K_{vs}..... 0.2 - 5.5 m^3/h
T..... 130/400 °C



UV 1.2 For simple control duties

body grey cas iron, spheroidal cast iron, cast steel

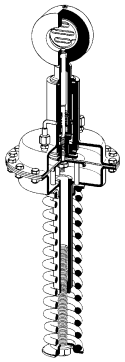
PN..... 16 - 40
DN..... 25 - 200
p_1..... 2 - 40 bar
T..... 130/300 °C
K_{vs}..... 6 - 125 m^3/h



Standard valve, cast body — UV 4.1

body grey cast iron, spheroidal cast iron, cast steel

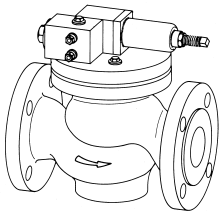
PN..... 16 - 40
DN..... 15 - 150
p_2..... 0.02 - 10 bar
T..... 130/200 °C
K_{vs}..... 4 - 160 m^3/h



UV 6.7 / 6.8 High capacity, only for small pressure drops

sliding gate, sandwich design
body carbon steel, stainless steel

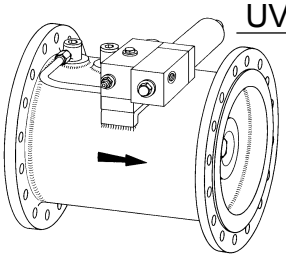
PN..... 10 - 40
DN..... 15 - 150
p_2..... 0.1 - 10 bar
T..... 80/300 °C
K_{vs}..... 4 - 338 m^3/h



High capacity, for high pressures — UV 820

pilot-controlled valve, cast body
body spheroidal cast iron, cast steel

PN..... 10 - 63
DN..... 40 - 400
p_2..... 2 - 40 bar
T..... 130 °C
K_{vs}..... 20 - 900 m^3/h



UV 824 / 825 High capacity, inline valve

pilot-controlled inline valve
body steel welded, stainless steel

PN..... 10 - 25
DN..... 100 - 800
p_2..... 2 - 20 bar
T..... 130 °C
K_{vs}..... 60 - 2100 m^3/h

Sheet no. UV714.1.081.2 - issue 06.02.2008

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Know How • Overflow valves

Overflow valves control an adjustable constant pressure upstream of the valve. A spring keeps the valve close. As the inlet pressure rises the valve opens.

Selecting valve type and nominal diameter
Using your maximum operating data and the smallest differential pressure Dp, you should calculate the characteristic performance figure K_v (see leaflet Calculation of Pressure Regulators). Select a valve whose K_{vs} value is 30 % greater than the calculated K_v figure. Additional allowances must be made for high-viscosity liquids or liquids which vaporise when depressurised.
Overflow valves should not be overdimensioned. Their optimum working range is within 10 % to 70 % of their K_{vs} value.

Selecting rated pressure and valve material
The rated pressure must exceed the maximum system pressure, irrespective of safety allowances. Please note also the effect of the temperature (see DIN 2401).

Selecting the setting range
For good control accuracy you should select a setting range which places the required inlet pressure near its upper limit. If, for example, the controlled inlet pressure is to be 2.3 bar, you should select the 0.8 to 2.5 bar setting range, not 2 to 5 bar. If the available setting range is not wide enough you may go below the bottom limit of the setting range provided that the valve loading is kept low and a high control accuracy not required.

Selecting elastomer materials
You should select eleastomers according to the operating temperature and the requirements of the medium. High-pressure gases, for example, can diffuse into the elastomer and cause damage when being depressurised.

Flow velocity
Depending on pressure drop and permitted maximum noise level, we recommend the following flow velocities:

Liquids	1	-	5	m/s
Saturated steam	10	-	40	m/s
Superheated steam	15	-	60	m/s
Gases up to 2 bar	2	-	10	m/s
Gases above 2 bar	5	-	40	m/s

Sense line (control line)
You should install a sense line if the selected overflow valve is designed for sense line operation. The sense line should be connected at a distance of not less than 10 times nominal diameter upstream of the pressure reducing valve. No isolating valves should be installed in the sense line to avoid an excessive pressure differential between valve body and diaphragm.
To attenuate any oscillations occurring in the pipeline system, the sense line may be fitted with a restrictor which must never be fully closed during operation.
In the case of steam and liquids the sense line must be installed so as to fall towards the valve. Under special operating conditions, for example intermittent operation with dry steam, an compensation vessel must be installed. The sense line must be rigid as elastic hoses can induce oscillations.

Protecting your system
To protect your system you should install a safety valve upstream of the overflow valve to prevent the maximum permitted operating pressure (normally 1.5 x maximum set pressure) being exceeded. The safety valve operating pressure should be set approximately 40 % above the maximum set pressure of the overflow valve to avoid blow-off during slight pressure fluctuations. For example: if the overflow valve setting range is 2 - 5 bar the safety valve operating pressure must be 1.4 x 5 bar = 7 bar.

Protecting the overflow valve
To protect the overflow valve against damage from solid particles carried in the pipeline, a strainer or filter should be fitted and serviced at regular intervals.

Valve seat leakage
Overflow valves are control valves which are not required to provide a leak-proof seal (VDI/VDE Guideline 2174). Normally overflow valves leave the factory with perfectly leakproof valve seats. During operation, however, solid particles often cause damage and seat leakage. Any low leakage requirement must be expressly specified when ordering. Valve leakage can be considerably reduced by special measures such as lapping the valve seat, using special cone seals and increasing the control (diaphragm) surfaces.

Cut-off
For the purpose of installation, servicing and isolation of the valve, shut-off valves should be installed upstream and downstream of the overflow valve. When closing the shut-off valves the upstream valve must always be closed first. A bypass line may be necessary to maintain emergency operation.

Stellited seat and cone
In the case of abrasive media or liquids with pressure drops (inlet pressure minus outlet pressure) of more than 25 bar the valve cone must be stellited; for pressure drops above 150 bar the seat must be stellited as well.

Leakage line
If toxic or hazardous media are used the valve must feature a sealed spring cap (including setting spindle seal) fitted with a leakage line connection. When the overflow valve is installed on site a leakage line must be fitted capable of safely and pressureless draining the escaping medium in case the control valve should become defective.

Sheet. no. UV/13.1.041.1 - issue 26.04.2004

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Know How • Overflow valves

Overflow valves control an adjustable constant pressure upstream of the valve. A spring keeps the valve close. As the inlet pressure rises the valve opens.

Mounting position
For gases a pressure reducing valve can normally be fitted in horizontal pipelines with the spring cap at the bottom or at the top. Installation in vertical pipe runs is possible but can result in increased wear and loss of control accuracy owing to increased friction. In the case of liquids a overflow valve should be installed with the spring cover at the bottom. Thus gas traps upstream of the valve are avoided which would cause the valve to oscillate. For steam a overflow valve should likewise be installed with its spring cover at the bottom to protect the diaphragm against overheating by means of a layer of condensate.

Start-up
Overflow valves should be started up and operated without pressure surges, if possible. A sudden operation of upstream or downstream valves should be avoided.

Steam operation
If a overflow valve is installed in a steam plant the diaphragm water reservoir must be filled before the plant is started up. There must be no danger of overheating at the installation site caused by excessive ambient temperatures or insufficient heat dissipation. Overflow valve must not be insolated. In some cases an insulating of the body is permitted, but only with cast bodies. Never insulate diaphragm housing, mid section and spring cap (or open springs). Overheating caused by insulating destroys the elastomere of the control unit.

Setting the pressure
Pressure reducing valves are normally supplied by us with a relaxed spring. This means that a valve is set at the factory to the minimuminlet pressure. The required pressure should be set under operating conditions.

Maintenance
Overflow valves must be cleaned and serviced regularly.

Valves free of oil and grease or silicone
Please pay attention to order an fit only spares free of oil and grease resp. free of silicone.

Please consult our engineer if extreme operating conditions apply or whenever you are in doubt.

Notes on Safety, operating instruction etc. MUST be followed.

Sheet no.. UV/13.1.041.2 - issue 26.04.2004

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for Steam

Inlet pressure bar	T °C	K_{VS}-Value m^3/h	Connection screwed	Connection flanged DN	*	SS	Notes	Type
0.005 - 12	250	0.15 - 0.90	1/2	15 - 25	*	•	small flow rates, sterile application	3.5Z
0.02 - 10	200	4 - 160		15 - 150			most economic steam valve	4.1
0,1 - 10	300	1.7 - 338		15 - 150			sandwich design, large flow rates at low pressure drops	6.7 / 6.8
0.5 - 10	280	32 - 1200		50 - 400			large flow rates, weight loaded, high accuracy	1.6 / 2.6

* other connections available • stainless steel deep drawn

for Liquids

Inlet pressure bar	T °C	K_{VS}-Value m^3/h	Connection screwed	Connection flanged DN	*	SS	Notes	Type
0.005 - 10	130	0.2 - 5.5		15 - 50			economical valve with cast body, small flow rates	3.1
0.005 - 20	130	0.15 - 0.9	1/2	15 - 25	*	•	general purpose valve for small flow rates	3.5
0.01 - 1.1	130	0.2 - 28	1/2 - 2	15 - 50	*	•	low pressure regulator	3.9
0.02 - 10	130	32 - 100		50 - 100	*	•	economical stainless steel valve	4.7 / 4.8
0.02 - 10	130	4 - 160		15 - 150			our most popular valve, can be used anywhere	4.1
0.02 - 12	130	3.2 - 18	1/2 - 2	15 - 50	*	•	our most popular valve, can be used anywhere	5.1
0.1 - 10	300	1.7 - 338		15 - 150			sandwich design, high flow rates at low pressure drops	6.7/6.8
0.1 - 21	100	47 - 3205		50 - 800			for drinking water epoxy coated, pilot controlled	E2116
0.5 - 10	280	32 - 1200		50 - 400	*		large flow rates, weight loaded, high accuracy	1.6 / 2.6
2 - 16	150	0.2 - 5.5	1/2 - 2	15 - 50	*	•	CIP, SIP, elbow design, electropolished available	3.8
2 - 20	130	60 - 2100		100 - 600	*		large flow rate, inline-valve, pilot controlled	824 / 825
2 - 40	300	0.2 - 5.5		15 - 50			economical valve with cast body, small flow rates, with bellow	3.2
2 - 100	400	0.2 - 5.5	3/8 - 2	15 - 50	*		high pressure valve	8.2
2 - 40	300	6 - 180		25 - 200			for simple control applications	1.2
2 - 40	130	20 - 900		40 - 400			large flow rates, inline-valve, pilot controlled	820
2 - 40	300	11 - 230		32 - 200			for simple control applications	2.2

* other connections available • stainless steel deep drawn

for Gases

Inlet pressure bar	T °C	K_{VS}-Value m^3/h	Connection screwed	Connection flanged DN	*	SS	Notes	Type
0.005 - 10	130	0.2 - 5.5		15 - 50			economical valve with cast body, small flow rates	3.1
0.005 - 20	130	0.15 - 0.9	1/2	15 - 25	*	•	general purpose valve for small flow rates	3.5
0.01 - 1.1	130	0.2 - 28	1/2 - 2	15 - 50	*	•	low pressure regulator	3.9
0.02 - 10	130	32 - 100		50 - 100	*	•	economical stainless steel valve	4.7 / 4.8
0.02 - 10	130	4 - 160		15 - 150			economical valve with cast body	4.1
0.02 - 12	130	3.2 - 18	1/2 - 2	15 - 50	*	•	our most popular valve, can be used anywhere	5.1
0.1 - 10	300	1.7 - 338		15 - 150			sandwich design, high flow rates at low pressure drops	6.7/6.8
0.5 - 10	280	32 - 1200		50 - 400			large flow rates, weight loaded, high accuracy	1.6 / 2.6
2 - 20	130	60 - 2100		100 - 800	*		large flow rate, inline-valve, pilot controlled	824 / 825
2 - 40	300	0.2 - 5.5		15 - 50			economical valve with cast body, small flow rates	3.2
2 - 100	400	0.2 - 5.5	3/8 - 2	15 - 50	*		high pressure valve	8.2
2 - 40	300	6 - 180		25 - 200			for simple control applications	1.2
2 - 40	130	20 - 900		40 - 400			large flow rates, pilot controlled	820
2 - 40	300	11 - 230		32 - 200	*	•	for simple control applications, high flow rates	2.2

* other connections available • stainless steel deep drawn

Sheet no. UV/11.1.062.1 - issue 12.06.2006

Special designs on request.
The pressure has always been indicated as overpressure.
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Overflow valve for liquids and gases
up to 300 °C

Technical Data

Connection	DN 25 - 200
Nominal Pressue	PN 16 - 40
Inlet Pressure	up to 2 - 40 bar
K_{VS}-value	6 - 125 m³/h
Tightness	acc. VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

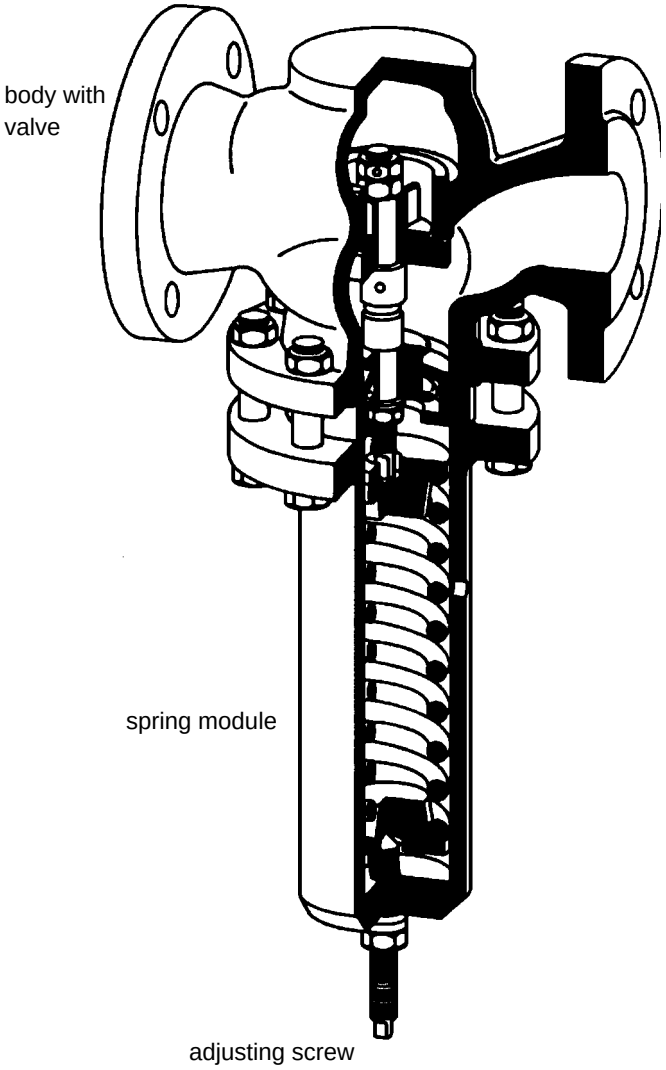
The UV 1.2 overflow valve is a spring-loaded seat-controlled proportional control valve featuring diaphragm, piston or bellows control. It is designed for simple control tasks and medium volumes. The valve cone can be fitted with a metallic or soft seal.

The inlet pressure to be controlled is balanced across the valve seat by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.

OPTIONS

- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m³/h]					
	nominal diameter DN				
seat	25	32	40	50	65
I	6	12	15	20	35
II	-	6	12	15	20
III	-	-	6	12	15

K_{VS}-values [m³/h]					
	nominal diameter DN				
seat	80	100	125	150	200
I	40	50	80	95	125
II	35	40	50	80	95
III	20	35	40	50	80

Sheet no. UV 1.2/2.1.071.1 - issue 06.08.2007

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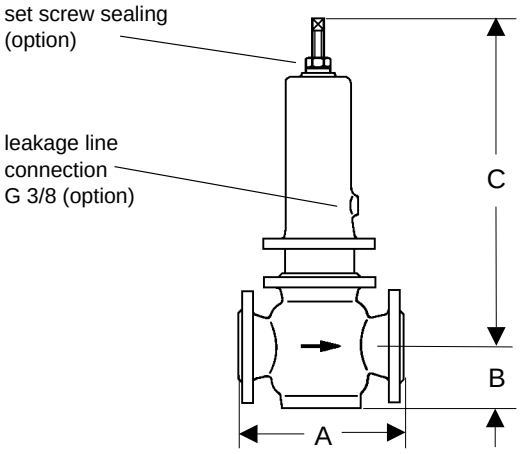
Pressure Control Valves UV 1.2

Overflow valve for liquids and gases
up to 300 °C

Materials				
Temperature		80 °C	130 °C	300 °C
Body	PN 16	up to DN 25 grey cast iron from DN 40 spheroidal cast iron		
	PN 40	cast steel	cast steel	cast steel
	PN 16 - 40	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Bonnet		steel-welded optional CrNiMo-steel		
Spring		spring steel optional CrNiMo-steel		
Metallic Seal		CrMo-steel optional CrNiMo-steel		
Soft Seal		NBR	EPDM optional FPM	-
Diaphragm		CR	EPDM optional FPM	-
O-ring		NBR	EPDM optional FPM or FXM	-
Bellow		CrNiMo-steel	CrNiMo-steel	CrNiMo-steel



Dimensions [mm]						
		nominal diameter DN				
size	nominal pressure	25	32	40	50	65
A	PN 16 - 40	160	180	200	230	290
B	PN 16 - 40	-	72	72	72	102
C	PN 16 - 40	on request				

Dimensions [mm]						
		nominal diameter DN				
size	nominal pressure	80	100	125	150	200
A	PN 16 - 40	310	350	400	480	600
B	PN 16 - 40	102	102	240	240	270
C	PN 16 - 40	on request				

Weights [kg]										
nominal	nominal diameter DN									
pressure	25	32	40	50	65	80	100	125	150	200
PN 16	12	17	20	22	32	40	60	100	120	220
PN 40	14	20	24	28	42	50	70	115	140	250

Special designs on request.
The pressure has always been indicated as overpressure.
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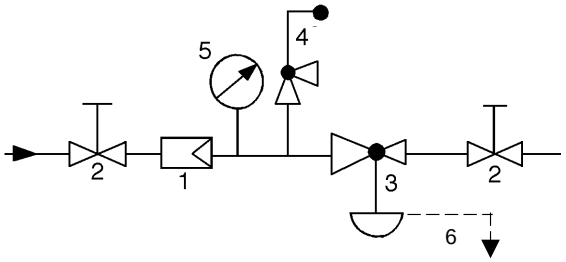
Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Leakage Line G 3/8 (option)

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Overflow valve for liquids and gases
up to 300 °C

Technical Data

Connection	G 1 - 2
	DN 25 - 100
Nominal Pressure	PN 16
Inlet Pressure	up to 2 - 16 bar
K_{VS}-value	6 - 50 m³/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)
Surface Roughness	≤ 3.2 µm

Description

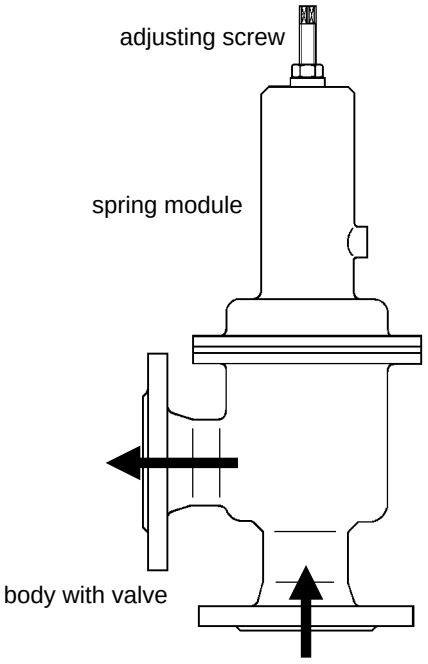
Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

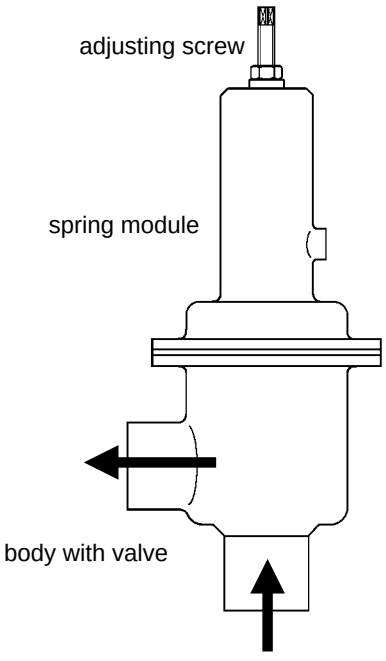
The UV 1.8 overflow valve is a spring-loaded seat-controlled proportional control valve featuring diaphragm, piston or bellows control. It is designed for hygienic applications and medium volumes of high-viscosity media. The valve cone can be fitted with a metallic or soft seal.

This overflow valve is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. It contains virtually no dead pockets and is suitable for use in CIP and SIP systems. The angled design allows complete draining.

The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance. Changing the control pressure setting does not affect the height of the valve (non-rising setting spindle).

The inlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.





OPTIONS

- Polished version for food, pharmaceutical and superclean applications, surface roughness Ra ≤ 0.25 or 0.4 or 0.8 µm
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m³/h]							
	nominal diameter DN						
seat	25	32	40	50	65	80	100
I	6	6	6	12	15	20	35
II	-	12	12	15	20	35	40
III	-	-	15	20	35	40	50

Sheet no. UV 1.8/2.1.071.1 - issue 06.08.2007

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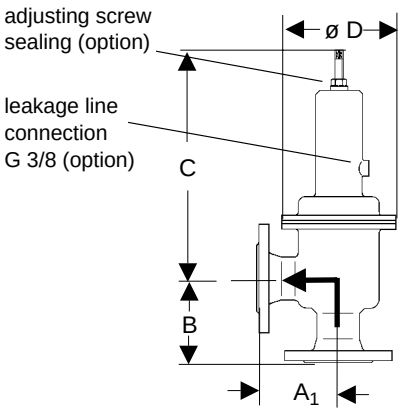
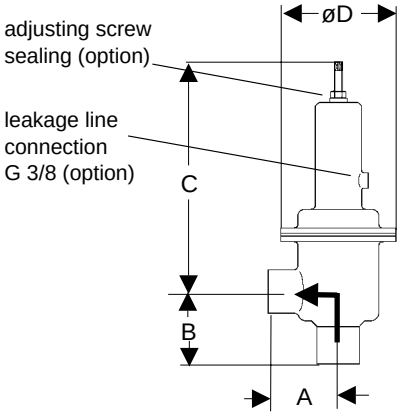
Pressure Control Valves UV 1.8

Overflow valve for liquids and gases
up to 300 °C

Materials			
Temperature	80 °C	130 °C	300 °C
Body	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Bonnet	steel welded optional CrNiMo-steel		
Spring	spring steel optional CrNiMo-steel		
Soft Seal	NBR	EPDM optional FPM	-
Metallic Seal	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Diaphragm	CR	EPDM optional FPM	-
O-ring	NBR	EPDM optional FPM	-
Bellow	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel



Dimensions [mm]							
	nominal diameter DN						
size	25	32	40	50	65	80	100
A_1	100	105	115	125	145	155	175
B	100	105	115	125	145	155	175
C	on request						
ø D							

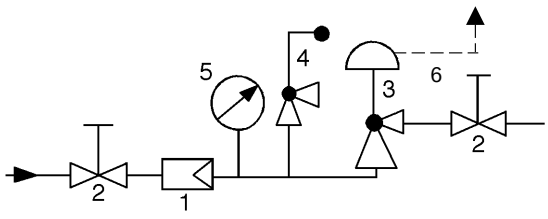


Dimensions [mm]				
	nominal diameter G			
size	1	1 1/4	1 1/2	2
A	80	80	80	80
B	80	80	80	80
C	on request			
ø D				

Weights [kg]						
nominal diameter DN						
25	32	40	50	65	80	100
10.2	11.5	12	13.5	14	14.7	15.6

Weights [kg]			
nominal diameter G			
1	1 1/4	1 1/2	2
8.5	8.8	9	9.4

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Leakage Line G 3/8 (option)

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

sheet no. UV 1.8/3.1.071.1 - issue 06.08.2007

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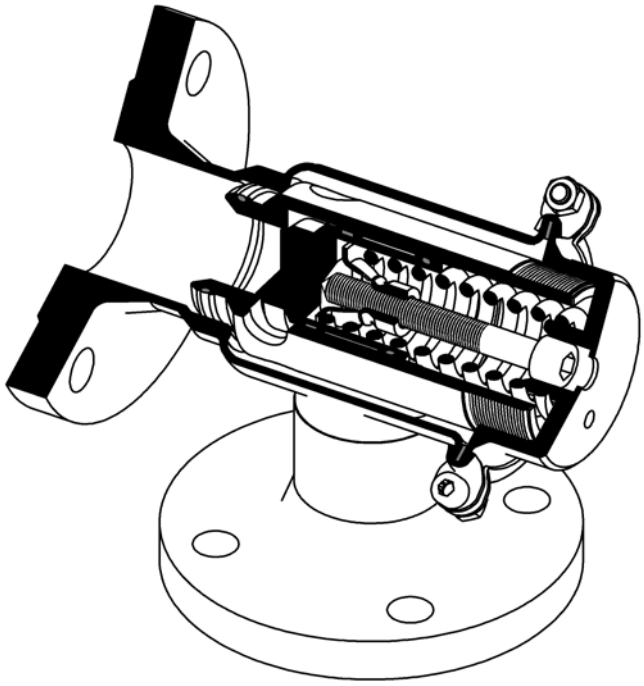
Overflow valve for liquids
up to 130 °C

Technical data

Connection	DN 50, G 2
Medium	liquids
Nominal Pressure	PN 16
Inlet Pressure	up to 2 - 16 bar in several ranges
K_{VS}-value	12 m^3/h
Tightness	acc. VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{VS}-value)



Description

Medium-controlled overflow valves are simple control valves used to relieve pressurised systems of excessive pressure in a controlled way. These valves do not require pneumatic or electrical control components to work reliably. They are easy to install and maintain.

The UV1.9 overflow valve is a seat-controlled spring-loaded valve used to protect pump systems or other pressurised vessels or pipelines. The set pressure is continuously adjustable from the outside.

Its special feature is its very compact design. The valve cone has a hard seal (metallic seal). The valve is manufactured from deep-drawn CrNiMo stainless steel featuring excellent corrosion resistance.

Thanks to its angled form the valve drains automatically, ensuring that medium cannot freeze in the valve (Frost protection without special draining).

Pilot lines are not required.

STANDARD EQUIPMENT

- all stainless steel construction
- valve body manufactured from high performance deepdrawn materials
- seat-controlled
- angled design, no dead pockets, self-draining
- surface roughness Ra ≤ 3,2 µm
- preset at the factory
- tamper-proof

OPTIONS

- replacement spring module available

APPLICATIONS

- as pump protection valve
- as pressure surge limiter

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. UV 1.9/2.1.081.1 - issue 14.04.2008

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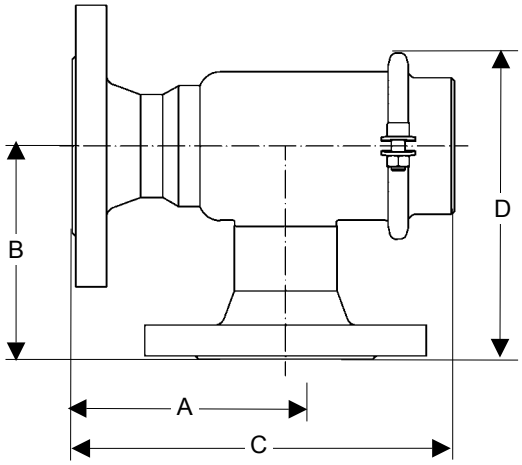
Overflow valve for liquids
up to 130 °C

Materials	
Temperature	130 °C
Body	CrNiMo-steel
Spring	CrNiMo-steel
Main Valve Valve Seal	metallic
Elastomeres	EPDM (PTFE or FPM option)

Dimensions [mm]	
size	nominal diameter DN 50
A	125
B	125
C	224
D	190

Weights [kg]
nominal diameter DN 50
10



Special designs on request.
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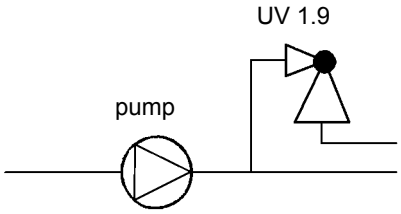

Sheet no. UV1.9/3.1.081.1 - issue 14.04.2008

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Overflow valve for liquids and gases
up to 300 °C

Technical Data

Connection	DN 15 - 50
Nominal Pressure	PN 16 - 40
Inlet Pressure	up to 2 - 40 bar
K_{VS}-value	0.2 - 5.5 m³/h
Tightness	acc. VDI/VDE guideline 2174 (leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

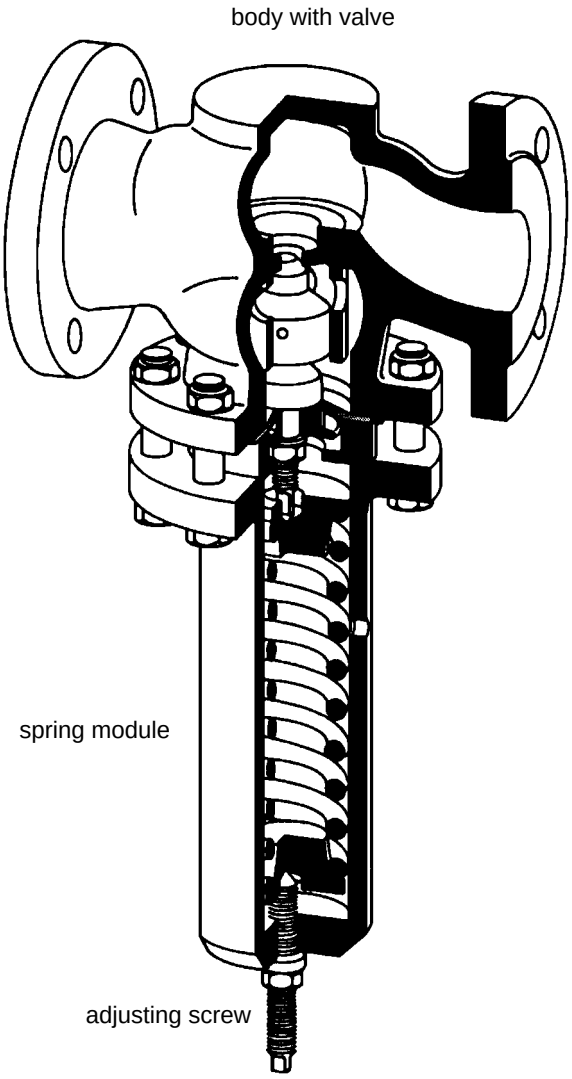
The UV 3.2 overflow valve is a spring-loaded proportional control valve featuring diaphragm, piston or bellows control. It is designed for small volumes. The valve cone can be fitted with a metallic or soft seal.

The inlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.

OPTIONS

- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m³/h]						
	nominal diameter DN					
seat	15	20	25	32	40	50
I	0.2	0.25	0.25	0.4	0.4	1
II	0.9	0.9	0.9	2.5	2.5	3.5
II	1.8	2.2	2.2	3.9	3.9	5.5

Sheet no. UV 3.2/2.1.071.1 - issue 06.08.2007

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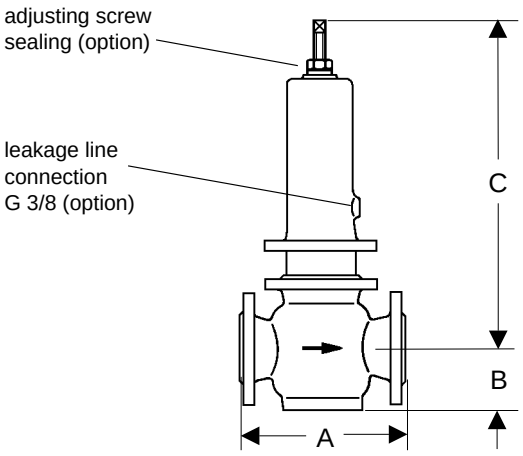
Overflow valve for liquids and gases
up to 300 °C

Materials				
Temperature		80 °C	130 °C	300 °C
Body	PN 16	up to DN 25 grey cast iron from DN 40 spheroidal cast iron		
	PN 40	cast steel	cast steel	cast steel
	PN 16 - 40	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Bonnet		steel welded optional CrNiMo-steel		
Spring		spring steel optional CrNiMo-steel		
Metallic Seal		CrMo-steel optional CrNiMo-steel		
Soft Seal		NBR	EPDM optional FPM	-
Diaphragm		CR	EPDM optional FPM	-
O-ring		NBR	EPDM optional FPM or FXM	-
Bellow		CrNiMo-steel	CrNiMo-steel	CrNiMo-steel

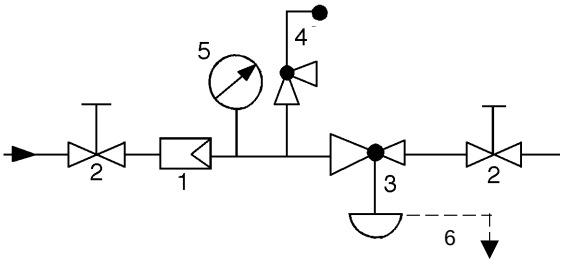


Dimensions [mm]						
		nominal diameter DN				
size	nominal pressure	15	25	32	40	50
A	PN 16 - 40	130	160	180	200	230
B	PN 16 - 40	-	-	72	72	72
C	PN 16 - 40	on request				

Weights [kg]						
	nominal diameter DN					
nominal pressure	15	20	25	32	40	50
PN 16	10	13	15	17	20	23
PN 25/40	13	15	17	20	23	26

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Leakage Line (option)

Sheet no. UV 3.2/3.1.071.1 - issue 06.08.2007

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Pressure Control Valves UV 3.5, 3.5S, 3.5Z

Overflow valves UV 3.5 and 3.5S for liquids and gases up to 130 °C,
UV 3.5Z for steam up to 200 °C

Technical Data

Connection	G 1/2
	DN 15 - 25
Nominal Pressure	PN 1 - 25
Inlet Pressure	3.5 + 3.5S : 0.005 - 20 bar in 8 ranges
	3.5Z : 0.005 - 12 bar in 7 ranges
K_{VS}-value	0.14 / 0.4 / 0.9 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

The UV 3.5, UV 3.5S and UV 3.5Z overflow valves are spring-loaded diaphragm-controlled proportional control valves for small volumes. They are manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone can be fitted with a metallic or soft seal.

The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance. Changing the control pressure setting does not affect the height of the valve (non-rising setting spindle).

The inlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.

For steam applications (UV 3.5 Z) the diaphragm control unit must be filled with water via the pilot line connections before the valve is commissioned.

The UV 3.5S and UV 3.5Z overflow valves require a pilot line (to be installed on-site).

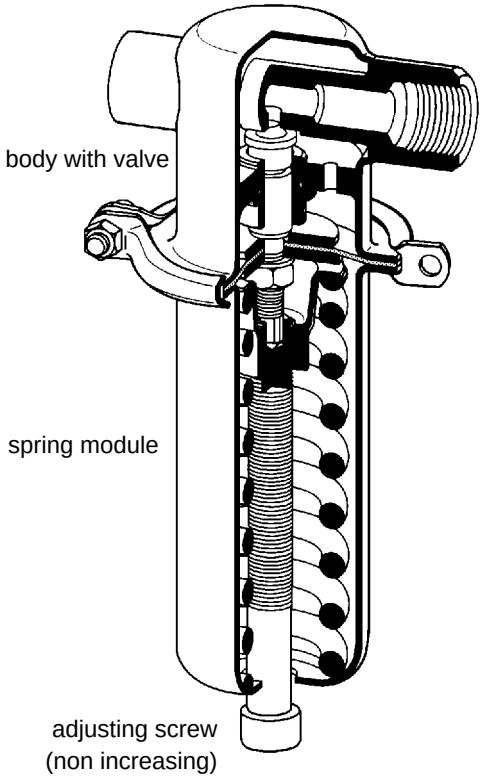
STANDARD EQUIPMENT

- All stainless steel construction
- Non increasing adjusting screw
- Quick-release body clamp ring
- Pilot line connection (UV 3.5S and UV 3.5Z)

OPTIONS

- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m^3/h]		
seat		
I	II	III
0.15	0.4	0.9

Setting Ranges [bar] UV 3.5 + UV 3.5S	
setting range bar	nominal pressure
0.005 - 0.025	PN 1
0.02 - 0.12	
0.1 - 0.5	
0.2 - 1.1	PN 2.5
0.8 - 2.5	PN 6
1 - 5	PN 10
4 - 12	PN 25
10 - 20	

Setting Ranges [bar] UV 3.5Z	
setting range bar	nominal pressure
0.005 - 0.025	PN 1
0.02 - 0.12	
0.1 - 0.5	
0.2 - 1.1	PN 2.5
0.8 - 2.5	PN 6
1 - 5	PN 10
4 - 12	PN 16

Sheet no. UV 3.5/2.1.071.1 - issue 06.08.2007

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Pressure Control Valves UV 3.5, 3.5Z

Overflow valves UV 3.5 and 3.5S for liquids and gases up to 130 °C,
UV 3.5Z for steam up to 200 °C

Materials			
Type	UV 3.5		UV 3.5Z
Temperature	80 °C	130 °C	200 °C
Body	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Bonnet			
Internals			
Spring	CrNi-steel	CrNi-steel	CrNi-steel
Valve Seal	metallic or EU	metallic or FPM or EPDM or PTFE	CrNiMo-steel
Diaphragm	CR	FPM or EPDM	EPDM
Protection Foil for Diaphragm	PTFE (option)	PTFE (option)	PTFE (option)

Dimensions [mm]

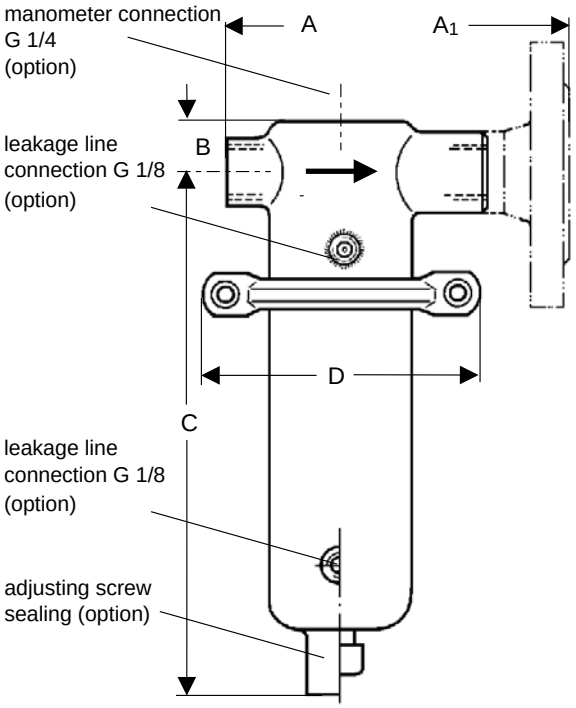
pressure range [bar]	Size	DM	nominal diameter G 1/2	DN 15	DN 20	DN 25
all ranges	B	3.5 + 3.5Z	25	25	25	25
0.005 - 0.025 0.02 - 0.12	A/A_1	3.5 + 3.5Z	100	130	150	160
	C	3.5	275	275	275	285
	C	3.5Z	405	405	405	415
	D	3.5 + 3.5Z	360	360	360	360
0.1 - 0.5	A/A_1	3.5 + 3.5Z	100	130	150	160
	C	3.5	275	275	275	285
	C	3.5Z	405	405	405	415
	D	3.5 + 3.5Z	264	264	264	264
0.2 - 1.1	A/A_1	3.5 + 3.5Z	100	130	150	160
	C	3.5	275	275	275	275
	C	3.5 + 3.5Z	405	405	405	405
	D	3.5 + 3.5Z	200	200	200	200
0.8 - 2.5	A/A_1	3.5 + 3.5Z	100	180	180	180
	C	3.5	205	205	205	205
	C	3.5Z	335	335	335	335
	D	3.5 + 3.5Z	138	138	138	138
1 - 5 4 - 12 10 - 20	A/A_1	3.5 + 3.5Z	100	130	150	160
	C	3.5	205	205	205	205
	C	3.5Z	335	335	335	335
	D	3.5 + 3.5Z	114	114	114	114

Weights [kg]

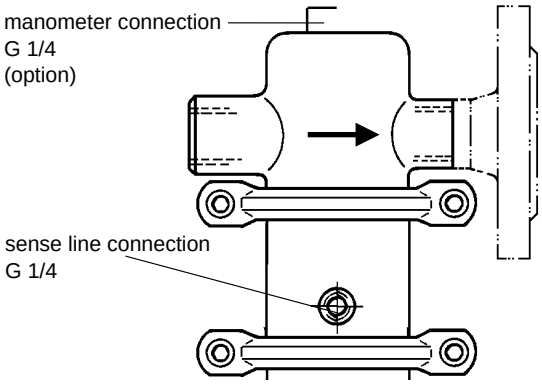
pressure range [bar]	DM	nominal diameter G 1/2	DN 15	DN 20	DN 25
0.005 - 0.025 0.02 - 0.12	3.5	6	7.5	7.5	8
	3.5Z	6.5	8	8	8.5
0.1 - 0.5	3.5	5.5	7	7	7.5
	3.5Z	6	7.5	7.5	8
0.2 - 1.1	3.5	4.5	6	6	6.5
	3.5Z	5	6.5	6.5	7
0.8 - 2.5	3.5	2	3.5	3.5	4
	3.5Z	2.5	4	4	4.5
1 - 20	3.5	1.5	3	3	3.5
	3.5Z	2	3.5	3.5	4

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

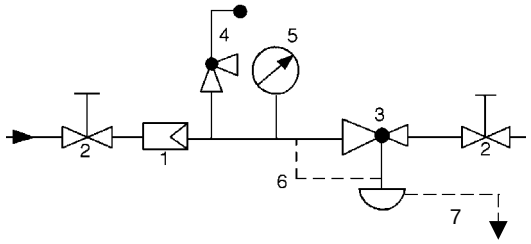
UV 3.5
UV 3.5S



UV 3.5Z
dimensions see UV 3.5



Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Sense Line EO8, G 1/4 (option)
7 Leakage Line G 1/8 (option)

Sense line connection 10 - 20 x DN before the valve

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Overflow valve for liquids and gases
up to 80 / 130 / 150 °C

Technical Data

Connection	G 1/2 - 2
	DN 15 - 50
Nominal Pressure	PN 10 - 16
Inlet Pressure	up to 2 - 16 bar
	in 3 setting ranges
K_{VS}-value	3.5 - 5.5 m³/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

Surface Roughness ≤ 3.2 µm

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements

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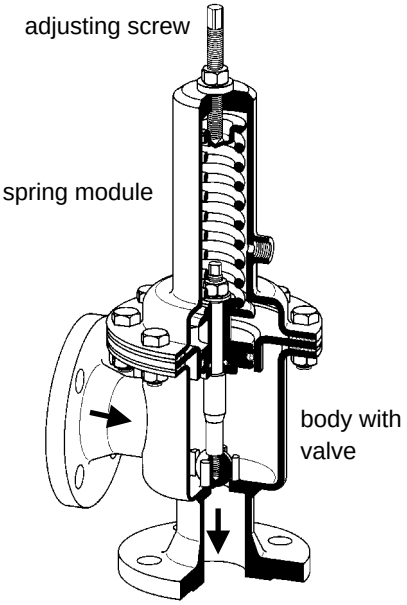
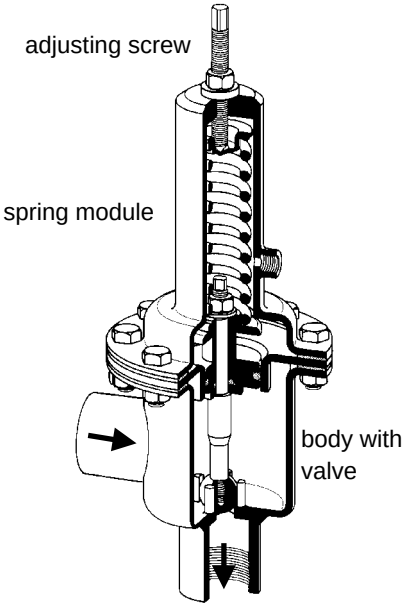
The UV 3.8 overflow valve is a spring-loaded piston-controlled proportional control valve designed for hygienic applications and medium volumes. The valve cone is fitted with a hard seal.
This bypass valve is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. It contains virtually no dead pockets and is suitable for use in CIP and SIP systems. The angled design allows complete draining.

The spring module comprising bonnet, spring, setting spindle, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance. Changing the control pressure setting does not affect the height of the valve (non-rising setting spindle).

The inlet pressure to be controlled is balanced across the piston by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.

The UV 3.8 overflow valve does not require a pilot line.





STANDARD EQUIPMENT

- All stainless steel construction
- Piston control

OPTIONS

- Polished version for food, pharmaceutical and superclean applications, surface roughness Ra ≤ 0.25 or 0.4 or 0.8 µm
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m³/h]					
nom. pressure	DN	25	32	40	50
	G	1	1 1/4	1 1/2	2
K_{VS}-value		3.5	3.5	5.5	5.5

Setting Ranges [bar], Nominal Pressure		
2 - 5	4 - 10	8 - 16
PN 10	PN 16	PN 16

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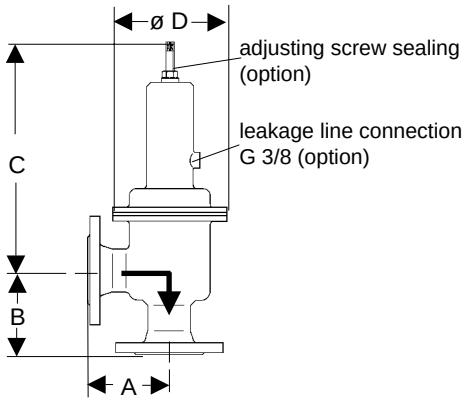
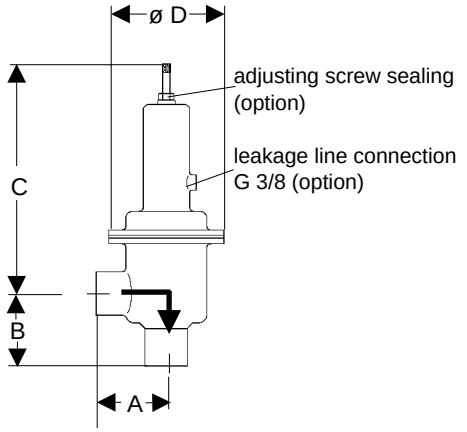
Overflow valve for liquids and gases
up to 80 / 130 / 150 °C

Materials			
Temperature	80 °C	130 °C	150 °C
Body	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Bonnet	steel welded optional CrNiMo-steel		
Spring	spring steel C optional CrNiMo-steel		
O-ring	NBR	EPDM optional FPM	FPM-PTFE coated



Dimensions [mm]				
	nominal diameter DN			
size	25	32	40	50
A	100	105	115	125
B	100	105	115	125
C	500	500	500	500
ø D	175	175	175	175

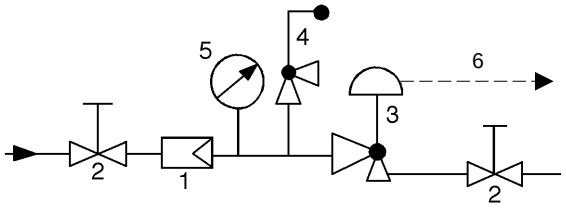


Dimensions [mm]				
	nominal diameter G			
size	1	1 1/4	1 1/2	2
A	80	80	80	80
B	80	80	80	80
C	500	500	500	500
ø D	175	175	175	175

Weights [kg]			
nominal diameter DN			
25	32	40	50
10.2	11.5	12	13.5

Weights [kg]			
nominal diameter G			
1	1 1/4	1 1/2	2
8.5	8.8	9	9.4

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Leakage Line G3/8 (option)

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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Overflow valve for liquids and gases
up to 130 °C

Technical Data

Connection	G 1/2 - 2
	DN 15 - 50
Nominal Pressure	PN 1 - 2.5
Inlet Pressure	up to 0.01 - 1.1 bar
	in 6 setting ranges
K_{VS}-value	0.2 - 28 m³/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

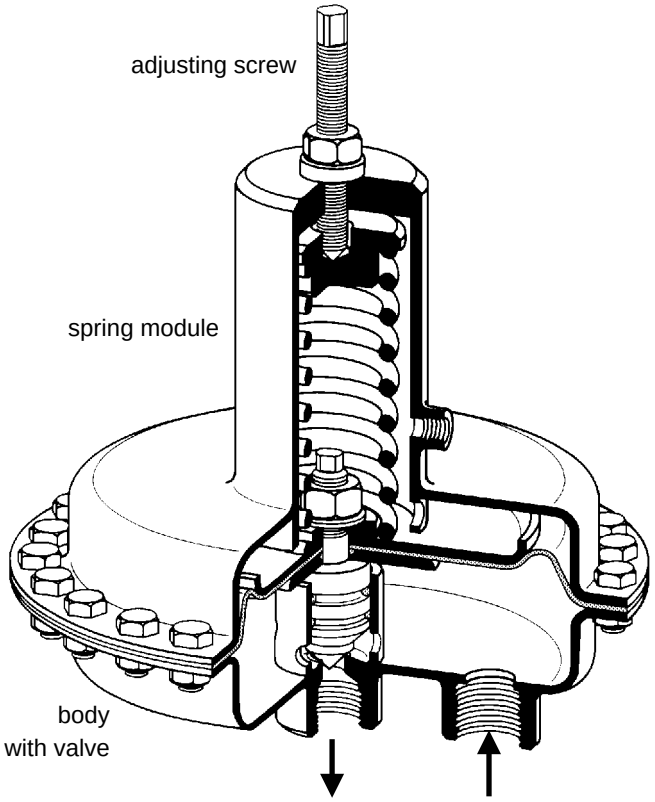
Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

The UV 3.9 overflow valve is a spring-loaded diaphragm-controlled proportional control valve designed for very low inlet pressures. This bypass valve is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone can be fitted with a soft or metallic seal.

The inlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.

The UV 3.9 overflow valve does not require a pilot line.



STANDARD EQUIPMENT

- All stainless steel construction

OPTIONS

- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m³/h]							
0.2	0.9	2.2	3.9	6	12	18	28

Setting Ranges [bar] and Nominal Pressure	
setting range bar	nominal pressure
0.01 - 0.025	PN 1
0.02 - 0.06	
0.05 - 0.12	
0.10 - 0.25	
0.2 - 0.5	
0.4 - 1.1	PN 2.5

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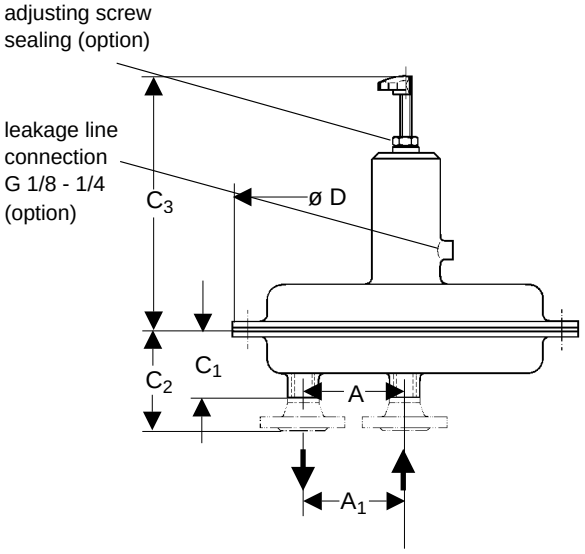
Pressure Control Valves UV 3.9

Overflow valve for liquids and gases
up to 130 °C

Materials		
Temperature	80 °C	130 °C
Body Bonnet Internals Spring Adjusting Screw	CrNiMo-steel	CrNiMo-steel
Valve Seal	CrNiMo-steel optional EU	CrNiMo-steel optional FPM, EPDM, PTFE
Diphragm	CR	FPM optional EPDM
Protection Foil for Diaphragm	PTFE (option)	PTFE (option)



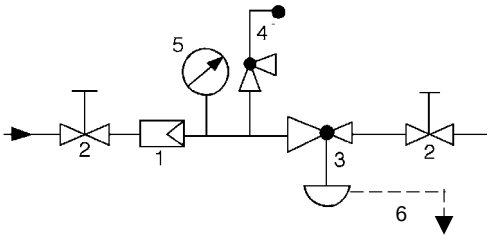
Dimensions [mm]							
pressure range bar	size	nominal diameter G 1/2 DN 15	G 3/4 DN 20	G 1 DN 25	G 1 1/4 DN 32	G 1 1/2 DN 40	G 2 DN 50
0.4 - 1.1	A	50	45	-	-	-	-
	C_1	95	100	-	-	-	-
	ø D	175	175	-	-	-	-
0.2 - 0.5	A	55	55	55	-	-	-
	C_1	95	100	105	-	-	-
	ø D	220	220	220	-	-	-
0.1 - 0.25	A	75	75	75	75	75	-
	C_1	95	100	105	110	115	-
	ø D	270	270	270	270	270	-
0.05 - 0.12	A	90	90	90	90	90	90
	A_1	125	125	125	-	-	-
	C_1	95	100	105	110	115	120
	C_2	115	120	120	-	-	-
	ø D	360	360	360	360	360	360
0.01 - 0.025	A	80	80	80	160	160	160
	A_1	150	150	150	180	180	180
0.02 - 0.06	C_1	95	100	105	110	115	120
	C_2	115	120	120	125	130	135
	ø D	500	500	500	500	500	500
all	C_3	250	250	250	250	250	250

Weights [kg]						
pressure range bar	nominal diameter G 1/2	3/4	1	1 1/4	1 1/2	2
0.4 - 1.1	4.5	4.5	-	-	-	-
0.2 - 0.5	6	6	6	-	-	-
0.1 - 0.25	8	8	8	8	8	-
0.05 - 0.12	12.5	12.5	12.5	12.5	12.5	12.5
0.01 - 0.025	13	13	13	13	13	13
0.02 - 0.06	13	13	13	13	13	13

Weights [kg]						
pressure range bar	nominal diameter DN 15	20	25	32	40	50
0.4 - 1.1	-	-	-	-	-	-
0.2 - 0.5	-	-	-	-	-	-
0.1 - 0.25	-	-	-	-	-	-
0.05 - 0.12	14	14.5	15	-	-	-
0.01 - 0.025	15.5	16	16.5	17.5	18	19.5
0.02 - 0.06	15.5	16	16.5	17.5	18	19.5

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Leakage Line G 1/8 - 1/4 (option)

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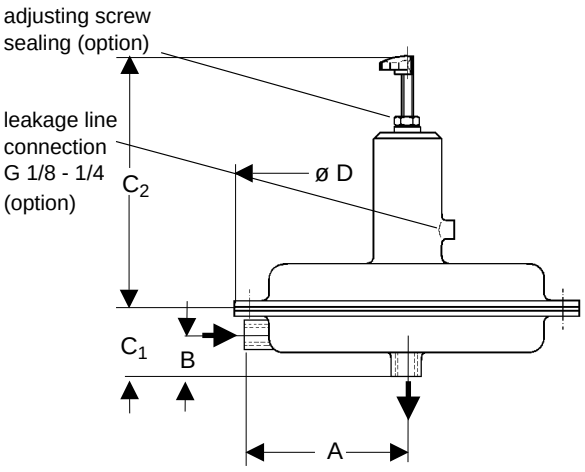
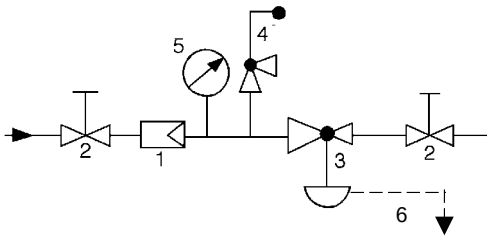
Overflow valve for liquids and gases
up to 130 °C

Materials		
Temperature	80 °C	130 °C
Body Bonnet Internals Spring Adjusting Screw	CrNiMo-steel	CrNiMo-steel
Valve Seal	CrNiMo-steel optional EU	CrNiMo-steel optional FPM, EPDM or PTFE
Diaphragm	CR	FPM optional EPDM
Protection Foil for Diaphragm	PTFE (option)	PTFE (option)



Dimensions [mm]		
pressure range bar	size	G 1/2
0.2 - 0.5	A	100
	B	65
	C_1	95
	ø D	220
0.1 - 0.25	A	126
	A1	65
	C_1	95
	ø D	270
0.05 - 0.12	A	167
	A1	65
	C_1	95
	ø D	360
all ranges	C_2	250

Recommended Installation



Weights [kg]	
pressure range bar	G 1/2
0.2 - 0.5	6
0.1 - 0.25	8
0.05 - 0.12	12.5

1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Leakage Line G 1/8 - 1/4 (option)

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Issue no. UV 3.9/3.1.071.2 - issue 06.08.2007

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Overflow valve for liquids and gases up to 130 °C,
for steam up to 200 °C

Technical Data

Connection	DN 15 - 150
Nominal Prseeure	PN 16 - 40
Inlet Pressure	up to 0.02 - 10 bar in 6 setting ranges
K_{VS}-value	4 - 160 m³/h
Tightness	acc. VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

The UV 4.1 overflow valve is a spring-loaded diaphragm-controlled proportional control valve designed for universal application and large volumes. The valve cone is fitted with a soft seal.

The inlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.

The UV 4.1 overflow valve requires a pilot line (to be installed on-site).

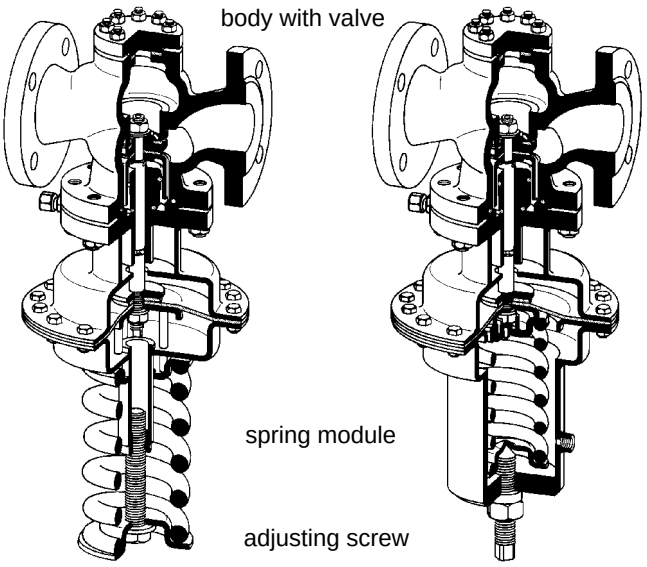
STANDARD EQUIPMENT

- Open spring
- Pilot line connection

OPTIONS

- Sealed spring cover
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m³/h]						
nom. diam.	DN	15	20	25	40	50
K_{VS}-value	m³/h	4	5	6	20	32

K_{VS}-values [m³/h]						
nom. dia.	DN	65	80	100	125	150
K_{VS}-value	m³/h	50	80	100	140	160

Setting Ranges and max. Inlet Pressure [bar]						
setting range	0.02 - 0.25	0.1 - 0.6	0.2 - 1.2	0.8 - 2.5	2 - 5	4.5 - 10*
max. inlet pressure	0.5	0.9	1.8	3.75	7.5	15

* not for DN 125 and DN 150

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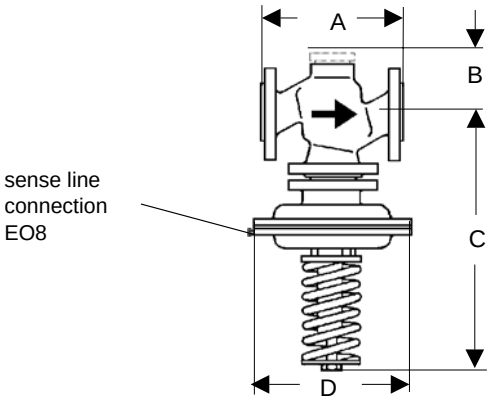
Pressure Control Valves UV 4.1

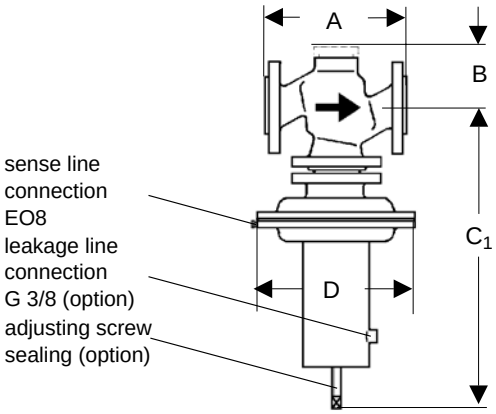
Overflow valve for liquids and gases up to 130 °C,
for steam up to 200 °C

Materials				
Temperature		80 °C	130 °C	200 °C
Body	PN 16	up to DN 25 gry cast iron ab DN 40 spheroidal cast iron		
	PN 40	cast steel	cast steel	cast steel
	PN 16 - 40	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Diaphragm Housing		steel welded optional CrNiMo-steel		
Bonnet		steel welded optional CrNiMo-steel		
Spring		spring steel C optional CrNiMo-steel		
Valve Seal		NBR	EPDM optional FPM	FEPM
Diaphragm		CR	EPDM optional FPM	FEPM
O-ring		NBR	EPDM optional FPM	FEPM



C= max. size with stressless spring

Dimensions [mm]											
pressure		nominal diameter DN									
range bar	size	15	20	25	40	50	65	80	100	125	150
all	A	130	150	160	200	230	290	310	350	400	480
rages	B	55	55	60	75	85	105	105	110	220	220
0.02-0.25	C	510	510	510	520	520	570	570	570	810	810
(0.05-0.25	C_1	640	640	640	680	680	730	730	730	970	970
ab DN 125)	D	360	360	360	360	360	360	360	360	500	500
0.1 - 0.6	C	510	510	510	630	630	680	680	680	810	810
	C_1	640	640	640	790	790	840	840	840	970	970
	D	270	270	270	360	360	360	360	360	360	360
0.2 - 1.2	C	510	510	510	630	630	680	680	680	810	810
	C_1	640	640	640	790	790	840	840	840	970	970
	D	220	220	220	270	270	270	270	270	270	270
0.8 - 2.5	C	490	490	490	650	650	680	680	680	810	810
2 - 5	C_1	620	620	620	810	810	840	840	840	970	970
4.5 - 10	D	175	175	175	220	220	220	220	220	220	220



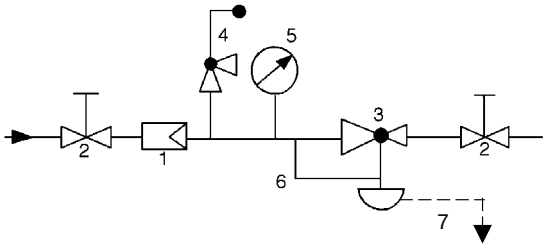
C_1= max. size with stressless spring

Weights PN 16 [kg]										
pressure	nominal diameter DN									
range bar	15	20	25	40	50	65	80	100	125	150
0.02 - 0.25	24	24	25	37	40	65	68	72	112	132
0.1 - 0.6	26	26	27	39	42	67	70	74	114	134
0.2 - 1.2	22	22	23	35	38	63	66	70	110	130
0.8 - 10	20	20	21	33	36	61	64	68	108	128

Weights PN 40 [kg]										
pressure	nominal diameter DN									
range bar	15	20	25	40	50	65	80	100	125	150
0.02 - 0.25	25	25	26	40	42	68	72	75	120	145
0.1 - 0.6	27	27	28	42	44	70	74	77	122	147
0.2 - 1.2	23	23	24	38	40	66	70	73	118	143
0.8 - 10	21	21	22	36	38	64	68	71	116	141

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Sense Line EO8
7 Leakage Line G 3/8 (option)

Sheet no. UV 4.1/3.1.071.1 - issue 06.08.2007

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Pressure Control Valves UV 4.7, 4.8

Overflow valve for liquids and gases up to 130 °C

Technical Data

Connection	DN 50 - 100
Nominal Pressure	PN 1 - 16
Inlet Pressure	up to 0,02 - 10 bar in 7 setting ranges
K_{VS}-value	32 - 100 m³/h
Tightness	acc. VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{VS}-value)
Design	UV 4.7 with open spring, UV 4.8 with closed spring cap

Description

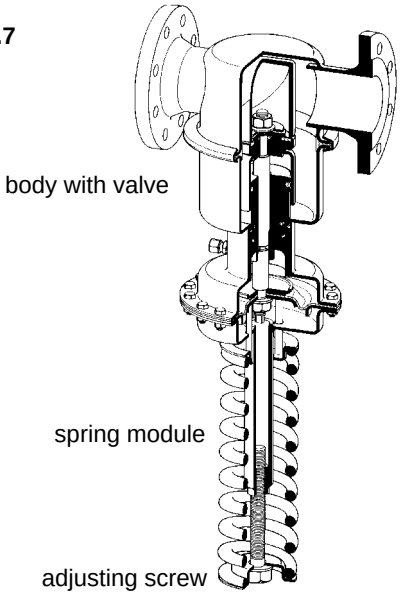
Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

The UV 4.7 and 4.8 overflow valves are spring-loaded diaphragm-controlled and balanced proportional control valves for large volumes. The valve cone is fitted with a soft seal (up to 130 °C). This bypass valve is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance.

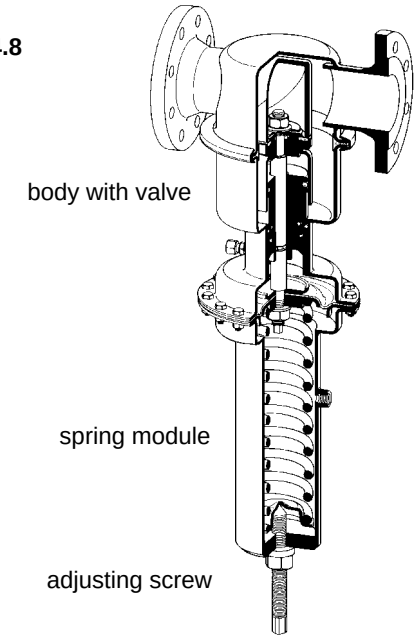
The inlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.

The UV 4.7 and 4.8 require a pilot line (to be installed on-site).

UV 4.7



UV 4.8



STANDARD EQUIPMENT

- All stainless steel construction
- Pilot line connection

OPTIONS

- For toxic or hazardous media: additional leakage line connection. Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m³/h]			
nominal diameter DN			
50	65	80	100
32	50	80	100

Setting Ranges [bar], Nominal Pressure						
4.5 - 10	2 - 5	0.8 - 2.5	0.2 - 1.2	0.1 - 0.6	0.02 - 0.25	0.02 - 0.15
PN 16	PN 10	PN 6	PN 2,5	PN 1	PN 1	PN 1

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Pressure Control Valves UV 4.7, 4.8

Overflow valve for liquids and gases up to 130 °C

Materials	
Temperature	130 °C
Body	CrNiMo-steel
Diaphragm Housing	CrNiMo-steel
Bonnet	CrNiMo-steel
Spring	CrNi-steel
Valve Seal	EPDM optional FPM
Diaphragm	EPDM optional FPM
O-ring	EPDM optional FPM

Dimensions [mm]

pressure range	DN 50				DN 65			
bar	A	C	C_1	D	A	C	C_1	D
4.5 - 10	230	610	750	220	290	750	890	220
2 - 5	230	610	750	220	290	750	890	220
0.8 - 2.5	230	610	750	220	290	750	890	220
0.2 - 1.2	230	610	750	270	290	750	890	270
0.1 - 0.6	230	610	750	360	290	750	890	360
0.02 - 0.25	230	500	640	360	290	640	780	360
0.02 - 0.15	230	500	640	500	290	640	780	500

Dimensions [mm]

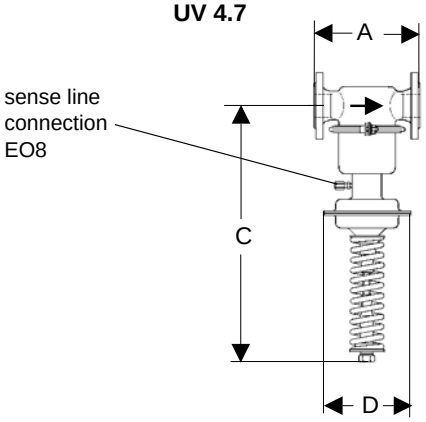
pressure range	DN 80				DN 100			
bar	A	C	C_1	D	A	C	C_1	D
4.5 - 10	310	750	890	220	350	750	890	220
2 - 5	310	750	890	220	350	750	890	220
0.8 - 2.5	310	750	890	220	350	750	890	220
0.2 - 1.2	310	750	890	270	350	750	890	270
0.1 - 0.6	310	750	890	360	350	750	890	360
0.02 - 0.25	310	640	780	360	350	640	780	360
0.02 - 0.15	310	640	780	500	350	640	780	500

Weights [kg]

pressure range	nominal diameter DN			
bar	50	65	80	100
4.5 - 10	30	31	33	35
2 - 5	30	31	33	35
0.8 - 2.5	30	31	33	35
0.2 - 1.2	33	34	36	38
0.1 - 0.6	36	37	39	41
0.02 - 0.25	37.5	38.5	38.5	38.5
0.02 - 0.15	37.5	38.5	38.5	38.5

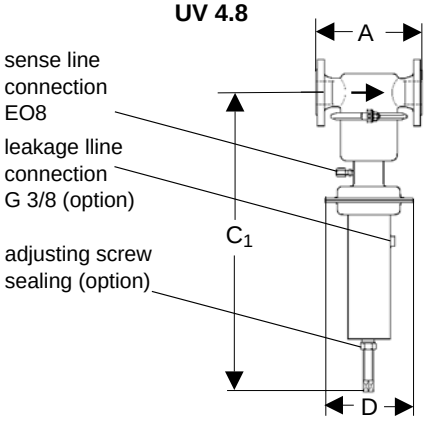
Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

UV 4.7



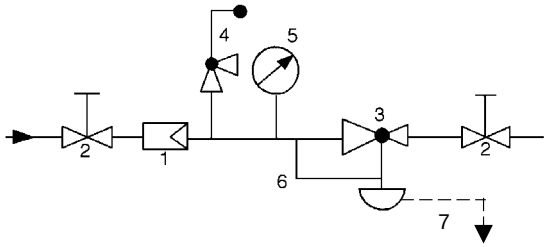
C= max. size with stressless

UV 4.8



C_1 = max. size with stressless

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Sense Line EO8
7 Leakage Line G 3/8(option)

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Overflow valve for liquids and gases
up to 130 °C

Technical Data

Connection	G 1/2 -2
	DN 15 - 50
Nominal Pressure	PN 1 - 16
Inlet Pressure	0.02 - 12 bar in 7 setting ranges
K_{VS}-value	3.2 - 18 m³/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

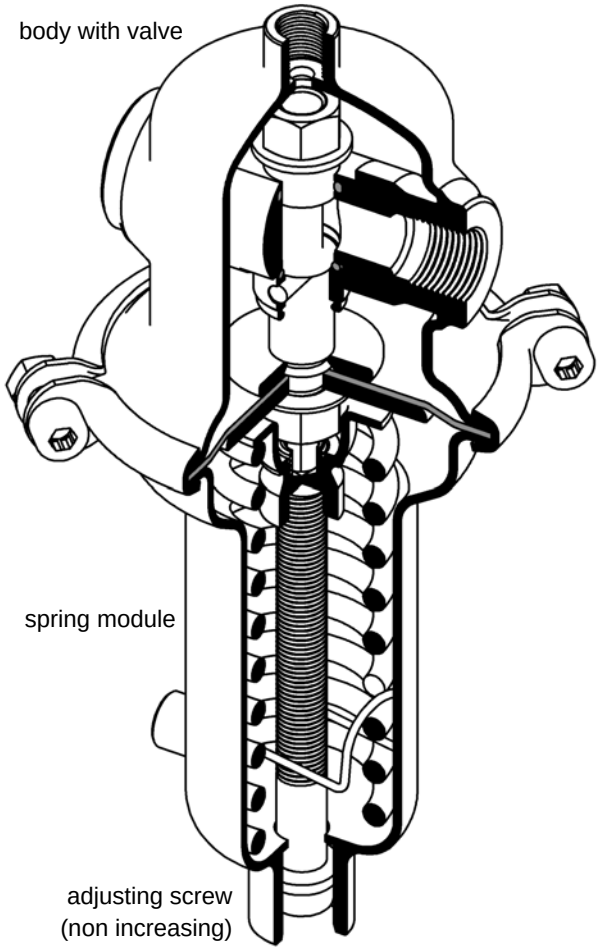
Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

The UV 5.1 overflow valve is a spring-loaded diaphragm-controlled and balanced proportional control valve for universal application. This bypass valve is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.

The spring module comprising bonnet, spring, adjusting screw, diaphragm and internal components, is connected to the valve body only by means of a clamp ring and two bolts. Changing the diaphragm or the complete spring assembly for a different control pressure range is extremely simple and does not call for special tools. The same applies to servicing and maintenance. Changing the control pressure setting does not affect the height of the valve (non-rising setting spindle).

The inlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.



STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring

OPTIONS

- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m³/h]							
nominal diameter	DN	15	20	25	32	40	50
	G	1/2	3/4	1	1 1/4	1 1/2	2
K_{VS}-value	m³/h	3.2	3.5	3.6	12	16	18

Setting Ranges [bar], Nominal Pressure				
setting range	6 - 12	4 - 8	2 - 5	0.8 - 2.5
nominal pressure	PN 16	PN 16	PN 10	PN 6

Setting Ranges [bar], Nominal Pressure			
setting range	0.3 - 1.1	0.1 - 0.5	0.02 - 0.12
nominal pressure	PN 2.5	PN 1	PN 1

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Pressure Control Valves UV 5.1

Overflow valve for liquids and gases
up to 130 °C

Materials	
Temperature	130 °C
Body	CrNiMo-steel
Bonnet	CrNiMo-steel
Internals	CrNiMo-steel
Screws	CrNiMo-steel
Adjusting Screw	CrNiMo-steel
Valve Sealing	EPDM optional GFPM or PTFE
Spring	CrNi-steel
Diaphragm	EPDM optional FPM
Protection Foil for diaphragm	PTFE (Option)

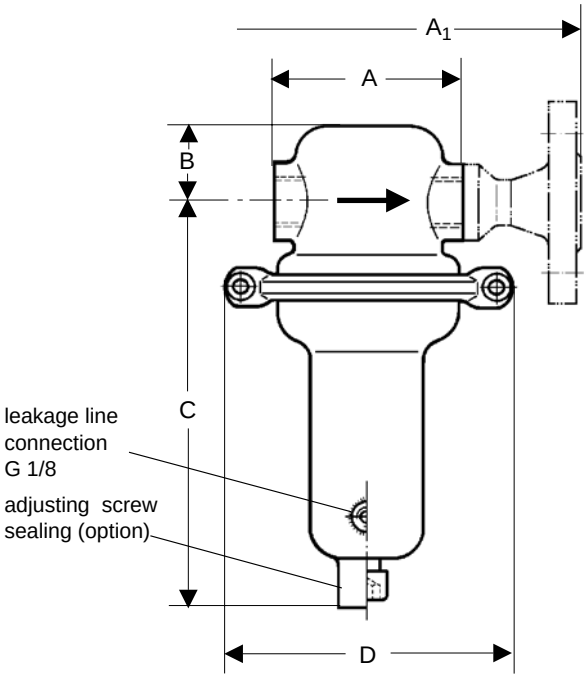
Dimensions [mm]

pressure range bar	size	nominal diammeter G 1/2 DN 15	G 3/4 DN 20	G 1 DN 25	G 1 1/4 DN 32	G 1 1/2 DN 40	G 2 DN 50
all ranges	A	90	90	136	130	145	185
	A_1	200	200	200	180	200	230
	B	40	40	40	110	110	110
0.02-0.12	C	270	270	270	285	285	285
	D	360	360	360	360	360	360
0.1 - 0.5	C	270	270	270	285	285	285
	D	264	264	264	264	264	264
0.3 - 1.1	C	270	270	270	285	285	285
	D	200	200	200	200	200	200
0.8 - 12	C	205	205	205	220	220	220
	D	138	138	138	138	138	138

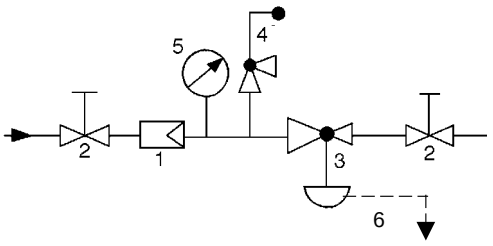
Weights [kg]

pressure range bar	nominal diamter G 1/2 - 1	G 1 1/4 - 2	DN 15 - 25	DN 32 - 50
0.02 - 0.12	13	14.4	14	16.4
0.1 - 0.5	6.5	8	7.5	10
0.3 - 1.1	5.5	7	6.5	9
0.8 - 12	2.5	4	3.5	6

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.



Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valves
4 Safety Valve
5 Pressure Gauge
6 Leakage Line G 1/8 (option)

Sheet no. UV 5.1/3.1.071.1 - issue 06.08.2007

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Pressure Control Valves — UV 6.7, 6.8

Overflow Valve sandwich design
for liquids, gases and steam up to 80 / 300 °C

Technical Data

Connection	DN 15 - 150
Nominal Pressure	Inlet PN 1 - 16
	Outlet PN 10 - 40
Inlet Pressure	0.1 - 10 bar in 7 setting ranges
Outlet Pressure	0.8 - 12 bar
K_{VS}-value	4 - 338 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)
Design	UV 6.7 with open spring,
	UV 6.8 with closed spring cap

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

The UV 6.7 and UV 6.8 overflow valves are spring-loaded proportional control valves for large volumes providing the following special features:
- space-saving installation between flanges
- low weight (especially for the large valve sizes)
- valve body geometry common to all pressure ranges PN 10-40
- high Kvs ratings
- low leakage
- low-noise operation

Two slotted discs which slide and seal against each other are operated by a medium-controlled spring-loaded diaphragm drive mechanism. When the system is depressurised the valve spring keeps the valve closed. As the inlet pressure rises it acts on the diaphragm/spring mechanism via the pilot line. The inlet pressure to be controlled is balanced across the diaphragm by the force of the valve spring (set pressure). As the inlet pressure rises above the pressure set using the adjusting screw, the slot width increases. The resulting volume will be such that the inlet pressure to be controlled (set pressure) is kept constant within the limits of the proportional control error. Rotating the adjusting screw clockwise increases the inlet pressure.

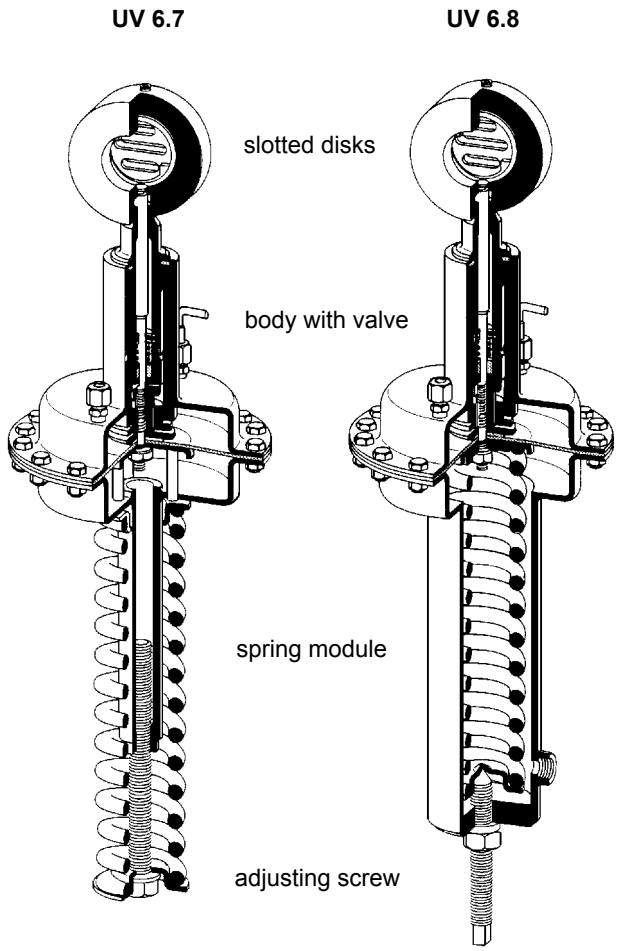
For steam applications (up to 300 °C) the diaphragm control unit must be filled with water via the pilot line connection before the valve is commissioned.

We recommend that the pilot line be fitted with an expansion tank. The UV 6.7 and UV 6.8 overflow valves require a pilot line (to be installed on-site).

OPTIONS

- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m^3/h] and max. ΔP [bar]							
nom. dia.	DN	15	20	25	32	40	50
K_{VS}-value	m^3/h	4	6.4	11	16	26	45
max. ΔP	bar	10	10	10	10	10	10

K_{VS}-values [m^3/h] and max. ΔP [bar]						
nom. dia.	DN	65	80	100	125	150
K_{VS}-value	m^3/h	52	92	154	237	338
max. ΔP	bar	10	6	3.8	2.4	1.9

Setting Ranges [bar], Nominal Pressure PN						
0.1 - 0.15	0.1 - 0.3	0.2 - 0.6	0.5 - 1.2	1 - 2.5	2 - 5	4 - 10
PN 1	PN 1	PN 1	PN 2.5	PN 6	PN 10	PN 16

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Pressure Control Valves — *UV 6.7, 6.8*

Overflow Valve sandwich design
for liquids, gases and steam up to 80 / 300 °C

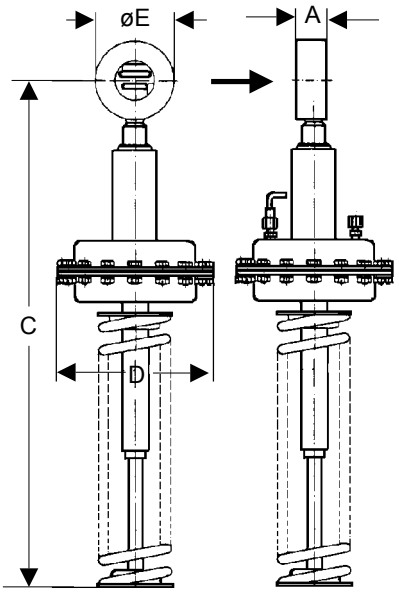
HIGH GRADE

Materials			
Design	standard	medium wetted CrNiMo-steel	completely CrNiMo-steel
Body	C-steel	CrNiMo-steel	CrNiMo-steel
Diaphragm Housing	C-steel	CrNiMo-steel	CrNiMo-steel
Bonnet	C-steel	C-steel	CrNiMo-steel
Spring	spring steel C	spring steel C	CrNi-steel
Plates (valve seal)	CrNiMo-steel / special carbon material, metallic impregnation		

Dimensions [mm]

pressure-range bar	size	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150
all ranges	A	33	33	33	33	33	43	46	46	52	56	56
	E	53	62	72	82	92	108	127	142	164	194	219
0.1 - 0.3	C*	550	555	560	680	685	695	705	715	725	740	755
	D	360	360	360	500	500	500	500	500	500	500	500
0.2 - 0.6	C*	550	555	560	680	685	695	705	715	725	740	755
	D	270	270	270	360	360	360	360	360	360	360	360
0.5 - 1.2	C*	550	555	560	680	685	695	705	715	725	740	755
	D	220	220	220	270	270	270	270	270	270	270	270
1.0 - 2.5	C*	530	535	540	680	685	695	705	715	725	740	755
2-5 / 4-10	D	175	175	175	220	220	220	220	220	220	220	220

*max. size with stressless spring
type 6.8 (closed spring cap) size C + 200 mm

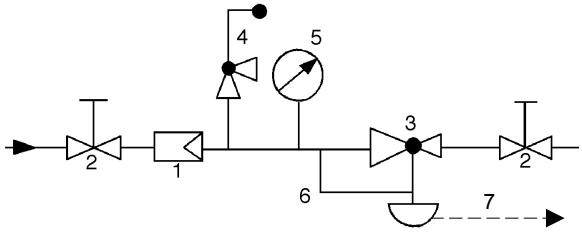


D = diaphragm ø
sense line ø 8/6 mm Ermeto

Weights [kg]

pressure-range bar	nominal diameter 15	20	25	32	40	50	65	80	100	125	150
0.1 - 0.3	19.7	19.8	19.9	23	23.1	24.2	24.7	25.4	25.6	28.4	30.4
0.2 - 0.6	16.7	16.8	16.9	22	22.1	23.2	23.7	24.4	24.6	27.4	29.4
0.5 - 1.2	23.7	23.8	13.9	19	19.1	20.2	20.7	21.4	22.6	24.4	26.4
1.0 - 10	12.7	12.8	12.9	16	16.1	17.2	17.7	18.4	19.6	21.4	23.4

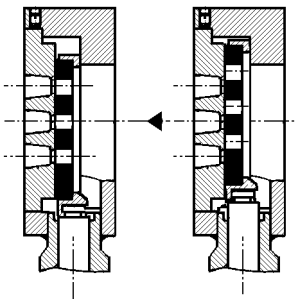
Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valves
4 Safety Valves
5 Pressure Gauge
6 Sense Line tube ø 8/6
7 Leakage Line (option)

use MANKENBERG-products

Valve Closing Principle



Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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Overflow valve for liquids, gases and steam
up to 400 °C

Technical Data

Connection	G 3/8 - 2
	DN 15 - 50
Nominal Pressure	PN 6 - 100
Inlet Pressure	up to 2 - 100 bar
	in 10 setting ranges
K_{VS}-value	0.2 - 5.5 m³/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

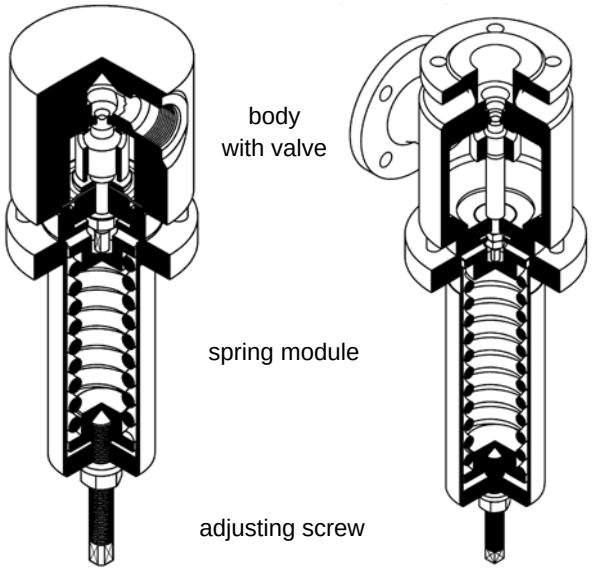
The UV 8.2 overflow valve is a diaphragm, piston or bellows-controlled spring-loaded proportional control valve for high pressures and small volumes. It can be supplied with three types of connections: sockets, flanges and welding spigots. Each size of valve may be fitted with three different seats. The valve cone may be fitted with a soft or metallic seal.

The inlet pressure to be controlled is balanced across the control unit by the force of the valve spring (set pressure). If the inlet pressure rises above the set pressure, the valve opens. With decreasing inlet pressure the valve control orifice reduces, when the pipeline is depressurised the valve is closed. Rotating the adjusting screw clockwise increases the inlet pressure.

OPTIONS

- Pressure gauge connection
- Valve cone and seat armoured
- For toxic or hazardous media: sealed bonnet complete with leakage line connection (incl. sealed adjusting screw). Must be installed with a leakage line capable of draining leaking medium safely and without pressure
- Various diaphragm and seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m³/h]						
nominal diameter		G	3/8	1/2	3/4	1
		DN		15	20	25
K_{VS}-value	seat	I	0.2	0.2	0.25	0.25
		II	0.9	0.9	0.9	0.9
		III	1.7	1.8	2	2.2

K_{VS}-values [m³/h]					
nominal diameter		G	1 1/4	1 1/2	2
		DN	32	40	50
K_{VS}-value	seat	I	0.4	0.4	1
		II	2.5	2.5	3.5
		III	3.9	3.9	5.5

Setting Ranges [bar], Nominal Pressure*				
2 - 4	4 - 7	7 - 10	5 - 16	10 - 20
PN 6	PN 16	PN 16	PN 25	PN 25

Setting Ranges [bar], Nominal Pressure*				
10 - 25	20 - 35	35 - 50	45 - 63	60 - 100
PN 40	PN 63	PN 100	PN 100	PN 100

* inlet and outlet pressure

Sheet no. UV 8.2/2.1.071.1 - issue 06.08.2007

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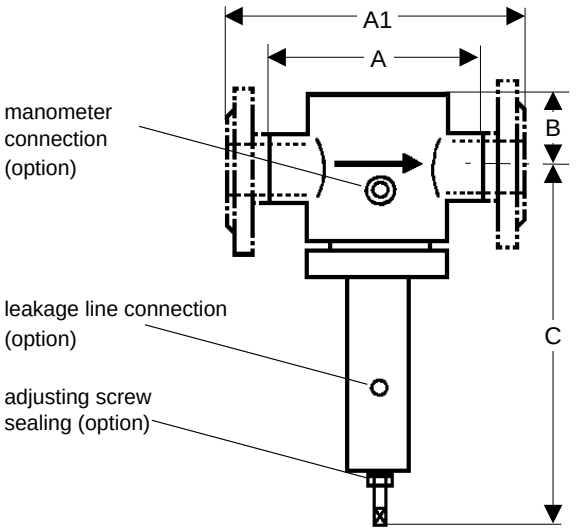
Pressure Control Valves UV 8.2

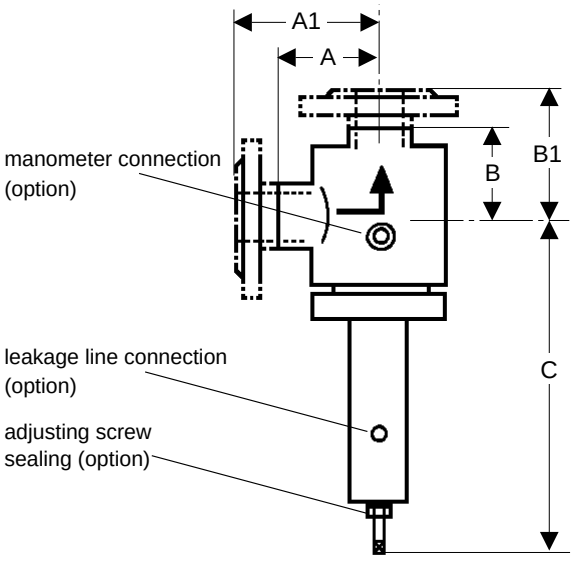
Overflow valve for liquids, gases and steam
up to 400 °C

Materials			
Temperature	80 °C	130 °C	400 °C
Body	G 3/8 - 1, DN 15 - 25 = C 22.8 G 1 1/4 - 2, DN 32 - 50 = steel welded optional CrNiMo-steel for all diameters		
Bonnet	steel welded optional CrNiMo-steel		
Internals	Rg optional CrMo-steel or CrNiMo-steel		CrNiMo-steel
Spring	CrNi-steel	CrNi-steel	CrNi-steel
Soft Seal	EU	FPM optional EPDM or PTFE	-
Metallic Seal	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Diaphragm	CR	FPM optional EPDM	-
Protection Foil	PTFE (option)	PTFE (option)	-
O-ring for piston	NBR	FPM optional EPDM or PTFE	-
Bellow	-	-	CrNiMo-steel



Dimensions [mm] Globe Design				
	nominal diameter			
	G 3/8	G 1/2	G 3/4	G 1
size	-	DN 15	DN 20	DN 25
A	110	110	110	110
A1	220	220	220	220
B	30	30	30	30
C	420	420	420	420

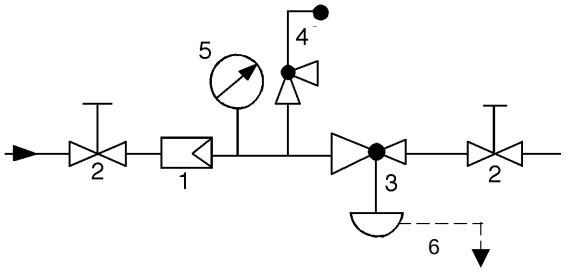
size C with bellow + 130 mm



Dimensions [mm] Elbow Design				
	nominal diameter			
	G 3/8 - 1	G 1 1/4	G 1 1/2	G 2
size	DN 15 - 25	DN 32	DN 40	DN 50
A	55	100	100	100
A1	110	*	*	*
B	65	108	108	108
B1	120	*	*	*
C	420	650	650	650

size C with bellow + 130 mm
* on request

Recommended Installation



Weights [kg] BSP female connection						
nominal diameter						
G 3/8	G 1/2	G 3/4	G 1	G 1 1/4	G 1 1/2	G 2
13	13	13	13	21	21	21

with bellow + 4 kg

Weights [kg] flange connection						
nom. press.	nominal diameter					
PN	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
16 - 40	16	16.2	16.6	25.8	26.8	27.8
63	16.4	17.6	19.4	27	30.6	31.4
100	16.4	17.6	19.4	27.4	30.6	36.4

with bellow + 4 kg

1 Strainer
2 Shutoff Valves
3 Overflow Valves
4 Safety Valve
5 Pressure Gauge
6 Leakage Line (option)

use MANKENBERG-products

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. UV 8.2/3.1.071.1 - issue 06.08.2007

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Overflow valve pilot operated for liquids
up to 130 °C

Technical data

Connection	DN 40 - 400
Nominal Pressure	PN 10 - 63
Inlet Pressure	up to 2 - 40 bar in 4 setting ranges above Δp 25 bar cone stellited
Differential Press.	min. 2 bar
Outlet Pressure	up to 38 bar
K_{VS}-value	20 - 900 m^3/h
Tightness	acc VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

The RP 820 overflow valve is a pilot-controlled control valve consisting of a main valve, a pilot valve complete with restrictor assembly and built-in strainer mounted on the cover of the main valve, non-return valve and restrictor valves. The valve cone can be fitted with a soft or metallic seal.

When the pipeline is depressurised the main valve is kept closed by a preloaded spring. When the inlet pressure is above the set pressure the pilot valve is kept open by a piston. The control medium can flow towards the valve outlet. Restrictor D1 produces a pressure drop causing the outlet pressure to be almost equal to the pilot pressure in the main valve piston. The inlet pressure overcomes the pilot pressure and closing force of the spring and opens the main valve.

When the inlet pressure has reached the set pressure, the pilot valve restricts the flow. This causes the pilot pressure to rise and push the main valve piston into a controlling position. The restrictors D1 and D2 are used to optimise the control characteristics. The bypass fitted with a non-return valve ensures quick closing.

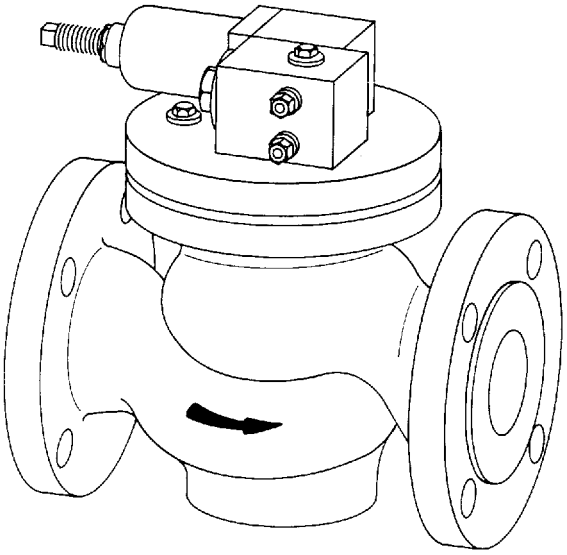
When the inlet pressure falls below the set pressure the pilot valve closes. The pilot pressure is equal to the inlet pressure. The main valve closes as the piston diameter is greater than the valve seat. The spring also forces the valve to close.

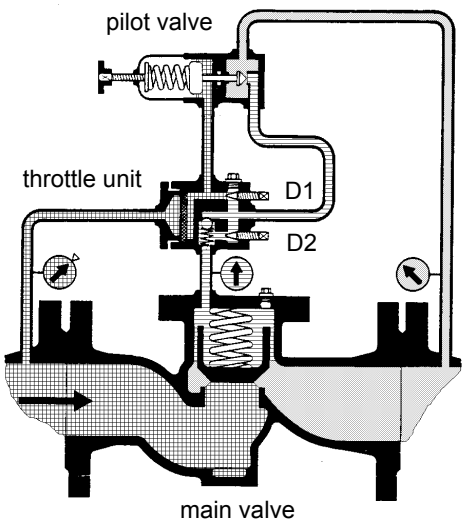
The G ½ pulse lines must be installed on-site.

OPTIONS

- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.





K_{VS}-values [m^3/h]							
nom. dia.	DN	40	50	65	80	100	125
K_{VS}-value	m^3/h	20	32	50	60	70	150

K_{VS}-values [m^3/h]							
nom. dia.	DN	150	200	250	300	350	400
K_{VS}-value	m^3/h	250	350	500	600	700	900

Setting Ranges [bar], Nominal Pressure			
2 - 5	4 - 12	10 - 20	15 - 40
PN 10	PN 25	PN 40	PN 63

The pressure has always been indicated as overpressure.

Sheet no. RP 820/2.1.061.1 - issue 12.06.2006

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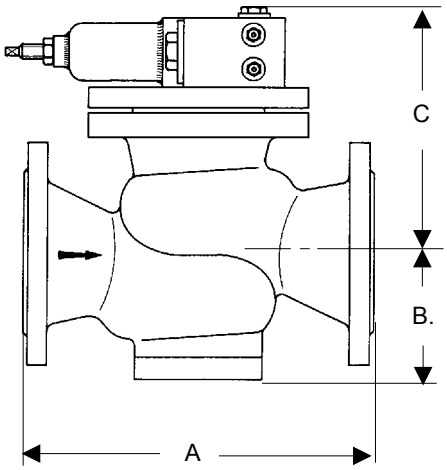
Pressure Control Valves RP 820

Overflow valve pilot operated for liquids
up to 130 °C

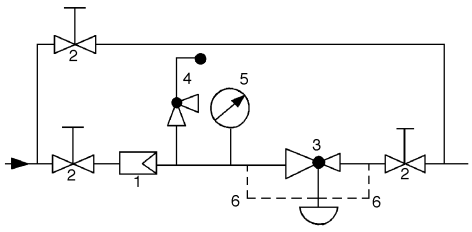
Materials			
Temperature		80 °C	130 °C
Body	PN 10	up to DN 25 grey cast iron from DN 40 spheroidal cast iron	
	PN 25, 40, 63	cast steel	
	PN 10 - 63	CrNiMo-steel	
Cover		steel optional CrNiMo-steel	
Internals		Cr-steel optional CrNi-steel or CrNiMo-steel	
Valve Seal		NBR	EPDM
O-ring		NBR	EPDM
Pilot Valve		CrNiMo-steel	CrNiMo-steel
Throttle Unit		CrNiMo-steel	CrNiMo-steel



Dimensions [mm]							
nom. press.		nominal diameter DN					
PN	size	40	50	65	80	100	125
16	A	200	230	290	310	350	400
40	A	200	230	290	310	350	400
63	A	260	300	340	380	430	
all PN	B	140	160	180	220	220	230
all PN	C	200	220	250	260	280	290

Dimensions [mm]							
nom. press.		nominal diameter DN					
PN	size	150	200	250	300	350	400
16	A	480	600	730	850	980	1100
40	A	480	600	730	850	980	
63	A	550	650				
all PN	B	240	270	290	350	350	410
all PN	C	330	390	420	550	550	550

Recommended Installation



Weights [kg]												
	nominal diameter DN											
PN	40	50	65	80	100	125	150	200	250	300	350	400
16	25	30	40	50	70	120	150	210	380	450	520	625
40	33	38	48	65	80	140	160	240	440	510	580	
100	40	45	55	80	110		165	290				

1 Strainer
2 Shutoff Valves
3 Overflow Valves
4 Safety Valves
5 Pressure Gauge
6 Sense Line

Special designs on request.
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Sheet no. RP 820/3.1.061.1 - issue 12.06.2006

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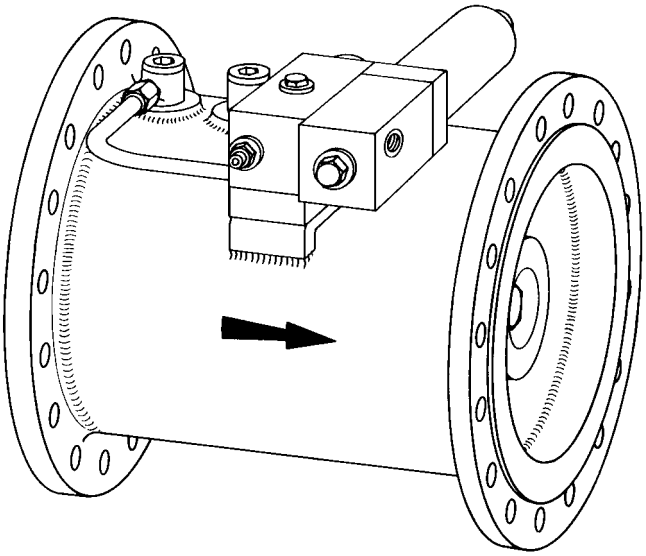
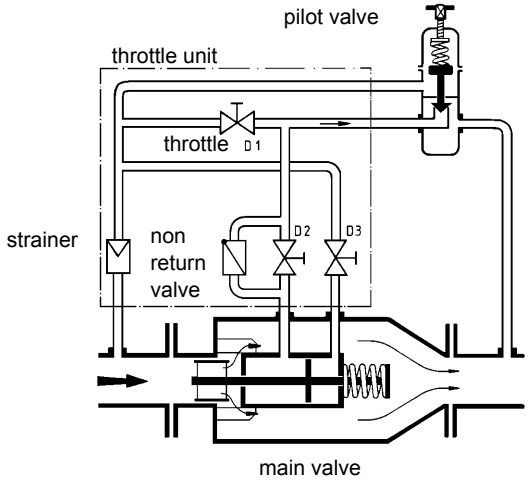
Pressure Control Valves RP 824, 825

Overflow valve, inline-design, pilot operated for liquids and gases up to 130 °C

Technical Data

Connection	RP 824 DN 100 - 800
	RP 825 DN 100 - 400
Nominal Pressure	PN 10 - 25
Inlet Pressure	2 - 20 bar
	in 3 setting ranges
Differential Press.	min. 2 bar
K_{VS}-value	60 - 2100 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)





Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

The RP 824 and RP 825 overflow valves are pilot-controlled control valves of tubular design consisting of a main valve, a pilot valve connected with the main valve via pipes and a restrictor assembly with built-in strainer. The valve cone is fitted with a metallic seal.

When the pipeline is depressurised the main valve is kept closed by a preloaded spring. To open the valve a pressure difference (p1 – p2) of at least 2 bar is required. When the inlet pressure is above the set pressure the pilot valve is kept open by its control mechanism. Restrictor D1 produces a pressure drop causing the outlet pressure to be almost equal to the pilot pressure in the main valve. The inlet pressure overcomes the pilot pressure and closing force of the spring and opens the main valve.

When the inlet pressure has reached the set pressure, the pilot valve restricts the flow. This causes the pilot pressure to rise and push the main valve piston into a controlling position in which opening and closing forces are in balance. When the inlet pressure falls below the set pressure the pilot valve closes. The pilot pressure is equal to the inlet pressure, the forces acting on the piston are in equilibrium and the main valve is kept closed by its spring.
The restrictors are used to optimise the control characteristics. The bypass line around D2 which is fitted with a non-return valve, ensures quick closing.

The valve is piped internally. The G ½ pulse lines must be installed on-site.

The valve can be fitted with electrical limit switches.

The RP 824 and RP 825 overflow valves differ from each other by their size and Kvs ratings.

OPTIONS

- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]						
	nominal diameter DN					
type	100	125	150	200	250	300
824	60	100	120	180	250	400
825	180	200	250	400	600	800

K_{VS}-values [m^3/h]							
	nominal diameter DN						
type	350	400	450	500	600	700	800
824	600	800	1100	1200	1800	2000	2100
825	1200	1800					

Setting Ranges [bar], Nominal Pressure		
2 - 5	4 - 12	10 - 20
PN 10	PN 16	PN 25

The pressure has always been indicated as overpressure.

Sheet no. RP 824/2.1.061.1 - issue 12.06.2006

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Pressure Control Valves *RP 824, 825*

Overflow valve, inline-design, pilot operated for liquids and gases
up to 130 °C

Materials		
Temperature	80 °C	130 °C
Body	steel welded optional CrNiMo-steel welded	
Internals	CrNiMo-steel	CrNiMo-steel
Valve Seal	CrNiMo-steel	CrNiMo-steel
O-ring	NBR	EPDM
Pilot Valve Sense Lines Throttle Unit	CrNiMo-steel	CrNiMo-steel

Dimensions [mm] RP 824

	nominal diameter DN												
size	100	125	150	200	250	300	350	400	450	500	600	700	800
A	300	325	350	400	450	500	550	600	650	700	800	900	1000
B max.	200	200	220	240	270	300	320	350	380	400	450	500	550
E max.	270	270	270	270	270	270	270	270	270	270	270	270	270

Weights [kg] RP 824

	nominal diameter DN												
PN	100	125	150	200	250	300	350	400	450	500	600	700	800
16	60	60	65	75	120	150	190	240	300	360	420	480	540
25	75	75	80	90	135	165	220	280	360	400	460	580	720

Dimensions [mm] RP 825

	nominal diameter DN							
size	100	125	150	200	250	300	350	400
A	350	400	480	600	730	850	980	1100
B max.	220	240	270	300	320	350	400	450
ø D max.	360	400	425	485	555	620	730	845
E max.	270	270	270	270	270	270	270	270

Weights [kg] RP 825

	nominal diameter DN							
PN	100	125	150	200	250	300	350	400
16	85	110	125	170	220	270	340	400
25	90	115	135	180	240	300	370	430

Special designs on request.
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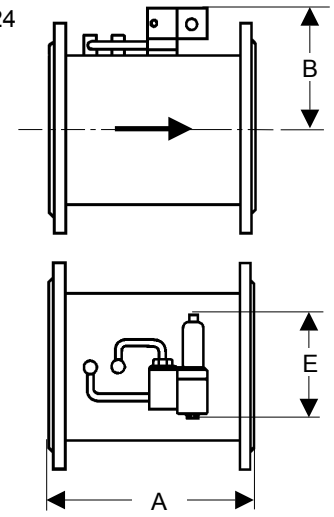
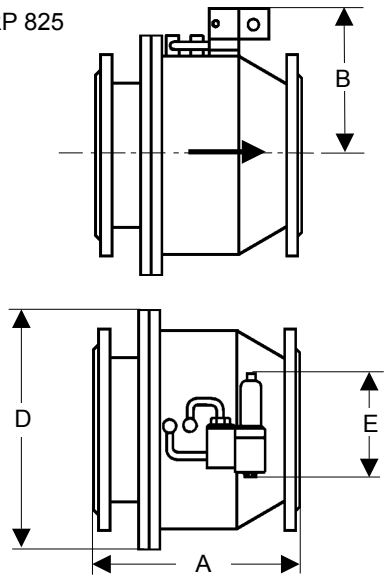
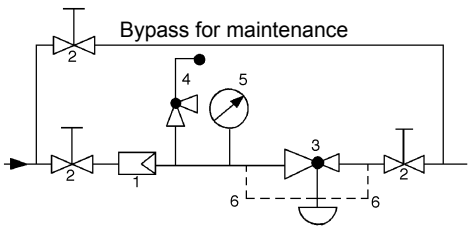
RP 824



RP 825



Recommended Installation



1 Strainer
2 Shutoff Valve
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Sense Line

Sheet no. RP 824/3.1.061.1 - issue 12.06.20006

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Pressure Control Valves UV EU116

Overflow valve pilot-controlled for water up to 70 °C

Technical Data

Connection	DN 50 - 600
Nominal Pressure	PN 10 - 16
Inlet Pressure	1.4 - 12 bar (standard)
	0.1 - 20 bar (special)
K_{VS}-Value	40 - 2550 m^3/h
Tightness	acc. VDI/VDE-rule 2174
	(leakage rate ≤ 0.05 % of the K_{VS}-value)

Description

Medium-controlled overflow valves are simple control valves offering accurate control while being easy to install and maintain. They control the pressure upstream of the valve without requiring pneumatic or electrical control elements.

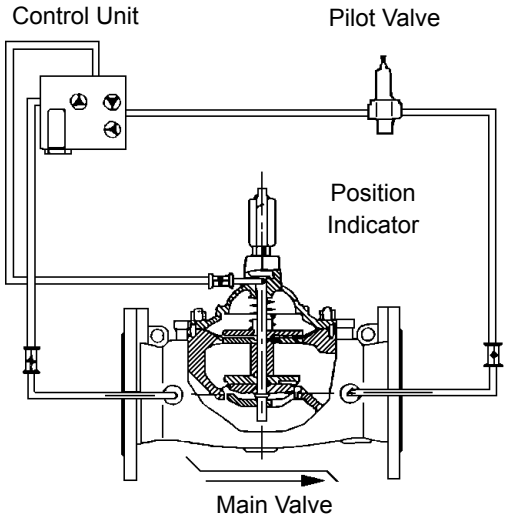
The UV EU116 overflow valve is a pilot-controlled control valve consisting of main valve with position indicator, control unit, pilot valve, pressure gauge stop valves and connecting pipes. The main valve cone is fitted with a soft seal. This valve which has been specially developed for drinking water applications, features an electrostatically deposited coating on internal and external surfaces and meets the KTW recommendation of the German Ministry for Health.
When the pipeline is depressurised or inlet and outlet pressures are equal, the main valve is kept closed by its spring.

When the inlet pressure rises above the set pressure the control medium flows towards the valve outlet via the open pilot valve. A restrictor in the control unit produces a pressure drop upstream of the diaphragm causing the inlet pressure to overcome the control pressure and spring force and open the main valve.

As soon as the inlet pressure has reached the set pressure, the pilot valve restricts the flow. This causes the pilot pressure to rise and push the main valve cone into a controlling position.

When the inlet pressure falls below the set pressure the pilot valve closes. The pilot pressure continues to rise and the main valve also closes. The control unit contains adjustable restrictors which allow the control characteristics of the pressure reducer to be matched to the system (closing, opening and response speeds).
The overflow valve is completely piped. It does not require any additional pilot lines.

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m^3/h]								
Nom. Dia.	DN	50	65	80	100	125	150	200
K_{VS}-value	m^3/h	40	43	47	115	170	175	360

K_{VS}-values [m^3/h]							
Nom. dia.	DN	250	300	350	400	500	600
K_{VS}-value	m^3/h	560	1240	1290	1780	2490	2550

Sheet no. UV EU116/2.1.061.1 - issue 12.06.2006

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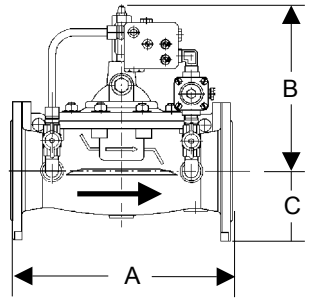
Pressure Control Valves — *UV EU116*

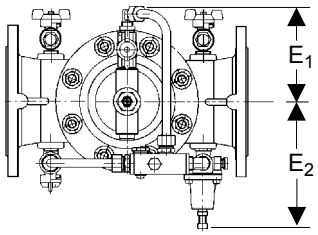
Overflow valve pilot-controlled for water up to 70 °C

Materials - Main Valve		
Temperature		70´°C
Body		spheroidal cast iron Epoxy-coated*
Cover		spheroidal cast iron Epoxy-coated*
Cap Bearing		bronze, self-lubricating
Internals		1.4401, 1.4305
Diaphragm-discs	DN 50 - 150	steel Epoxy-coated*
	ab DN 200	cast steel Epoxy-coated*
Spring		1.6900
Valve Seal		NBR Quad-ring
O-ring		Viton
Diaphragm		NBR-nylon-reinforced*

Materials - Pilot Circuit	
Control Unit	1.4305
Pilot Valve	bronze, 1.4305 / 1.4401, brass NBR diaphragm
Strainer	1.4404
Non-Return Valve	Hastoform, spring 1.4401
Pilot Line	1.4305
Pipe Unions	brass, nickel plated
Fittings	1.4301, 1.4401
Stop Valves	brass, nickel plated
Gauge Stop Valves	brass, nickel plated

* in accordance with KTW-recommendation

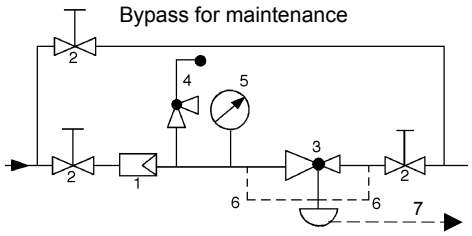




Dimensions [mm] and Weights [kg]								
nom. press.		nominal diameter DN						
PN	size	50	65	80	100	125	150	200
10/16	A	230	290	310	350	400	480	600
10/16	B	225	225	225	260	310	310	365
10/16	C	85	95	100	110	125	145	170
10/16	E_1	160	170	175	190	200	210	235
10/16	E_2	130	130	130	140	145	155	180
10/16	kg	20	23	25	36	50	61	110

Dimensions [mm] and Weights [kg]							
nom. press.		nominal diameter DN					
PN	size	250	300	350	400	500	600
10/16	A_1	730	850	980	1100	1250	1450
10/16	B	475	570	570	680	720	820
10	C	200	230	255	285	335	390
16		200	230	260	290	360	420
10/16	E_1	280	305	330	355	405	455
10/16	E_2	220	245	270	295	360	420
10/16	kg	225	390	485	580	820	1180

Recommended Installation



1 Strainer
2 Shutoff Valves
3 Overflow Valve
4 Safety Valve
5 Pressure Gauge
6 Sense Line (option)
7 Leakage Line (option)

sense line connection 10 - 20 x DN behind the valve

Special designs on request.
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Sheet no. UV EU116/3.1.061.1 - issue 12.06.2006

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Pressure Surge Relief Valve
up to 80/130 °C

Technical Data

Connection	DN 100 - 400
Nominal Pressure	PN 16 - 100
Relief Pressure	max. 100 bar
K_{VS}-value	190 - 3100 m^3/h
C_{VS}-value	220 - 3565 US gal/min.
Tightness	acc. to VDI/VDE-guideline 2174 (leakage rate ≤ 0.05% of K_{VS}-value) or ANSI B16.104 Leakage Class V (soft seated)
Response Time	adjustable (pilot version)

Description

The pressure surge relief valve UV 6.2 is used to relieve pipeline systems of pressure surges by providing a secondary outlet.

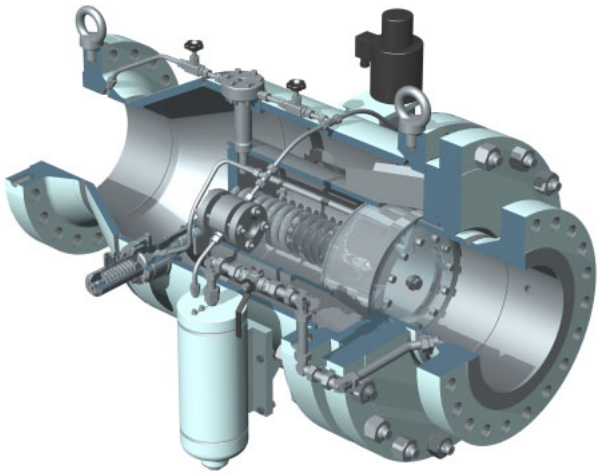
The valve is controlled by its own medium and requires no energy input to operate. The UV 6.2 is available in the pilot operated or the spring-loaded version. Pilot operation allows variable response pressures during operation

The principal components of the valve are the body including piston guide which houses the piston/valve cone/spring assembly, and the valve seat which is bolted to the inlet side of the valve body by means of a flange. Piston guide and valve cone have threaded bores which can take a blanking plug, nozzle or bypass valve depending on the application.

In application “A” the valve cone is closed by a blanking plug, whilst the piston guide is open. In this case the spring chamber is subject to the outlet pressure. During normal operation the valve is kept closed by the spring pressure. As soon as the inlet pressure exceeds the operating pressure determined by the spring, the valve cone opens and allows the fluid to flow to the outlet side. The valve closes again when the inlet pressure falls below the operating pressure.

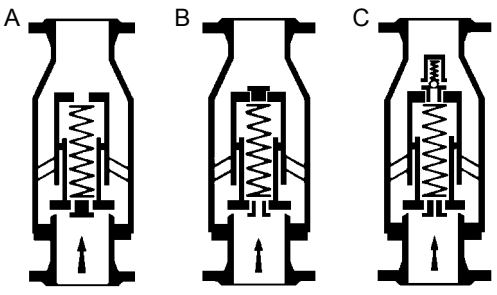
In application “B” the piston guide is closed by a plug and a nozzle is mounted in the cone. The result is that the inlet pressure acts on the back of the cone and reinforces the spring pressure.
In application “C” the piston guide is fitted with a bypass valve which allows the fluid to drain to the outlet side as the valve cone opens.

The relief or opeyrating pressure is set at the factory. It can be altered by adding/replacing the spring shims.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



pilot operated

spring loaded



Sheet no. UV 6.2/2.1.071.1 - issue 09.01.2007

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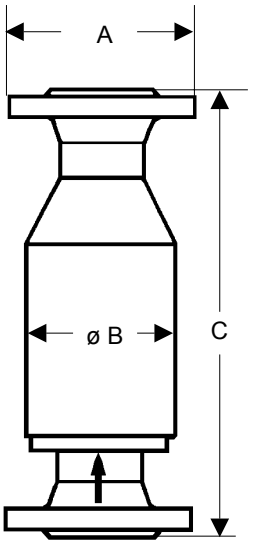
Pressure Surge Relief Valve
up to 80/130 °C

Materials		
Temperature	80°C	130°C
Body	Steel-/CrNiMo-steel-welded	Steel-/CrNiMo-steel-welded
Inner Parts	CrNiMo-steel	CrNiMo-steel
Valve Seal	NBR	EPDM
Piston Seal	PTFE	PTFE
Piston Guide	PTFE	PTFE
Pressure Springs	CrNi-steel	CrNi-steel



Dimensions [mm]						
	Nominal diameter DN					
size	100	150	200	250	300	300
A	on request					
ø B						
C						

Weights [kg]						
Nominal	Nominal diameter DN					
pressure	100	150	200	250	300	400
PN 16	on request					
PN 25						

Special designs on request.
The pressure has always been indicated as overpressure.
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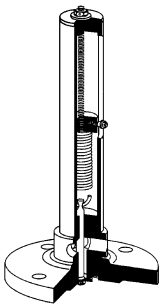
Vacuum Breakers, Vacuum Control Valves



Vacuum breaker with setting scale VV 34 35

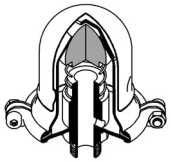
body CrNi-steel, stainless steel
spring cap brass, stainless steel
flange steel, stainless steel

PN..... 6 - 40	DN..... 20 - 250
p_2..... 0.05 - 0.95 bar diff. pressure	G..... 3/4A - 2 1/2A
K_{vs}..... 1.5 - 388 m^3/h	T..... 300 °C

VV 36 Vacuum breaker without setting scale

stainless steel

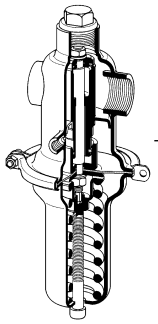
PN..... 6 - 40	G..... 1/2A - 2 1/2A
p_2..... 0.05 - 0.1 bar diff. pressure	T..... 300 °C
K_{vs}..... 1.2 - 25 m^3/h	



Vacuum Breaker VV 59

all stainless steel SST 316 construction

PN..... 16	G..... 3/4A
p_2..... 0,1 bar diff.-pressure	T..... 40 °C
K_{vs}..... 6 m^3/h	



VV 652 Vacuum control valve

please send us your operating data and a description of the application

Sheet no. VV/14.1.081.1 - issue 06.02.2008

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Know How • Vacuum valves

Vacuum breakers protect vessels and pipelines against vacuum. A vacuum can build up when a system is being drained, when it cools down or when a pump fails.
Vacuum control valves are pressure reducing or overflow valves which control pressures below 1 bara

Vacuum control valves:
See Kow How pressure reducing valves and overflow valves.

Vacuum breakers:

Operation
Vacuum breakers protect installations, vessels etc. against vacuum. They are normally closed. If the pressure inside a tank or vessel drops below atmospheric pressure by more than the set differential pressure, the valve opens causing the system to be vented until the set pressure difference has been established again. Vacuum breakers remain closed when the pressure rises above atmospheric; therefore they do not offer protection against excessive pressure.

Selecting valve type and nominal diameter
Vacuum breakers should be selected according to the pressure difference between the atmospheric pressure and the pressure inside the vessel or pipeline, not according to the vacuum or absolute pressure in the vessel or pipeline. All specifications given in data sheets or tables or on the scales of valves etc., relate to this differential pressure. Another factor which must be taken into account when selecting a vacuum valve is the suction capacity. For very small differential pressures vacuum control valves can be used as vacuum breakers.

Vacuum breaker capacity table
Please use the capacity table to select your vacuum breaker. The table applies to valve types 34, 35 and 36. On the left side you will find the nominal diameter; at the top (horizontally) you find the differential pressure given in bar at which the valve opens.

Full opening at set pressure
For applications which require a vacuum breaker to open fully at the set pressure (to prevent a further rise in vacuum), our weight-loaded vacuum breakers type 43 or 44 should be used.

Seat leakage
In their standard form vacuum breakers are supplied with a metallic cone seal which requires less maintenance than a soft seal. For more stringent leakage specifications these valves can be supplied with soft seals. As vacuum breakers may remain in closed position for longer periods, a soft seal tends to stick to the valve seat. The correct functioning of such valves can therefore be guaranteed only if they are serviced frequently and carefully. Also the soft elastomer seal limits the maximum possible operating temperature.

Protecting your system
If toxic or hazardous media are used measures must be taken to ensure that in the case of cone failure the hazardous medium can be drained in a controlled and safe manner. In such a case we reccomend our type 33 with closed valve body and spring cap.

Protecting the vacuum breaker
As the suction orifices are open to atmosphere, they should be adequately protected against the ingress of dust, dirt or insects. If there is a danger of freezing the vacuum breaker should by fitted with a heating-jacket.

Setting the valve
The performance curves shown in the flow capacity diagram relate to fully open valves. To obtain these values under partial load conditions, the operating pressures on the scales of valve types 34 and 35 should always be set 0.05 bar below the pressures given in the diagram. The reason for this is the spring force which increases as the flow and cone movement increase.

Maintenance
Vacuum breakers should be cleaned and serviced regularly. Depending on the ambient operating conditions, the valve spindle should regularly be checked for freedom of movement. The service intervals should be specified in a maintenance schedule.

Valves free of oil and grease or silicone
Please pay attention to order an fit only spares free of oil and grease resp. free of silicone.

Please consult our engineer if extreme operating conditions apply or whenever you are in doubt.

Notes on Safety, operating instruction etc. MUST be followed.

Sheet no. VV/13.1.041.1 - issue 26.04.2004

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Vacuum Breakers
Selection

PN	Differential pressure bar (adjustable)	T °C	K_{VS}-Value m^3/h	Connection screwed	Connection flanged DN	Notes	Type
16 - 40	0.05 - 0.95	300	1.5 - 70		20 - 100	spring cap with setting scale	34
16 - 40	0.05 - 0.5	300	107 - 388		125 - 250	spring cap with setting scale	34
6 - 40	0.05 - 0.95	300	1.5 - 25	3/4 - 2 1/2		spring cap with setting scale	35
6 - 40	0.05 - 0.1	300	1.2 - 25	1/2 - 2 1/2		open design, without scale	36
16 - 40	0.05 - 0.95	300	1.5 - 388		25 - 250	weight loaded	43
6 - 40	0.05 - 0.95	300	1.5 - 25	3/4 - 2 1/2		weight loaded	44

Vacuum Breakers 34, 35, 36, 43 and 44
Flow Rate [m^3/h]

nominal diameter	Differential Pressure (Set Pressure) [bar] ≥ 0.47	0.4	0.3	0.2	0.1	0.05
G 1/2					12	7
G 3/4	41	37	32	26	18	10
G 1	71	66	57	46	33	18
G 1 1/4	127	117	102	82	58	32
G 1 1/2	199	183	158	129	91	50
G 2	348	320	278	227	160	87
G 2 1/2	551	507	439	359	254	139
DN 20	41	37	32	26	18	10
DN 25	71	66	57	46	33	18
DN 32	127	117	102	82	58	32
DN 40	199	183	158	129	91	50
DN 50	348	320	278	227	160	87
DN 65	551	507	439	359	254	139
DN 80	891	819	710	580	410	225
DN 100	1514	1393	1207	986	697	382
DN 125	2316	2129	1846	1507	1065	584
DN 150	3664	3369	2921	2385	1686	923
DN 200	5768	5303	4597	3753	2654	1453
DN 250	8387	7711	6685	5458	3859	2114

The specified flow rate refer to a full open valve.
To get these flow rates the scale setting for type 34 and 35 must be 0.05 bar lower then the Δp tabular values.
Type 36 is fully adjusted.

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. VV/11.1.061.1 - issue 12.06.2006

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Pressure Control Valves VV 34, 35, 36

Vacuum breaker, Vacuum ventilating valves,
Vacuum limiting valves

Technical Data

Connection	VV 34 DN 20 - 250
	VV 35 G 3/4A - 2 1/2A
	VV 36 G 1/2A - 2 1/2A
Nominal Pressure	PN 6 - 40
Setting Range	0.05 - max. 0.95 bar differential pressure (see table below)
K_{VS}-value	1.2 - 388 m^3/h

Description

Vacuum breakers – also called vacuum venting valves or vacuum limiters - are valves which allow air to be aspirated once a set vacuum or pressure difference to atmosphere is reached. These valves are installed on pipelines, vessels, machines and equipment and are used, for instance, for venting tanks, limiting the vacuum in vacuum systems and protecting steam installations.

Under normal operating conditions the valve is kept closed by a pre-loaded spring and the internal vacuum acting on the valve cone. If the vacuum drops below the value set by means of the spring, the valve is opened by the atmospheric pressure and air enters the system. With increasing air flow the cone stroke and spring force increase. The pressure difference increases accordingly.

The VV 34 and VV 35 vacuum breakers have a tension spring and a bonnet complete with scale for setting the breaking pressure.

Vacuum breaker VV 36 is an open version without bonnet or setting scale made entirely of stainless steel.

For control duties vacuum breakers may be used only to a limited degree. For such duties we recommend using the diaphragm-controlled vacuum control valve VV 33.

STANDARD EQUIPMENT

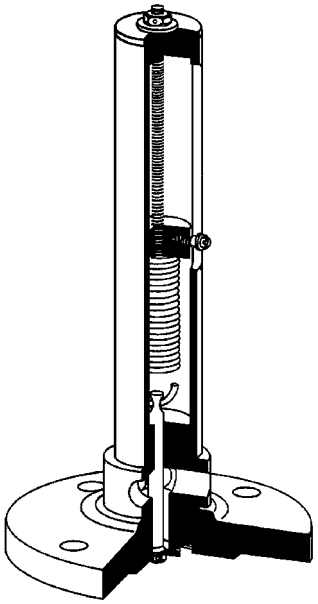
- VV 34 and 35 with brass bonnet and setting scale
- VV 36 all stainless steel construction (CrNiMo steel)

OPTIONS

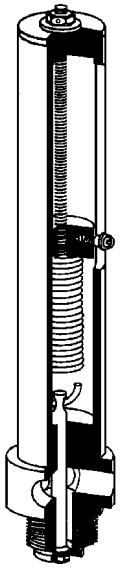
- VV 34 and 35 all stainless steel construction (CrNiMo steel)
- Special connections: ANSI or DIN flanges, other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

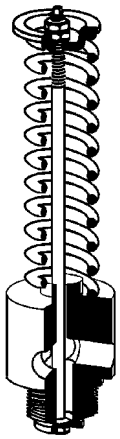
VV 34



VV 35



VV 36



K_{VS}-values [m^3/h]								
nom. dia.	DN		20	25	32	40	50	65
	G..A	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
K_{VS}-value	m^3/h	1.2	1.5	3.2	6	9	16	25

K_{VS}-values [m^3/h]							
nom. dia.	DN	80	100	125	150	200	250
K_{VS}-value	m^3/h	41	70	107	169	266	388

Adjustable Differential Pressure [bar]				
Type	34		35	36
	≤ DN 100	≥ DN 125		
Δp bar	0.05-0.95	0.05-0.5	0.05-0.95	0.05-0.1

Sheet no. VV 34/2.1.081.1 - issue 06.02.2008

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Pressure Control Valves VV 34, 35, 36

Vacuum breaker, Vacuum ventilating valves,
Vacuum limiting valves

Materials	
Type	VV 34
Body	CrNi-steel optional CrNiMo-steel
Flange	steel optional CrNiMo-steel
Bonnet	Ms optional CrNiMo-steel
Cone	CrNiMo-steel
Valve Seal	CrNiMo-steel

Materials	
Type	VV 35
Body	CrNi-steel optional CrNiMo-steel
Bonnet	Ms optional CrNiMo-steel
Cone	CrNiMo-steel
Valve Seal	CrNiMo-steel

Materials	
Type	VV 36
Body	CrNiMo-steel
Cone	CrNiMo-steel
Valve Seal	CrNiMo-steel

Dimensions [mm] VV 34												
	nominal diameter											
size	20	25	32	40	50	65	80	100	125	150	200	250
A	250	280	350	350	380	530	600	650	700	860	1140	1390

Weights [kg] VV 34											
nominal diameter DN											
20	25	32	40	50	65	80	100	125	150	200	250
2	2.2	4.2	4.2	5.2	9.7	10.5	11.5	20	25	34	44

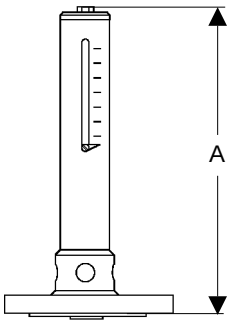
Dimensions (mm) VV 35						
	nominal diameter G...A					
size	3/4	1	1 1/4	1 1/2	2	2 1/2
A	250	280	350	350	380	530

Weights [kg] VV 35					
nominal diameter G...A					
3/4	1	1 1/4	1 1/2	2	2 1/2
1	1	1.8	2.3	2.5	6

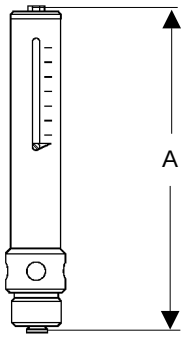
Dimensions [mm] VV 36							
	nominal diameter G...A						
size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
A	120	120	130	140	150	150	180

Weights [kg] VV 36						
nominal diameter G...A						
1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
0.5	0.6	0.8	1	1.2	1.5	2

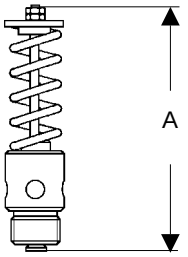
VV 34



VV 35



VV 36



Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. VV34/3.1.81.1 - issue 06.02.2008

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Vacuum breaker, Vacuum ventilating valves, Vacuum limiting valves
up to 40 °C

Technical Data

Connection	G 3/4A
Nominal Pressure	PN 16
Set Pressure	0,1 bar fixed adjusted
K_{vs} Value	6 m^3/h

Description

Vacuum breakers – also called vacuum venting valves or vacuum limiters - are valves which allow air to be aspirated once a set vacuum or pressure difference to atmosphere is reached. These valves are installed on pipelines, vessels, machines and equipment and are used, for instance, for venting tanks, limiting the vacuum in vacuum systems and protecting steam installations.

Under normal operating conditions the valve is kept closed by a pre-loaded spring and the internal vacuum acting on the valve cone. If the vacuum drops below the value set by means of the spring, the valve is opened by the atmospheric pressure and air enters the system. With increasing air flow the cone stroke and spring force increase. The pressure difference increases accordingly.

Due to the large dimensioned seat diameter VV 59 achieves an outstanding high flow rate. This vacuum breaker is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.

Top and bottom sections of the valve body are connected by a clamp ring and two bolts. Servicing/maintenance is easy and does not call for special tooling.

For control duties vacuum breakers may be used only to a limited degree. For such duties we recommend using the diaphragm-controlled vacuum control valve VV 33.

STANDARD EQUIPMENT

- All stainless steel construction
- Removeable protection cap made of stainless steel
- Quick-release body clamp ring

OPTIONS

- Special connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

K_{vs} Value [m^3/h]
6

Sheet no. VV 59/2.1.072.1 - issue 12.11.2007

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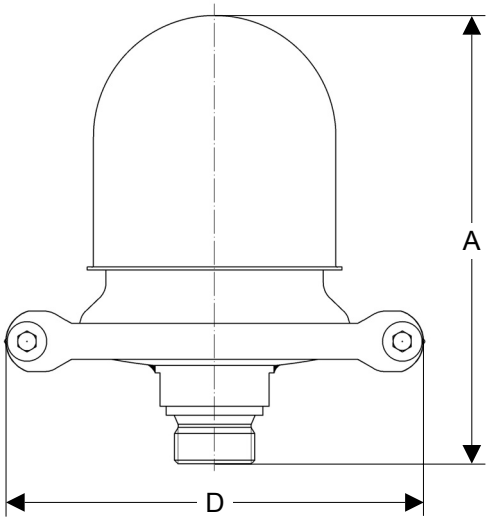
Pressure Control Valves VV 59

Vacuum breaker, Vacuum ventilating valves, Vacuum limiting valves
up to 40 °C

Materials	
Body	stainless steel
Protection Cap	stainless steel
Body Seal	EPDM
Cone	ball made of NBR
Spring	stainless steel

Dimensions [mm]	
size	nominal diameter G 3/4A
A	148
D	136/110

Weight [kg]
nominal diameter G 3/4A
1,5



Special designs on request.
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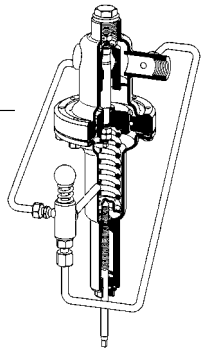
Burst Pipe Isolating Valves

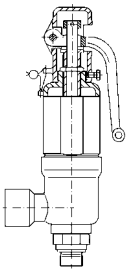


For hazardous and toxic media — RS 659

shut off pipelines in case of leaks
these valves lock automatically following operation
all stainless steel SST 316 construction

PN..... 16 — DN..... 15 - 50
K_{VS}..... 4 - 18 m^3/h — T..... 130 °C

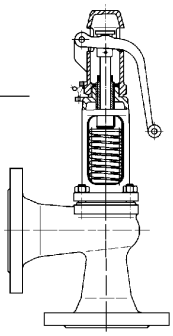
Safety Valves



SV 29 / 29V — Normal or full lift, screwed

spring loaded
SV 29 normal safety valve
SV 29V full lift safety valve
body 1.4104, 1.4404

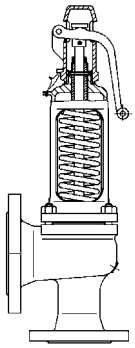
PN..... 40 - 400 — G..... 1/2 - 1 1/2
T..... 200/300 °C



Normal or proportional valve — SV 4 / 40

spring loaded
SV 4 closed spring cap
SV 40 open spring cap for steam
body grey cast iron, cast steel, stainless steel

PN..... 16 - 40 — DN..... 15 - 150
T..... 200/400 °C



SV 6 / 60 — Full lift valve

spring loaded
SV 6 closed spring cap
SV 60 open spring cap for steam
body grey cast iron, cast steel, stainless steel, steel welded

PN..... 16 - 40 — DN..... 25/40 - 250/400
T..... 200/400 °C

Sheet no. RS/SV/14.1.081.1 - issue 06.02.2008

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Know how • safety valves

Safety valves are the ultimate protection device for tanks and pipelines. They prevent pressure limits being exceeded once all automatic control and monitoring equipment has failed.

Normal safety valves initially open proportionally up to a pressure rise of 10 %. This initial phase is followed by the full opening of the valve, allowing a large flow of medium.
Especially in the case of liquids, the wide proportional range results in a continuous operation.
Pressure rise:
above 1 bar set pressure: .....10 % up to required valve lift;
below 1 bar set pressure: .....0.1 bar.

Proportional safety valves open almost continuously as the pressure rises. They produce the valve lift required for draining the volume within a maximum pressure rise of 10 %. They are used where only small volumes are expected to be drained (e.g. thermal expansion) and where the loss of medium is to be minimised.
Pressure rise:
above 1 bar set pressure: .....10 % up to required valve lift;
below 1 bar set pressure: .....0.1 bar.

Full lift safety valves open instantly up to maximum lift within a pressure rise of 5 %. Because of their instant opening they are used where suddenly larger flow volumes or fast pressure rises may occur. They are mainly used for relieving pressure in vapours and gases.
Pressure rise:
above 1 bar set pressure:.....5 % up to the max. valve lift;
below 1 bar set pressure: .....0.1 bar.

Closing pressure difference.
compressible media: .....10 %
below 3 bar:.....0.3 bar
non-compressible media: .....20 %
below 3 bar:.....0.6 bar

System operating pressure
The plant or system operating pressure should be at least 5 % below the safety valve closing pressure to ensure that the safety valve closes correctly.

Variable back pressure
During blow-off the variable back pressure created by blowing-off must not exceed 15 % of the valve operating pressure. If the variable back pressure is more than 15 % of the valve operating pressure, the valve capacity must be checked. For higher pressures safety valves fitted with pressure-compensating metal bellows should be used.

External back pressure
A constant external back pressure (caused by the system) can be compensated by selecting a suitable spring. In this case the above statements are not applicable.

Installation
Safety valves must always be installed with the spring cover at the top.

Safety valve inlet
The inlet spigots for safety valves should be as short as possible and must not produce a pressure drop exceeding 3 % of the valve operating pressure. If the pressure drop is greater, the inlet pipeline diameter should be increased. The edge of the inlet spigot should be chamfered or rounded.

Blow-off pipeline
For vapours or gases the blow-off pipeline should rise, whilst for liquids it should be installed with a fall. Please make sure that a blowing safety valve does not create a hazard, especially when a safety valve with open spring cover is installed.

Draining of condensate
To keep away dirt and foreign bodies from the safety valve, the blow-off line must have a condensate drain installed at its lowest point. In addition a drain orifice may be provided in the valve itself (this may be necessary for special operating environments such as ships). Before commissioning the valve the plastic plug inserted by the manufacturer must be replaced by a screwed plug.
Drain lines must have no constriction; they must have a fall away from the valve and an outlet which is open to view; the draining of the medium must not create a hazard. If the medium is steam the above requirement can be met by installing steam traps.

Leakage
Safety valves fitted with bellows feature a relief orifice in the spring cover. If medium leaks from this orifice, the bellows is faulty. In the case of toxic or hazardous media you must make sure that these are drained safely.

Insulation
If insulation is used it must not be applied to the spring cover or cooling area (if provided).

Maintenance
Safety valves must be cleaned and serviced at regular intervals. The service intervals depend on the ambient atmosphere (corrosive, dirty) and mode of operation (occasional, continual).

Function check
From time to time the valve should be checked for correct functioning either by manual venting or blowing off. Steam generators are subject to the regulations given in Section 6 of TRD 601 Sheet 1, Issue 6.83.
A slight leakage can be cured by blowing-off. If this does not stop the leak the sealing surfaces are probably damaged.
The valve should be closed by a sudden release of the venting lever. After testing the lever must no longer be engaged with the coupling. To disengage the lever it should be pushed towards the centre of the spring cover until the venting fork is free.

Valves free of oil and grease or silicone
Please pay attention to order an fit only spares free of oil and grease resp. free of silicone.

Please consult our engineer if extreme operating conditions apply or whenever you are in doubt.

Notes on Safety, 0perating instruction etc. MUST be followed.

Sheet. no. SV/13.1.041.1 - issue 26.04.2004

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Safety Valves
for steam and gases

PN*	Set Pressure** bar	T*** °C	Connection screwed	Connection flanged DN	Notes	Type
16 - 40	0.2 - 40	450		20 - 400	full lift safety valve	6
16 - 40	0.2 - 40	450		20 - 400	full lift safety valve for steam with open bonnet	60
63 - 400	2.5 - 300	550		25 - 100	high pressure full lift safety valve	46
63 - 400	2.5 - 300	550		25 - 100	high pressure full lift safety valve for stem with open bonnet	47
16 - 40	1 - 40	450		25 - 100	full lift safety valve, weight loaded	3
-	0.2 - 630	300	3/4 - 1		full lift safety valve, screwed	29V
16 - 160	0.2 - 40	450		15 - 150	normal safety valve	4
16 - 160	0.2 - 40	450		15 - 150	normal safety valve for steam with open bonnet	40
16 - 40	0.5 - 40	450		20 - 150	normal safety valve weight loaded	1
-	0.3 - 160	300	1/2 - 1 1/4	-	normal safety valve, screwed	29
16 - 40	0.2 - 40	450		15 - 150	proportional safety valve	4
16 - 40	0.2 - 40	450		15 - 150	proportional safety valve for steam with open bonnet	40
16 - 40	0.5 - 40	400		15 - 150	globe proportional safety valve	7

for liquids

PN*	Set Pressure** bar	T*** °C	Connection screwed	Connection flanged DN	Notes	Type
16 - 40	0.2 - 40	450		20 - 400	full lift safety valve	6
63 - 400	2.5 - 300	550		25 - 100	full lift high pressure safety valve	46
-	0.2 - 630	300	3/4 - 1		full lift safety valve, screwed	29V
16 - 160	0.2 - 40	450		15 - 150	normal safety valve	4
-	0.3 - 160	300	1/2 - 1 1/4	-	normal safety valve, screwed	29
16 - 40	0.2 - 40	450		15 - 150	proportional safety valve	4
16 - 40	0.5 - 40	400		15 - 150	globe proportional safety valve	7

* Nominal Pressure PN : The stated PN are not valid for all body sizes DN.
** Set Pressure: The stated set pressures are not valid for all body sizes DN and media.
*** Temperature: Standard design up to 200 °C, higher temperatures on request.

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. SV/11.1.061.1 - issue 12.06.2006

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Burst Pipe Isolating Valves for liquids and gases
up to 130 °C

Technical Data

Connection	DN 32 - 100
Nominal Pressure	PN 16 - 40
Cut Off Flow Rate	min. 15 % above operating flow rate
K_{vs}-value	14 - 65 m^3/h
Tightness	acc. VDI/VDE-guideline 2174 (leakage rate ≤ 0.05 % of K_{vs}-value)

Description

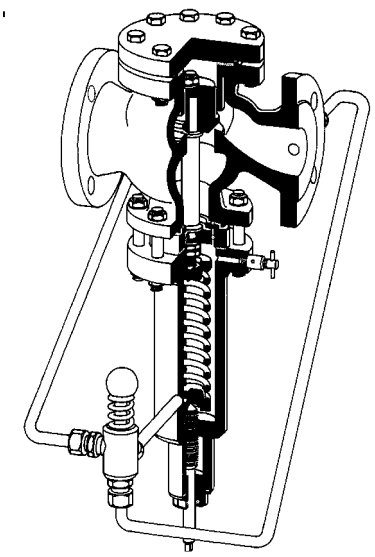
Leaking or broken pipes or hoses may only result in flooding but can, if the escaping fluids are flammable, water-polluting or toxic, have catastrophic consequences. For this reason pipe break isolating valves are fitted on the inlet side of such systems. These valves are set to a certain flow volume and shut off reliably and without delay as soon as this flow volume is exceeded.

RS 219 is a piston-controlled spring-loaded pipe break isolating valve. Depending on the medium the valve cone can be fitted with a soft or metallic seal.

When the pipeline is depressurised the valve is open. Under operating conditions the small pressure drop caused by the pipe break isolating valve acts on the piston/spring system. If the flow volume increases beyond the set value, an imbalance is introduced between the pressure acting on the piston and the force of the spring causing the cone to close. The resulting increase in the flow resistance reinforces the closing force of the piston and causes the complete shutoff of the pipe section. The closing or shutoff speed may be adjustable. Once the fault has been removed the valve can be re-opened and re-activated by pushing the button on the pilot valve.

Rotating the adjusting screw clockwise increases the shutoff trigger volume. In special cases an adjustable shutoff delay may be fitted.

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{vs}-values [m^3/h]						
nom. diameter DN	32	40	50	65	80	100
K_{vs}-value m^3/h	14	18	20	40	50	65

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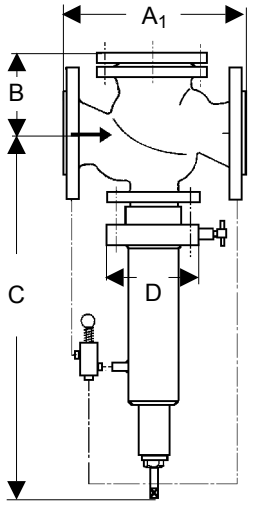
Pressure Control Valves — *RS 219*

Burst Pipe Isolating Valves for liquids and gases
up to 130 °C

Materials			
Temperature		80 °C	130 °C
Body	PN 16	GG-20	GG-20
	PN 25/40	GS-C 25	GS-C 25
Bonnet		steel-welded	steel-welded
Internals		Cr-steel / CrNi-steel	Cr-steel / CrNiMo-steel
Adjusting Screw		steel	steel
Valve Seal		NBR / CrNiMo-steel	EPDM / CrNiMo-steel
Spring		CrNi-steel	CrNi-steel
O-Ring		NBR	EPDM
Pipework		CrNiMo-steel	CrNiMo-steel



Dimensions [mm]						
	nominal diameter DN					
size	32	40	50	65	80	100
A_1	180	200	230	290	310	350
B	125	125	125	180	180	180
C	480	480	480	560	560	560
D	115	115	115	165	165	165

Weights on request.

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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Burst Pipe Isolating Valves for liquids and gases
up to 130 °C

Technical Data

Connection	G 1/2 - 2
	DN 15 - 50
Nominal Pressure	PN 16
Cut Off Flow Rate	min. 15 % above operating flow rate
K_{VS}-value	4 - 18 m^3/h
Tightness	acc. VDI/VDE-guideline 2174
	(leakage rate ≤ 0.05 % of K_{VS}-value)

Description

Leaking or broken pipes or hoses may only result in flooding but can, if the escaping fluids are flammable, water-polluting or toxic, have catastrophic consequences. For this reason pipe break isolating valves are fitted on the inlet side of such systems. These valves are set to a certain flow volume and shut off reliably and without delay as soon as this flow volume is exceeded.

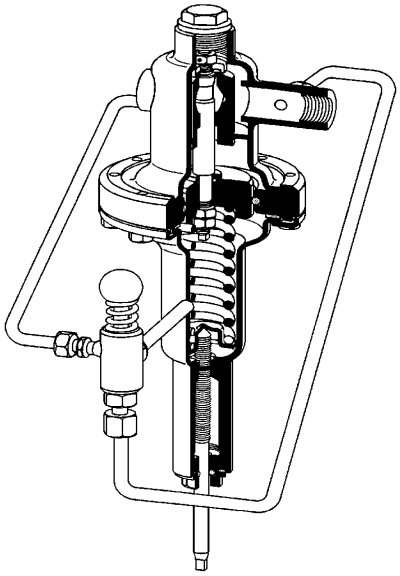
RS 659 is a piston-controlled spring-loaded pipe break isolating valve. Depending on the medium the valve cone can be fitted with a soft or metallic seal.

When the pipeline is depressurised the valve is open. Under operating conditions the small pressure drop caused by the pipe break isolating valve acts on the piston/spring system. If the flow volume increases beyond the set value, an imbalance is introduced between the pressure acting on the piston and the force of the spring causing the cone to close. The resulting increase in the flow resistance reinforces the closing force of the piston and causes the complete shutoff of the pipe section. The closing or shutoff speed may be adjustable. Once the fault has been removed the valve can be re-opened and re-activated by pushing the button on the pilot valve.

Rotating the adjusting screw clockwise increases the shutoff trigger volume. In special cases an adjustable shutoff delay may be fitted.

RS 659 is entirely manufactured from stainless steel (CrNiMo steel).

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m^3/h]							
nominal diameter	G	1/2	3/4	1	1 1/4	1 1/2	2
	DN	15	20	25	32	40	50
K_{VS}-value	m^3/h	4	5	6	12	16	18

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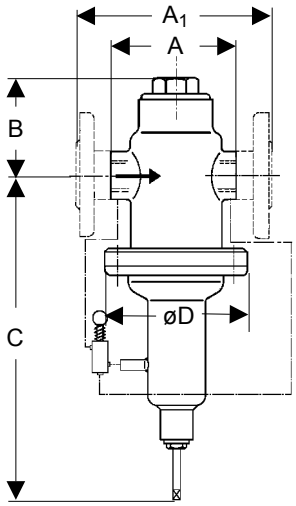
Pressure Control Valves — *RS 659*

Burst Pipe Isolating Valves for liquids and gases
up to 130 °C

Materials		
Temperature	80 °C	130 °C
Body	CrNiMo-steel	CrNiMo-steel
Bonnet	CrNiMo-steel	CrNiMo-steel
Internals	CrNiMo-steel	CrNiMo-steel
Adjusting Screw	CrNiMo-steel	CrNiMo-steel
Valve Seal	NBR / CrNiMo-steel	EPDM / CrNiMo-steel
Spring	CrNi-steel	CrNi-steel
O-Ring	NBR	EPDM
Pipework	CrNiMo-steel	CrNiMo-steel



Dimensions [mm]						
	nominal diameter					
size	G 1/2	G 3/4	G 1	G 1 1/4	G 1 1/2	G 2
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
A	85	91	85	130	145	185
A_1	130	150	160	180	200	230
B	76	76	76	88	88	88
C	~400	~400	~400	~400	~400	~400
D	135	135	135	135	135	135

Weights on request

Special designs on request.
The pressure has always been indicated as overpressure.
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Blatt Nr. RS 659/3.1.061.1 - Stand 12.06.2006

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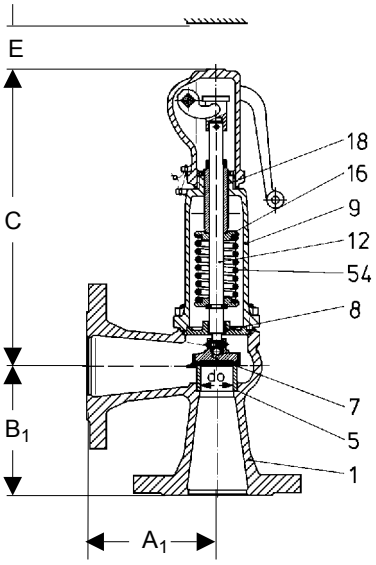
spring loaded safety valves for liquids, gases and steam
with open or closed spring cap

Materials			
1	Body		GG-25 / GGG-40 / GS-C 25
5	Seat		1.4571 / 1.4404
7	Cone		1.4122
8	Guide		1.4104 / 1.0501 / 0.7040
9	Spring Cap		0.7040 (0.7043 / 1.0619)
12	Spindle		1.4021
16	Spring Plate		1.0718 / 1.4404
18	Adjusting Screw		1.4104 with PTFE-bush
54	Spring	up tp 200 °C	1.1200 / 1.7102 / 1.8159 / 1.4310
		from 200 °C	1.7102 / 1.8159 / 1.4310

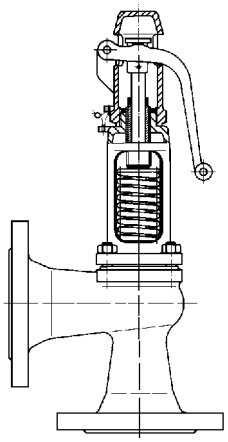
Materials stainless steel design			
1	Body		1.4408
5	Seat		1.4571 / 1.4404
7	Cone		1.4404
8	Guide		1.4404
9	Spring Cap		1.4408
12	Spindle		1.4404
16	Spring Plate		1.4404
18	Adjusting Screw		1.4404 with PTFE-bush
54	Spring	up to 200 °C	1.4310
		from 200 °C	1.4310



SV 4

Dimensions [mm]											
DN Inlet	15	20	25	32	40	50	65	80	100	125	150
DN Outlet	15	20	25	32	40	50	65	80	100	125	150
do	12	18	18	18	23	29	37	46	60	74	92
A_1	90	95	100	105	115	125	145	155	175	200	225
B_1	90	95	100	105	115	125	145	155	175	200	225
C (O/G) *	218	218	218	218	218	233	315	360	400	500	600
C (M/N) *	220	220	220	220	220	235	325	370	430	545	645
C (M/G) *	215	215	215	215	215	230	330	375	435	540	640
E	150	150	150	200	200	250	250	300	350	400	450

*O/G = without lifting device, gastight cap
*M/ N = with lifting device, not gastight
*M/G = with lifting device, gastight cap



SV 40

Dimensions for CrNiMo-steel design on request.

Weights [kg]										
nominal diameter DN										
15	20	25	32	40	50	65	80	100	125	150
5	6	6	8	9	12	15	20	33	48	65

Special designs on request.
The pressure has always been indicated as overpressure.
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Pressure Control Valves — *SV 4, 40*

spring loaded safety valves for liquids, gases and steam
with open or closed spring cap

Type	Medium	Set Pressure [bar]	Nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150
4 40	Saturated steam [kg/h]	0.5	51.2	28.4	61.4	61.4	100	159	259	401	682	1030	1600
		1	73.3	64.4	95.8	95.8	156	249	405	625	1060	1610	2500
		2	115	120	160	160	261	415	676	1040	1770	2700	4180
		3	155	166	216	216	353	562	914	1410	2400	3650	5650
		4	193	210	275	275	449	714	1160	1790	3050	4640	7180
		5	231	251	329	329	538	855	1390	2150	3650	5560	8600
		6	269	293	383	383	626	995	1620	2500	4260	6480	10000
		7	307	334	437	437	714	1130	1840	2850	4860	7390	11400
		8	345	375	491	491	802	1270	2070	3200	5450	8300	12800
		9	383	416	545	545	890	1410	2300	3550	6050	9210	14200
		10	420	457	599	599	978	1550	2530	3910	6650	10100	15600
		12	496	539	706	706	1150	1830	2980	4610	7840	11900	18400
		14	571	621	814	814	1320	2110	3430	5310	9040	13700	21200
		16	646	703	921	921	1500	2390	3890	6010	10200	15500	24000
		18	722	785	1020	1020	1670	2670	4340	6710	11400	17300	26900
		24	950	1030	1350	1350	2200	3510	5710	8830	15000	22800	-
		28	1100	1190	1570	1570	2560	4070	6630	10200	17400	-	-
		32	1250	1360	1790	1790	2920	4640	7560	11600	19800	-	-
	Air [Nm^3/h]	0.5	62.8	34.8	75.2	75.2	123	195	318	491	836	1270	1960
		1	92	80.9	120	120	196	312	508	786	1330	2030	3140
		2	147	153	204	204	333	529	861	1330	2260	3440	5320
		3	199	213	278	278	454	722	1170	1810	3080	4690	7260
		4	250	271	356	356	581	923	1500	2320	3950	6000	9280
		5	300	327	428	428	699	1110	1800	2790	4750	7230	11100
		6	351	382	500	500	817	1290	2110	3260	5560	8450	13000
		7	402	437	573	573	935	1480	2420	3740	6360	9680	14900
		8	453	492	645	645	1050	1670	2720	4210	7170	10900	16800
		9	504	548	718	718	1170	1860	3030	4680	7970	12100	18700
		10	555	603	790	790	1290	2050	3330	5160	8770	13300	20600
		12	656	714	935	935	1520	2420	3950	6100	10300	15800	24400
		14	758	824	1070	1070	1760	2800	4560	7050	11900	18200	28200
		16	859	935	1220	1220	1990	3170	5170	7990	13600	20700	31900
		18	961	1040	1360	1360	2230	3550	5780	8940	15200	23100	36200
		22	1160	1260	1650	1650	2700	4300	7010	10800	18400	28000	-
		24	1260	1370	1800	1800	2940	4680	7620	11700	20000	30400	-
		32	1670	1810	2380	2380	3890	6180	10000	15500	26400	-	-
		36	1870	2040	2670	2670	4360	6930	-	17700	30100	-	-
		40	2070	2260	2960	2960	4830	7690	-	19600	-	-	-
4	Water [m^3/h]	0.5	2.14	1.90	2.51	2.51	4.09	6.51	10.6	16.4	27.8	42.4	65.5
		1	2.90	2.58	3.39	3.39	5.54	8.81	14.3	22.2	37.7	57.4	88.7
		2	4.10	3.65	4.80	4.80	7.84	12.5	20.3	31.3	53.3	81.1	125
		3	5.02	4.47	5.88	5.88	9.60	15.3	24.8	38.4	65.3	99.3	154
		4	5.79	5.16	6.79	6.79	11.1	17.6	28.7	44.3	75.4	115	177
		5	5.48	5.77	7.59	7.59	12.4	19.7	32.1	49.6	84.3	128	198
		6	7.09	6.32	8.31	8.31	13.6	21.6	35.1	54.3	92.4	140	217
		7	7.66	6.82	8.98	8.98	14.7	23.3	37.9	58.6	99.8	152	235
		8	8.19	7.30	9.60	9.60	15.7	24.9	40.6	62.7	107	162	251
		9	8.69	7.74	10.2	10.2	16.6	26.4	43	66.5	113	172	266
		10	9.16	8.16	10.7	10.7	17.5	27,9	45.3	70.1	119	181	280
		12	10	8.93	11.8	11.8	19.2	30.5	49.7	76.8	131	199	307
		14	10.8	9.65	12.7	12.7	20.7	33	53.7	82.9	141	215	332
		16	11.6	10.3	13.6	13.6	22.2	35.2	57.4	88.7	151	229	355
		22	13.6	12.1	15.9	15.9	26	41.3	67.3	104	177	269	-
		28	15.3	13.6	18	18	29.3	46.6	75.9	117	200	-	-
		32	16.4	14.6	19.2	19.2	31.3	49.8	81.1	125	213	-	-
		36	17.4	15.5	20.4	20.4	33.2	52.9	-	133	226	-	-
		40	18.3	16.3	21.5	21.5	35	55.7	-	140	-	-	-

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. SV 4/2.1.061.2 - Issue 12.06.2006

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spring loaded safety valves for liquids, gases and steam
with open or closed spring cap

Materials up to DN 150			
1	Body		GG-25 / GS-C 25 / 1.4408
5	Seat		1.4404
7	Cone		1.4122 / 1.4404
8	Guide		0.7040 / 1.0501 / 1.4104 / 1.4404
9	Spring Cap		0.7040 (0.7043 / 1.0619) / 1.4408 / 1.4571
12	Spindle		1.4021 / 1.4404
16	Spring Plate		1.0718 / 1.4404
18	Adjusting Screw		1.4404 / 1.4104 with PTFE-bush
54	Spring	up to 200 °C	1.1200 / 1.7102 / 1.8159 / 1.4310
		from 200 °C	1.7102 / 1.8159 / 1.4310

Materials from DN 200				
1	Body		GGG-40.3 / C22.8 / HII / St 35.8 / 1.4571	
5	Seat		1.4404	DN 200 - 250: 1.0305 / 1.4571 DN 300 - 400: 1.0460 / 1.4571
7	Cone		1.4122 / 1.4571	
8	Guide		1.0038 / 1.4571	
9	Spring Cap		0.0743 / 1.4571	
12	Spindle		1.4021 / 1.4404	
16	Spring Plate		1.0570 / 1.4571	
18	Adjusting Screw		1.4404 with PTFE-bush	
54	Spring	up to 200 °C	1.7102 / 1.8159 / 1.4310	
		from 200 °C	1.7102 / 1.8159 / 1.4310	

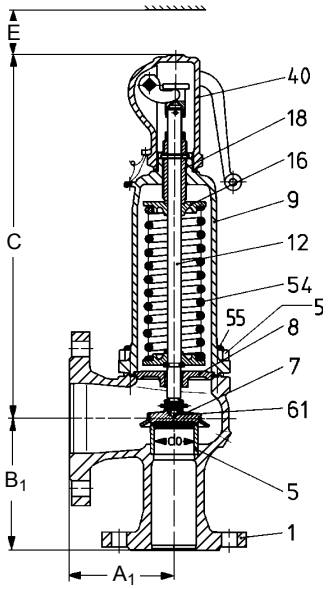
Dimensions [mm]													
DN Inlet	20	25	32	40	50	65	80	100	125	150	200	250	300
DN Outlet	40	40	50	65	80	100	125	150	200	250	300	350	400
do	18	23	29	37	46	60	74	92	98	125	165	200	235
A1	95	100	110	115	120	140	160	180	200	225	300	325	394
B1	85	105	115	140	150	170	195	220	250	285	305	340	330
C (O/G) *	217	232	315	356	403	481	558	615	615	735	1105	1115	1240
C (M/N) *	218	233	325	366	413	526	603	660	660	735	1105	1115	1240
C (M/G) *	219	234	331	372	419	529	606	663	663	735	1105	1115	1240
E	150	150	200	250	300	350	400	450	450	450	700	700	850

*O/G = without lifting device, gastight cap
*M/ N = with lifting device, not gastight
*M/G = with lifting device, gastight cap

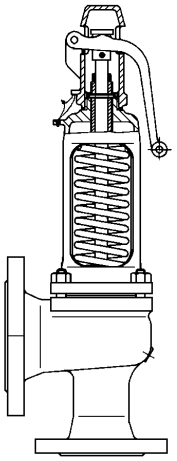
Dimensions for CrNiMo-steel design on request.

Weights [kg]												
nominal diameter DN												
20	25	32	40	50	65	80	100	125	150	200	250	300
9	9	12	16	22	32	56	75	85	131	285	335	384

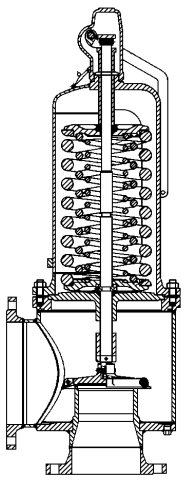
Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.



SV 6



SV 60



from DN 200 welded design

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Pressure Control Valves *SV 6, 60*

spring loaded safety valves for liquids, gases and steam
with open or closed spring cap

Type	Medium	Set Pressure [bar]	Nominal Diameter DN 25/40	32/50	40/65	50/80	65/100	80/125	100/150	125/200	150/250
6 60	Saturated steam [kg/h]	0.5	212	337	549	849	1440	2190	3390	3850	6260
		1	308	490	798	1230	2090	3190	4930	5590	9100
		2	493	783	1270	1970	3350	5100	7880	8940	14500
		3	663	1050	1710	2650	4510	6860	10600	12000	19500
		4	827	1310	2140	3300	5620	8560	13200	15000	24400
		5	990	1570	2560	3960	6740	10200	15800	17900	29200
		6	1150	1830	2980	4610	7840	11900	18400	20900	34000
		7	1310	2090	3400	5260	8950	13600	21000	23800	38800
		8	1470	2340	3820	5910	10000	15200	23600	26800	43600
		9	1630	2600	4240	6550	11100	16900	26200	29700	48400
		10	1800	2860	4660	7200	12200	18600	28800	32600	53100
		12	2120	3370	5490	8490	14400	21900	33900	38500	62700
		14	2440	3890	6330	9780	16600	25300	39100	44400	72200
		16	2770	4400	7170	11000	18800	28600	44300	50300	81800
		18	3090	4910	8000	12300	21000	32000	49500	56100	91400
		24	4070	6470	10500	16200	27700	42100	65100	73900	120000
		28	4720	7510	12200	18900	32100	48900	75600	-	-
		32	5380	8560	13900	21500	36600	55700	86200	-	-
	Air [Nm^3/h]	0.5	260	414	673	1040	1770	2690	4160	4720	7680
		1	387	616	1000	1540	2630	4000	6190	7030	11400
		2	627	997	1620	2500	4260	6490	10000	11300	18500
		3	852	1350	2200	3400	5790	8810	13600	15400	25100
		4	1060	1700	2760	4270	7270	11000	17100	19400	31500
		5	1280	2040	3330	5140	8760	13300	20500	23300	38000
		6	1500	2390	3890	6020	10200	15500	24000	27300	44400
		7	1720	2730	4450	6890	11700	17800	27500	31200	50800
		8	1940	3080	5020	7760	13200	20000	31000	35200	57300
		9	2150	3430	5580	8630	14600	22300	34500	39100	63700
		10	2370	3770	6150	9500	16100	24600	38000	43100	70100
		12	2810	4470	7270	11200	19100	29100	44900	51000	83000
		14	3240	5160	8400	12900	22100	33600	51900	58900	95900
		16	3680	5850	9530	14700	25000	38100	58900	66800	108000
		18	4110	6540	10600	16400	28000	42600	65900	74700	121000
		22	4990	7930	12900	19900	33900	51600	79800	90600	149000
		24	5420	8620	14000	21700	36900	56100	86800	99800	162000
		32	7160	11300	18500	28600	48700	74200	116000	-	-
		36	8040	12700	20800	32100	55400	84300	-	-	-
		40	8910	14100	23000	35600	61400	93500	-	-	-
6	Water [m^3/h]	0.5	7.37	11.7	19.1	29.5	50.1	76.3	118	134	218
		1	9.97	15.9	25.8	39.9	67.9	103	160	181	295
		2	14.1	22.4	36.5	56.4	96	146	226	256	417
		3	17.3	27.5	44.7	69.1	118	179	276	314	510
		4	19.9	31.7	51.6	79 .8	136	206	319	362	589
		5	22.3	35.5	57.7	89.2	152	231	357	405	659
		6	24.4	38.8	63.2	97.7	166	253	391	444	722
		7	26.4	42	68.3	106	180	273	422	479	779
		8	28.2	44.8	73	113	192	292	451	512	833
		9	29.9	47.6	77.4	120	204	310	479	543	884
		10	31.5	50.1	81.6	126	215	326	505	573	932
		12	34.6	54.9	89.4	138	235	358	553	627	1020
		14	37.3	59.3	96.6	149	254	386	597	678	1100
		16	39.9	63.4	103	160	271	413	638	724	1170
		22	46.8	74.4	121	187	318	484	748	849	1380
		28	52.8	83.9	137	211	359	546	844	-	-
		32	56.4	89.7	146	226	384	584	903	-	-
		36	59.8	95.1	155	239	407	619	-	-	-
		40	63.1	100	163	252	429	653	-	-	-

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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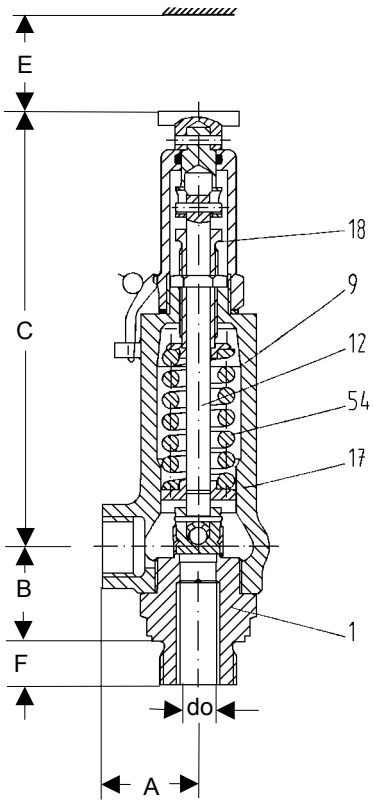
spring loaded safety valves for liquids, gases and steam
with closed spring cap

Materials			
1	Body (Base)	1.4104	1.4404
9	Spring Cap	0.7043	1.4404
12	Spindle	1.4021	1.4404
17	Spring Plate	1.4104	1.4404
18	Adjusting Screw	1.4104	1.4404
54	Spring	1.4310	1.4310

Dimensions [mm] and Weights [kg]		
G inlet	1/2 A	3/4 A
G outlet	1/2	1/2
max. set pressure [bar]	150	150
do	10	12,5
A	33	33
B	33	33
C (O/G) *	132	132
C (M/G) *	147	147
E	150	150
F	15	16
Weight	0.8	0.8

*O/G = without lifting device / gastight cap
*M/G = with lifting device / gastight cap



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spring loaded safety valve for liquids, gases and steam
with closed spring cap

seat [mm]	medium	set pressure [bar]	inlet BSP male - outlet BSP female connection G 1/2 - 1/2 D	L	W	G 3/4 - 1/2 D	L	W
do = 10	D = saturated steam [kg/h] L = air [m^3/h] W = water [kg/h]	0.5	28	35	1100	28	35	1100
		1	41	52	1500	41	52	1500
		2	67	85	2100	67	85	2100
		3	90	115	2500	990	115	2500
		4	112	145	2900	112	145	2900
		5	134	174	3300	134	174	3300
		6	156	203	3600	156	203	3600
		8	200	262	4200	200	262	4200
		10	243	321	4600	243	321	4600
		15	353	468	5700	353	468	5700
		20	462	615	6600	462	615	6600
		25	572	762	7300	572	762	7300
		30	683	909	8000	683	909	8000
		40	907	1203	9300	907	1203	9300
		50	1137	1497	10000	1137	1497	10000
		60	1372	1791	11000	1372	1791	11000
		70	1612	2084	12000	1612	2084	12000
		80	1859	2378	13000	1859	2378	13000
		100	2373	2966	15000	2373	2966	15000
		150	3788	4436	18000	3788	4436	18000
do = 6		180	-	2757	-	-	2757	-
		200	-	3061	-	-	3061	-
		250	-	3823	-	-	3823	-
		300	-	4585	-	-	4585	-
		330	-	5042	-	-	5042	-

Special designs on request.
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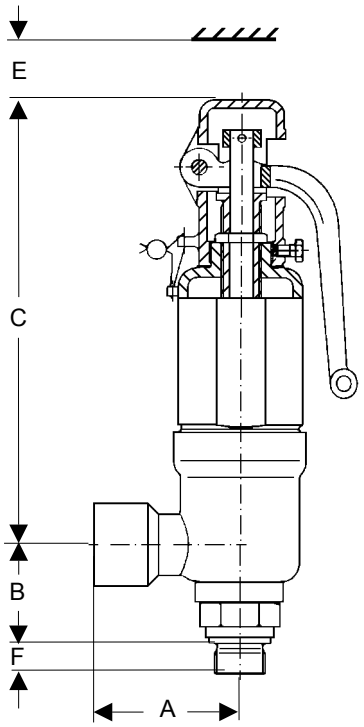
spring loaded safety valves for liquids, gases and steam
with closed spring cap

Materials		
Body (Base)	1.4104	1.4404
Outlet Body	0.7043	1.4404
Guide	1.4104 tenifer	1.4404
Spring Cap	0.7043	1.4404
Spindle	1.4021	1.4404
Spring Plate	1.0718	1.4404
Adjusting Screw with Bush	1.4104 with PTFE	1.4404 tenifer with PTFE
Spring	spring steel C	1.4310

Dimensions [mm] and Weights [kg]			
G inlet	3/4 A	3/4 A	1 A
G outlet	1	1	1 1/2
max. set pressure bar	400	200	100
do	9	13	17.5
A	75	75	75
B	50	50	54
C (O/G) *	228	228	225
C (M/N) *	228	228	225
C (M/G) *	230	230	227
E	150	150	150
F	16	16	18
Weight	2.6	2.6	3



*O/G = without lifting device, gastight cap
*M/N = with lifting device, not gastight
*M/G = with lifting device, gastight cap

Special designs on request.
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Sheet no. SV 29V/3.1.061.1 - issue 12.06.2006

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Pressure Control Valves — *SV 29V*

spring loaded safety valve for liquids, gases and steam
with closed spring cap

Seat Diameter			
inlet	: BSP male connection	G 3/4	G 1
outlet	: BSP female connection	G 1	G 1 1/2
seat ø	:	9 mm, 13 mm	17.5 mm

type	set pressure [bar]	saturated steam [kg/h]			air [Nm^3/h]			water [m^3/h]		
		9 mm	13 mm	17.5 mm	9 mm	13 mm	17.5 mm	9 mm	13 mm	17.5 mm
29V	0.2	-	51.7	82.6	-	61.3	98	-	1.96	3.48
	0.5	-	79.5	130	-	97.4	160	-	2.77	4.93
	1	-	114	192	-	143	241	-	3.75	6.67
	2	88.3	181	316	112	230	402	2.93	5.31	9.44
	3	120	245	433	155	315	556	3.59	6.50	11.60
	4	150	306	540	194	395	699	4.14	7.51	13.30
	5	180	366	647	234	476	841	4.63	8.39	14.90
	6	209	426	753	273	556	983	5.07	9.19	16.30
	8	268	546	965	352	717	1260	5.86	10.60	18.90
	10	327	666	1170	431	879	1550	6.55	11.90	21.10
	15	474	964	1700	629	1280	2260	8.02	14.50	25.80
	20	621	1260	2230	827	1680	2970	9.26	16.80	29.80
	25	769	1560	2760	1020	2080	3680	10.4	18.80	33.40
	30	918	1860	3300	1220	2480	4390	11.3	20.60	36.50
	40	1210	2480	4390	1610	3290	5820	13.1	23.70	42.20
	50	1520	3110	5500	2010	4090	7240	14.6	26.50	47.20
	60	1840	3750	6630	2400	4900	8660	16	29.10	51.70
	80	2490	5080	8990	3200	6510	11500	18.5	33.60	59.70
	100	3190	6490	11400	3990	8120	14300	20.7	37.50	66.70
	150	5090	10300	-	5960	12100	-	25.4	46	-
	200	-	-	-	7940	16100	-	29.3	53.10	-

Special designs on request.
The pressure has always been indicated as overpressure.
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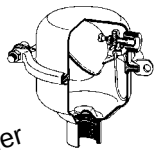
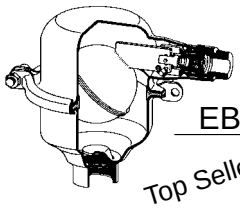
Continous
Bleeding and Venting Valves

Compact standard valve — EB 1.12 / 1.32



for water treatment (incl. ozone), pipelines, petrol tanks ect.
float-controlled, with valve shutoff
EB 1.32 also available as pure bleed valve
EB 1.12 has side outlet, EB 1.32 has top outlet
all stainless steel SST 316 construction
PN..... 16 — G..... G 3/4 x 1/2A
T..... 130 °C

Top Seller

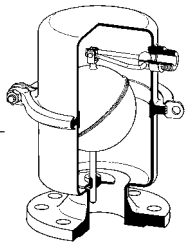


EB 1.12 Medium-sized universal valve

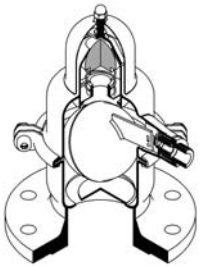
Top Seller

for water treatment (incl. ozone), pipelines, petrol tanks ect.
float-controlled, with valve shutoff
also available as pure bleed valve
all stainless steel SST 316 construction
PN..... 16 — G..... G 1 - 2 x 3/4A
DN..... 25 - 50 x G 3/4A — T..... 130 °C

Large stainless steel valve — EB 1.12



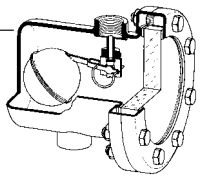
for water treatment (incl. ozone), pipelines, petrol tanks ect.
float-controlled, with valve shutoff
also available as pure bleed valve
all stainless steel SST 316 construction
PN..... 16 — DN..... DN 65 - 100 x G 3/4A
T..... 130 °C



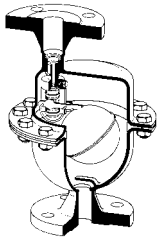
EB 1.59 with integrated vacuum breaker

for plants subject to vacuum hazards
float-controlled, with valve shutoff
all stainless steel SST 316 construction
PN..... 10 — DN..... 100 x 3/4A
T..... 60 °C

With sight glass for visual checking — EB 1.48



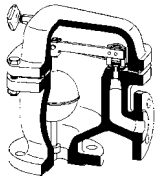
float-controlled, with valve shutoff
all stainless steel SST 316 construction
PN..... 16 — G..... 1/2
T..... 150 °C



EB 1.32So High pressure valve

float-controlled, with valve shutoff
also available as pure bleed valve
all stainless steel SST 316 construction
PN..... 25 - 63 — G..... 1/2 - 1
DN..... 15 - 50 — T..... 130 °C

Robust valves — EB 1.10 / 1.11 / 1.20



for larger air volumes e.g. sand filters
float-controlled, with valve shutoff
EB 1.11 features esternal float for dirty or foaming media
body spheroidal cast iron, cast steel
PN..... 16 - 40 — DN..... DN 32/15 - 200/150
T..... 130/200 °C

Top Seller

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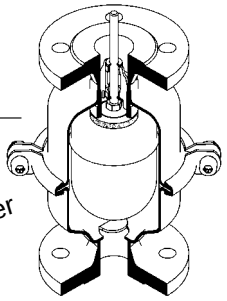
Level Control Valve

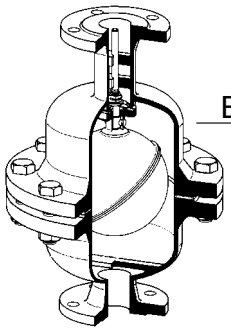
Startup
Bleeding and Venting Valves



Universal valve — EB 3.52

Top Seller

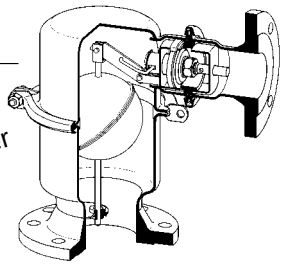
float-controlled, with valve shutoff
all stainless steel SST 316 construction
PN..... 16 DN..... 25 - 100
T..... 130 °C



EB 3.50 Valve for large air volumes

float-controlled, with valve shutoff
body steel, stainless steel
PN..... 6 - 40 DN..... 100 - 300
T..... 130 °C

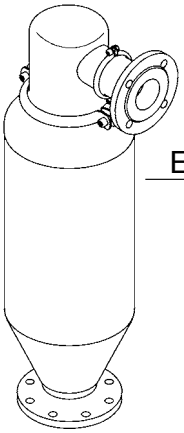
Double Function
Combined Startup and continuous
Bleeding and Venting Valves



For clean water — EB 1.74

Top Seller

for large air volumes at startup
continuous bleeding or venting under pressure
opens immediately if a vacuum is present
all stainless steel SST 316 construction
PN..... 16 DN..... 50 - 150
T..... 130 °C



EB 1.84 For dirty or waste water

for large air volumes at startup
continuous bleeding or venting under pressure
opens immediately if a vacuum is present
all stainless steel SST 316 construction
PN..... 10 DN..... 50 - 100
T..... 40 °C

Sheet no. EB/14.1.081.2 - issue 06.02.2008

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Know how • Bleed and Venting Valves

Bleed and venting valves remove or admit air or gases automatically from/to tanks, vessels or pipelines. They are float-controlled valves which close as the liquid level rises and open as the level falls.

Operation
A rising liquid level lifts the float and closes the valve, in most cases via a system of levers. If the liquid level drops because air is entering the system or the plant is being started up, the valve will open and either admit air or vent the air from the system.

Start-up vent valves
are used to vent low-pressure plant systems when such systems are started up or filled. The float acts directly on the cone. They have a large seat diameter to ensure fast venting for pressures below 0.2 bar. During operation these valves are kept closed by the internal system pressure.
A suddenly occurring vacuum causes them to open and equalise the pressure. This prevents damage which a vacuum may cause.

Continuous vent valves
are used to remove air which accumulates as the plant operates. They incorporate a lever system which enables them to operate at very low and high pressures.
A non-return valve can be fitted to the outlet side of these valves to prevent air entering the system. In this case they are pure vent valves, no air enters the system.

Double function vent valve
are combined start-up and continuous bleed/venting valves. They have a large seat for start-up operation and a small seat for continuous operation, which are controlled by a float via a system of levers. Both valve seats are open while the system is being filled. During system operation the large seat is kept closed by the internal pressure. Any accumulating small air volumes are vented from the system via the small valve seat. If the pressure drops below 0.1 bar the large valve seat can open again. If a vacuum occurs which may be caused, for instance, by a pump failure, the large seat opens instantaneously and prevents damage.
If subsequently a pressure surge runs back through the pipeline, the large seat closes causing the air volume which has entered the system to act as a damper while escaping to atmosphere through the small seat.

Elastomers and coatings
Standard valves can be used for water up to 80 °C, in certain cases up to 130 °C, higher temperatures with special types.
For ozone we supply a special version fitted with special elastomers. For hydrocarbons like petrol, gasoline etc. we use FPM. For hot mineral water, sea water and other liquids containing chloride we supply valves that feature coated bodies and internal components. For corrosive media we supply rubber-coated valves. In addition we can supply special valves manufactured from high-molybdenum materials.
Please note that our stainless steel venting valves are in most cases cheaper than equivalent cast iron valves.

Operating pressure range
You should select an operating pressure range which covers the maximum pressure that may occur, as otherwise the vent valve will not open.
You should select the type and size of vent valve according to the air volume to be removed at operating pressure. You will find the appropriate tables in the data sheets. The throughput capacities given in these tables apply to a fully open valve i.e. when the system is started up or as long as the liquid level remains below the vent valve inlet. For steady and continuous venting, e.g. of filter vessels, the throughput capacity should be reduced by approximately 30%.
To ensure smooth operation and long life, continuous vent valves should not be overdimensioned. If the throughput capacity is excessive for a given nominal diameter, a higher operating pressure coupled with a correspondingly lower throughput may provide the solution.

Installation
Vent valves should always be installed at high points in pipelines or vessels. Do not install vent valves on standpipes or in flushing lines but at those points where air accumulates. Select a pipe run where the flow velocity is reduced and, if required, install a vent dome. You should choose an installation site where the vent valve is not likely to "hammer" and thereby get damaged.
During venting slugs of water must not be carried over and enter the valve body at high speed. If you are in doubt you should install a baffle or deflector.
Please make sure that the cross-sectional area of the tank outlet is not less than that of the vent valve inlet.
Under certain conditions (steam, foaming, very high flow velocity, contamination) a vent valve may "spit" i.e. discharge a small quantity of water when closing. For this reason it is recommended to fit a blow-off line to the outlet of the valve, if required.
In the case of large air capacities, great turbulence, two-phase mixed media or side-mounting of the valve because of restricted headroom above the tank, a pipeline should be installed between the bleed valve cover and the highest point of the tank (i.e. a balancing line such as is used with level control valves). For this purpose the bleed valve cover must be fitted with an additional connector.

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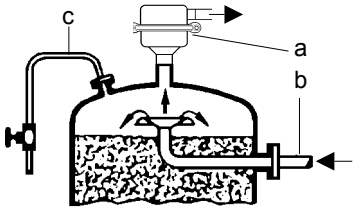
Know how • Bleed and Venting Valves

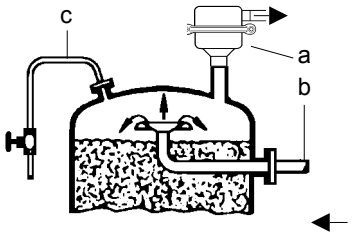
Bleed and venting valves remove or admit air or gases automatically from/to tanks, vessels or pipelines. They are float-controlled valves which close as the liquid level rises and open as the level falls.

Example for insatllation on a filter vessel
Picture 1: wrong



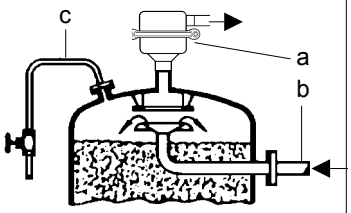
a = Bleeding/ventig valve
b = Water supply
c = Vent line

Picture 2: right
off-centre



a = Bleeding/ventig valve
b = Water supply
c = Vent line

Picture 3: right
with deflector



a = Bleeding/ventig valve
b = Water supply
c = Vent line

Pollution
If you have polluted liquids and the vent valve must be cleaned from time to time, please, install a stop valve between tank, vessel resp. pipeline and vent valve. This is not necessary if the equipment to be vented can be simple depressurized.

Operation
Pressure surges or water hammer can destroy a float. For this reason suitable protective devices should be installed in the system.
With foaming media and their reduced specific density, bleeding/venting valves cannot operate reliably. For such applications we strongly recommend the installation of a smoothing vessel. In such cases our bleeding/venting valves type EB 1.11 and EB 1.84 may be used.

.
Maintenance
Pressure reducers must be cleaned and serviced regularly, especially in the case of liquids containing compounds which tend to form deposits such as iron or lime.

Valves free of oil and grease or silicone.
Please pay attention to order an fit only spares free of oil and grease resp. free of silicone.

Please consult our engineer if extreme operating conditions apply or whenever you are in doubt.

Notes on Safety, Operating Instruction etc. MUST be followed

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Continuous Bleed and Venting Valves

max. inlet pressure bar	T °C	V at 6 bar m³/h Air	V max. m³/h Air	Connection screwed	Connection flanged DN	*	SS	Notes	Type
16	130	9.8	12	3/4		*	•	small economical vent valve for water treatment, also for ozone	1.12
16	130	9.8	12	3/4		*	•	small economical vent valve for water treatment, also for ozone	1.32
16	130	22	28	1/2		*	•	including sight glass	1.48
16	130	61	73	1 - 2	25 - 50	*	•	vent valve for water treatment, also for ozone	1.12
16	130	246	248		65 - 100	*	•	vent valve for water treatment, also for ozone	1.12
16 - 40	200	355	2440		32 - 100			vent valve for sand filter	1.10
16 - 40	200	355	2440		32 - 100			with external float for contaminated and foaming liquids	1.11
16 - 40	200	5215	7770		80 - 200			vent valve for large capacity	1.20
16 - 63	200	on request				*	•	vent valve for high operating pressures	1.32So

* other connections available
• stainless steel deep drawn

Start-up Vent Valves

max. inlet pressure bar	T °C	V at 6 bar m³/h Air	V max. m³/h Air	Connection screwed	Connection flanged DN	*	SS	Notes	Type
16	80		3400		25 - 100	*	•	economical start-up vent valve	3.52
16 - 40	80		12400		100 - 300	*		start-up vent valve for large capacities	3.50

* other connections available
• stainless steel deep drawn

Double Vent valve (for start-up and continuous venting)

max. inlet pressure bar	T °C	V at 6 bar m³/h Air	V max. m³/h Air	Connection screwed	Connection flanged DN	*	SS	Notes	Type
16	130	209	1550		50 - 150	*	•	high-performance double vent valve, closes also in pressure-less system	1.74

* other connections available
• stainless steel deep drawn

flow rates are valid for dry air with 0°C and 1,01325 bar

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. EB/11.1.061.1 - issue 12.06.2006

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air release valves float actuated
up to 200 °C

Technical Data

Connection	DN 32/15 - 100/50
Nominal Pressure	PN 40
Operating Pressure	0 - 40 bar in several ranges
Flow Rate	up to 2440 m^3/h

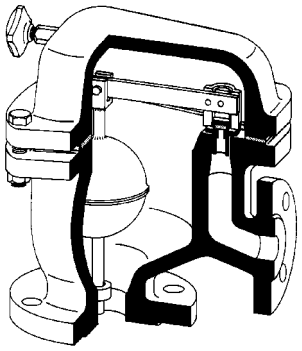
Description

Bleeding and venting valves remove air or gases from systems or pipelines without requiring an external energy input. When a system is drained they act as venting valves; venting may be prevented by fitting a non-return valve.

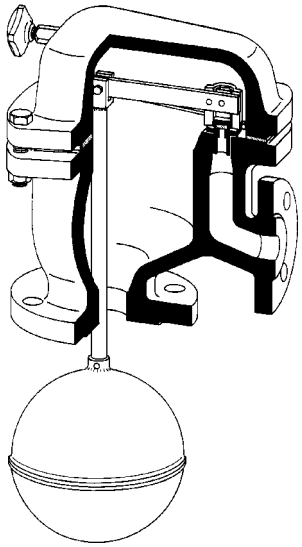
The EB 1.10 and EB 1.11 bleeding/venting valves are float-controlled robust valves made of spherical-graphite cast iron or cast steel to handle large air volumes e.g. in sand filters. The internal components are made of stainless steel featuring excellent corrosion resistance. Up to 130 °C the valve cone is fitted with a soft seal; up to 200 °C the seal is metallic. The simple design makes it easy to specify, install, handle and service these valves in an industrial environment.

EB 1.11 is fitted with an external float and specially suitable for foaming and contaminated media. Valves for continuous bleeding must not be overdimensioned. If a larger valve size is selected, a higher working pressure range with a correspondingly lower flow volume should be chosen. In case of doubt we shall be happy to advise you. On filter vessels the bleed connection is often located in the middle of the vessel. If the flow volume is large and the distance between distribution funnel and bleed connection small, the incoming water jet hits the bleed connection. This will impair the efficiency of the bleed valve and can result in water hammer. This problem may be avoided by installing a baffle or by placing the bleed connection away from the centre.

EB 1.10



EB 1.11



STANDARD EQUIPMENT

- Manual bleed valve made of brass
  (supplied loose and must be fitted on-site)

OPTIONS

- Manual bleed valve made of stainless steel (CrNiMo steel)
- Rubber or plastic coating for corrosive fluids
- Non-return valve to prevent venting
- Special versions on request

Please state working pressure range when enquiring or ordering.

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Flow Rate in m^3/h
see sheet EB 1.10/2.1.061.2

Pressure Ranges [bar] EB 1.10, EB 1.11						
PN 16	0 - 2	0 - 6	0 - 10	0 - 16		
PN 40	0 - 2	0 - 6	0 - 10	0 - 16	0 - 25	0 - 40

Sheet no. EB 1.10/2.1.061.1 - issue 12.06.2006

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Level Control Valve EB 1.10, 1.11

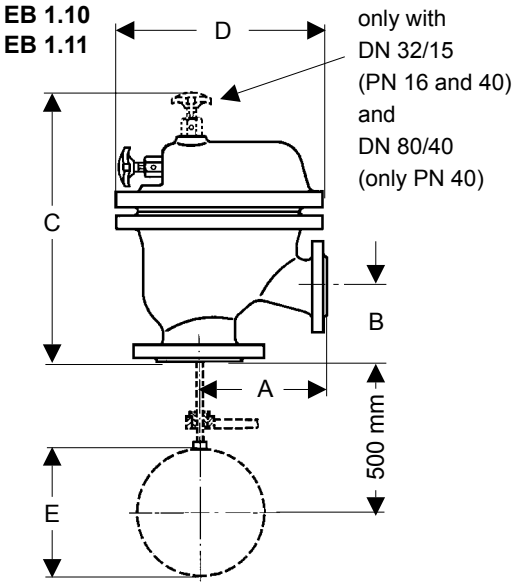
air release valves float actuated
up to 200 °C

Materials			
Temperature		130 °C	200 °C
Body	PN 16	spheroidal cast iron	spheroidal cast iron
	PN 25/40	cast steel	cast steel
Body Seal		Nova Universal	Nova Universal
Internals		CrNiMo-steel	CrNiMo-steel
Float		CrNiMo-steel	CrNiMo-steel
Valve Seal		FPM	metallic

Dimensions [mm]							
nom. press		nominal diameter DN					
PN	size	32/15	40/20	50/25	65/32	80/40	100/50
16	A	120	130	145	160	185	205
	B	70	95	100	105	110	180
	C	260	240	250	270	315	375
	D	205	225	245	270	315	355
25 / 40	A	130		160		200	
	B	70		100		170	
	C	275		260		385	
	D	225		270		350	

Weights [kg]						
nom. pressure	nominal diameter DN					
PN	32/15	40/20	50/25	65/32	80/40	100/50
16	11	14	18	23	31	45
25/40	18		23		41	

Float Dimensions [mm] EB 1.11							
pressure		nominal diameter DN					
ranges [bar]	size	32/15	40/20	50/25	65/32	80/40	100/50
0 - 2 / 0 - 6	E	110	110	110	130	160	180
0 - 10		110	130	130	150	180	200
0 - 16		120	150	150	180	200	220
0 - 25 / 0 - 40		150		180		280	



Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. EB 1.10/3.1.061.1 - issue 12.06.2006

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air release valves float actuated
up to 200 °C

Seat Diameter [mm] EB 1.10						
pressure range bar	nominal diameter DN					
	32 / 15	40 / 20	50 / 25	65 / 32	80 / 40	100 / 50
0 - 2	6	7.5	8	10	13	16
0 - 6	4	4.5	5	6	9	12
0 - 10	3	3.5	4	5	7.5	10
0 - 16	2	2.5	3.5	4	5.5	8
0 - 25	2		3		4.5	
0 - 40	1.5		2		3.5	

Air Flow Rate [Nm³/h] EB 1.10, EB 1.11 up to Δp 10 bar, at 0 °C 1013 mbar								
seat ø	differential pressure Δp bar							
mm	0.1	0.5	1	2	4	6	8	10
1.5	0.5	1.2	1.5	2.3	3.9	5.5	7.1	8.7
2	1	2.2	2.8	4.2	7	9.8	12	15
2.5	1.6	3.4	4.4	6.6	11	15	19	24
3	2.3	5	6.3	9.5	15	22	28	34
3.5	3.1	6.8	8.6	12	21	30	38	47
4	4.1	8.9	11	16	28	39	50	62
4.5	5.2	11	14	21	35	50	64	78
5	6.4	13	17	26	44	61	79	96
5.5	8	16	21	32	53	75	96	118
6	9.3	20	25	38	63	88	114	140
7.5	14	31	39	59	99	138	178	218
8	16	35	45	67	113	157	203	248
9	21	45	57	85	143	200		
10	25	55	70	106	176	246	317	388
12	37	80	102	152	254	355		
13	43	94	119	178	298	416	535	655
16	66	143	180	270	451	630	811	992

Seat Diameter [mm] EB 1.11						
pressure range bar	nominal diameter DN					
	32 / 15	40 / 20	50 / 25	65 / 32	80 / 40	100 / 50
all ranges	6	7.5	8	10	13	16

Air Flow Rate [Nm³/h] EB 1.10, EB 1.11 from Δp 12 bar, at 0 °C 1013 mbar							
seat ø	differential pressure Δp bar						
mm	12	16	20	25	30	35	40
1.5	10	13	16	20	24	28	32
2	18	24	29	36	43	50	57
2.5	28	37					
3	41	54	66	82			
3.5	56	73	90	112	133	155	176
4	73	95					
4.5	93	121	150	185			
5							
5.5	139	182					
6	165	216	266	330	393	456	520
7.5	258	336					
8	293	383	473	586	697	810	923
9							
10	459	599					
12							
13	774	1010	1250	1550	1840	2140	2440
16	1170	1530					

Operating instructions, Know How and Notes on Safety etc. MUST be followed.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right to change specifications without notice.

The quoted flow volumes apply to a fully open valve i.e. in start-up condition at 0 °C and 1013 mbar. With continuous bleeding e.g. of filter vessels, the maximum flow volume is 30 % less on average.

*** Please note:** Smaller seat diameter for higher pressure range. If the selected working pressure range is too high, the flow volume may be inadequate.

Sheet no. EB 1.10/2.1.061.2 - issue 12.06.2006

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Level Control Valves EB 1.12, 1.32

air release valves float actuated
up to 130 °C

Technical Data

Connection	G 3/4 -2
	DN 25 - 100
Nominal Pressure	PN 16
Operating Pressure	0 - 16 bar in several ranges
Flow Rate	up to 248 m^3/h

Description

Bleeding and venting valves remove air or gases from systems or pipelines without requiring an external energy input. When a system is drained they act as venting valves; venting may be prevented by fitting a commercial check valve (EB 1.12) or by means of a built-in check valve (option for EB 1.32).

The EB 1.12 and EB 1.32 bleeding/venting valves are compact and lightweight float-controlled valves for water treatment (incl. ozone), pipelines, petrol tanks etc. They are manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone can be fitted with a soft or metallic seal.

Top and bottom sections of the valve body are connected by a clamp ring and two bolts. Servicing/maintenance is easy and does not call for special tooling. The simple design makes it easy to specify, install, handle and service these valves in an industrial environment.

EB 1.12 is available in three body versions for small, medium and large volumes.

Valves for continuous bleeding must not be overdimensioned. If a larger valve size is selected, a higher working pressure range with a correspondingly lower flow volume should be chosen. In case of doubt we shall be happy to advise you.

On filter vessels the bleed connection is often located in the middle of the vessel. If the flow volume is large and the distance between distribution funnel and bleed connection small, the incoming water jet hits the bleed connection. This will impair the efficiency of the bleed valve and can result in water hammer. This problem may be avoided by installing a baffle or by placing the bleed connection away from the centre.

STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring

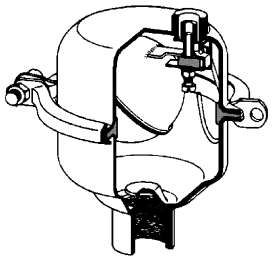
OPTIONS

- Ozone-resistant design
- Various seal materials suitable for your medium
- Plastic coating for corrosive fluids
- Non-return valve to prevent venting
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

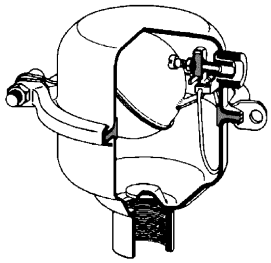
Please state working pressure range when enquiring or ordering.

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

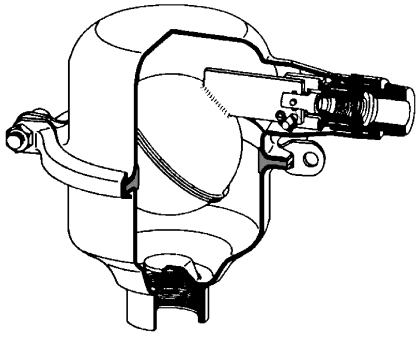
EB 1.32 G 3/4



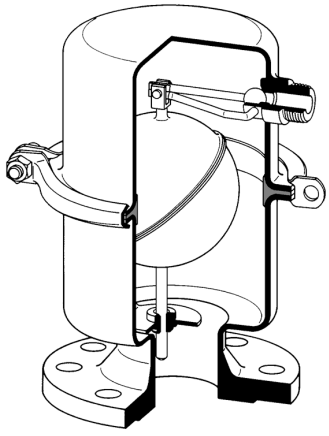
EB 1.12 G 3/4



EB 1.12 G 1 - 2, DN 25 - 50



EB 1.12 DN 65 - 100



Pressure Ranges [bar]				
nominal diameter G 3/4 x 1/2 A				
press. range bar	0 - 2	0 - 6	0 - 16	

Pressure Ranges [bar]				
nominal diameter G 1 - 2, DN 25 - 100				
press. range bar	0 - 2	0 - 6	0 - 10	0 - 16

Flow Rate in Nm^3/h see sheet EB 1.12/2.1.041.2

Sheet no. EB 1.12/2.1.062.1 - issue 12.06.2006

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Level Control Valve EB 1.12, 1.32

air release valves float actuated
up to 130 °C

Materials		
Design	standard	
Type	EB 1.32, EB 1.12 G 3/4 EB 1.12 G 1-2, DN 25-50	EB 1.12 DN 65-100
Temperature	130 °C	130 °C
Body	CrNiMo-steel	CrNiMo-steel
Body Seal	EPDM	EPDM
Internals	CrNiMo-steel	CrNiMo-steel
Float	CrNiMo-steel	CrNiMo-steel
Valve Seal	FPM	CrNiMo-steel
Profile Clamp	CrNiMo-steel	CrNiMo-steel

Materials		
Design	ozone resistant	
Type	EB 1.32, EB 1.12 G 3/4	EB 1.12 G 1-2, DN 25-100
Temperature	80 °C	100 °C
Body	CrNiMo-steel	CrNiMo-steel
Body Seal	FPM	FPM
Internals	CrNiMo-steel	CrNiMo-steel
Float	CrNiMo-steel	CrNiMo-steel
Valve Seal	CSM	CrNiMo-steel
Profile Clamp	CrNiMo-steel	CrNiMo-steel

Dimensions [mm] EB 1.32 / 1.12 G 3/4x1/2		
size	EB 1.32	EB 1.12
	inlet female G 3/4	inlet female G 3/4
	outlet male G 1/2 A	outlet male G 1/2 A
A	-	109
B	27	57
C	135	127
D	140	140

size A tolerance ± 4 mm

Weights [kg]	
EB 1.32	EB 1.12
0.8	0.8

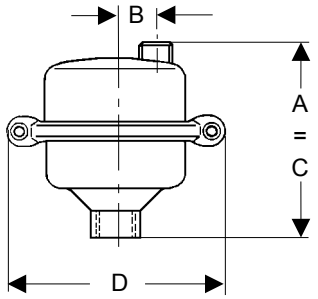
Dimensions [mm] EB 1.12 G 1 - 2, DN 25 - 100											
	inlet female G				inlet flange DN						
size	1	1 1/4	1 1/2	2	25	32	40	50	65	80	100
	outlet male G 3/4A										
A	146	149	149	145	161	163	165	164	250	255	257
B	140	140	140	140	140	140	140	140	113	113	113
C	185	190	190	185	200	200	205	205	295	300	305
D	200	200	200	200	200	200	200	200	265	265	265

size A tolerance ± 4 mm

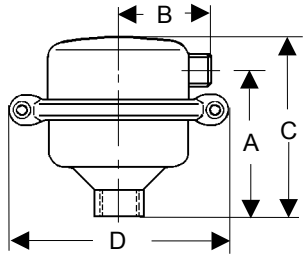
Weights [kg] EB 1.12 G 1 - 2, DN 25 - 100											
inlet female G					inlet flange DN						
3/4	1	1 1/4	1 1/2	2	25	32	40	50	65	80	100
0.8	2.6	2.6	2.7	3.1	3.5	4.2	4.2	5	10.5	11	12

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

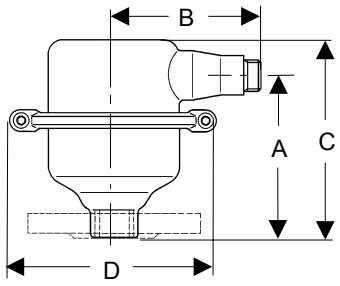
EB 1.32



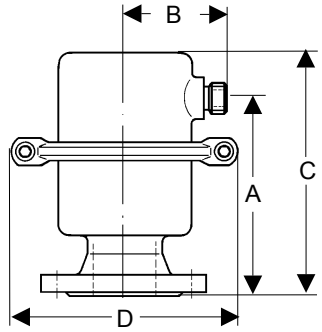
EB 1.12 3/4 x 1/2



EB 1.12 G 1 - 2, DN 25 - 50



EB 1.12 DN 65 - 100



Sheet no. EB 1.12/3.1.062.1 - issue 12.06.2006

WIR REGELN DAS SCHON
FIRMLY IN CONTROL

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air release valves float actuated
up to 130 °C

Flow Rate [Nm³/h) with 0 °C 1013 mbar			
	EB 1.32 + EB 1.12 G 3/4 x 1/2A		
Δp	pressure range bar		
bar	0 - 2	0 - 6	0 - 16
0.1	3.1	1	0.3
0.2	4.4	1.4	0.4
0.5	6.8	2.2	0.6
1	8.6	2.8	0.7
2	12	4.2	1
4		7	1.7
6		9.8	2.4
8			3.1
10			3.8
12			4.5
16			5.9

Flow Rate [Nm³/h] with 0 °C 1013 mbar				
	EB 1.12 G 1 - 2 x 3/4A, DN 25 - 50 x 3/4A			
Δp	pressure range bar			
bar	0 - 2	0 - 6	0 - 10	0 - 16
0.1	14	6.4	4.1	3.1
0.2	20	9	5.7	4.4
0.5	31	13	8.9	6.8
1	39	17	11	8.6
2	59	26	16	12
4		44	28	21
6		61	39	30
8			50	38
10			62	47
12				53
16				73

Flow Rate [Nm³/h] with 0 °C 1013 mbar				
	EB 1.12 DN 65 - 100 x 3/4A			
Δp	pressure range bar			
bar	0 - 2	0 - 6	0 - 10	0 - 16
0.1	25	25	16	8
0.2	36	36	23	11
0.5	55	55	35	16
1	70	70	45	21
2	106	106	67	32
4		176	113	53
6		246	157	75
8			203	96
10			248	118
12				139
16				182

Operating instructions, Know How and Notes on Safety etc. MUST be followed.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right to change specifications without notice.

The quoted flow volumes apply to a fully open valve i.e. in start-up condition at 0 °C and 1013 mbar. With continuous bleeding e.g. of filter vessels, the maximum flow volume is 30 % less on average.

*** Please note:** Smaller seat diameter for higher pressure range. If the selected working pressure range is too high, the flow volume may be inadequate.

Sheet no. EB 1.12/2.1.061.2 - issue 12.06.2006

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Level Control Valves EB 1.59

Continuous venting and bleeding system with float control and vacuum venting up to 60 °C

Technical Data

Connection	DN 100
Nominal Pressure	PN 10
Working Pressure	0 - 10 bar in several ranges
Flow Rate	continous bleeding up to 62 Nm^3/h
	vavuum breaker up to 223 m^3/h
Temperature	up to 60 °C

Description

If, for instance in the case of a pump failure, much larger quantities of air are fed into the pipe, an additional vacuum breaker with a large seat diameter is integrated. EB 1.59 is therefore particularly suitable for water-technological plants subject to vacuum hazards.

EB 1.59 is a float-controlled venting and bleeding system with preset vacuum bleeding, operating with spring load and cone seal. The valve seats are sealed with soft gaskets. The valve is made completely of deep-drawn stainless steel with outstanding corrosion-resistance qualities and smooth, easy-to-clean surfaces. A robust and frost-proof design for external use.

The upper and lower sections of the housing are connected by means of the stable and proven MANKENBERG profile clamp. Servicing/maintenance is easy and does not call for special tooling. The simple design makes it easy to specify, install, handle and service these valves in an industrial environment.

Valves for continuous bleeding must not be overdimensioned. If a larger valve size is selected, a higher working pressure range with a correspondingly lower flow volume should be chosen. In case of doubt we shall be happy to advise you.

Standard Equipment

- All stainless steel construction
- Quick-release body clamp ring
- Integrated vacuum breaker with large seat diameter and protective cap

Options

- Ozone-resistant design
- Various seal materials suitable for your medium
- Rubber or plastic coating for corrosive fluids
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Please state working pressure range when enquiring or ordering.

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

Bleeding Flow Rate [Nm^3/h] with 0 °C and 1013 mbar			
Δp	pressure range bar *		
bar	0 - 2	0 - 6	0 - 10
0,1	14	6,4	4,1
0,2	20	9	5,7
0,5	31	13	8,9
1	39	17	11
2	59	26	16
4		44	28
6		61	39
8			50
10			62

*** Please note:**
Smaller seat diameter for higher pressure range. If the selected working pressure range is too high, the flow volume may be inadequate.

Vacuum Venting [m^3/h] with Δp 0,125 bar
223

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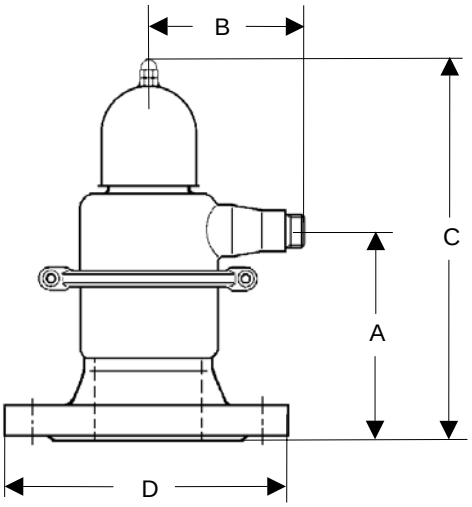
Continuous venting and bleeding system with float control and vacuum venting up to 60 °C

Materials	
Body	SST 316
Body Seal	EPDM
Innenteile	SST 316
Float	SST 316
Valve Seal Bleeding Valve	FPM
Valve Seal Vacuum Breaker	NBR
Profile Clamp	SST 316



Dimensions [mm]	
size	nominal diameter DN 100
A	165
B	120
C	310
D	215

size A tolerance ± 4 mm

Weights [kg]
nominal diameter DN 100
7,75

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. EB 1.59/3.1.071.1 - issue 21.0.2.2007

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twin bleed valve float-controlled up to 130 °C
for start-up and continous operation

Technical Data

Connection	DN 50 - 150
Nominal Pressure	PN 16
Operating Pressure	0 - 8 bar
Flow Rate	up to 1030 m³/h

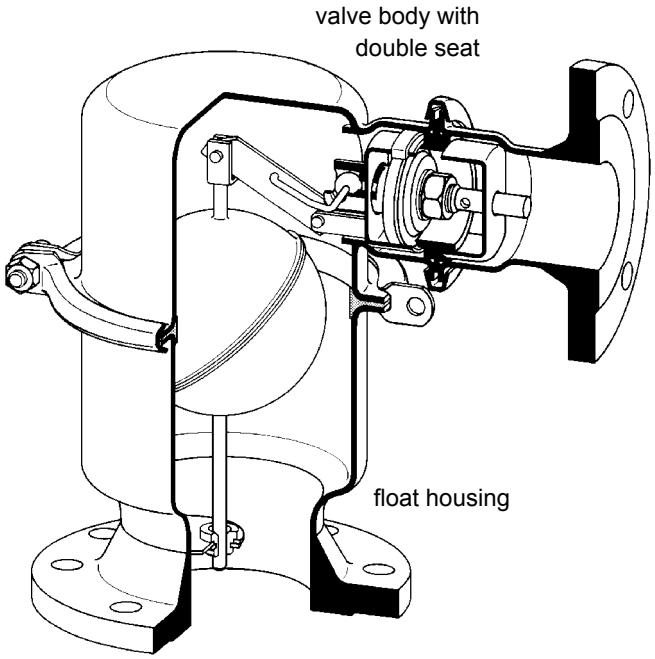
Description

Bleeding and venting valves remove air or gases from systems or pipelines without requiring an external energy input. When a system is drained they act as venting valves; venting may be prevented by fitting a check valve.

The EB 1.74 bleeding/venting valve is a combined start-up/ continuous bleeding/venting valve with float control. During start-up a large volume of air is bled at low pressure via a large valve cone. When the bleed valve is closed and small air volumes have to be bled during continuous operation, an additional smaller cone in the valve opens and bleeds these smaller volumes. The large cone will not open until the liquid level and the pressure drops. The valve opens immediately if a vacuum forms.

The EB 1.74 bleeding/venting valve is a compact and lightweight float-controlled valve. It is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone can be fitted with a soft or metallic seal. The minimum pressure required for valve sealing is 0.2 bar.

Top and bottom sections of the valve body are connected by a clamp ring and two bolts. Servicing/maintenance is easy and does not call for special tooling.



STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring

OPTIONS

- Ozone-resistant design
- Various seal materials suitable for your medium
- Plastic coating for corrosive fluids
- Non-return valve to prevent venting
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Please state working pressure range when enquiring or ordering.

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Air Flow Rate [m³/h] at 0 °C, 1013 mbar

	ΔP	Nennweite DN				
	bar	50	65	80	100	150
start up venting	0.05	113	396	396	396	728
	0.1	159	560	560	560	1030
continuous venting	1	11	25	25	25	55
	2	16	38	38	38	85
	4	28	63	63	63	140
	6	39	88	88	88	209
	8	50	114	114	114	250

Sheet no. EB 1.74/2.1.061.1 - issue 12.06.2006

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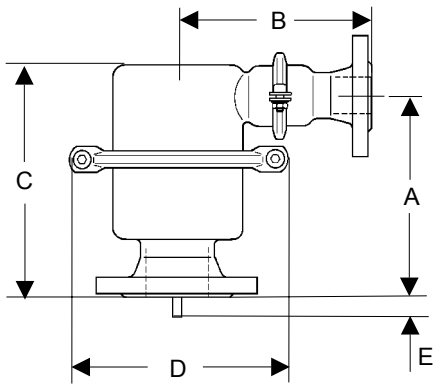
Level Control Valve EB 1.74

twin bleed valve float-controlled up to 130 °C
for start-up and continous operation

Materials	
Body	CrNiMo-steel
Body Seal	EPDM
Internals	CrNiMo-steel
Float	CrNiMo-steel
Valve Seal	EPDM + metallic
Profile Clamp	CrNiMo-steel

DN 50 - 100

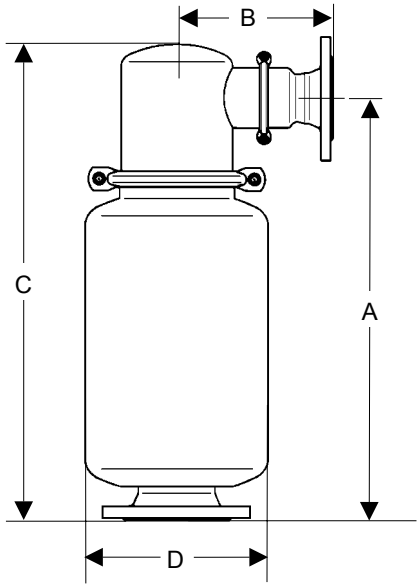


Dimensions [mm]					
	nominal diameter DN				
size	50 / 50	65 / 65	80 / 65	100 / 65	150 / 80
A	285	285	300	265	695
B	175	235	235	235	300
C	325	330	340	310	795
D	200	265	265	265	273
E	25	40	25	55	-

size A tolerance ± 4 mm

Weights [kg]				
nominal diameter DN				
50	65	80	100	150
8.5	14.5	15	16	28

DN 150



Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. EB 1.74/3.1.061.1 - issue 12.06.2006

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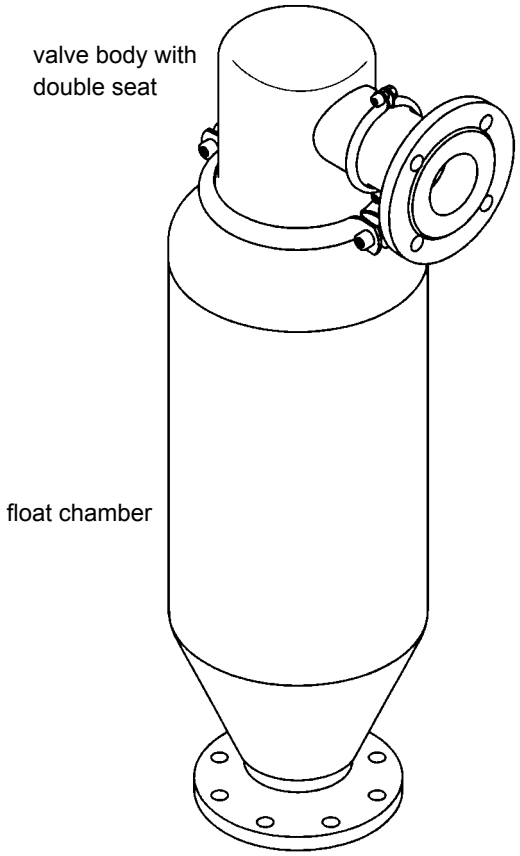
Level Control Valve EB 1.84

twin bleed valve float-controlled for contaminated waste water,
for start-up and continous operation, up to 40 °C

Technical Data Daten

Connection	DN 50 - 100
Nominal Pressure	PN 10
Operating Pressure	max. 6 bar
Flow Rate	up to 560 m^3/h



Description

Bleeding and venting valves remove air or gases from systems or pipelines without requiring an external energy input. When a system is drained they act as venting valves; venting may be prevented by fitting a check valve.

The EB 1.84 bleeding/venting valve is a combined start-up/continuous bleeding/venting valve with float control. During start-up a large volume of air is bled at low pressure via a large valve cone. When the bleed valve is closed and small air volumes have to be bled during continuous operation, an additional smaller cone in the valve opens and bleeds these smaller volumes. The large cone will not open until the liquid level and the pressure drops. The valve opens immediately if a vacuum forms. The minimum pressure required for valve sealing is 0.2 bar.

The EB 1.84 is a float-controlled bleeding/venting valve for waste water and effluents as well as foaming media. The enlarged float chamber prevents contact between the dirty water and the upper part of the closing mechanism. It is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone can be fitted with a soft or metallic seal.

Top and bottom sections of the valve body are connected by a clamp ring and two bolts. Servicing/maintenance is easy and does not call for special tooling.

STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring

OPTIONS

- Flushing connection
- Various seal materials suitable for your medium
- Plastic coating for corrosive fluids
- Non-return valve to prevent venting
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions MUST be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Air Flow Rate [m^3/h] at 0 °C, 1013 mbar

	ΔP	nominal diameter DN			
	bar	50	65	80	100
start up venting	0.05	113	396	396	396
	0.1	159	560	560	560
continous venting	1	11	25	25	25
	2	16	38	38	38
	4	28	63	63	63
	6	39	88	88	88

Sheet no. EB 1.84/2.1.061.1 - issue 12.0.2006

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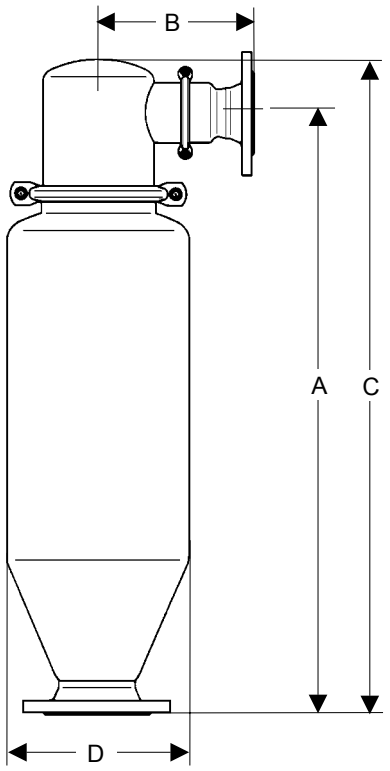
Level Control Valve EB 1.84

twin bleed valve float-controlled for contaminated waste water,
for start-up and continous operation, up to 40 °C

Materials	
Body	CrNiMo-steel
Body Seal	EPDM
Internals	CrNiMo-steel
Float	CrNiMo-steel
Valve Seal	EPDM
Profile Clamp	CrNiMo-steel

Dimensions [mm]				
size	nominal diameter DN			
	50 / 50	65 / 65	80 / 65	100 / 65
A	762	930	940	905
B	175	235	235	235
C	805	1010	1020	985
D	166	275	275	275

Weights [kg]			
nominal diameter DN			
50	65	80	100
17.5	41	41	42



Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. EB 1.84/3.1.061.1 - issue 12.06.2006

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start up air release valve, float controlled
up to 130 °C

Technical Data

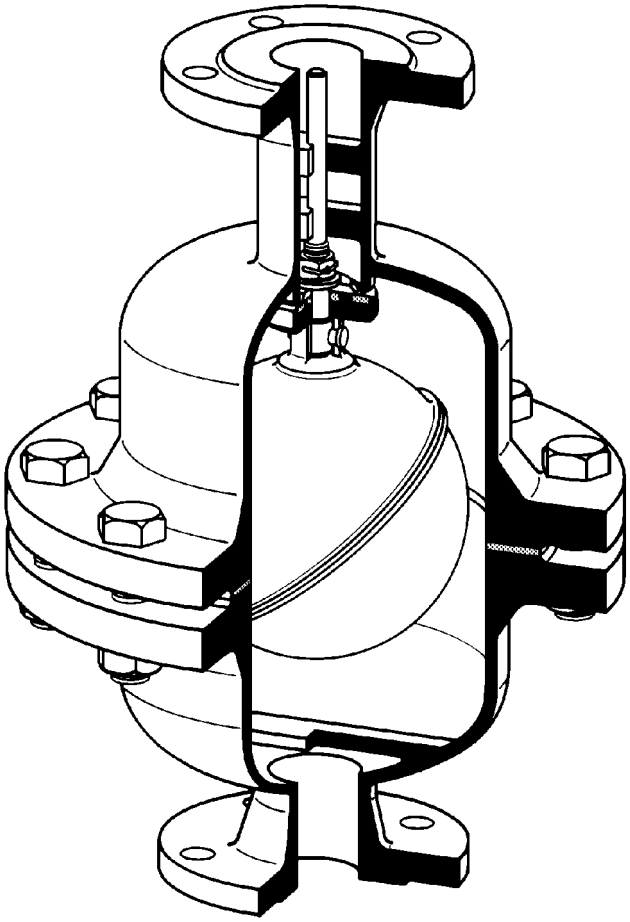
Connection	DN 100 - 300
Nominal Pressure	DN 100 - 200: PN 6 - 40
	DN 250 - 300: PN 6 - 16
Flow Rate	up to 10708 m^3/h

Description

Start-up bleed valves remove air or gases from systems or pipelines during the filling process without requiring an external energy input. When a system is drained they act as venting valves; venting may be prevented by fitting a commercial check valve to the outlet.

Thanks to the large cross-sectional area of the seat these valves are capable of handling large air volumes at low pressures. They close as soon as the system is filled with fluid. When the liquid level drops these valves will only open if the system is depressurised; they will not open under working pressure.

EB 3.50 is a float-controlled start-up bleed valve. Its body is made of steel whilst the internal components are manufactured from stainless steel featuring excellent corrosion resistance. The float is precisely guided in the outlet spigot. The valve cone is fitted with a soft seal. The minimum pressure required fro valve sealing is 0.3 bar. If small air volumes have to be bled during continuous operation, a dual bleed valve should be used.



OPTIONS

- Various seal materials suitable for your medium
- Rubber or plastic coating for corrosive fluids
- Non-return valve to prevent venting
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Air Flow Rate [m^3/h] at 0 °C, 1013 mbar			
	nominal diameter DN		
Δp bar	100	125	150
0.05	971	1604	2236
0.1	1374	2268	3162

Air Flow Rate [m^3/h] at 0 °C, 1013 mbar			
	nominal diameter DN		
Δp bar	200	250	300
0.05	3948	5783	7572
0.1	5583	8178	10708

Sheet no. EB 3.50/2.1.062.1 - issue 25.09.2006

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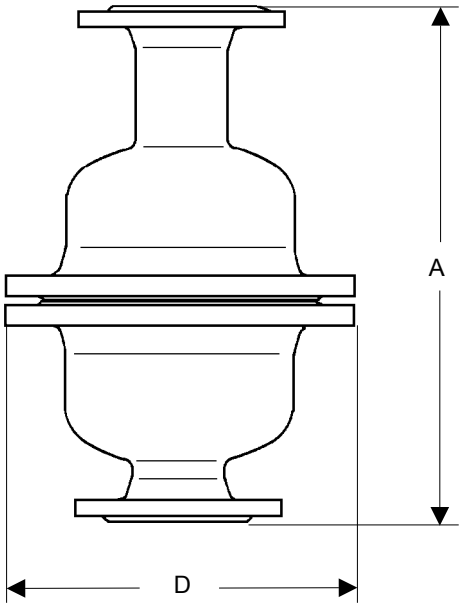
Level Control Valve EB 3.50

start up air release valve, float controlled
up to 130 °C

Materials	
Body	steel
Body Seal	Nova Universal
Internals	CR-steel optional CrNiMo-steel
Float	CrNiMo-steel
Valve Seal	EPDM



Dimensions [mm]

PN	size	nominal diameter DN 100	125	150	200	250	300
6	A	620	620	750	860		1030
	D	440	440	540	645	755	755
10	A	625	625	760	870		1050
	D	445	445	565	670	780	780
16	A	625	625	760	870		1060
	D	460	460	580	715	840	840
25	A	650	650	790	910		1090
	D	485	485	620	730	845	845
40	A	650	650	790	930	1100	1140
	D	515	515	660	755	890	890

Weights [kg]

PN	nominal diameter DN 100	125	150	200	250	300
6	70	73	on request			
10	70	73				
16	81	84				
25	110	115				
40	165	170				

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. EB 3.50/3.1.062.1 - issue 25.09.2006

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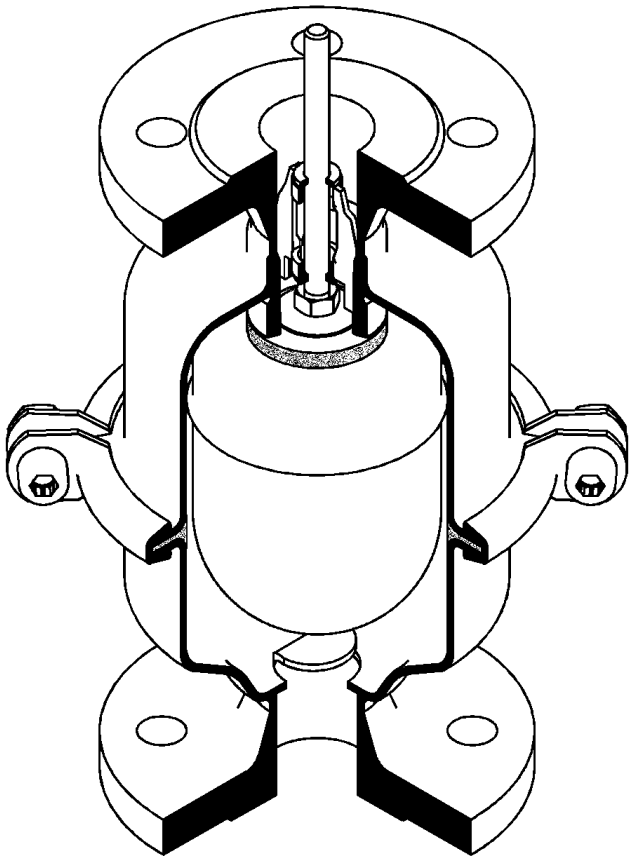
start up air release valve, float controlled
up to 130 °C

Technmical Data

Connection	DN 25 - 100
Nominal Pressure	PN 16
Operating Pressure	DN 25 - 50 up to 12 bar
	DN 65 - 100 up to 13 bar
Flow Rate	up to 1117 m^3/h



Description

Start-up bleed valves remove air or gases from systems or pipelines during the filling process without requiring an external energy input. When a system is drained they act as venting valves; venting may be prevented by fitting a commercial check valve to the outlet.

Thanks to the large cross-sectional area of the seat these valves are capable of handling large air volumes at low pressures. They close as soon as the system is filled with fluid. When the liquid level drops these valves will only open if the system is depressurised; they will not open under working pressure.

EB 3.52 is a float-controlled start-up bleed valve manufactured completely from deep-drawn stainless steel components featuring excellent corrosion resistance. The float is precisely guided in the outlet spigot. The valve cone is fitted with a soft seal. The minimum pressure required for valve sealing is 0.3 bar.

Top and bottom sections of the valve body are connected by a clamp ring and two bolts. Servicing/maintenance is easy and does not call for special tooling.

If small air volumes have to be bled during continuous operation, a dual bleed valve should be used such as EB 1.74.

STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring

OPTIONS

- Working pressure up to 16 bar
- Various seal materials suitable for your medium
- Plastic coating for corrosive fluids
- Non-return valve to prevent venting
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Air Flow rate [m^3/h] at 0 °C, 1013 mbar

	nominal diameter DN						
Δp bar	25	32	40	50	65	80	100
0.05	52	90	125	217	378	543	790
0.1	73	126	177	307	534	767	1117

Sheet no. EB 3.52/2.1.081.1 - issue 14.04.2008

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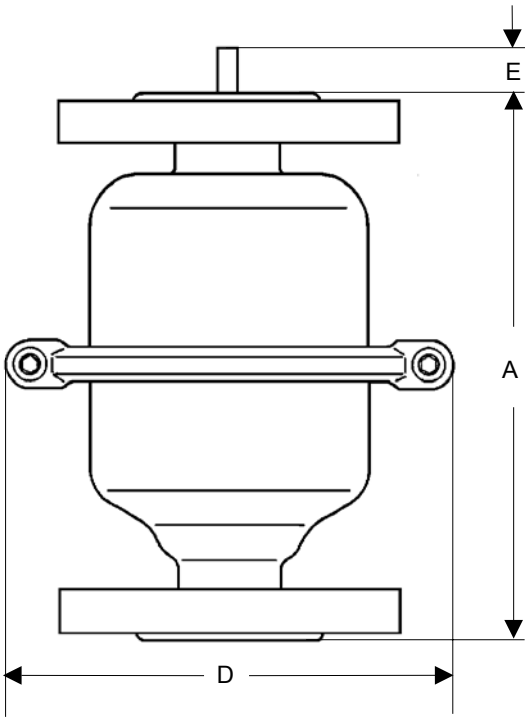
Level Control Valve EB 3.52

start up air release valve, float controlled
up to 130 °C

Materials	
Body	CrNiMo-steel
Body Seal	EPDM
Internals	CrNiMo-steel
Float	CrNiMo-steel
Valve Seal	EPDM
Profile Clamp	CrNiMo-steel

Dimensions [mm]							
	nominal diameter DN						
size	25	32	40	50	65	80	100
A	247	255	257	261	430	440	440
D	200	200	200	200	265	265	265
E	45	45	35	35	-	-	-

Weights [kg]						
nominal diameter DN						
25	32	40	50	65	80	100
4.5	6	6.5	8.5	15	16	18



Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. EB 3.52/3.1.081.1 - issue 14.04.2008

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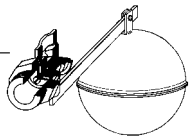
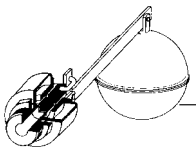
Float Valves for Installation in Tanks

Compact stainless steel valve — NV 94



feed or drain valve
for use as feed valve only in closed tanks
all stainless steel SST 316 construction

PN..... 16
p..... 0 - 2, 0 - 4, 0 - 8 bar
K_{VS}..... 0.3 - 21 m^3/h
G..... G 3/8 - 1 1/2A
T..... 130/300 °C



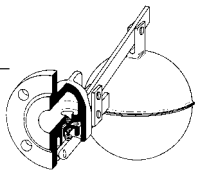
Top Seller

NV 98 Universal Valve

feed valve for open or closed tanks
available with parallel guide
all stainless steel SST 316 construction

PN..... 16
p..... 0 - 2, 0 - 4, 0 - 8 bar
K_{VS}..... 0.3 - 82 m^3/h
DN..... 40 - 80
G..... 3/8 - 1 1/2A
T..... 130 °C

Standard feed valve, cast body — NV 12 / 12P

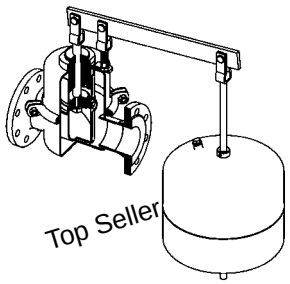


NV 12P with parallel guide
body grey cast iron, spheroidal cast iron

PN..... 16
p..... 0 - 2, 0 - 4, 0 - 8 bar
K_{VS}..... 2.8 - 195 m^3/h
DN..... 20 - 150
T..... 110 °C

Float Valves for Pipelines

NV 66e Large Capacity, stainless steel

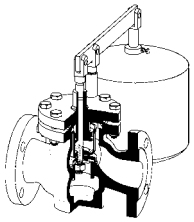


Top Seller

feed or drain valve
all stainless steel SST 316 construction

PN..... 16
p..... 0 - 2, 0 - 4, 0 - 8
K_{VS}..... 4 - 100 m^3/h
DN..... 20 - 150
T..... 80/130 °C

Large Capacity, cast body — NV 16 / 16e / 26



feed or drain valve
NV 16 single seat, NV 16e single seat balanced, NV 26 double seat
body grey cast iron, spheroidal cast iron, cast steel

PN..... 16 - 40
p..... NV 16: 0 - 1, 0 - 4 bar NV 16e: 0 - 16 bar
NV 26: 0 - 1, 0 - 4, 0 - 16 bar
DN..... NV 16: 15 - 100 NV 16e: 15 - 150
NV 26: 125 - 400
K_{VS}..... 2.6 - 1800 m^3/h
T..... 130 °C

Sheet no. NV/14.1.081.1 - issue 06.02.2008

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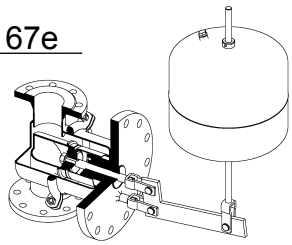
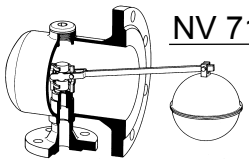
Float Valves
for Installation at Tanks

Large Capacity, stainless steel — NV 67e

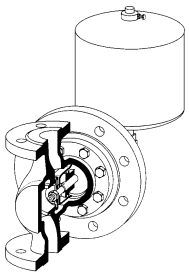


feed or drain valve, single seat balanced
all stainless steel SST 316 construction
PN..... 16 DN..... 15 - 100
p..... 0 - 16 bar T..... 130 °C
K_{vs}..... 4 - 100 m^3/h



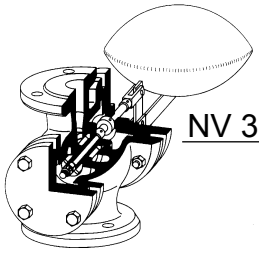
NV 71 Direct feed or drain valve

the tank is filled or drained via the mounting flange on the tank
body steel, stainless steel
PN..... 10 DN..... 25 - 150
p..... 0 - 2, 0 - 4, 0 - 8 bar T..... 110 / 300 °C
K_{vs}..... 1.6 - 81 m^3/h



Large capacity, cast body — NV 55 / 55e / 56

vertical flow direction
NV 55 single seat, NV 55e single seat balanced
NV 56 double seat
body grey cast iron, spheroidal cast iron, cast steel
PN..... 16 - 40 DN..... 15 - 150
p..... NV 55: 0 - 1, 0 - 4 bar NV 55e: 0 - 16 bar
NV 56: 0 - 1, 0 - 4, 0 - 16 bar
DN..... NV 55: 15 - 100 NV 55e: 15 -150
NV 56: 125 - 400
K_{vs}..... 2.6 - 1800 m^3/h T..... 130 °C

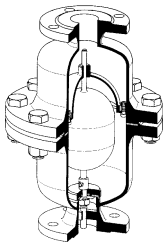


Overfill Preventer Valve
with PTB approval

NV 36SF For flammable liquids

NV 36SF body cast steel
PN..... 16 DN..... 32 - 200
p..... 0 - 4, 0 - 16 bar T..... 80 °C
K_{vs}..... 11 - 230 m^3/h

Compressed Air Shutoff Valve
for Drinking or Industrial Clean Water supplies



For systems fitted with accumulators — NV 80 / 82

compressed air shutoff valve for water supply systems fitted with accumulator
body steel, stainless steel
PN..... 10 - 16 DN..... 15 - 200
p..... 0 - 8 bar T..... 80 °C
v..... max. 1.5 m/sec flow velocity

Sheet no. NV/14.1.081.2 - issue 06.02.2008

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Know how • Float Valves

Level controllers and float valves control the liquid level in a vessel

Level controller or float valve
You should use a level controller with float chamber if the float cannot be mounted in the vessel. It is mounted in the pipeline and connected to the vessel by means of balancing lines.
Float valves have no float chamber. The float is always mounted in the vessel.

Feed and drain valves
Feed valves (code letter "Z") close as the float rises and prevent overflowing. Drain valves (code letter "A") close as the float sinks and ensure that the liquid level does not drop below the required level.

Mounting of float-controlled valves
- Float valves for installations in vessels are mounted inside the vessel complete with float.
- Float valves for installation on vessels are flange-mounted on the outer skin of the vessel.
- Float valves for installation in pipe lines are installed in the feed/drain pipe.

The float lever either projects into the vessel or the float movemen´s is transferred by means of a cable.

Flow direction of float valves
The flow direction determines the mounting arrangement and type of float lever used:
- horizontal, flow direction towards or away from the vessel code letter "w"
- vertical, flow direction upwards code letter "o")
- vertical, flow direction downwards (code letter "u")

Selecting valve type and nominal diameter
To select the valve type and determine the required nominal diameter you should calculate first the operating performance parameter K_v based on the maximum operating values and minimum pressure drop Dp. You should choose a valve having a K_{vs} value which is 30 % greater than the calculated K_v figure.

Selecting the operating pressure range
The maximum operating pressure of your system must be within the operating pressure range of the valve; if not, the float valve will not close or open.

Pressure inside the vessel
Check whether the vessel in which the float is to be mounted is not pressurised. If the vessel is pressurised a pressure-resistant ball float has to be fitted. Cylindrical floats may only be used in non-pressurised vessels.

Temperature
If the valve is to be used for temperatures above 80 °C or a liquid other than water, the compatibility of the elastomers must be checked. For hydrocarbons like gasoline, petrol etc., for example, the valves are fitted with FPM elastomers, whilst for higher temperatures they are fitted with EPDM or, if necessary, with a metallic cone seal.

Adapting the float
Float valves are normally designed for media with the specific gravity of water. By choosing a different float geometry, by filling the float or by altering the operating pressure range, we can adapt the floats to other media.

Balance and double seat
Single seat non-balanced float valves are used for low pressures. They are relatively insensitive to contamination and dirt deposits.
Single seat balanced valves can be used for larger pressure drops and feature smaller floats.
Double seat valves are specially suitable for large flow rates.

Overflow preventers
A special product are the PTB-approved overflow preventers Types 36S and 36SF. These are mechanical safety devices for flammable liquids.

Seat leakage
Level controllers and float valves are control valves which are not required to provide a leak-proof seal (VDI/VDE Guideline 2174). For leakproof shutoff, shut-off valves must be used. Normally our valves leave the factory with perfectly leakproof valve seats. During operation, however, solid particles (e.g. sand, welding nuggets etc.) often cause damage and seat leakage. Any low leakage requirement must be expressly specified when ordering. Valve leakage can be considerably reduced by special measures such as lapping the valve seat, using special cone seals and increasing the valve closing force by changing the lever geometry or increasing the size of the float.

Adjustable filling level
In the case of valves fitted with float rod and adjustable float, the level in the vessel can be adjusted by sliding the float along the rod.

Float rod guide
For float rods a guide must be provided in the vessel to prevent the float oscillating. Float valves with parallel guide or special designs featuring a top-mounted float do not require a rod guide.

Sheet. no. NV/13.1.041.1 - issue 26.04.2004

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Know how • Float Valves

Level controllers and float valves control the liquid level in a vessel

Operation
Make sure that no pressure surges or water hammer occur in the system, which could destroy the float. In the case of foaming media and the resulting reduction of the specific gravity, a float valve cannot operate reliably. In this case a foam abatement circuit should be provided.

Maintenance
Float valves and level controllers should be cleaned and serviced at regular intervals. This rule applies especially to valves which are rarely operated e.g. valves fitted in sprinkler systems.
Thorough cleaning is important in the case of liquids containing substances which easily form deposits (such as iron, lime, suspended solids etc).
Sand and abrasive particles carried along in the liquid can cause rapid wear. Please ask for specially adapted valves.

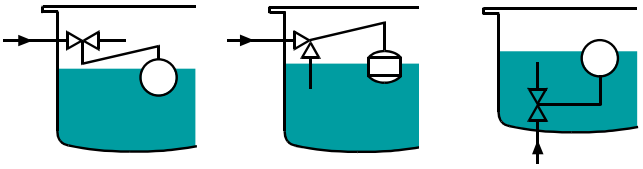
Valves free of oil and grease or silicone
Please pay attention to order an fit only spares free of oil and grease resp. free of silicone.

Please consult our engineer if extreme operating conditions apply or whenever you are in doubt.

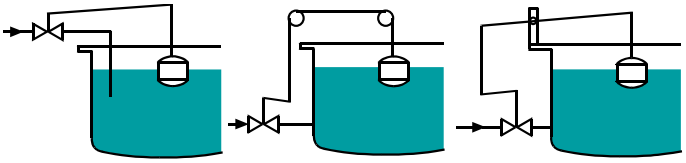
Notes on Safety, operarting instruction etc. MUST be followed

Samples of installation for inflow valves

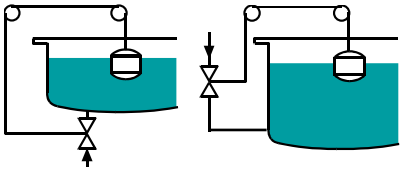
for installation in vessels



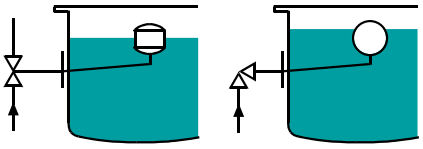
for installation in pipelines, horizontal installation



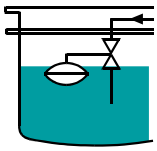
for installation in pipelines, vertical installation



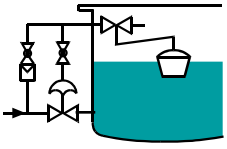
for installation at tanks



Overflow preventer for flammable liquids



Pilot operated float valve



Legend

float valve

float valve pilot operated

shut off valve

shut off valve

Sheet no.: NV/13.1.041.2 - issue 26.04.2004

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for installation in vessels

Flow direction W	S	E	Operating press. bar	K_{VS}-value m^3/h	Connection screwed	flanged DN	*	SS	Notes	Type
		•	8	2.8 - 195		20 - 150			inflow valve made of GG-25	12
•	•		8	0.3 - 21	3/8 - 1 1/2		*	•	inflow or outflow valve, inflow only for closed vessels	94
		•	8	0.3 - 82	3/8 - 1	40 - 80	*	•	inflow or outflow valve, for open or closed vessels	98

* other connections available • stainless steel deep drawn

for installation in pipelines

Flow direction W	S	E	Operating press. bar	K_{VS}-value m^3/h	Connection screwed	flanged DN	*	SS	Notes	Type
•	•		4	3 - 80		15 - 100			economical valve up to 4 bar	16
•	•		16	4 - 100		15 - 100	*	•	economical stainless steel valve, single seat, balanced	66e
•	•		40	4 - 160		15 - 150			standard valve, single seat, balanced	16e
•	•		40	46 - 1800		125 - 400			double seat	26

* other connections available • stainless steel deep drawn

for installation on vessels

Flow direction W	S	E	Operating press. bar	K_{VS}-value m^3/h	Connection screwed	flanged DN	*	SS	Notes	Type
•	•		4	3 - 80		15 - 100			economical valve up to 4 bar	55
		•	8	2 - 81		25 100	*		direct feed or drain through the mounting flange at the vessel	71
•	•		16	4 - 100		15 - 100	*	•	economical stainless steel valve, single seat, balanced	67e
•	•		40	4 - 160		15 - 150			standard valve, single seat, balanced	55e
•	•		40	46 - 1800		125 - 400			double seat	56

* other connections available • stainless steel deep drawn

Pilot controlled float valves

Flow direction W	S	E	Operating press. bar	K_{VS}-value m^3/h	Connection screwed	flanged DN	*	SS	Notes	Type
•	•	•	40	20 - 3200		50 - 600			Design and price on request	8,50

* other connections available • stainless steel deep drawn

Level regulators

Flow direction W	S	E	Operating press. bar	K_{VS}-value m^3/h	Connection screwed	flanged DN	*	SS	Notes	Type
	•		10	0.4	1/2		*	•	small level regulator	10
	•		10	0.4	1/2		*	•	small level regulator with sight glass	11
		•	16	3.3	3/4 - 1	20 - 25	*	•	level regulator for higher flow rates	60

* other connections available • stainless steel deep drawn

Overflow Protection

Flow direction W	S	E	Operating press. bar	K_{VS}-value m^3/h	Connection screwed	flanged DN	*	SS	Notes	Type
	•		16	11 - 230		32 - 200			with PTB approval for flammable liquids, body grey cast iron	36S
	•		16	11 - 230		32 - 200			with PTB approval for flammable liquids, body cast steel	36SF

Compressed Air Shutoff Valves

* other connections available • stainless steel deep drawn

Flow direction W	S	E	Operating press. bar	K_{VS}-value m^3/h	Connection screwed	flanged DN	*	SS	Notes	Type
		•	8	2 - 510		15 - 200			safety device for waterworks with pressure vessel (compressed air)	80
	•		8	2 - 510		15 - 200			safety device for waterworks with pressure vessel (compressed air)	82

W = horizontal

S = vertical

E = angled

* other connections available • stainless steel deep drawn

Special designs on request. The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. EB/11.1.061.1 - issue 12.06.2006

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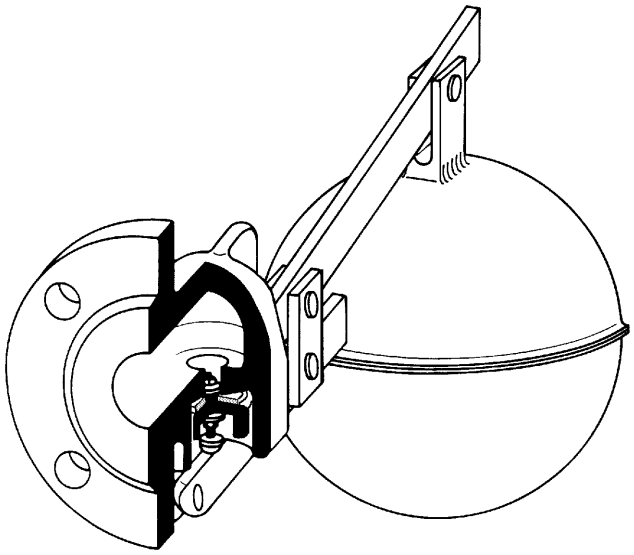
Level Control Valves *NV 12, 12P*

for installation in vessels with or without parallel guide
up to 110 °C

Technical Data

Connection	DN 20 - 150
Nominal Pressure	PN 16
K_{VS}-value	2.8 - 195 m^3/h
Design	feed valve horizontal inflow



Description

Float valves automatically control liquid levels in sealed or open (non-pressurised) tanks and vessels without requiring external energy. The float registers the liquid level and directly controls the valve via a lever. A change in the liquid level immediately results in a changed flow volume.

The NV 12 and NV 12 P float valves are standard inlet (feed) valves for installation in tanks; they are made of cast iron. The valve cone is fitted with a soft seal.

The following note applies to float valves fitted with float bars:
If the liquid level is below the float bar i.e. if the float points downwards, a guide for the float bar should be installed.
NV 12P is fitted with a parallel guide which prevents float oscillation if a float bar guide is not fitted in the tank.

Please state working pressure range when enquiring or ordering.

STANDARD EQUIPMENT

- Ball or cylindrical float (see overleaf)
- NV 12P with parallel guide

OPTIONS

- Various seal materials suitable for your medium

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]								
nom. dia. DN	20-25	32-40	50	65	80	100	125	150
Kvs-value m^3/h	2.8	9.5	12	25	44	70	110	195

Pressure Ranges [bar]			
operating pressure [bar]	0 - 2	0 - 4	0 - 8

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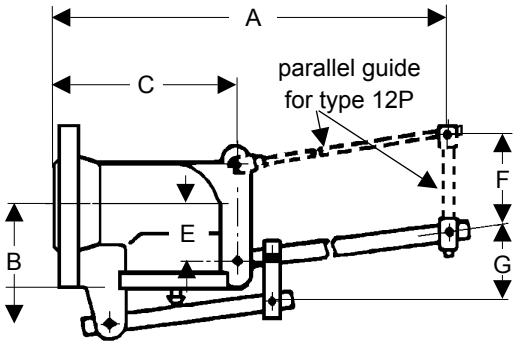
Level Control Valve *NV 12, 12P*

for installation in vessels with or without parallel guide
up to 110 °C

Materials	
Body	up to DN 25 grey cast iron from DN 32 spheroidal cast iron
Cone	CrNiMo-steel
Cone Guide	grey cast iron
Seat	grey cast iron
Valve Seal	EPDM
Float Rod	CrNiMo-steel
Float	CrNiMo-steel



Dimensions [mm]										
	nominal diameter DN									
size	20	25	32	40	50	65	80	100	125	150
A	350	350	455	455	470	610	710	875	1160	1350
B	68	68	88	88	95	104	113	135	165	180
C	100	100	125	125	140	170	180	225	310	350
E	30	30	40	40	50	50	60	60	100	100
F	55	55	80	80	80	80	100	100	100	100
G	5°	5°	5°	5°	10°	10°	10°	20°	20°	20°

Weight without float [kg]									
nominal diameter DN									
20	25	32	40	50	65	80	100	125	150
1.8	2	4.5	5	7	9	11	18	27	35

Float Dimension										
pressure	nominal diameter DN									
range	20	25	32	40	50	65	80	100	125	150
bar	ball float SR 3 ø in mm *									
0 - 2	160	160								
0 - 4	160	160								
	cylindrical float SR 8 ø = height in mm									
0 - 2	-	-	200	200	200	200	240	240	280	305
0 - 4	-	-	200	200	200	240	240	280	305	340
0 - 8	200	200	200	200	240	280	280	340	380	420

*only for type 12 DN 20 + 25 working pressure ranges 0 - 2 and 0 - 4 bar.
(without float rod)

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. NV 12/3.1.081.1 - issue 06.02.2008

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Float Valve, single seated, balanced, installation in pipelines
for liquids up to 130 °C

Technical Data

Connection	NV 16	: DN 15 - 100
	NV 26	: DN 125 - 400
Nominal Pressure	DN 15 - 350	: PN 16 - 40
	DN 400	: PN 10 - 16
Operating Pressure	NV 16	: up to 4 bar
	NV 26	: up to 16 bar
K_{VS}-value	2.6 - 1800 m^3/h	
Design	NV 16	: single seat
	NV 26	: double seat

Description

The NV 16 and NV 26 float valves automatically control liquid levels in sealed or open (non-pressurised) tanks and vessels without requiring external energy. The float registers the liquid level and directly controls the valve via a lever. A change in the liquid level immediately results in a changed flow volume.

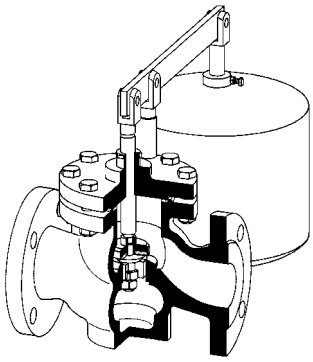
NV 16 and NV 26 are pipeline valves for horizontal or vertical flow. The standard soft seal ensures perfect sealing of the valve. The valves are fitted with a float bar on which a float featuring an inner tube is mounted (cylindrical float SR 8). By changing the position of the float on the bar the required liquid level is infinitely variable.
The following note applies to float valves fitted with float bars:
If the liquid level is below the float bar i.e. if the float points downward, a guide for the float bar should be installed.

When enquiring or ordering please quote the suffix letters given below:

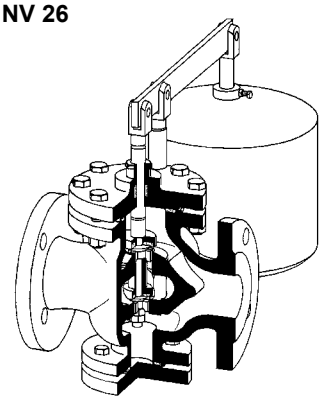
Z	=	Inlet. Valve closes when float rises
A	=	Outlet. Valve closes when float drops
w	=	Horizontal flow
o	=	Upward flow
u	=	Downward flow

Example: Float valve NV 16Z/w (inlet valve for horizontal flow).

NV 16



NV 26



STANDARD EQUIPMENT

- Float bar stainless steel
- Cylindrical float SR 8 stainless steel

OPTIONS

- Rubber or plastic coating for corrosive media
- Various seal materials suitable for your medium

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Pressure Ranges [bar] and K_{VS}-values [m^3/h]

Type	NV 16								
press. range	nominal diameter DN								
bar	15	20	25	32	40	50	65	80	100
0 - 1	2.6	3.5	3.5	5.7	7.6	15	27	47	80
0 - 4	2.6	3.5	3.5	5.7	7.6	7.6	15	27	47

Pressure Range [bar] and K_{VS}-values [m^3/h]

Type	NV 26						
press. range	nominal diameter DN						
bar	125	150	200	250	300	350	400
0 - 1	140	230	380	570	1000	1000	1800
0 - 4	84	140	230	380	570	570	1000
0 - 16	46	84	140	230	380	380	570

Please state working pressure range, when inquiring or ordering

Sheet no. NV 16/2.1.062.1 - issue 12.06.2006

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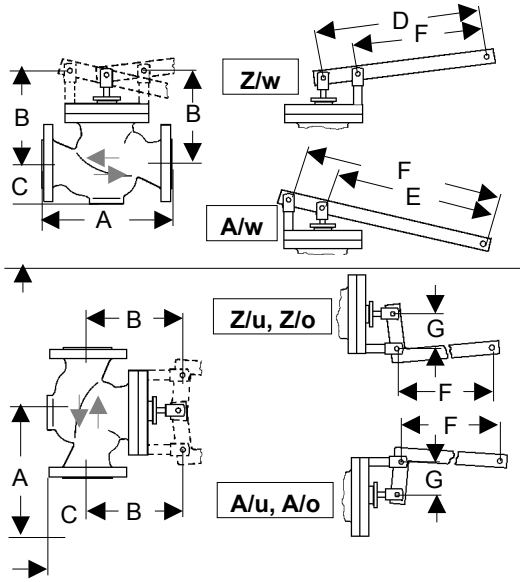
Level Control Valve — *NV 16, 26*

Float Valve, single seated, balanced, installation in pipelines
for liquids up to 130 °C

Materials		
Body	PN 16	up to DN 25 grey cast iron from DN 32 spheroidal cast iron
	PN 25 - 40	cast steel
	PN 16 - 40	optional CrNiMo-steel *
Cone and Seat		Cr-steel optional CrNiMo-steel
Cone Guide		gun metal optional CrNiMo-Stahl
Valve Seal		EPDM
Linkage		steel zinced or steel, optional CrNiMo-steel
Float Rod		CrNiMo-steel
Float		CrNiMo-steel

* up to DN 100 made of CrNiMo-steel use NV 66e



Dimensions [mm] and Weights [kg] NV 16 PN 10/16*									
	nominal diameter DN								
size	15	20	25	32	40	50	65	80	100
A	130	150	160	180	200	230	290	310	350
B	175	175	175	195	195	195	290	290	290
C	55	55	55	125	125	125	105	105	105
D	360	360	360	480	480	480	640	640	640
E	270	270	270	360	360	360	480	480	480
F	315	315	315	420	420	420	560	560	560
G	45	45	45	60	60	60	80	80	80
kg	6	7	8	11	14	19	40	48	60

*PN 25/40 on request

NV 16 necessary Cylindrical Float ø SR 8 [mm] (ø = hight)*										
press. range bar			nominal diameter DN							
			15	20	25	32	40	50	65	80	100
0	-	1	200	200	200	200	200	240	280	280	305
0	-	4	240	240	240	240	280	280	305	340	420

*dimension and weights see sheet no. SR/2.1.041.1

Dimensions [mm] and Weights [kg] NV 26 PN 10/16*							
	nominal diameter DN						
size	125	150	200	250	300	350	400
A	400	480	600	730	850	980	1100
B	325	400	440	490	540	540	555
C	185	200	210	250	290	290	385
D	760	895	1120	1280	1440	1440	1600
E	570	675	840	960	1080	1080	1200
F	665	785	980	1120	1260	1260	1400
G	95	110	140	160	180	180	200
kg	93	128	198	276	480	535	690

*PN 25/40 on request

NV 26 necessary Cylindrical Float ø SR 8 [mm] (ø = hight)*									
press. range bar			nominal diameter DN						
			125	150	200	250	300	350	400
0	-	1	240	305	305	340	380	380	380
0	-	4	280	340	340	380	420	420	460
0	-	16	380	420	460	500	600	600	600

*dimensions and weights see sheet no. SR/2.1.041.1

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. NV 16/3.1.062.1 - issue 12.06.2006

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Float Valve, single seated, balanced, installation in pipelines and at tanks for liquids up to 130 °C

Technical Data

Connections	DN 15 - 150
Nominal Pressure	PN 16 - 40
K_{VS}-value	4 - 160 m^3/h

Description

Float valves automatically control liquid levels in sealed or open (non-pressurised) tanks and vessels without requiring external energy. The float registers the liquid level and directly controls the valve via a lever. A change in the liquid level immediately results in a changed flow volume.

NV 16e is a pipeline valve for horizontal or vertical flow. NV 55e is a pipeline valve complete with tank connecting flange for vertical flow. The valve cone is fitted with a soft seal. The valves are fitted with a float bar on which a float featuring an inner tube is mounted (normally a cylindrical float type SR 8). By changing the position of the float on the bar the required liquid level is infinitely variable. The float of discharge valves must be provided with sand filling by the customer.

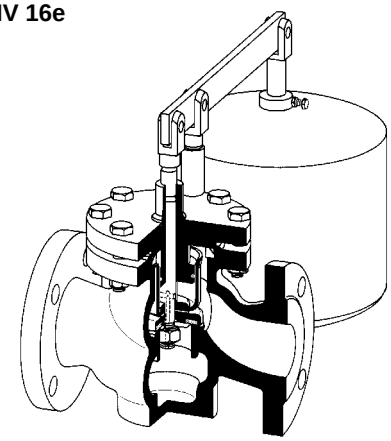
The following note applies to float valves fitted with float bars:
If the liquid level is below the float bar i.e. if the float points downward, a guide for the float bar should be installed.

When enquiring or ordering please quote the suffix letters given below:

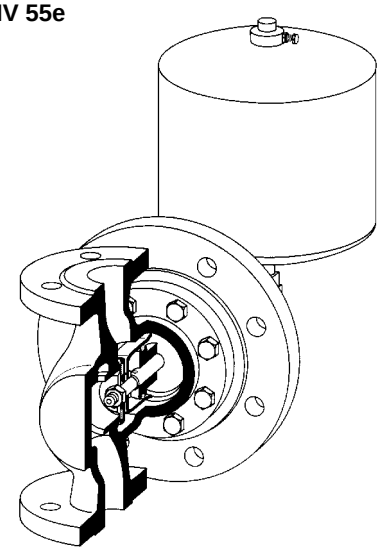
Z	=	Inlet. Valve closes when float rises
A	=	Outlet. Valve closes when float drops
w	=	Horizontal flow
o	=	Upward flow
u	=	Downward flow

Example: Float valve NV 16e Z/w (inlet valve for horizontal flow).

NV 16e



NV 55e



STANDARD EQUIPMENT

- Float bar stainless steel
- Cylindrical float SR 8 stainless steel

OPTIONS

- Rubber or plastic coating for corrosive media
- Various seal materials suitable for your medium

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]						
nom. dia.	DN	15	20	25	40	50
Kvs-value	m^3/h	4	5	6	20	32

K_{VS}-values [m^3/h]						
nom. dia.	DN	65	80	100	125	150
Kvs-value	m^3/h	50	80	100	140	160

Sheet no. NV 16e/2.1.081.1 - issue 06.02.2008

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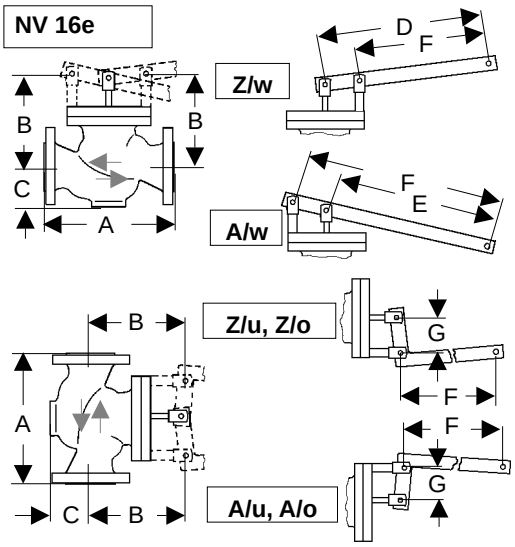
Level Control Valve NV 16e, 55e

Float Valve, single seated, balanced, installation in pipelines and at tanks for liquids up to 130 °C

Materials		
Body	PN 16	up to DN 25 grey cast iron
		from DN 40 spheroidal cast iron
	PN 25/40	cast steel
Cone and Seat		grey cast iron / Cr-steel
Piston and Spindle		Cr-steel
Valve Seal		EPDM
Linkage		steel zinced / steel
Float Rod		CrNiMo-steel
Float		CrNiMo-Stahl

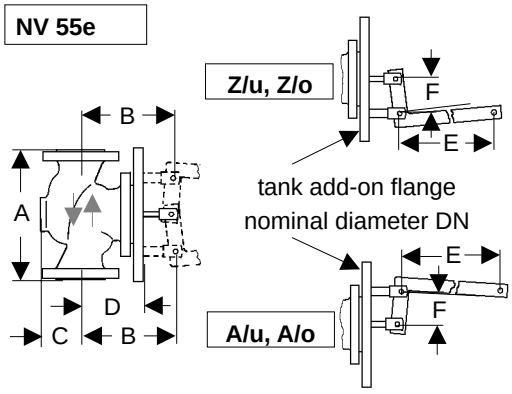
Dimensions [mm] and Weights [kg] NV 16e PN 16*										
	nominal diameter DN									
size	15	20	25	40	50	65	80	100	125	150
A	130	150	160	200	230	290	310	350	400	480
B	175	175	175	195	195	290	290	290	325	400
C	55	55	55	125	125	105	105	105	185	200
D	360	360	360	480	480	640	640	640	760	895
E	270	270	270	360	360	480	480	480	570	675
F	315	315	315	420	420	560	560	560	665	785
G	45	45	45	60	60	80	80	80	95	110
Weights without float										
kg	6	7	8	14	19	40	48	60	98	128

* PN 25/40 on request



Dimensions [mm] and Weights [kg] NV 55e PN 16*										
	nominal diameter DN									
size	15	20	25	40	50	65	80	100	125	150
A	130	150	160	200	230	290	310	350	400	480
B	180	180	180	200	200	300	300	300	340	410
C	55	55	55	125	125	105	105	105	185	200
D	95	95	95	115	115	175	175	175	235	255
E	210	210	210	280	280	420	420	420	420	490
F	30	30	30	40	40	60	60	60	60	70
DN	100	100	100	125	125	200	200	200	250	250
Weights without float										
kg	10	11	12	21	24	45	53	65	103	133

* PN 25/40 on request



Necessary cylindrical float ø SR 8 [mm] (ø = hight) *											
nom. diameter	DN	15	20	25	40	50	65	80	100	125	150
float ø	mm	200	200	200	240	240	305	305	305	340	340

*dimensions and weights see sheet SR 2.1.041.1

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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Float Valve, single and double seated, installation at tanks
for liquids up to 130 °C

Technical Data

Connection	NV 55	: DN 15 - 100
	NV 56	: DN 125 - 400
Nominal Pressure	DN 15 - 350	: PN 16 - 40
	DN 400	: PN 10 - 16
Operating Pressure	NV 55	: up to 4 bar
	NV 56	: up to 16 bar
K_{vs}-value	2.6 - 1800 m^3/h	
Design	NV 55	: single seat
	NV 56	: double seat

Description

The NV 55 and NV 56 float valves automatically control liquid levels in sealed or open (non-pressurised) tanks and vessels without requiring external energy. The float registers the liquid level and directly controls the valve via a lever. A change in the liquid level immediately results in a changed flow volume.

NV 55 and NV 56 are pipeline valves with tank connecting flange for vertical flow. The standard soft seal ensures perfect sealing of the valve.

The valves are fitted with a float bar on which a float featuring an inner tube is mounted (cylindrical float SR 8). By changing the position of the float on the bar the required liquid level is infinitely variable.

The following note applies to float valves fitted with float bars:
If the liquid level is below the float bar i.e. if the float points downward, a guide for the float bar should be installed.

When enquiring or ordering please quote the suffix letters given below:

Z	=	Inlet. Valve closes when float rises
A	=	Outlet. Valve closes when float drops
o	=	Upward flow
u	=	Downward flow
r	=	includes sealed spindle

Example: Float valve NV 55Z/o (inlet valve for upward flow).

STANDARD EQUIPMENT

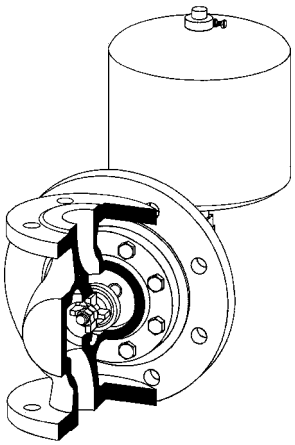
- Tank connecting flange
- Float bar stainless steel
- Cylindrical float SR 8 stainless steel

OPTIONS

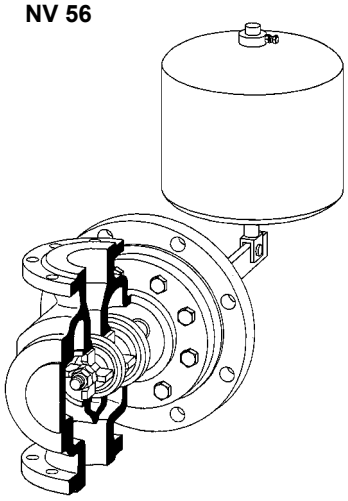
- Rubber or plastic coating for corrosive media
- Various seal materials suitable for your medium
- Spindle sealed against the tank (for example with Rießler plants)

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

NV 55



NV 56



Pressure Range [bar] and K_{vs}-values [m^3/h]									
type	NV 55								
press. range	nominal diameter DN								
bar	15	20	25	32	40	50	65	80	100
0 - 1	2.6	3.5	3.5	5.7	7.6	15	27	47	80
0 - 4	2.6	3.5	3.5	5.7	7.6	7.6	15	27	47

Pressure Range [bar] and K_{vs}-values [m^3/h]							
type	NV 56						
press. range	nominal diameter DN						
bar	125	150	200	250	300	350	400
0 - 1	140	230	380	570	1000	1000	1800
0 - 4	84	140	230	380	570	570	1000
0 - 16	46	84	140	230	380	380	570

Please state working pressure range, when inquiring or ordering

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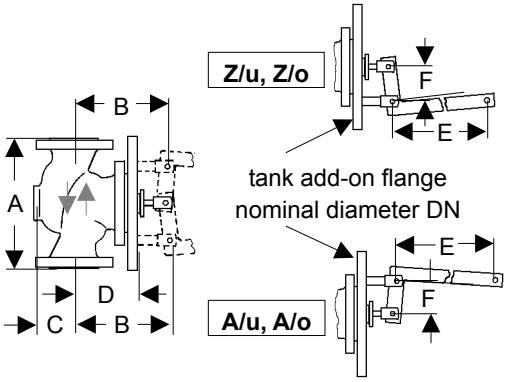
Level Control Valve NV 55, 56

Float Valve, single and double seated, installation at tanks
for liquids up to 130 °C

Materials		
Gehäuse	PN 16	up to DN 25 grey cast iron from DN 32 spheroidal cast iron
	PN 25 - 40	cast steel
	PN 16 - 40	optional CrNiMo-steel *
Cone and Seat		Cr-steel optional CrNiMo-steel
Cone Guide		gun metal optional CrNiMo-steel
Valve Seal		EPDM

* up to DN 100 made of CrNiMo-steel use NV 67e



Dimensions [mm] and Weights [kg] NV 55 PN 10/16*									
	nominal diameter DN								
size	15	20	25	32	40	50	65	80	100
A	130	150	160	180	200	230	290	310	350
B	180	180	180	200	200	200	300	300	300
C	55	55	55	125	125	125	105	105	105
D	95	95	95	115	115	115	175	175	175
E	210	210	210	280	280	280	420	420	420
F	30	30	30	40	40	40	60	60	60
DN	100	100	100	125	125	125	200	200	200
kg	10	11	12	19	21	24	45	53	65

* PN 25/40 on request

NV 55 necessary Cylindrical Float ø SR 8 [mm] (ø = hight)*									
press. range	nominal diameter DN								
bar	15	20	25	32	40	50	65	80	100
0 - 1	200	200	200	200	200	240	280	280	305
0 - 4	240	240	240	240	280	280	305	340	420

*dimensions and weights see sheet no. SR 2.1.041.1

Dimensions [mm] and Weights [kg] NV 56 PN 10/16*							
	nominal pressure						
size	125	150	200	250	300	350	400
A	400	480	600	730	850	980	1100
B	340	410	460	500	550	550	550
C	185	200	210	250	290	290	385
D	235	255	295	350	380	380	380
E	420	490	630	700	770	770	770
F	60	70	90	100	110	110	110
DN	250	250	300	350	400	400	500
kg	98	133	222	302	510	570	725

* PN 25/40 on request

NV 56 necessary Cylindrical Float ø SR 8 [mm] (ø = hight)*							
Druckbereich	Nennweite DN						
bar	125	150	200	250	300	350	400
0 - 1	240	305	305	340	380	380	380
0 - 4	280	340	340	380	420	420	460
0 - 16	380	420	460	500	600	600	600

*dimensions and weights see sheet no. SR 2.1.041.1

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. NV 55/3.1.062.1 - issue 12.06.2006

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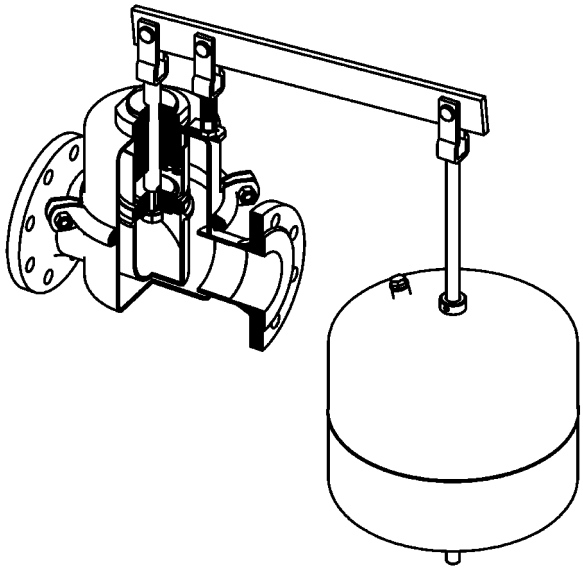
Float Valve, single seated, balanced, installation in pipelines and at tanks for liquids up to 130 °C

Technical Data

Connection	DN 15 - 100
Nominal Pressure	PN 16
K_{VS}-values	4 - 100 m^3/h

NV 66e



Description

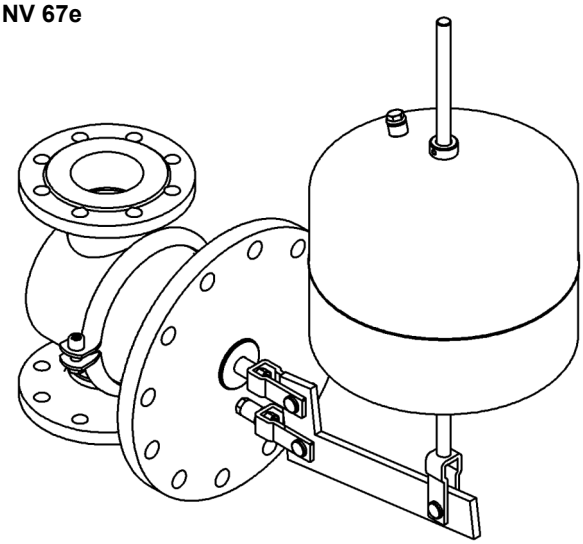
Float valves automatically control liquid levels in sealed or open (non-pressurised) tanks and vessels without requiring external energy. The float registers the liquid level and directly controls the valve via a lever. A change in the liquid level immediately results in a changed flow volume.

NV 66 and NV 67e are pipeline valves for tank mounting capable of handling large volumes. NV 66e is a pipeline valve for horizontal or vertical flow. NV 67e is a pipeline valve with tank connecting flange for vertical flow. Both valves are made from deep-drawn stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal.

Top and bottom sections of the valve body are connected by a clamp ring and two bolts. Servicing/maintenance is easy and does not call for special tooling.

The valves are fitted with a float bar on which a float featuring an inner tube is mounted (cylindrical float SR 8). By changing the position of the float on the bar the required liquid level is infinitely variable.

NV 67e



The following note applies to float valves fitted with float bars:
If the liquid level is below the float bar i.e. if the float points downward, a guide for the float bar should be installed.

When enquiring or ordering please quote the suffix letters given below::

Z	=	Inlet. Valve closes when float rises
A	=	Outlet. Valve closes when float drops
w	=	Horizontal flow
o	=	Upward flow
u	=	Downward flow

Example: Float valve NV 66e Z/w (inlet valve for horizontal flow).

STANDARD EQUIPMENT

- Float bar stainless steel
- Cylindrical float SR 8 stainless steel
- Quick-release body clamp ring

OPTIONS

- Various seal materials suitable for your medium

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]							
nominal diameter DN							
15	20	25	40	50	65	80	100
4	5	6	20	32	50	80	100

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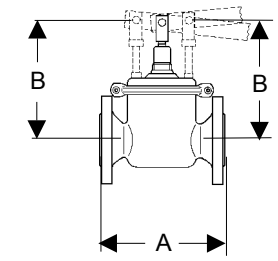
Level Control Valve — *NV 66e, 67e*

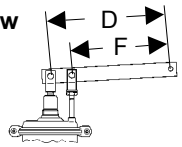
Float Valve, single seated, balanced, installation in pipelines and at tanks for liquids up to 130 °C

Materials	
Body	CrNiMo-steel
Cone, Seat	CrNiMo-steel
Piston, Spindle	CrNiMo-steel
Valve Seal	EPDM
Linkage	CrNiMo-steel
Float Rod	CrNiMo-steel
Float	CrNiMo-steel

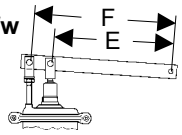
NV 66e

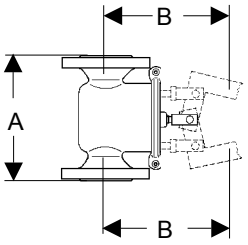


Z/w

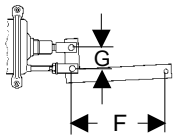


A/w

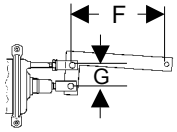




Z/u, Z/o



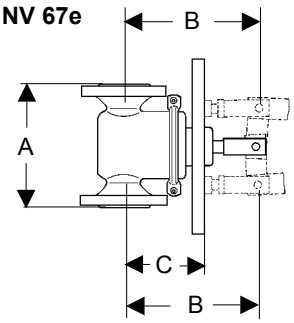
A/u, A/o



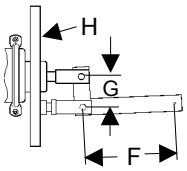
Dimensions [mm]								
	nominal diameter DN							
size	15	20	25	40	50	65	80	100
A	160	160	160	200	230	290	310	350
B	185	185	185	220	220	325	325	325
D	360	360	360	480	480	640	640	640
E	270	270	270	360	360	480	480	480
F	315	315	315	420	420	560	560	560
G	45	45	45	60	60	80	80	80

Weights [kg]							
nominal diameter DN							
15	20	25	40	50	65	80	100
5.8	6.2	6.5	14	14.5	28.5	30.5	31.5

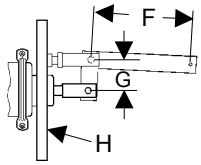
NV 67e



Z/u, Z/o



A/u, A/o



Dimensions [mm]								
	nominal diameter DN							
size	15	20	25	40	50	65	80	100
A	160	160	160	200	230	290	310	350
B	185	185	185	220	220	317	317	317
C	125	125	125	145	145	211	211	211
F	210	210	210	280	280	420	420	420
G	30	30	30	40	40	60	60	60
H	DN 100	DN 100	DN 100	DN 125	DN 125	DN 200	DN 200	DN 200

Weights [kg]							
nominal diameter DN							
15	20	25	40	50	65	80	100
11.5	12	15	22.5	23	44.5	46.5	47.5

Cylindrical Float ø SR 8 [mm] (ø = height) *								
nominal diameter DN	15	20	25	40	50	65	80	100
float ø mm	200	200	200	240	240	305	305	305

*dimensions and weights see sheet no. SR 2.1.041.1

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. NV 66e/3.1.061.1 - issue 12.06.2006

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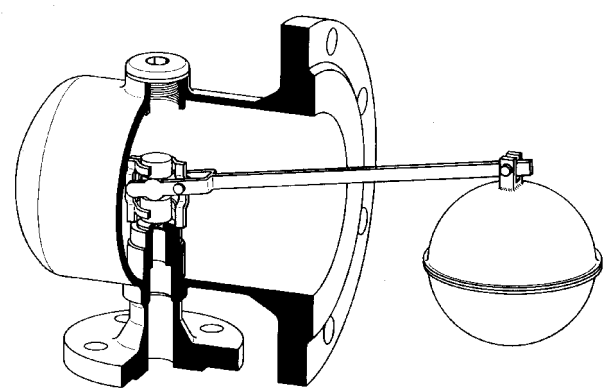
Single and double seated Float Valve, installation in pipelines and at tanks elbow design, for liquids up to 110 / 300 °C

Technical Data

Connection	DN 25 - 150
Nominal Pressure	PN 10
Operating Pressure	up to 8 bar, in 3 ranges
K_{VS}-value	1.6 - 81 m^3/h

Description

Float valves automatically control liquid levels in sealed or open (non-pressurised) tanks and vessels without requiring external energy. The float registers the liquid level and directly controls the valve via a lever. A change in the liquid level immediately results in a changed flow volume.



NV 71 is a pipeline valve for tank mounting complete with tank connecting flange for direct inlet/outlet. The valve cone can be fitted with a soft seal (up to 110 °C) or a metallic seal (up to 300 °C). NV 71 is supplied with a ball float type SR 3 fixed to the float bar.

When enquiring or ordering please quote the suffix letters given below:

Z	=	Inlet. Valve closes when float rises
A	=	Outlet. Valve closes when float drops
w	=	Horizontal flow
o	=	Upward flow
u	=	Downward flow

Example: Float valve NV 71 Z/u (inlet valve for downward flow).

STANDARD EQUIPMENT

- SR 3 ball float stainless steel

OPTIONS

- Stainless steel construction – all components stainless steel
- Rubber or plastic coating for corrosive media
- Various seal materials suitable for your medium

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Pressure Ranges [bar], K_{VS}-values [m^3/h]

press. range bar	nominal diameter DN						
	25	32	40	50	65	80	100, 125, 150
0 - 2	5.1	10	15	21	31	57	81
0 - 4	3.3	5.1	8.7	12	20	35	49
0 - 8	1.6	2.9	4.5	6.4	10	17	28

Please state working pressure range, when inquiring or ordering

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Level Control Valve NV 71

Single and double seated Float Valve, installation in pipelines and at tanks
elbow design, for liquids up to 110 / 300 °C

Materials	
Body	steel optional CrNiMo-steel
Cone, Seat	gun metal optional CrNiMo-steel
Cone Guide	Cr-steel optional CrNiMo-steel
Valve Seal	EPDM up to 110 °C or metallic up to 300 °C
Linkage	steel optional CrNiMo-steel
Float	CrNiMo-steel

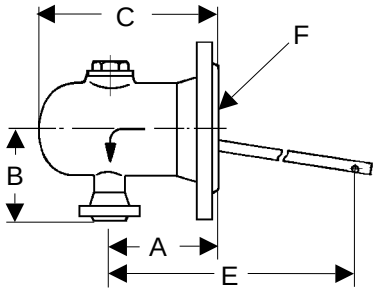
Dimensions [mm] and Weights [kg]

	nominal diameter DN								
size	25	32	40	50	65	80	100	125	150
A	120	140	140	140	160	175	200	200	200
B	125	150	150	150	170	180	200	200	200
C	200	240	240	240	300	310	350	350	395
E	310	350	380	415	495	630	775	775	775
F	DN125	DN150	DN150	DN150	DN200	D 200	DN250	DN250	DN250
ball float SR 3									
ø	110	130	160	200	220	250	280	280	280
Weights									
kg	10	15	17	19	41	44	58	60	62

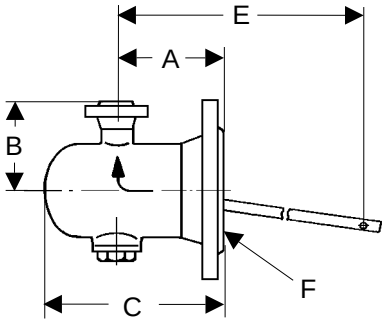
from DN 40 float fitted through manhole

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

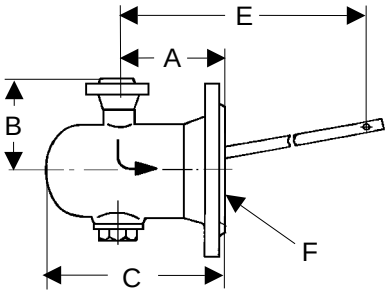
NV 71 A/u



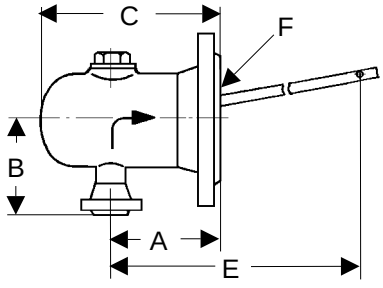
NV 71 A/o



NV 71 Z/u



NV 71 Z/o



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Float Valves for installation in closed vessels up to 300 °C

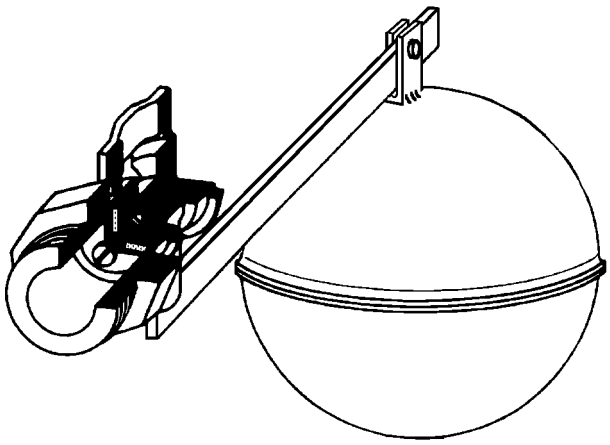
Technical Data

Connection	G 3/8A - 1 1/2A (Zapfen)
Nominal Pressure	PN 16
K_{VS}-value	0.3 - 21 m^3/h

Description

Float valves automatically control liquid levels in sealed or open (non-pressurised) tanks and vessels without requiring external energy. The float registers the liquid level and directly controls the valve via a lever. A change in the liquid level immediately results in a changed flow volume.

NV 94 is a float valve for horizontal or vertical installation inside a tank as inlet or outlet valve. This valve is made entirely of stainless steel featuring excellent corrosion resistance. The valve cone can be fitted with a soft seal (up to 130 °C) or a metallic seal (up to 300 °C). NV 71 is supplied with a ball float type SR 3 fixed to the float bar.



When enquiring or ordering please quote the suffix letters given below:

Z	=	Inlet. Valve closes when float rises
A	=	Outlet. Valve closes when float drops
w	=	Horizontal flow
o	=	Upward flow
u	=	Downward flow

Example: Float valve NV 94 Zw (inlet valve for horizontal flow).

STANDARD EQUIPMENT

- All stainless steel construction
- SR 3 ball float stainless steel

OPTIONS

- Various seal materials suitable for your medium

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

K_{VS}-values [m^3/h]						
nom. diameter G .... A	3/8	1/2	3/4	1	1 1/4	1 1/2
press. range 0 - 2 bar	1.2	2.8	5.1	10	15	21
press. range 0 - 4 bar	0.7	1.9	2.8	5.1	8.7	12
press. range 0 - 8 bar	0.3	0.9	1.9	2.8	4.4	6.4

Pressure Ranges [bar]		
0 - 2	0 - 4	0 - 8

Please state working pressure range, when inquiring or ordering

Sheet no. NV 94/2.1.062.1 - issue 12.06.2006

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Level Control Valve NV 94

Float Valves for installation in closed vessels
up to 300 °C

Materials	
Body	CrNiMo-steel
Cone	CrNiMo-steel
Seat	CrNiMo-steel
Valve Seal	EPDM up to 130 °C metallic up to 300 °C
Float	CrNiMo-steel

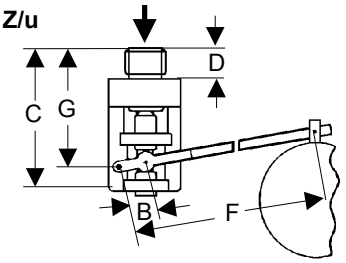
Dimensions [mm]						
	nominal diameter G...A					
size	3/8	1/2	3/4	1	1 1/4	1 1/2
B	9	13.5	15.5	19.5	24	26
C	56	75	75	97	110	120
D	12	16	16	20	22	25
E	34	42	42	55	63	63
F	110	165	190	225	285	320
G	43	57	57	72	80	90

Weights [kg]					
nominal diameter G ... A					
3/8	1/2	3/4	1	1 1/4	1 1/2
0.6	0.9	1.3	2	3.5	4.5

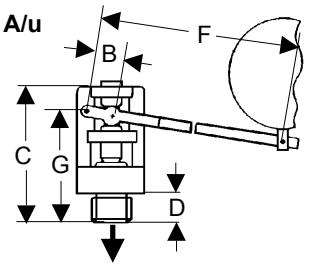
Dimensions Ball Float SR 3 [ø mm]					
nominal diameter G ... A					
3/8	1/2	3/4	1	1 1/4	1 1/2
100	110	130	150	180	200

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

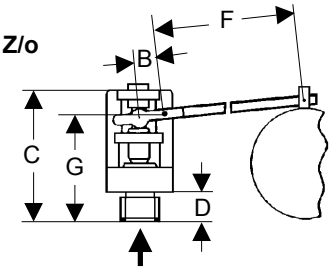
Z/u



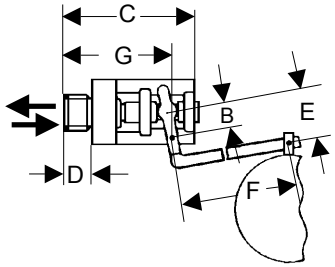
A/u



Z/o



Z/w, (A/w)



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Float Valves for installation in vessels
up to 130 °C

Technical Data

Connection	G 3/8A - 1 1/2 A (Zapfen)
	DN 40 - 80
Nominal Pressure	PN 16
K_{VS}-value	0.3 - 82 m^3/h

Description

Float valves automatically control liquid levels in sealed or open (non-pressurised) tanks and vessels without requiring external energy. The float registers the liquid level and directly controls the valve via a lever. A change in the liquid level immediately results in a changed flow volume.

NV 98 is a float valve for horizontal installation inside a tank as inlet valve with outlet at the bottom. This valve is made entirely of stainless steel featuring excellent corrosion resistance. NV 98 R (spigot connection) is fitted with a SR 3 ball float, NV 98 F (flange connection) is fitted with a SR 8 cylindrical float that is adjustable on its float bar. NV 98 FP is fitted with a parallel float guide which prevents oscillation of the float. The valve cone is fitted with a soft seal.

The following note applies to float valves fitted with float bar:
If the liquid level is below the float bar i.e. if the float points downwards, a guide for the float bar should be installed.

When enquiring or ordering please quote the suffix letters given below:

R = Spigot connetion
F = Flange connection
P = Parallel guide
Z = Inlet. Valve closes when float rises
u = Downward flow

Example: Float valve tape 98 R Z/u (inlet valve with spigot connection, downward flow).

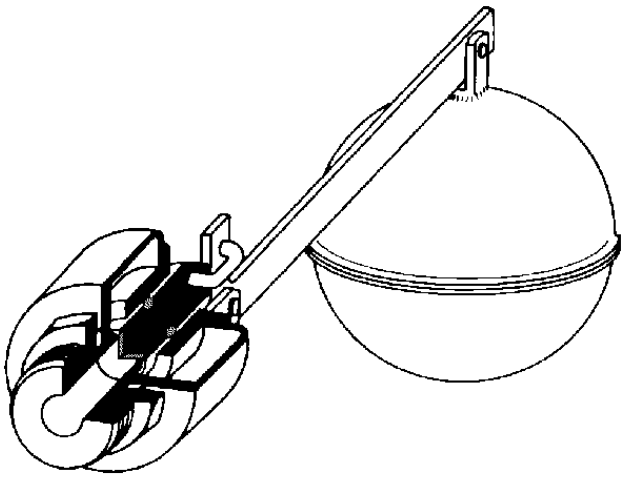
STANDARD EQUIPMENT

- All stainless steel construction
- NV 98 R with ball float SR 3
- NV 98 F with cylindrical float SR 8
- NV 98FP with cylindrical float SR 8 and float bar parallel guide

OPTIONS

- Various seal materials suitable for your medium

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



K_{VS}-values [m^3/h]							
nom. diameter	G..A	3/8	1/2	3/4	1	1 1/4	1 1/2
press. range	0 - 2 bar	0.7	1.95	5	7.9	13.3	17.8
	0 - 4 bar	0.7	1.95	2.9	5	7.9	13.3
	0 - 8 bar	0.3	0.7	1.95	2.9	5	6.4

K_{VS}-values [m^3/h]					
nom. diameter	DN	40	50	65	80
press. range	0 - 8 bar	20	32	50	82

Pressure Ranges			
nom. diameter	pressure range [bar]		
G 3/8 - 1	0 - 2	0 - 4	0 - 8
DN 40 - 80	0 - 8		

Please state working pressure range, when inquiring or ordering

Sheet no. NV 98/2.1.071.1 - issue 07.06.2007

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Level Control Valve — NV 98

Float Valves for installation in vessels
up to 130 °C

Materials	
Body	CrNiMo-steel
Cone	CrNiMo-steel
Seat	CrNiMo-steel
Valve Seal	G 3/8 FPM, G 1/2 - 1 1/2 EPDM
Float	CrNiMo-steel

Dimensions [mm] NV 98 R

	nominal diameter G..A					
size	3/8	1/2	3/4	1	1 1/4	1 1/2
A	40	40	40	45	47	47
B	60	60	60	65	72	77
C	85	85	85	90	96	101
D	ø 60	ø 60	ø 60	ø 60	ø 60	ø 60
E	110	110	110	115	123	128
F	16	16	20	20	23	25
G	3/8	1/2	1/2	3/4	1	1 1/4
H	200	200	200	200	200	200
I	135	145	165	185	215	235
K	ø 100	ø 110	ø 130	ø 150	ø 180	ø 200

Weights [kg] NV 98 R

nominal diameter G ... A					
3/8	1/2	3/4	1	1 1/4	1 1/2
0.9	0.9	1.4	1.5	2.7	3

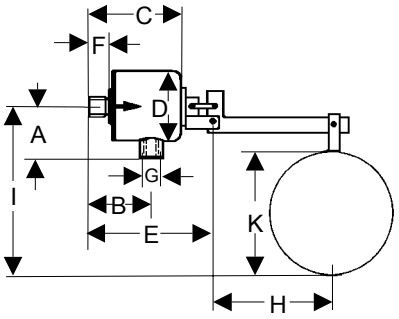
Dimensions [mm] NV 98 F + NV 98 FP

	nominal diameter DN			
size	40	50	65	80
A	85	95	95	110
B	60	75	75	80
C	105	125	125	140
D	ø 70	ø 90	ø 90	ø 125
E	145	165	165	180
F	ø 43	ø 53	ø 64	ø 80
H	330	330	440	530
K	ø 280	ø 305	ø 340	ø 380
L	280	305	340	380
M	55	55	80	80

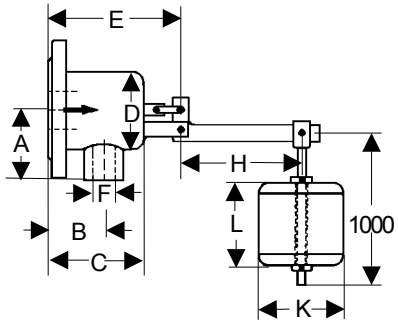
Weights [kg] NV 98 F + NV 98 FP

nominal diameter DN			
40	50	65	80
6.5	9.5	12.5	13.5

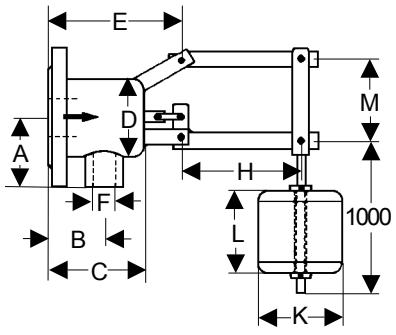
NV 98 RZ/u



NV 98 FZ/u



NV 98 FPZ/u



Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. NV 98/3.1.071.1 - issue 07.06.2007

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Overflow Protection for flammable liquids
up to 80 °C

Technical Data

Connection	DN 32 - 200
Nominal Pressure	PN 16
Operating Pressure	0 - 4 and 0 - 16 bar
K_{VS}-value	11 - 230 m^3/h

Description

This overfill preventer valve has been tested by Physikalisch-Technische Bundesanstalt, the Technischer Überwachungsverein (TÜV) and the Deutscher Ausschuß für brennbare Flüssigkeiten and approved for systems subject to the above regulations. Each overfill preventer valve is given its own factory ID number.

An overfill preventer valve operates under direct float control and requires no external energy. It is installed in the vertical filler pipe in the storage tank. At the end of the filling process the float is lifted by the fluid and closes the filler pipe. The valve closes softly and without pressure surges.

Features:

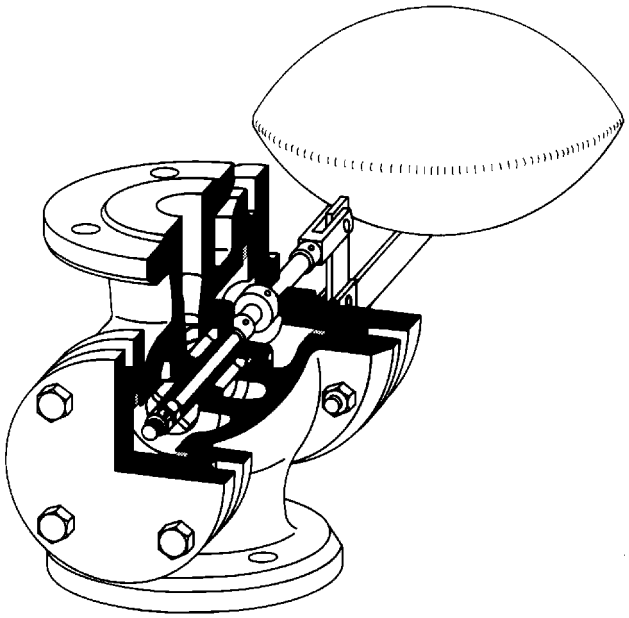
- Robust, proven and reliable design
- Easy installation
- Requires no energy input
- Can be installed at any site, independent of supply networks

According to the revised version of the German "Verordnung über brennbare Flüssigkeiten" (VbF) (Directive governing flammable liquids) dated 5.6.1970 and the associated German "Technische Regeln über brennbare Flüssigkeiten" (TRbF) (Technical Rules for flammable liquids), systems or system components used in Hazard Areas Zone 0 (TRbF 510), must have design approval in accordance with § 11a of VbF.

STANDARD EQUIPMENT

- Lenticular float SR 5 or SR 6 (see overleaf)

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



Test Symbol of the Physical Technical Federal Institute	
nominal diameter DN	test symbol
32	III B/S 1610 F
40	III B/S 1611 F
50	III B/S 1612 F
65	III B/S 1613 F
80	III B/S 1614 F
100	III B/S 1615 F
125	III B/S 1616 F
150	III B/S 1617 F
200	III B/S 1618 F

K_{VS}-values m^3/h		
nominal diameter	pressure range bar	
DN	0 - 4	0 - 16
32	11	11
40	11	11
50	11	11
65	11	11
80	23	11
100	46	23
125	84	46
150	140	84
200	230	140

Please state working pressure range, when inquiring or ordering

Sheet no. NV 36SF/2.1.061.1 - issue 12.06.2006

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Level Control Valve — *NV 36SF*

Overflow Protection for flammable liquids
up to 80 °C

Materials	
Body	cast steel
Double Seat and Cone	CrNiMo-steel
Spindle	brass
Valve Seal	FPM
Float	CrNiMo-steel

Dimensions [mm]

size	press. range bar	nominal diameter DN 32	40	50	65	80	100	125	150	200
A	0 - 4 / 0 - 16	180	200	230	290	310	350	400	480	600
B	0 - 4	180	180	180	235	255	275	300	360	395
C	0 - 16	60	60	60	65	75	90	95	110	140
D	0 - 4 / 0 - 16	420	420	420	455	525	630	700	784	980
E	0 - 4	185	175	160	125	110	80	85	65	15
	0 - 16	210	200	185	150	130	130	15	30	110

Weights [kg] including float

nominal diameter DN 32	40	50	65	80	100	125	150	200
18	20	26	40	50	62	87	137	215

Float Type

pressure range bar	nominal diameter DN 32	40	50	65	80	100	125	150	200
0 - 4	SR 5								
0 - 16	SR 5						SR 6		

Float Dimensions [mm]

size	press. range bar	nominal diameter DN 32	40	50	65	80	100	125	150	200
ø F	0 - 4	350	350	350	350	450	450	500	570	570
	0 - 16	550	550	550	550	550	570	500	570	570
G	0 - 4	280	280	280	280	275	275	300	330	330
	0 - 16	300	300	300	300	300	330	300	330	330

Special designs on request.
The pressure has always been indicated as overpressure.
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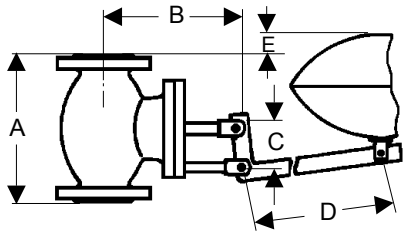
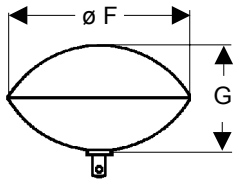
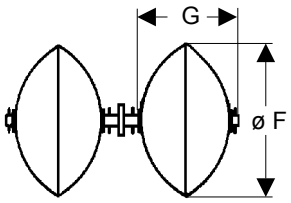
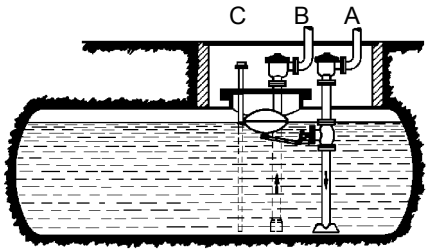


SR 5



SR 6





A filling tube with flame protection and overflow protection
B outlet pipe with flame protection
C inspection tube

Sheet no. NV 36/3.1.061.1 - issue 12.06.2006

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Compressed Air Shutoff Valve for pipelines, straight and angled versions
up to 80 °C

Technical Data

Connection	DN 15 - 200
	DN 250 - 400 on request
Nominal Pressure	PN 16
Operating Pressure	bis 8 bar
Flow Rate	1 - 115 m^3/h

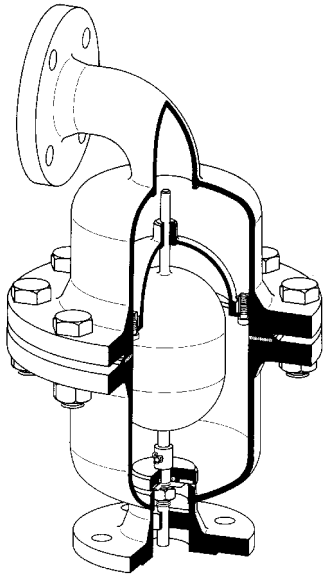
Description

Pneumatic shutoff valves are independent stop valves for water installations fitted with accumulators. These valves prevent air escaping from accumulators into the pipe network once a pump has failed owing to lack of water, power cut, pipe blockage etc. In this way dangerous water hammer in the pipe network and loss of compressed air is prevented.

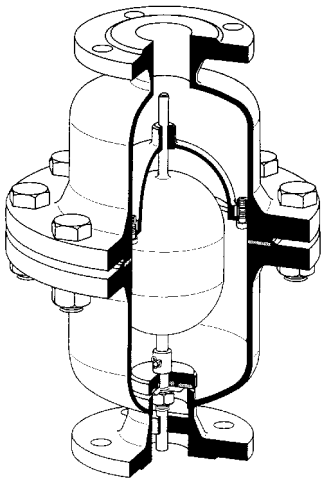
The accumulator must be installed in a pipe spur. As long as the accumulator is filled with water up to the level of the lower connecting spigot, the float of the pneumatic shutoff valve keeps the valve open in both directions if there is a flow of water. As soon as air passes from the accumulator into the pneumatic shutoff valve the latter closes tightly preventing air entering the pipe network. When the pump starts delivering the pneumatic shutoff valve automatically opens again and allows water to flow into the accumulator. When the water level is rising the pneumatic shutoff valve will open only if the pressure inside and downstream of the valve is approximately zero. The water flow velocity in the valve must not exceed 1.5 m/s (1 m/s for valve size DN 200).

NV 80 is a pneumatic shutoff valve of angled design, whereas NV 82 is a straight valve. The valve body is of welded steel construction; the float is precisely guided in two bushes; the valve cone is fitted with a soft seal.

NV 80



NV 82



OPTIONS

- Stainless steel construction – all components stainless steel
- Rubber or plastic coating for corrosive media
- Various seal materials suitable for your medium

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Q = max. [m^3/h]				
nominal diameter DN				
15	20, 25	32, 40	50	65
1	3	7	11	18

Q = max. [m^3/h]				
nominal diameter DN				
80	100	125	150	200
27	42	68	100	115

Sheet no. NV 80/2.1.061.1 - issue 12.06.2006

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Level Control Valve — *NV 80, 82*

Compressed Air Shutoff Valve for pipelines, straight and angled versions
up to 80 °C

Materials	
Temperature	80 °C
Body	steel optional CrNiMo-steel
Body Seal	Nova Universal
Internals	Cr-steel optional CrNi-steel or CrNiMo-steel
Float	CrNi-steel optional CrNiMo-steel
Valve Seal	NBR

Dimensions [mm] NV 80, NV 82 PN 10

	nominal diameter DN							
size	15	20	25	32	40	50	65	80
A_1	300	300	300	360	370	390	500	540
A_2	320	320	320	355	360	360	460	475
B	60	65	75	85	100	120	130	165
D	285	285	285	285	285	285	340	340

Dimensions [mm] NV 80, NV 82 PN 10

	nominal diameter DN							
size	100	125	150	200	250	300	350	400
A_1	680	720	875	1250	on request			
A_2	580	580	700	1100				
C	205	245	285	310				
D	395	395	445	445				

Dimensions [mm] NV 80, NV 82 PN 16

	nominal diameter DN							
size	15	20	25	32	40	50	65	80
A_1	300	300	300	360	370	390	500	540
A_2	320	320	320	355	360	360	460	475
B	60	65	75	85	100	120	130	165
D	285	285	285	285	285	285	340	340

Dimensions [mm] NV 80, NV 82 PN 16

	nominal diameter DN							
size	100	125	150	200	250	300	350	400
A_1	680	720	875	900	on request			
A_2	580	580	700	800				
B	205	245	285	310				
D	405	405	460	460				

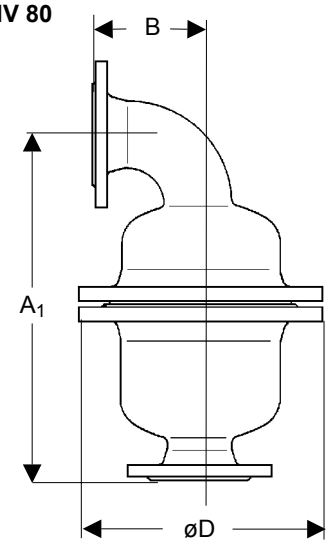
Weights [kg] NV 80, NV 82

	nominal diameter DN							
	15	20	25	32	40	50	65	80
PN 10	26	26.5	27	29.5	30	31	56	58
PN 16	26	26.5	27	29.5	30	31	57	59

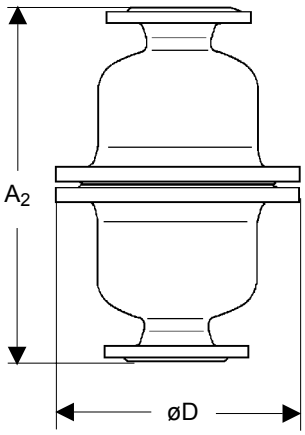
Weights [kg] NV 80, NV 82

	nominal diameter DN							
	100	125	150	200	250	300	350	400
PN 10	103	108	137	153	on request			
PN 16	106	112	148	164				

NV 80



NV 82



Special designs on request.
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Floats made of 316L
SR 3 and SR 4 for pressure-vessels, SR 7 and SR 8 for depressurised vessels

HIGH GRADE

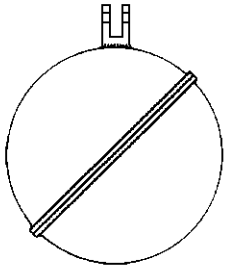
Dimensions SR 3 and SR 4 [mm]										
diameter	mm	60	70	80	90	100	110	120	130	150
thikness	mm	0.5	0.8	0.8	0.8	0.8	0.8	0.8	1	1
pressure ≤ 120 °C	bar	34	52	42	32	30	26	24	31	24
socket	G	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
internal tube ø	mm	-	-	-	-	-	12	12	12	12
filling screw	G	-	-	-	-	-	1/4	1/4	1/4	1/4

Buoyancy SR 3 and SR 4 [kg] in cold water								
ø60	ø70	ø80	ø90	ø100	ø110	ø120	ø130	ø150
0.06	0.08	0.14	0.22	0.30	0.42	0.595	0.69	1.14

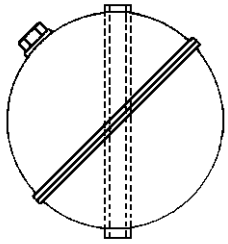
Displacement SR 3 and SR 4 [dm³]								
ø60	ø70	ø80	ø90	ø100	ø110	ø120	ø130	ø150
0.06	0.08	0.14	0.22	0.30	0.42	0.595	0.69	1.14

Weight SR 3 and SR 4 [kg]								
ø60	ø70	ø80	ø90	ø100	ø110	ø120	ø130	ø150
0.67	1.23	1.53	1.88	2.37	2.94	3.87	5.35	8.14

SR 3 with fork



SR 4 with internal tube



Dimensions SR 3 and SR 4 [mm]										
diameter	mm	160	180	200	220	250	280	320	380	460
thikness	mm	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
pressure ≤ 120 °C	bar	21	33	30	26	24	21	16	13	7
socket	G	1/4	1/4	1/4	3/8	3/8	3/8	3/4	3/4	3/4
internal tube ø	mm	16	16	16	16	16	16	20	20	20
filling screw	G	3/8	3/8	3/8	3/8	3/8	3/8	3/4	3/4	3/4

Buoyancy SR 3 and SR 4 [kg] in cold water								
ø160	ø180	ø200	ø220	ø250	ø280	ø320	ø380	ø460
1.47	1.79	2.66	3.70	5.81	8.55	13.29	23.38	42.81

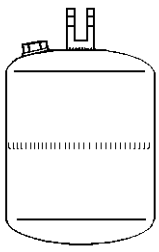
Displacement SR 3 and SR 4 [dm³]								
ø160	ø180	ø200	ø220	ø250	ø280	ø320	ø380	ø460
2.14	3.05	4.19	5.58	8.18	11.19	17.16	28.73	50.95

Weight SR 3 and SR 4 [kg]								
ø160	ø180	ø200	ø220	ø250	ø280	ø320	ø380	ø460
0.67	1.26	1.53	1.88	2.37	2.94	3.87	5.35	8.14

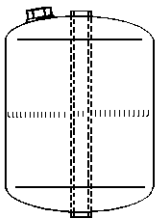
Dimensions SR 7 and SR 8 [mm]						
diameter	mm	200	240	280	305	340
height	mm	200	240	280	305	340
buoyancy *	kg	4.2	77.2	11.8	15.6	21.7
displacement	dm³	5.5	9.5	15	19.4	26.3
weight	kg	1.3	2.3	3.2	3.8	4.6
internal tube ø	mm	16	16	16	20	20
filling screw	G	3/8	3/8	3/8	3/8	3/4

Dimensions SR 7 and SR 8 [mm]						
diameter	mm	380	420	460	500	600
height	mm	380	420	460	500	600
buoyancy *	kg	31.2	42.1	55.1	71.2	130
displacement	dm³	37	49	65	83	147
weight	kg	5.8	6.9	9.9	11.8	17
internal tube ø	mm	20	20	20	24	24
filling screw	G	3/4	3/4	3/4	3/4	3/4

SR 7 with fork



SR 8 with internal tube



Special designs on request.
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Sheet no. SR 3/3.1.061.1 - Issue 12.06.2006

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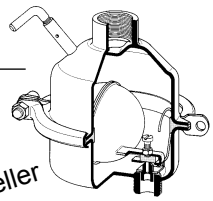
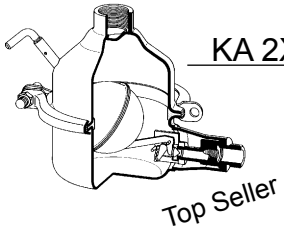
Float-controlled Steam Traps

Universal valve, small capacity — KA 2



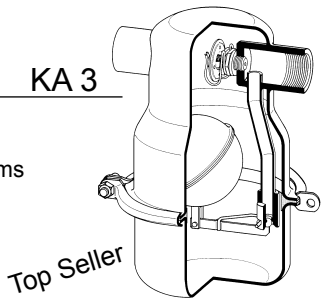
for steam, compressed air, aerosols
for steam with manual bleeding
all stainless steel SST 316 construction
PN..... 16
G..... G 3/4 x 1/2A
T..... 190 °C

KA 2X — Universal valve, larger capacity



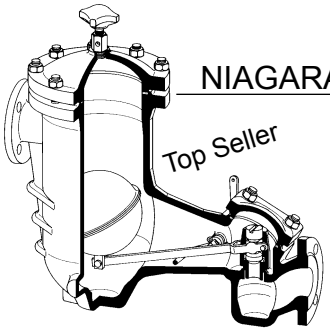
for steam, compressed air, aerosols
for steam with manual bleeding
all stainless steel SST 316 construction
PN..... 16
G..... G 1 - x 3/4A
DN..... 25 x G 3/4A
T..... 190 °C

Universal valve, with thermal bleeding — KA 3



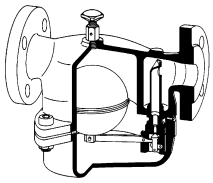
for steam, compressed air, aerosols
for steam with thermal bleeding
external surfaces can be polishhed for use in clean or sterile rooms
all stainless steel SST 316 construction
PN..... 16
G..... 1/2 - 1
DN..... 15 - 25
T..... 190 °C

NIAGARA — A high-performance and robust valve



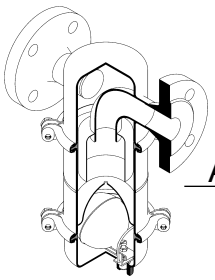
robust and proven steam trap
with manual or thermal bleeding or fixed continuous bleeding
body spheroidal cast iron, cast steel
PN..... 16 - 40
DN..... 15 - 150
T..... 200/400 °C

Universal valve, cast body — AXOMAT



no working pressure ranges
with manual or thermal bleeding or fixed continuous bleeding
body grey cast iron, cast steel
PN..... 16 - 40
DN..... 15 - 32
T..... 200/300 °C

Separators



AS 2 — Centrifugal separator

with built-in liquid trap
all stainless steel SST 316 construction
PN..... 16 - 40
G..... 1, 2
DN..... 25, 40
T..... 200 °C

Sheet no. KA/14.1.081.1 - issue 06.02.2008

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Selection Guidelines • Steam Traps

1. Design principles

- reliability
- long service intervals
- save operation even if fluid is dirty
- without loss of steam
- high quality materials
- optimum design down to the smallest detail
- unlimited suitability for all operating conditions

2. Design details

- float control
- shutoff valve
- dirt collection chamber with drain
- also suitable for risers
- body design:
  - optimum design for various applications (see right-hand column)
  - avoids bleeding problems
  - safe operation even if fluids are dirty
  - easy to service, good access to service parts
  - protected against wet steam erosion

- bleeding devices:
  - manual bleed valve
  - thermal startup bleeding
  - fixed continuous bleeding
  - thermal startup and continuous bleeding
  - adjustable continuous bleeding

Types:

AXOMAT-X

- Standard steam trap for all operating pressures, featuring a patented control system that is independent of pressure or level. Compact size. Protected against erosion. In-line flange connections. Recommended for limited stockholding. Savings up to 75 %.

NIAGARA

- Steam trap for larger installations featuring extremely high flow volumes. Very large sludge collecting chamber. Can be supplied in sizes up to DN 150. Many hundreds of thousands of steam traps of this model have been in use over the past decades.

Stainless steel steam traps Types 2, 2X, 3

- These are manufactured from grade 1.4404 stainless steel for universal application. They are especially suitable for corrosive condensates or for use in the food processing industry.

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. KT/13.1.071.1 - issue 07.06.2007

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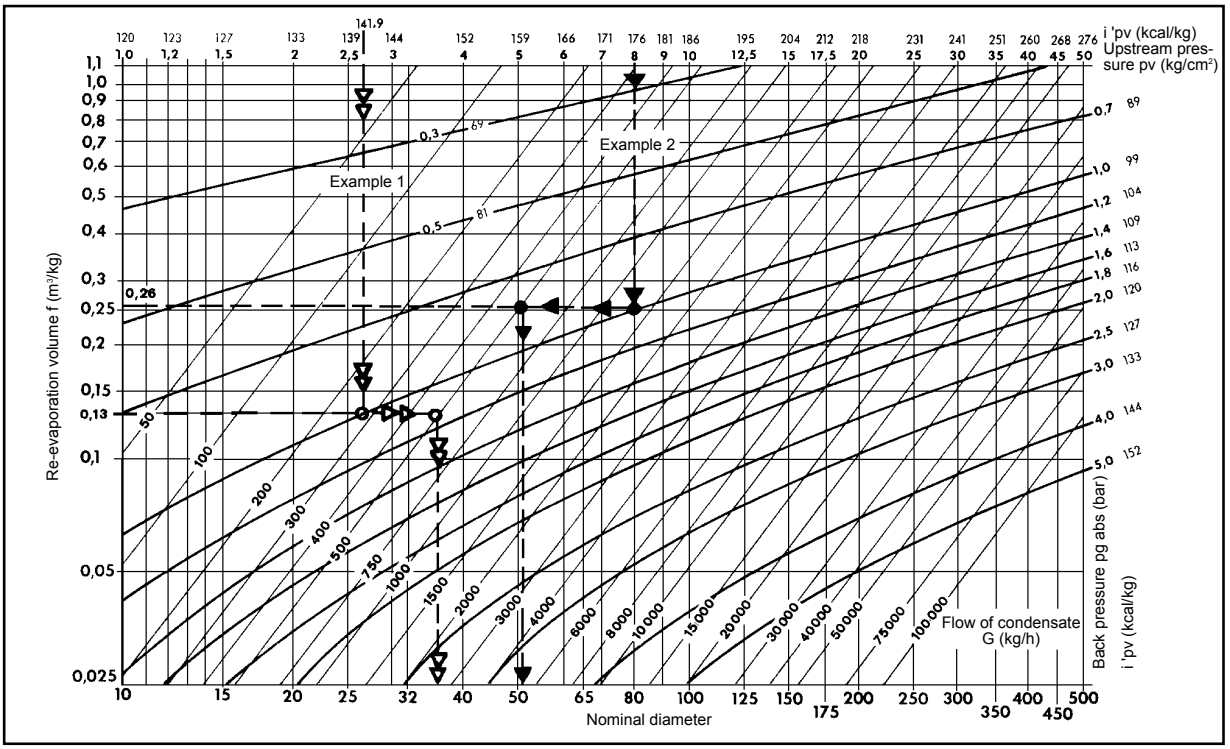
Selection Guidelines • Steam Traps

Flow data chart
pipeline sections downstream of steam traps

The diagram below can be used for dimensioning condensate drain pipelines downstream of steam traps. The steam traps themselves should be selected using the flow data for a particular type.
When hot condensate is depressurised re-evaporation occurs, which must be taken into account when dimensioning pipelines downstream of a steam trap. The diagram is based on a re-evaporation speed of 18 m/s. The volume of residual condensate after depressurising has been ignored.
The left-hand scale gives the re-evaporation volume for a back pressure pg which results from depressurising 1 kilogramme of condensate. If the condensate is undercooled the reduced enthalpy of the condensate i 'p resulting from undercooling, should be used (example 2).

pv	(bar)	=	pressure upstream of steam trap (operating pressure)
pg	abs(bar)	=	pressure downstream of steam trap (back pressure)
i 'pv	(kcal/kg)	=	enthalpy of the condensate at operating pressure and boiling point
i 'p	(kcal/kg)	=	enthalpy of undercooled condensate
Λt	(°C)	=	undercooling of condensate
G	(kg/h)	=	flow of condensate (hot water throughput)
DN	(mm)	=	Nom. pipe diameter downstream of steam trap
f	(m^3/kg)	=	re-evaporation volume Q (m^3/h) = f . G)



Example 1: Undercooled condensate				
Operating pressure	pv	=	8	bar
Back pressure	pg abs	=	1	bar
Boiling point at operating pressure			174,5	°C
Condensate temperature			140	°C
Condensate undercooling	Λt	=	34,5	°C
Enthalpy of boiling condensate	i 'pv	=	176,4	kcal/kg
Condensate undercooling *)	Λt	=	34,5	°C
Enthalpy of undercooled condensate	i 'p	=	141,9	kcal/kg
Condensate flow	G	=	500	kg/h
Re-evaporation volume	f	=	0,13	m^3/kg
Nom. pipe dia. **DN 40**				

*) As in case of water the numerical value of the specific thermal unit (kcal/kg) is approximately equal to that of the temperature (°C), the undercooling temperature may in this example be directly subtracted from the enthalpy of the boiling condensate.

Example 2: Non-undercooled condensate			
Operating pressure	pv	=	8 bar
Back pressure	pg abs	=	1 bar
Condensate flow	G	=	500 kg/h
Re-evaporation volume	f	=	0,26 m^3/kg
Nom. pipe dia. **DN 50**			

Special designs on request.
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Sheet no. KT/13.1.071.2 - issue 07.06.2007

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T	max. p_1	max. V	Connection			SS	Vent device	Notes	Type
°C	bar	m^3/h	screwed	flanged DN	*				
190	12	0.35	3/4		*	•	manual vent valve	small stainless steel trap	2
190	13	1.2	1	25	*	•	manual vent valve	economic stainless steel trap	2X
190	13	1.2		15 - 32		•	thermal vent valve	universal useably, without pressure ranges	Axomat X Type 8
190	12	2	1/2 - 1	15 - 25	*	•	thermal vent valve	also for sterile applications	3
190	16	193		15 - 150			thermal vent valve	large flow rates	Niagara Type 83
300	16	193		15 - 150			thermal start-up and continuous vent valve	large flow rates	Niagara Type 80
400	22	1.2		15 - 32			adjustable continuous vent valve	universal useably, without pressure ranges	Axomat X Type 9
400	22	1.2		15 - 32			manual vent valve	universal useably, without pressure ranges	Axomat X Type 1
400	40	193		15 - 150			continuous vent valve	large flow rates	Niagara Type 81
400	40	193		15 - 150			manual vent valve	large flow rates	Niagara Type 1

* other connections available
• stainless steel deep drawn

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. KA/11.1.061.1 - issue 12.06.2006

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Level Control Valves KA 2, KA 2X

Steam trap float actuated
up to 190 °C

Technical Data

KA 2:

Connection	G 3/4 x 1/2A
Nominal Pressure	PN 16
Operating Pressure	0 - 12 bar in 3 ranges
Flow Rate	up to 350 l/h

KA 2X:

Connection	G 1 x 3/4A DN 25 x G 3/4A
Nominal Pressure	PN 16
Operating Pressure	0 - 13 bar
Flow Rate	up to 1200 l/h

Description

Steam traps automatically drain condensate without loss of steam of gas. They operate instantaneously and are not affected by back-pressure or pressure fluctuations. They do not require an external energy input.

KA 2 and KA 2X are float-controlled steam traps for all applications and especially suitable for corrosive condensate and applications in the food industry. They are entirely manufactured from stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a soft seal (KA2) or a metallic seal (KA 2X).

The KA 2 steam trap is available in working pressure ranges (0 - 2 bar, 0 - 6 bar, 0 - 12 bar); KA 2X is fitted with a flow control which is largely independent of the pressure.

Top and bottom sections of the valve body are connected by a clamp ring and two bolts. Servicing/maintenance is easy and does not call for special tooling.

The simple design makes it easy to specify, install, handle and service these valves in an industrial environment.

STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring
- Manual bleed valve

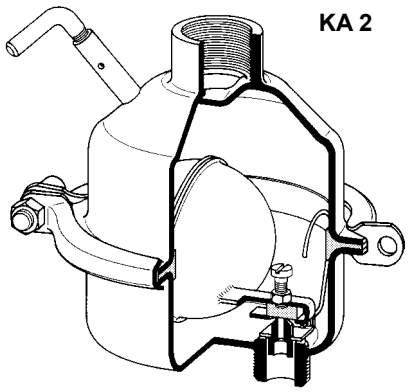
OPTIONS

- Various seal materials suitable for your medium
- Expansion pipe connection in the valve top section for draining condensate from compressed air or gases
- No manual bleed valve

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

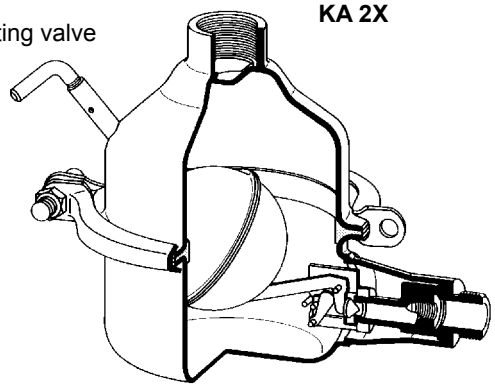
venting valve

KA 2



venting valve

KA 2X



Pressure Ranges [bar]			
KA 2			KA 2X
0 - 2	0 - 6	0 - 12	0 - 13

Flow Rate [l/h]				
	KA 2			KA 2X
Δp	setting ranges bar			
bar	0 - 2	0 - 6	0 - 12	0 - 13
0.1	70	19	6	220
0.2	100	28	9	320
0.5	160	40	12	710
1	230	70	18	980
2	350	110	27	1200
4	-	160	46	1200
6	-	200	50	1200
8	-	-	60	1200
10	-	-	70	1180
12	-	-	75	1030
13	-	-	-	950

Sheet no. KA 2/2.1.071.1 - issue 09.01.2007

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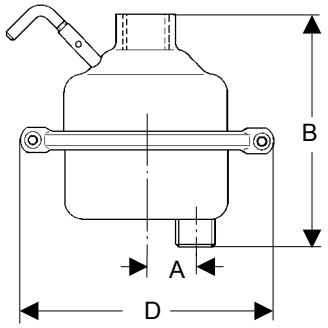
Level Control Valve — *KA 2, KA 2X*

Steam trap float actuated
up to 190 °C

Materials		
Type	KA 2	KA 2X
Body	CrNiMo-steel	CrNiMo-steel
Body Seal	FEPM	FEPM
Seat, Cone	CrNiMo-steel	CrNiMo-steel
Float	CrNiMo-steel	CrNiMo-steel
Valve Seal	FFKM	metallic

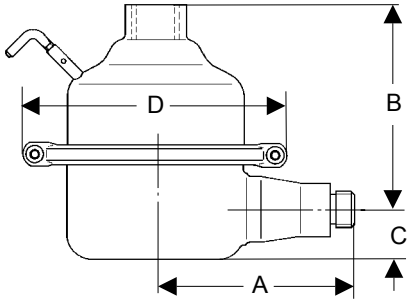
Dimensions [mm] KA 2		**Weight [kg]**
size	inlet female G 3/4 outlet male G 1/2A	
A	27	0.85
B	135	
D	140	

KA 2



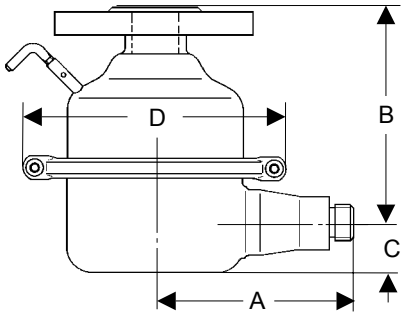
Dimensions [mm] KA 2X		
size	inlet female G 1 outlet male G 3/4A	inlet flange DN 25 outlet male G 3/4A
A	140	140
B	145	160
C	40	40
D	200	200

KA 2X, G 1



Weights [kg] KA 2X	
inlet female G 1	inlet flange DN 25
2.6	3.5

KA 2X, DN 25



Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. KA 2/3.1.071.1 - issue 09.01.2007

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Steam trap float actuated, with automatic venting valve
up to 190 °C

Technical Data

Connection	G 1/2 - 1
	DN 15 - 25
Nominal Pressure	PN 16
Operating Pressure	0 - 12 bar in 3 ranges
Flow Rate	up to 2000 l/h

Description

Steam traps automatically drain condensate without loss of steam of gas. They operate instantaneously and are not affected by back-pressure or pressure fluctuations. They do not require an external energy input.

KA 3 is a float-controlled steam trap for all applications and especially suitable for corrosive condensate and applications in the food industry. It is entirely manufactured from stainless steel featuring excellent corrosion resistance. The valve cone is fitted with a metallic seal. The KA 3 steam trap is fitted with thermal internal bleeding as standard. For draining condensate from compressed air or gases a special version without thermal bleeding can be supplied featuring G ½ connection on the top section of the valve for connecting an expansion pipe.

Top and bottom sections of the valve body are connected by a clamp ring and two bolts. Servicing/maintenance is easy and does not call for special tooling.

The simple design makes it easy to specify, install, handle and service these valves in an industrial environment.

For clean room applications or for condensate subject to stringent purity requirements, KA 3 can be supplied with electropolished or bead-blasted surface finish.

STANDARD EQUIPMENT

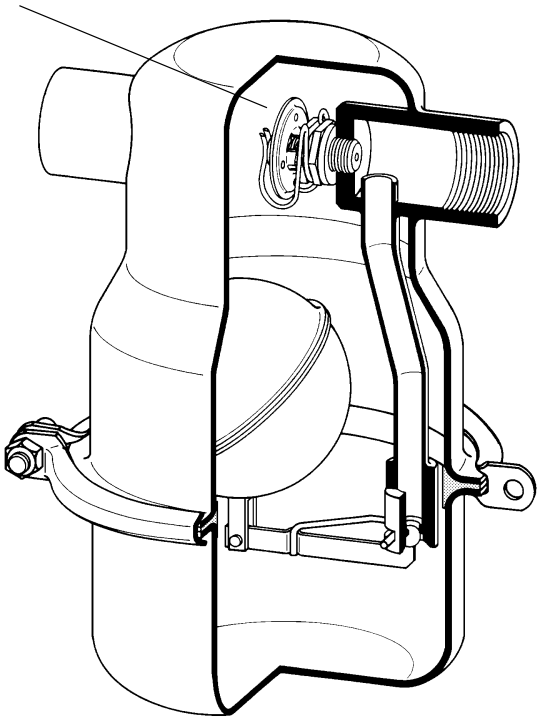
- All stainless steel construction
- Quick-release body clamp ring
- Thermal internal bleeding

OPTIONS

- Various seal materials suitable for your medium
- Expansion pipe connection in the valve top section for draining condensate from compressed air or gases
- Bead-blasted or electropolished surface finish for clean or sterile rooms

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

continuous thermal bleeding



Pressure Ranges [bar]			
bar	0 - 2	0 - 4	0 - 12

Flow Rate [l/h]			
Δp	pressre range		
bar	0 - 2	0 - 4	0 - 12
0.1	300	205	100
0.2	510	290	140
0.5	900	462	220
1	1300	655	315
2	2000	925	445
3		1130	545
4		1300	630
6			805
8			940
10			1080
12			1180

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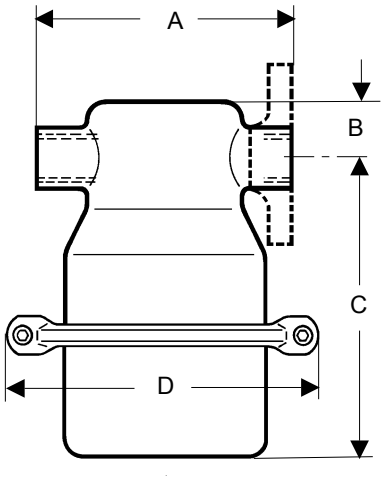
Level Control Valve KA 3

Steam trap float actuated, with automatic venting valve
up to 190 °C

Materials	
Body	CrNiMo-steel
Body Seal	FEPM
Seat, Cone	CrNiMo-steel
Float	CrNiMo-steel



Dimensions [mm]						
	nominal diameter					
size	G 1/2	G 3/4	G 1	DN 15	DN 20	DN 25
A	160	160	160	160	160	160
B	35	35	35	35	35	35
C	190	190	190	190	190	190
D	200	200	200	200	200	200

Weights [kg]					
nominal diameter					
G 1/2	G 3/4	G 1	DN 15	DN 20	DN 25
2.6	2.6	2.6	4	4.6	5

Special designs on request.
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Level Control Valve KA Niagara

Steam trap for high flow rate
up to 200 °C

Technical Data

Connection	PN 16: DN 15 - 150
	PN 25: DN 15 - 100
	PN 40: DN 15 - 80
Nominal Pressure	PN 16 - 40
Operating Pressure	0 - 40 bar inseveral ranges
Flow Rate	up to 193 m^3/h

Description

Steam traps automatically drain condensate without loss of steam of gas. They operate instantaneously and are not affected by back-pressure or pressure fluctuations. They do not require an external energy input.

For many decades NIAGARA steam traps have been used in all industries. Their excellent reliability and durability have made them renowned throughout the world.

KN Niagara is a float-controlled steam trap for all applications where large volumes have to be handled. Body, cover and valve cap are manufactured from cast iron; the cone is fitted with a metallic seal. NIAGARA KN 1 is fitted as standard equipment with a manual bleed valve, a test gag and, for the larger valve sizes, with a drain plug in the sludge collecting chamber.

The pipe diameter downstream of the steam trap should be dimensioned according to the volume of condensate and the length of the pipe.

STANDARD EQUIPMENT

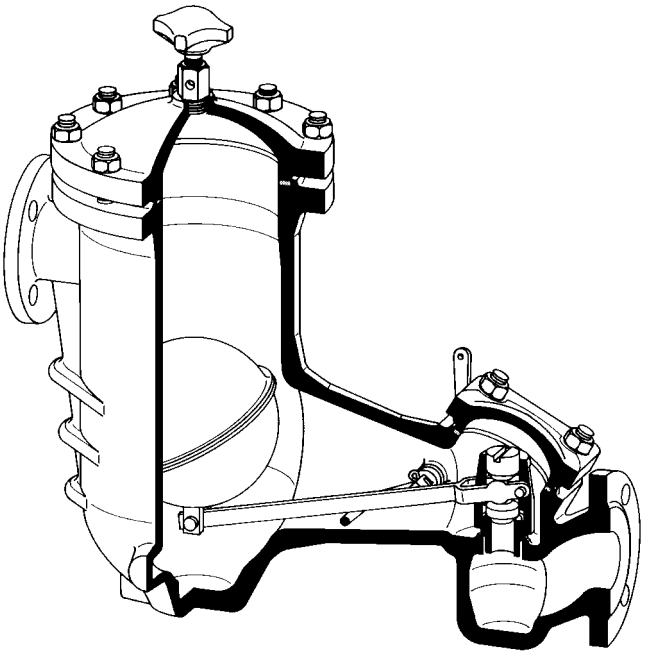
- KN 1 : Manual bleed valve
- KN 80 : thermal start-up bleeding and fixed continuous bleed orifice
- KN 81 : fixed continuous bleed orifice
- KN 83 : thermal start-up and continuous bleeding
- KN 88 : adjustable continuous bleeding
- manual test gag
- From size DN 65 up: drain plug in sludge collecting chamber

OPTIONS

- Up to size DN 65: drain plug in sludge collecting chamber (standard equipment for sizes DN 65 and larger)
- Various seal materials suitable for your medium
- Special versions up to 400 °C
- Designs for special applications and extreme operating conditions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

KA Niagara 1



Pressure Ranges [bar]									
PN 16	0-2	0-4	0-8	0-13	0-16				
PN 25	0-2	0-4	0-8	0-13	0-16	0-22			
PN 40	0-2	0-4	0-8	0-13	0-16	0-22	0-25	0-32	0-40

Flow Rate in m^3/h see Sheet KA Niagara/2.1.061.2

Please state working pressure range, when inquiring or ordering

Sheet no. KA Niagara/2.1.081.1 - issue 06.02.2008

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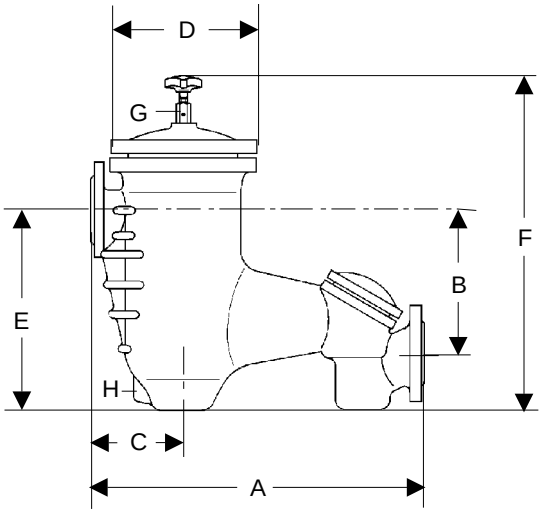
Level Control Valve KA Niagara

Steam trap for high flow rate
up to 200 °C

Materials		
Body	PN 16	spheroidal cast iron
	PN 25/40	cast steel
Forklever	up to DN 80	CrNiMo-steel
	from DN 100	gun metal
Seat		Cr-steel
Cone		CrNiMo-steel
Float		CrNiMo-steel
Body Seal		Nova Universal



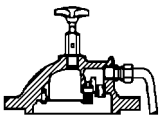
Dimensions [mm]

size	PN	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150
A	16	285	295	340	355	445	530	635	685	800	900	1055
	25	305	305	390	415	455	550	635	685	800		
	40	305	305	390	415	445	550	635	720			
B	16	100	135	120	135	170	215	280	270	315	400	490
	25	155	155	165	185	185	235	280	270	315		
	40	155	155	165	185	220	235	280	330			
C	16	100	110	140	140	155	175	175	235	300	275	345
	25	115	115	160	150	165	200	215	230	300		
	40	115	115	160	150	170	200	215	250			
D	16	130	135	200	210	230	270	285	365	380	460	520
	25	160	160	230	230	230	285	325	345	395		
	40	160	160	230	230	265	285	325	390			
E	16	150	185	185	205	245	300	385	370	430	555	635
	25	215	215	225	255	260	320	385	385	450		
	40	215	215	225	255	295	320	385	430			
F	16	270	310	310	365	390	470	610	575	655	835	920
	25	330	330	365	385	385	480	550	560	655		
	40	330	330	365	385	455	480	550	645			
G	16	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 1/2
	25	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8		
	40	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8			
H*	16	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 1/2	G 1/2	G 1/2	G 3/4	G 3/4	G 3/4
	25	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 1/2	G 1/2	G 1/2	G 1/2		
	40	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 1/2	G 1/2	G 1/2			

*) from DN 65 standard

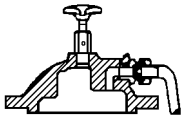
Venting Devices

KA 80 PN 16



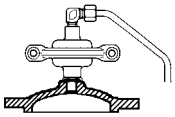
therm. start vent. and rigid perm. vent. nozzle

KA 81 PN 16-40



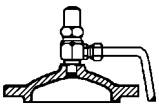
rigid permanent venting nozzle

KA 83 PN 16



thermal start up and permanent venting

KA 88 PN 16-40



adjustable permanent venting

Weights [kg]

nom. press.	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150
PN 16	11	12	18	25	31	46	77	107	135	186	270
PN 25	22	23	23	30	35	58	90	110	144		

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. KN/3.1.081.1 - issue 06.02.2008

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Steam Trap for high flow rate
up to 200 °C

max. Flow Rate in m^3/h												
pressure range bar	operating pressure bar	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150
0 - 2	0.1	0.46	0.57	0.69	1.1	1.94	3.15	5.38	9.5	14.8	21.5	35.8
	0.25	0.73	0.9	1.1	1.8	3.1	5	8.6	15.2	23.6	34	57
	0.5	1.13	1.4	1.7	2.8	4.8	7.8	13.5	23.6	35.8	53	89
	1	1.59	2	2.4	3.9	6.8	11	19	33.5	52	75	125
	1.5	2.2	2.7	3.1	5.3	9.5	15.6	26	46	64	103	172
	2	2.47	3.05	3.7	6	10.6	17.4	29	52	73	116	193
0 - 4	0.1	0.28	0.36	0.47	0.7	1.12	2.4	4	6.1	9.5	12	23
	0.5	0.69	0.9	1.15	1.7	2.8	6	10	15	23.6	30	60
	1	0.97	1.28	1.6	2.4	4	8.36	14	21.4	33.4	42.3	83
	2	1.5	1.95	2.5	3.7	6	13	21.7	32.8	51.4	65	114
	3	1.84	2.4	3.05	4.52	7.35	15.8	26.6	40.3	63	79	137
	4	2.12	2.76	3.5	5.3	8.6	18.4	30.7	46.5	72.7	92	156
0 - 8	2	0.73	1.06	1.5	1.7	3.7	6	10.2	19.5	29	39.5	64.5
	4	1.05	1.5	2.12	2.8	5.22	8.5	12.9	26.3	41	55.7	89
	6	1.32	1.9	2.75	3.54	6.66	10.8	15.3	33.5	52.4	71	106
	8	1.54	2.22	3.13	4.1	7.72	12.5	17	38	60.4	82	123
0 - 13	4	0.63	1.05	1.26	1.5	2.76	6.22	11.6	18.2	26.2	35.6	55.7
	8	0.94	1.54	1.86	2.22	4.08	9.19	17.2	26.88	37.8	52.7	82
	10	1.08	1.76	2.15	2.55	4.69	10.55	19.75	30.86	44.4	60.5	98
	12	1.18	1.93	2.33	2.78	5.13	11.55	21.6	33.75	48.6	66.2	110
	13	1.23	2.01	2.43	2.9	5.35	12.04	22.5	35.2	50.7	69	115
0 - 16	8	0.72	1.19	1.54	1.86	3.12	6.38	14.4	21.7	32.5	44	82
	12	0.9	1.49	1.93	2.33	3.93	8.02	18	27.4	40.9	57	110
	14	0.98	1.6	2	2.52	4.24	8.66	19.5	29.5	44.1	61	119
	16	1.04	1.73	2.23	2.7	4.54	9.26	20.8	31.6	47.2	65	127
0 - 22	12	1.22		1.49	1.93	1.78	6.49	11.55	15.7	21.6		
	16	1.42		1.73	2.23	3.2	7.5	13.34	18.15	24.9		
	18	1.52		1.85	2.4	3.45	8.05	14.33	19.5	26.8		
	20	1.61		1.96	2.54	3.64	8.49	15.1	20.5	28.2		
	22	1.66		2.04	2.6	3.75	8.89	15.82	21.5	29.6		
0 - 25	16	0.66		1.04	1.36	3.5	5.21	9.26	13.34	18.15		
	20	0.75		1.18	1.55	4	5.9	10.49	15.1	20.5		
	22	0.77		1.22	1.62	4.15	6.18	10.98	15.82	21.5		
	25	0.83		1.32	1.74	4.4	6.62	11.78	16.96	23.1		
0 - 32	20	0.52		0.75	1.18	1.95	3.05	5.1	8.5			
	22	0.55		0.78	1.22	2.05	3.15	5.4	8.9			
	25	0.58		0.84	1.32	2.2	3.4	5.8	9.5			
	28	0.62		0.9	1.42	2.35	3.65	6.2	10.2			
	32	0.66		0.95	1.5	2.5	3.9	6.6	10.85			
0 - 40	35	0.25		0.69	0.99	0.99	2.1	3.8	6.8			
	40	0.28		0.74	1.06	1.06	2.3	4.1	7.3			

Sheet no. KA Niagara/2.1.061.2 - issue 12.06.2006

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Steam Trap without Operating Pressure Ranges up to 200 °C

Technical Data

Connection	PN 16 : DN 15 - 32
	PN 25/40: DN 20 + 25
Nominal Pressure	PN 16 - 40
Flow Rate	up to 2700 l/h
	(hot water at boiling temperature)

Description

Steam traps automatically drain condensate without loss of steam of gas. They operate instantaneously and are not affected by back-pressure or pressure fluctuations. They do not require an external energy input.

KX Axomat is a float-controlled steam trap specially designed for systems subject to strongly and frequently fluctuating working pressures. Body and cover are manufactured from cast iron; the cone is fitted with a metallic seal. The automatic shutoff valve is fitted with a lever which provides an adjustable force transmission ratio. The cone stroke corresponding to a particular pressure is achieved automatically which eliminates the necessity to divide the rated pressure range into 3 or 4 working pressure ranges. Small volumes of condensate are controlled by the float without loss of steam. Even at low start-up pressures exceptionally large start-up volumes are achieved.

The Axomat KX 1 is fitted as standard equipment with a manual bleed valve and a drain plug in the sludge collecting chamber. KX 8 is equipped with a combined start-up and continuous bleed valve; KX 9 features adjustable continuous bleeding.

STANDARD EQUIPMENT

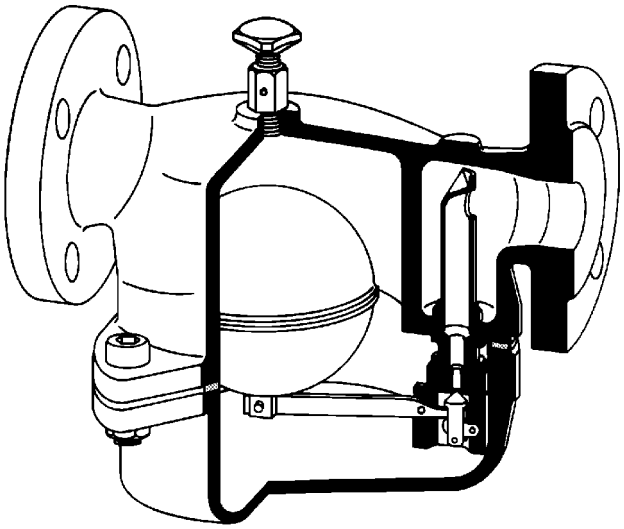
- Variable cone stroke
- KX 1: manual bleed valve
- KX 8: combined start-up and continuous bleeding
- KX 9: adjustable continuous bleeding
- drain plug in sludge collecting chamber

OPTIONS

- Various seal materials suitable for your medium
- Special versions up to 300 °C
- Designs for special applications and extreme operating conditions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

KA Axomat 1



Flow Rate [l/h] PN 16
(hot water at boiling temperature)

operating press.	nominal diameter DN		
bar	15	20 + 25	32
0.5	480	700	1300
1	800	1000	1800
2	1100	1300	2500
3	1200	1500	2700
3.5 - 9	1000	1200	2250
10	980	1150	2100
11	900	1100	2000
12	800	1000	1800
13	750	950	1400

Flow Rate [l/h] PN 25/40
(hot water at boiling temperature)

operating pressure	nominal diameter DN
bar	20 + 25
1	400
2	600
4	780
7 - 14	900
15	850
18	800
22	600

Sheet no. KA Axomat/2.1.061.1 - issue 12.06.2006

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Level Control Valve *KA Axomat*

Steam Trap without Operating Pressure Ranges
up to 200 °C

Materials		
Body	PN 16	up to DN 25 grey cast iron DN 32 spheroidal cast iron
	PN 25/40	cast steel
Seat		Cr-steel
Cone		CrNi-steel
Float		CrNiMo-steel
Body Seal		Nova Universal

Dimensions [mm]				
	nom. pressure	nominal diameter DN		
size	PN	15	20 - 25	32
A	16	200	215	290
	25/40	-	240	-
B	16	115	130	190
	25/40	-	150	-
C	16	80	80	90
	25/40	-	80	-
D	16	145	155	215
	25/40	-	160	-
E	16	G 1/4	G 1/4	G 1/4
	25/40	-	G 3/8	-
F	16	180	200	270
	25/40	-	200	-

Weights [kg]				
nom. pressure	nominal diameter DN			
PN	15	20	25	32
16	7	8	9	17
25/40	-	13	14	-

Special designs on request.
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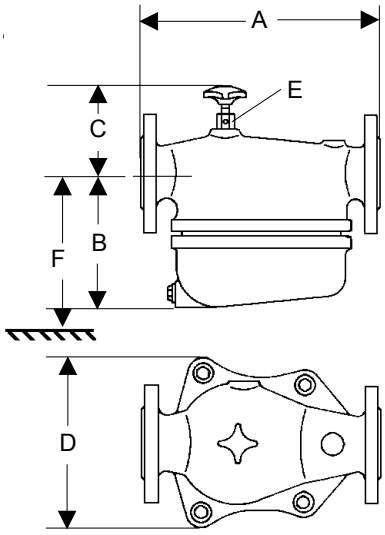
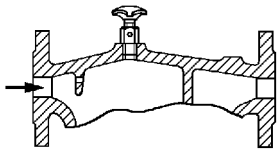
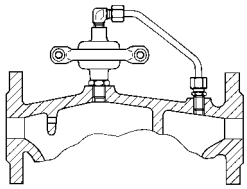


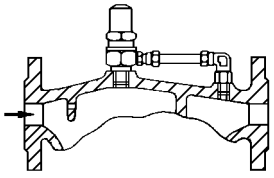
Venting Devices



type 1
manual venting valve, PN 16 - 40



type 8
thermal start up and permanent venting, PN 16



type 9
adjustable permanent venting, PN 16 - 40

Sheet no. KA Axomat/3.1.061.1 - issue 12.06.2006

WIR REGELN DAS SCHON
FIRMLY IN CONTROL

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Steam trap, faith to faith length DIN
up to 300 °C

Technical Data

Connection	DN 15 - 50
Faith to Faith Length	acc. DIN 3548 LK
Nominal Pressure	PN 25
Operating Pressure	steam max. 20 bar compressed air max. 25 bar
Flow Rate	6000 kg/h*

Description

Steam traps automatically drain condensate without loss of steam of gas. They operate instantaneously and are not affected by backpressure or temperature fluctuations. They do not require an external energy input.

KA RV2 is a float controlled steam trap for all flow directions and face to face length to DIN 3548, short series.

The KA RV2 will be assembled as specified by customer. A change of flow direction can be accomplished in situ by merely rotating the housing flange and repositioning the float control unit.

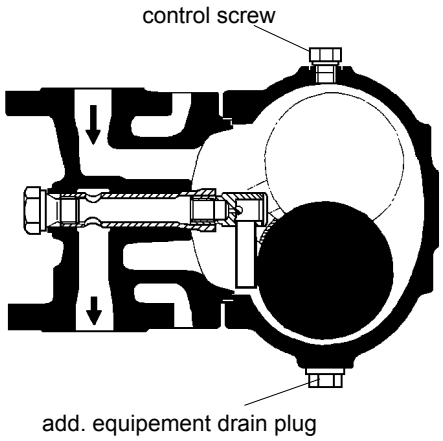
Standard

- flange connection acc. to DIN 2501
- control screw

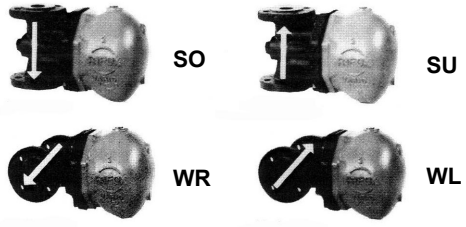
Optionen

- external start-up and continous venting
- internal start-up and continous venting
- internal venting nozzle
- drain plug
- manual venting valve (on top, instead control screw)

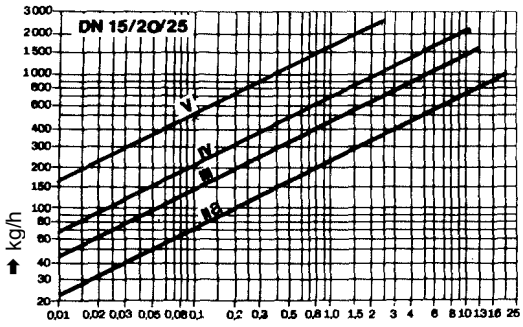
Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

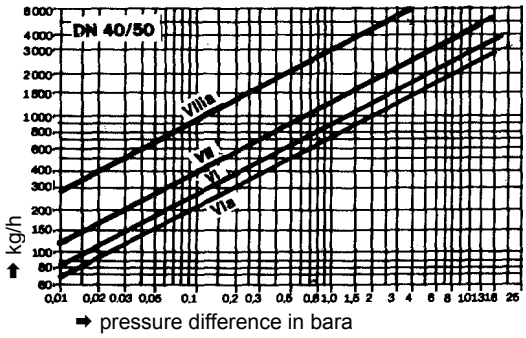


Direction of Flow



Flow Rate [kg/h]*





* Performance values apply to hot condensate. For cold condensate the performance vallue is approx. 45% higher.

Max. Inlet Pressure [bar g]		
float-control cross section	steam	compressed air
IIA	20	25
III	13	15
IV	11	14
V	2,5	3
VI	17	24
VIa	20	25
VII	16	23
VIIIa	4	5

Application Limit [bar ü]			
bar g	25	18	16
°C	100	250	300

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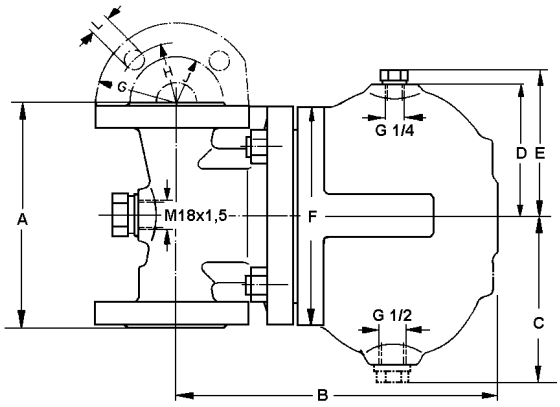
Steam trap, faith to faith length DIN
up to 300 °C

Materials	
Body	EN (GGG-40.3)
Body seal	CU / Weicheisen
Float	1.4301 optional 1.4571
Assembly with rotary valve and cotter pin	1.4057/1.4112/1.4301/1.4104 optional complete 1.4571
Float control assembly	1.4057/1.4112/1.4301/1.4104 optional complete 1.4571



Dimensions [mm] and Weights [kg]					
size	15	20	25	40	50
A	150	150	160	230	230
B	225	225	225	300	300
C	115	115	115	150	150
D	95	95	95	135	135
E	105	105	105	150	150
F	155	155	155	215	215
G	95	105	115	150	165
H	65	75	85	110	125
J	45	58	68	88	102
L	14	14	14	18	18
Weight	13	13,5	14	34,5	35

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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Level Control Valves KA RX1, RX2

Steam Trap for High Pressures
up to 400 °C

Technical Data

Connection	DN 15 - 50
Nominal Pressure	PN 100
Operating Pressure	Steam max. 50 bar g compressed air max. 70 bar g
Flow Rate	up to 1000 kg/h*

Description

Steam traps automatically drain condensate without loss of steam of gas. They operate instantaneously and are not affected by back-pressure or temperature fluctuations. They do not require an external energy input.

KA RX1 is a float contolled steamtrap in straight through design for horizontal istallation.
KA RX2 has angled design, inlet at the top, outlet lateral.

Both featuring the approved rotary lide alve. Only one moveable point since the rotary slide alves is both swivel joint and shut-off device. Very simple functional check and vent possibility through stainless steel control valve.

There are three body designs available:
design A: C22.8, design B: 13CrMO44, design C: 1.4571

Standard

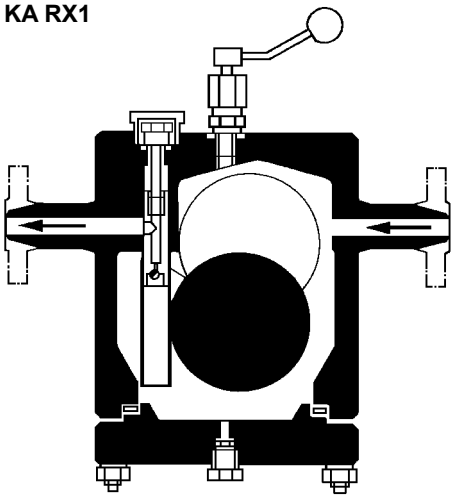
- flange connection acc. DIN 2636, 2637
- rotary slide valve
- manual venting valve made of stainless steel
- draining plug G 1/2 made of CrNiMo-steel

Optionen

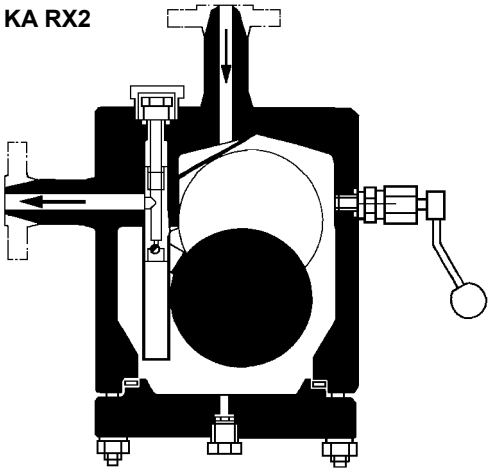
- flange connection acc. ANSI B 16.5, welding sockets, welding ends
- blow-off valve for contamination
- internal venting nozzle (for steam)
- connection for pressure compensation line instead of control valve
- support device

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

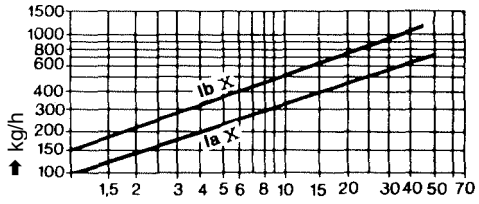
KA RX1



KA RX2



Flow rate [kg/h]*



➡ pressure difference in bar a

* Performance values apply to hot condensate. For cold condensate the performance vallue is approx. 45% higher.

Application Limit PN 63, Body Type A (C22.8)				
bar g	63	40	35	28
°C	100	300	350	400
Application Limit PN 100, Body Type A (C22.8)				
bar g	100	64	55	44
°C	100	300	350	400

other body designs on request

Operating Pressure [bar g]		
float-control cross-section	steam	compressed air
Iax	50	70
Ibx	45	65

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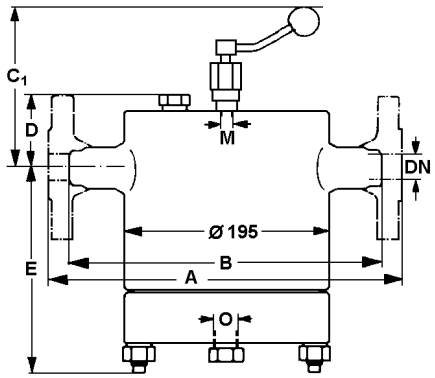
Level Control Valves *KA RX1, RX2*

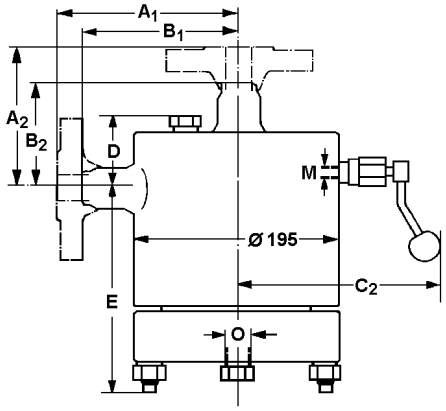
Steam Trap for High Pressures
up to 400 °C

MATERIALS	
Body	C 22.8 optional 13CrMo44 or 1.4571
Body Seal	soft iron profiled
Float	CrNiMo-steel
Assembly with rotary valve and cotter pin	1.4057/1.4112/1.4301/1.4541/1.4571 optional completely 1.4571
Float control assembly	1.4057/1.4112/1.4301/1.4541/1.4571 optional completely 1.4571

KA RX1



KA RX2



Dimensions [mm] and Weights [kg]								
	flanges				welding ends			
DN	15	25	40	50	15	25	40	50
A*	335	335	385	385				
A_1*	168	168	193	193				
A_2*	135	135	164	164				
B					295	295	390	390
B_1					148	148	195	195
B_2					106	106	169	169
C_1	180	180	180	180	180	180	180	180
C_2	215	215	215	215	215	215	215	215
D	80	80	80	80	80	80	80	80
E	195	195	195	195	195	195	195	195
O	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
M	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4
Weight	~ 40	~ 44	~ 46	~ 50	~ 38	~ 38	~ 40	~ 41

* Other installation length on request

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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Level Control Valves KA RH1, RH2

Steam Trap for high pressures,
up to 400 °C

Technical Data

Connection	DN 15 - 50
Nominal Pressure	PN 160
Operating Pressure	steam max. 80 bar compressed air max. 120 bar
Flow Rate	up to 3000 kg/h*

Description

Steam traps automatically drain condensate without loss of steam of gas. They operate instantaneously and are not affected by back-pressure or temperature fluctuations. They do not require an external energy input.

KA RH1 is a float controled steam trap in straight through design for horizontal installation.
KA RH2 has angled design, inlet at the top, outlet lateral.

Both featuring the approved rotary lide alve. Only one moveable point since the rotary slide alves is both swivel joint and shut-off device.

There are three body designs available:
design A: C22.8, design B: 13CrMO44
design C: 1.4571

Standard

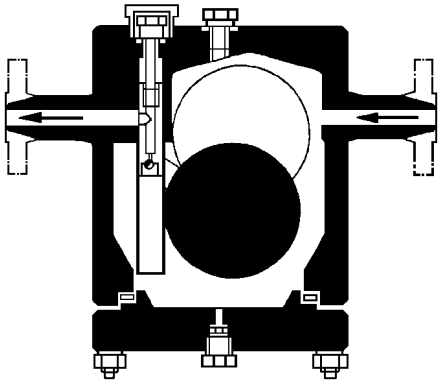
- flange connection acc. to DIN 2638
- rotary slide valve
- manual venting valve made of stainless steel
- draining plug G 1/2 made of CrNiMo-steel

Optionen

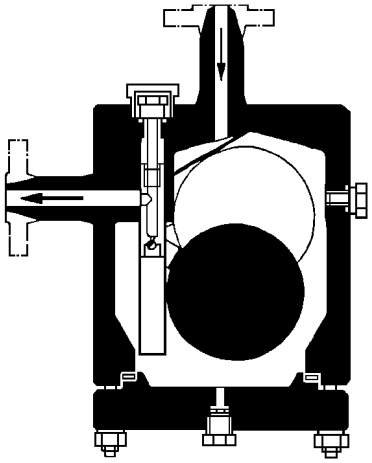
- flange connection acc. to ANSI B 16.5,welding ends, welding sockets, threaded ports
- manual venting valve instead of control screw
- internal venting nozzle (for steam)
- connection for pressure compensation line instead of control valve
- support device

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

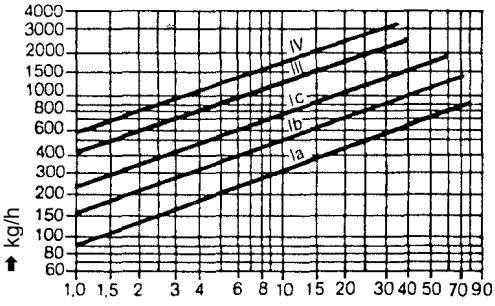
KA RH1



KA RH2



Flow Rate [kg/h]*



* Performance values apply to hot condensate. For cold condensate the performance vallue is approx. 45% higher.

Operating Pressure [bar g]		
float-control cross section	steam	compressed air
Ia	80	120
Ib	75	120
Ic	60	115
III	40	65
IV	35	60

Application Limit, Body Type A (C22.8) connections acc. to DIN			
bar g	140	81	64
°C	100	350	400
Application Limit, Body Type A (C22.8) connections acc. to ANSI B 16.5 600 lbs			
bar g	94	77	74
°C	93	316	370

other body designs on request

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Level Control Valves *KA RH1, RH2*

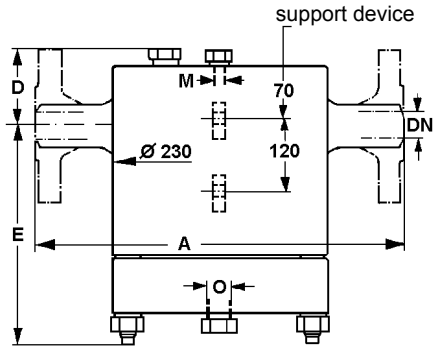
Steam Trap for high pressures,
up to 400 °C

Materials	
Body	C 22.8 optional 13CrMo44 or 1.4571
Body Seal	SS-profil.-graphite
Float	CrNiMo-steel
Assembly with rotary valve and cotter pin	1.4057/1.4112/1.4301/1.4541/1.4571 optional completely 1.4571
Float control assembly	1.4057/1.4112/1.4301/1.4541/1.4571 optional completely 1.4571

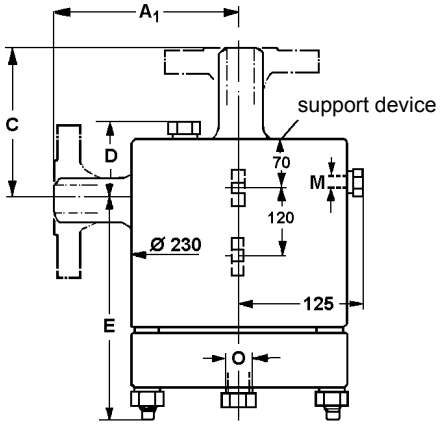
Dimensions [mm] and Weights [kg]								
	flanges				welding ends			
DN	15	25	40	50	15	25	40	50
A	370	370	420	420	370	370	420	420
A_1	185	185	210	210	185	185	210	210
C	175	175	190	190	175	175	190	190
D	105	105	105	105	105	105	105	105
E	240	240	240	240	240	240	240	240
O	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
M					G 1/4	G 1/4	G 1/4	G 1/4
Weight	72	73	75	76	68	69	71	72

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

KA RH1



KA RH2



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Separator with built-in liquid trap
up to 200 °C

Technical Data

AS 2

Connection	G 1, G 1 1/2, DN 25, DN 40
Nominal Pressure	PN 16
Operating Pressure	0 - 12 bar in 3 ranges
Flow Rate	up to 1900 Nm³/h
Collection Efficiency	up to 1200 l/h

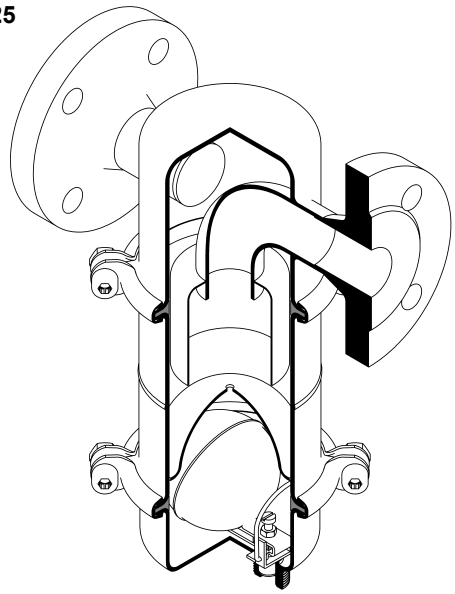
Description

Centrifugal separators use the cyclone principle to separate automatically liquids, solids and steam from gas flows while the gas is under operating pressure. The liquid trap built into the separator body operates instantaneously and its operation is not impaired by backpressure or pressure fluctuations. The collected liquid is safely drained by the float control. No additional energy input is required.

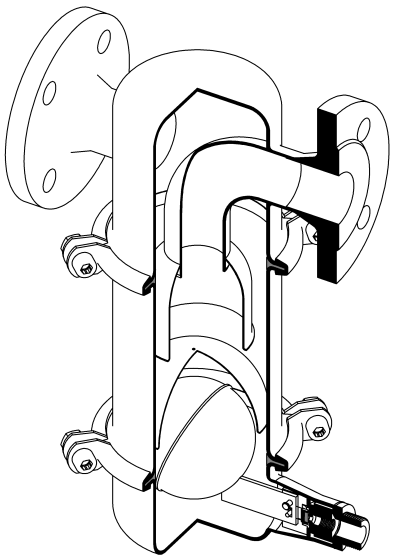
Separators type AS2 are of inline design and have their drain outlets at the bottom. Being entirely constructed of corrosion-resistant stainless steel, they can be used universally, i.e. especially for corrosive media.

Body top and bottom sections are coupled by means of the proven Mankenberg clamp ring technology. Together with the lightweight construction based on the use of deep-drawn components, this results in easy installation, handling and maintenance in everyday industrial use.

AS2 DN 25



AS2 DN 40



Standard equipment

- All stainless steel construction (CrNiMo steel)
- Quick-release body clamp ring
- built-in liquid trap
- lateral drain outlet

Options

- various seal materials to suit your medium
- expansion pipe connection in body top section for separating liquids from compressed air or gases
- other connections on request

Product features in brief

- Inline design with drain outlet at the bottom
- Built in steam trap
- Compact and lightweight thanks to deep-drawn components
- Corrosion-resistant CrNiMo steel
- Various connection options

Operating instructions and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Collection Efficiency [l/h] and Pressure Ranges

Δp	G 1, DN 25 Druckbereich bar			G 1 1/2, DN 40 Druckbereich bar
bar	0 - 2	0 - 6	0 - 12	0 - 13
0,1	70	19	6	220
0,2	100	28	9	320
0,5	160	40	12	710
1	230	70	18	980
2	350	110	27	1200
4	-	160	46	1200
6	-	200	50	1200
8	-	-	60	1200
10	-	-	70	1180
12	-	-	75	1030
13	-	-	-	950

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Separator AS 2

Separator with built-in liquid trap
up to 200 °C

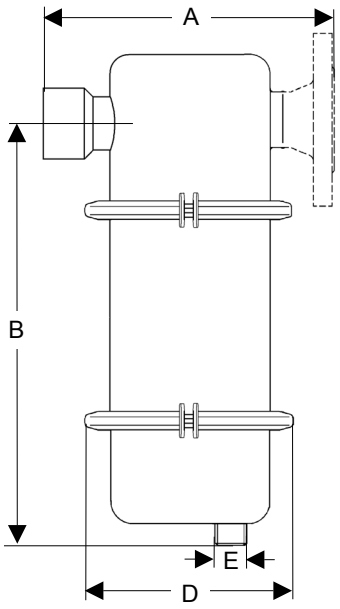
Materials		
Nominal Diameter	G 1, DN 25	G 1 1/2, DN 40
Body	CrNiMo-steel	CrNiMo-steel
Body Seal	EPDM optional FEPM	EPDM optional FEPM
Seat, Cone	CrNiMo-steel	CrNiMo-steel
Float	CrNiMo-steel	CrNiMo-steel
Valve Seal	FFKM	metallic, CrNiMo-steel

Dimensions [mm]				
	nominal diameter			
size	G 1	G 1 1/2	DN 25	DN 40
A	155	195	195	240
AE	-	238	-	260
B	225	330	225	330
D	140	200	140	200
E	G 1/2A	G 3/4A	G 1/2A	G 3/4A

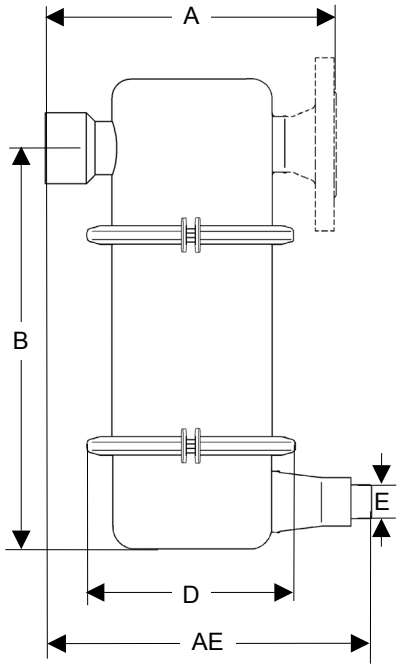
Weights [kg]			
nominal diameter			
G 1	G 1 1/2	DN 25	DN 40
2,6	3,5	4,5	6

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

G 1, DN 25



G 1 1/2, DN 40



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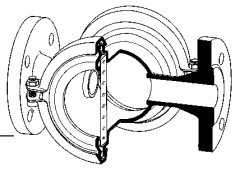
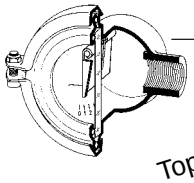
Sightglasses, Flow Indicators



Without indicator, stainless steel — DA 6.00 / 7.00

economical stainless steel sightglasses
DA 6.00 has single glass, DA 7.00 has 2 glasses
all stainless steel SST 316 construction

PN..... 16	G..... 1/2 - 2
DN..... 15 - 50	T..... 130 °C



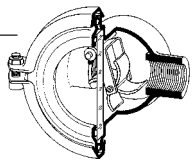
DA 6.10 / 7.10 With flag, stainless steel

Top Seller

DA 6.10 has single glass, DA 7.10 has 2 glasses
all stainless steel SST 316 construction

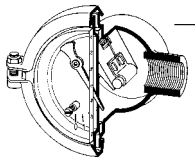
PN..... 16	G..... 1/2 - 2
DN..... 15 - 50	T..... 130 °C

With impeller, stainless steel — DA 6.30



all stainless steel SST 316 construction

PN..... 16	G..... 1/2 - 2
DN..... 15 - 50	T..... 80 °C

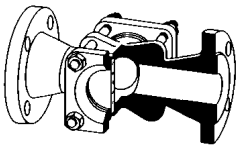


DA 6.12 For turbid, opaque media

flow indicator with external indication
all stainless steel SST 316 construction

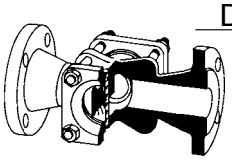
PN..... 16	G..... 1/2 - 2
DN..... 15 - 50	T..... 80 °C

Without indicator — DA 2.00 / 4.00



DA 2.00 has single glass and turbolence block
DA 4.00 has 2 glasses but no internal components
body grey cast iron, spheroidal cast iron, cast steel, stainless steel

PN..... 16 - 40	G..... 3/8 - 1
DN..... 15 - 250	T..... 150/280 °C



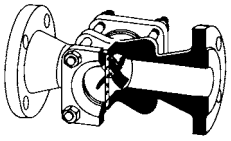
DA 1.10 / 3.10 / 4.10 With flag

Top Seller

DA 1.10 small type G 3/8 - 3/4, DA 3.10 has single glass
DA 4.10 has 2 glasses
body grey cast iron, cast steel, stainless steel

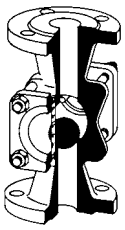
PN..... 16 - 40	G..... 3/8 - 1
DN..... 15 - 250	T..... 150/280 °C

With impeller — DA 1.30 / 3.30 / 4.30



DA 1.30 small type G 3/8 - 3/4, DA 3.30 has single glass
DA 4.30 has 2 glasses
body grey cast iron, cast steel, stainless steel

PN..... 16 - 40	G..... 3/8 - 1
DN..... 15 - 50	T..... 80 °C



DA 1.40 / 3.40 / 4.40 With ball

DA 1.40 small type G 3/8 - 3/4, DA 3.40 has single glass
DA 4.40 has 2 glasses
body grey cast iron, cast steel, stainless steel

PN..... 16 - 40	G..... 3/8 - 1
DN..... 15 - 50	T..... 100 °C

Sheet no. DA/14.1.081.1 - issue 06.02.2008

Special versions on request. All the pressure has always been indicated as overpressure. We reserve the right to alter technical specifications without notice.

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Know how • Flow indicators

Sight glasses, flow indicators and flow meters indicate media and flow conditions in pipeline systems and plant

Selection
Sight glasses are monitoring equipment without indicating mechanisms.
Flow indicators have internal components that are set in motion by the flow.
Flow meters are fitted with a calibrated measuring scale and indicating flag.

Glasses
Sight glasses and flow indicators are supplied with one or two glasses. Two glasses enable the user to see through the medium. If the installation site is dark or if it is difficult to see the glass, a light may be fixed at the back which allows a better view of the flowing medium.

Glass qualities
Soda lime glass is used for temperatures up to 150 °C (see DIN 8902); in the case of alkaline media (boiler water) only up to 100 °C.
Maxos glass is used for temperatures up to 280 °C (see DIN 7080).

Flow direction
Our standard flow indicators are supplied for left-to-right flow; we also supply indicators for right-to-left flow at the customer´s request. Please state the required flow direction when ordering.

Operating limit
Flow indicators and flow meters have an operating limit. Below this limit the flow is insufficient to set the internal components in motion (see Data Sheet).

Indicator flag for one direction
Flow indicators with flag and reset spring for one flow direction are the most popular type and can be installed in any position. Soda lime glasses feature a graduated scale of lines from 1 to 10. This scale allows the flow volume to be gauged easily and quickly. In many simple applications this type of indicator may be used as an alternative to an expensive flow meter. For the smaller DN (up to G 1 / 25 mm) the indicating flag is supplied without a spring to allow it to indicate even small volumes. Vertical installation with flow from top to bottom, however, requires a spring.

Indicator flag for both directions
The centrally mounted flag is deflected towards the flow direction, thus indicating the direction of the flow. The position of the flag changes as the flow increases or decreases.

External indicator
For turbid or opaque liquids without magnetic contamination you should select a flow indicator with external pointer (Type 6.12). What has been said above under item “Indicator flag for one direction” applies to this type of indicator as well.

Ball-type indicator
The flow moves a ball from its rest position (at the bottom of the housing) to the top. This type of flow indicator must be installed vertically for flow from bottom to top.

Indicator with impeller
The flow causes the impeller to rotate. The speed of the impeller allows the flow volume to be gauged. Suitable for all installation positions as well as all pipeline flow speeds below 1 m/sec.

Wiper
Some media tend to deposit dirt on the internal surface of the glass. For such cases we supply a type fitted with an elastomer wiper. The wiper can be supplied only for single-glass flow indicators.

Flow meters
An internal weighted flag indicates the flow volume in m^3/h water at 20 °C on a calibrated scale. Flow meters can be supplied in two measuring ranges for each nominal diameter.

Resistance to media
The standard cover seal is not resistant to all media.

Installation
Please note the flow direction if you want to install a flow indicator with fixed direction of flow.

Operation
Flow indicators and sight glasses are quite simple units which do not require any special maintenance during operation. Dirty glasses should be cleaned and the cover seals renewed at the same time.

Maintenance
Remove the glass for cleaning. For reassembling the screws should be tightened evenly and diagonally using the specified torque, or the clamp ring seal tightened gently to avoid damaging the glass. We recommend that you keep a supply of replacement glasses.

Valves free of oil and grease or silicone
Please pay attention to order an fit only spares free of oil and grease resp. free of silicone.

Please consult our engineer if extreme operating conditions apply or whenever you are in doubt.

Notes on Safety, Operating Instruction etc. MUST be followed.

Sheet no. DA/13.1.041.1 - issue 26.04.2004

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Sight Glasses

1 Glass	2 Glasses	Temp. °C	PN	Connection screwed	Connection flanged DN	*	SS	Notes	Type
•		280	16 - 40	3/8 - 2				with turbulence block	2.00
•		130	16	1/2 - 2	15 - 50	*	•	economical stainless steel design	6.00
	•	280	16 - 40	3/8 - 2	15 - 250			simple sight glass	4.00
	•	130	16	1/2 - 2	15 - 50	*	•	economical stainless steel design	7.00

* other connections available
• stainless steel deep drawn

Flow indicators with flag

1 Glass	2 Glasses	Temp. °C	PN	Connection screwed	Connection flanged DN	*	SS	Notes	Type
•		280	16 - 40	3/8 - 3/4				small design with	1.10
•		280	16 - 40	3/8 - 2	15 - 250			with scale	3.10
•		130	16	1/2 - 2	15 - 50	*	•	economical stainless steel design with scale	6.10
•		80	16	1/2 - 2	15 - 50	*	•	for opaque and turbid liquids, with external indicator and scale	6.12
	•	280	16 - 40	3/8 - 2	15 - 250			one glass with scale	4.10
	•	130	16 - 40	1/2 - 2	15 - 50	*	•	economical stainless steel design, one glass with scale	7.10
	•	150	16		15 - 150			flow meter for water	4.11
	•	280	16	3/8 - 2	15 - 250			for alternating flow directions	4.20

* other connections available
• stainless steel deep drawn

Flow Indicators with Impeller

1 Glass	2 Glasses	Temp. °C	PN	Connection screwed	Connection flanged DN	*	SS	Notes	Type
•		80	16 - 40	3/8 - 3/4				small design, flow velocity < 1 m/s	1.30
•		80	16 - 40	3/8 - 2	15 - 50			flow velocity < 1 m/s	3.30
•		80	16	1/2 - 2	15 - 50	*	•	economical stainless steel design, flow velocity < 1 m/s	6.30
	•	80	16 - 40	3/8 - 2	15 - 50			flow velocity < 1 m/s	4.30

* other connections available
• stainless steel deep drawn

Flow Indicator with Ball

1 Glass	2 Glasses	Temp. °C	PN	Connection screwed	Connection flanged DN			Notes	Type
•		100	16 - 40	3/8 - 2				flow direction only up	1.40
•		100	16 - 40	3/8 - 2	15 - 50			flow direction only up	3.40
	•	100	16 - 40	3/8 - 2	15 - 50			flow direction only up	4.40

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. DA/11.1.061.1 - issue 12.06.2006

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Flow Controller, small model with indicator flag, impeller or ball, with one glass
DA 1.10 up to 280 °C, DA 1.30 up to 80 °C, DA 1.40 up to 100 °C

Technical Data

Connection	G 3/8 - 3/4
Nominal Pressure	PN 16 - 40

Description

Flow indicators fitted with indicating vane, impeller wheel or ball can be used to indicate the flow of liquids, gases (only DA 1.10 and DA 1.40) and biphase fluids.

DA 1.10, DA 1.30 and DA 1.40 are small flow indicators with one sightglass. Body and cover are either cast or machined from the solid; internal components are manufactured from corrosion-resistant stainless steel and plastic.

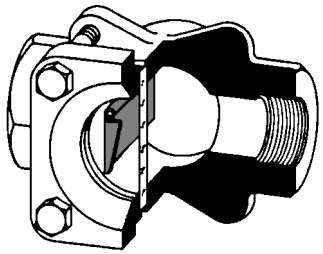
DA 1.10 with internal indicating vane, for uniform flow direction:
- Horizontal or vertical installation
- No return spring
- If installed vertically, flow must be upward

DA 1.30 with impeller wheel, for uniform flow direction:
- Horizontal or vertical installation
- for small flow volumes (v < 1 m/s)

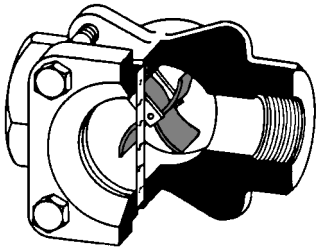
DA 1.40 with indicating ball, for uniform flow direction:
- Vertical installation
- Flow must be upward

Response threshold according to data sheet DA/2.1.061.1

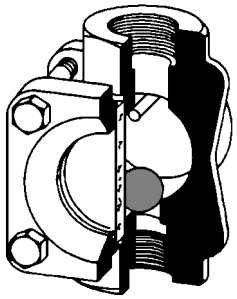
DA 1.10



DA 1.30



DA 1.40



STANDARD EQUIPMENT

- Internal components made of stainless steel and plastic
- Soda lime glass

OPTIONS

- Various seal materials suitable for your medium
- PTFE indicating vane or ball
- Borosilicate glass
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. DA 1.10/2.1.061.1 - issue 12.06.2006

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Flow Controller, small model with indicator flag, impeller or ball, with one glass
DA 1.10 up to 280 °C, DA 1.30 up to 80 °C, DA 1.40 up to 100 °C

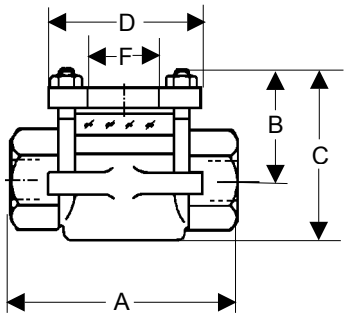
Materials DA 1.10			
Temperature		150 °C	280 °C
Body	PN 16	grey cast iron	grey cast iron
	PN 25 - 40	C 22.8	C 22.8
	PN 16 - 40	CrNiMo-steel	CrNiMo-steel
Seal		Nova Universal	Graphit
Glass		soda lime glass	maxos glass
Internals		CrNiMo-steel	CrNiMo-steel
Screws		5.6 zinced	5.6 zinced

Materials DA 1.30		
Temperature		80 °C
Body	PN 16	grey cast iron
	PN 25 - 40	C 22.8
	PN 16 - 40	CrNiMo-steel
Seal		Nova Universal
Glass		soda lime glass optional: maxos glass
Internals		CrNiMo-Stahl und PBTP
Screws		5.6 zinced

Materials		
Temperature		100 °C
Body	PN 16	grey cast iron
	PN 25 - 40	C22.8
	PN 16 - 40	CrNiMo-steel
Seal		Nova Universal
Glass		soda lime glass optional: maxos glass
Internals		CrNiMo-steel and PA
Screws		5.6 zinced

Dimensions [mm]				
	nominal	nominal diameter G		
size	pressure	3/8	1/2	3/4
A	PN 16	100	100	100
	PN 25/40	82	82	82
B		50	50	50
C		75	75	75
D	PN 16	□72	□72	□72
	PN 25/40	ø 90	ø 90	ø 90
F		ø 40	ø 40	ø 40

Weights [kg]			
	nominal diameter G		
nominal pressure	3/8	1/2	3/4
PN 16	1.4	1.4	1.4
PN 25/40	2.3	2.3	2.3



Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. DA 1.10/3.1.061.1 - issue 12.06.2006

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Flow Controller with vortex baffle or, without flow indicators, with one or two glasses, up to 280 °C

Technical Data

Connection	DA 2.00 : G 3/8 -1
	DA 4.00 : DN 15 - 250
Nominal Pressure	PN 16 - 40
Glasses	DA 2.00 has single glass
	DA 4.00 has 2 glasses

Description

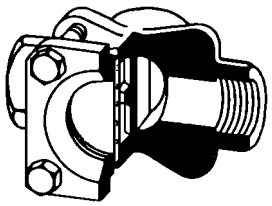
Flow sightglasses with vortex baffle or without flow indicator may be used for easy checking of fill levels, consistency, bi- or multi-phase flows or condensate. They may also be used for mixtures of liquids, gases and vapours.

DA 2.00 is fitted with one glass and one vortex baffle which induces turbulence in the fluid and thus makes it easier to see the flow.

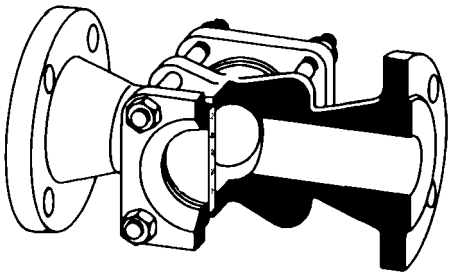
DA 4.00 is a flow sightglass with two glasses without internal components. A good view of the fluid is provided by the two opposite glasses.

For flow sightglasses with flow indicators see data sheets DA 1.10/ 2.1.061.1, DA 3.10/2.1.061.1 and DA 6.00/2.1.061.1

DA 2.00



DA 4.00



STANDARD EQUIPMENT

- Soda lime glasses

OPTIONS

- Various seal materials suitable for your medium
- Rubber or plastic coating for corrosive media
- Borosilicate glasses
- Halogen sightglass light
- High pressure models up to PN 160
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. DA 2.00/2.1.081.1 - issue 11.02.2008

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Flow Controller with vortex baffle or, without flow indicators,
with one or two glasses, up to 280 °C

Materials			
Temperature		150 °C	280 °C
Body	PN 16	up to DN 25 grey cast iron from DN 32 spheroidal cast iron optional: DN 80 - 200 St 37-2	
	PN 25/40	G 3/8 - 2, DN 15 - 65: C 22.8 DN 80 - 200: St 37-2	
	PN 16 - 40	CrNiMo-steel	
Seal		Nova Universal	Graphit
Glasses		soda lime glasses	maxos glasses
Screws		5.6 zinced	5.6 zinced

Dimensions [mm] DA 2.00

size	nominal pressure	nominal diameter G 3/8	1/2	3/4	1	1 1/4	1 1/2	2
A	PN 16 (cast iron)	100			135	145	155	165
	PN 16 (CrNiMo-St)	90						110
	PN 40	90						110
B	PN 16 (cast iron)	50			60		70	90
	PN 40, PN 16*	70						90
C	PN 16 (cast iron)	75			85		110	140
	PN 40, PN 16*	110						140
D	PN 16 (cast iron)	□ 72			□ 85		□ 110	
	PN 40, PN 16*	ø115						ø 150
E	PN 16 (cast iron)	ø 40			ø 50		ø 60	ø 66
	PN 40, PN 16*	ø 50						ø 66

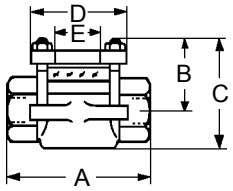
* also for PN 16 CrNiMo-steel

Dimensions [mm] DA 4.00, BSPT female

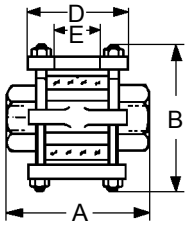
size	nominal pressure	nominal diameter G 3/8	1/2	3/4	1	1 1/4	1 1/2*	2
A	PN 16 (cast iron)	105		110		115	-	165
	PN 16 (CrNiMo-St)	90						110
	PN 40							
B	PN 16 - 40	140						180
D	PN 16 (cast iron)	□ 85						□ 110
	PN 40, PN 16**	ø115						ø 150
E	PN 16 - 40	ø50						ø 66

* PN 16 grey cast iron not available ** also for PN 16 CrNiMo-steel

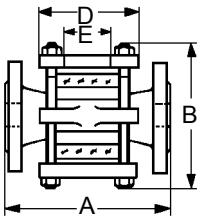
DA 2.00 sleeve



DA 4.00 sleeve



DA 4.00 flange



Dimensions [mm] DA 4.00, flange connection

size	nominal pressure	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150	200**	250**
A	PN 16 (cast iron)	140	150	160	180	200	230	200	260	300	350	400	600	650
	PN 16 (CrNiMo-St) ***	164	168	168	172	178	202	290	on request					
	PN 40 (Steel)***	166	170	170	174	180	206	290						
	PN 40 (CrNiMo-St)***	164	168	168	172	178	206	290						
B	PN 16 - 40	140					180		220	250	270		460	500
D	PN 16 (cast iron)	□ 85					□ 110	□ 120	□ 130	ø 190	ø 210		ø 285	
	PN 40, PN 16*	ø 115					ø 150	ø 150	on request					
E	PN 16 - 40	ø 50					ø 66		ø 80	ø 100	ø 110		ø 175	

* also for PN 16 CrNiMo-steel ** DN 200 and 250 made of St37-2 *** tolerance ± 2 mm

Weights [kg]

Type	nominal pressure	nominal diameter G 3/8	1/2	3/4	1	1 1/4	1 1/2	2	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150	200	250
2.00	PN 16	1.2		1.3	1.8	2.3	3.5	5.6													
	PN 40	4.5						9.0													
4.00	PN 16	2.6		2.8	3.0	3.2	3.5	6.5	3.5	4.0	5.0	6.0	7	10	13	17	26	36	43	80	126
	PN 40	4.5						10	6.0	7.0	7.5	8.5	9	15	15	on request					

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. DA 2.00/3.1.081.1 - issue 11.02.2008

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Flow controller with indicator flag, impeller or ball, with one or two glasses, up to 280 °C

Technical Data

Connection	G 3/8 - 2
	DN 15 - 50 (type 3.30, 3.40, 4.30, 4.40)
	DN 15 - 250 (type 3.10, 3.20, 4.10, 4.20)
Nom. Pressure	PN 16 - 40
Glasses	1 glass (type 3.10 up to 3.40)
	2 glasses (type 4.10 up to 4.40)

Description

Flow controller with indicator flag, impeller or ball are for monitoring of fluids, gases, vapours and two-phase flow.

With internal indicator flag, for constant flow direction:
With 10-divension scale glass, installation horizontal or vertical, scale only with soda lime glasses with PN 16 up to DN 100, with PN 40 up to DN 65, above without scale.
DA 3.10 with one glass.
DA 4.10 with two glasses.
Nominal diameters G 3/8 - G 1 and DN 15 - 25 are without resetting spring as standard, subsequent installation is possible. All others are with resetting spring.
Installation position:
- with resetting spring any position
- without resetting spring horizontal with flag downwards, vertical only with flow from below upwards

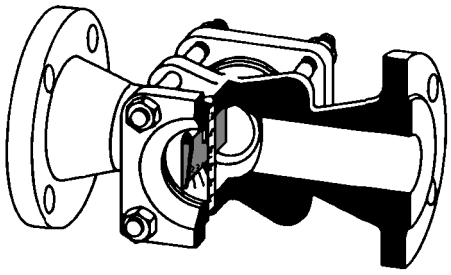
With internal indicator flag, for alternating flow directions:
DA 3.20 with one glass.
DA 4.20 with two glasses.
Nominal diameters G 3/8 - G 1 and DN 15 - 25 are without resetting spring as standard, subsequent installation is possible. All others are with resetting spring.
Installation position:
- with resetting spring any position
- without resetting spring horizontal with flag downwards

With impeller, for constant flow direction:
DA 3.30 with one glass.
DA 4.30 with two glasses.
Installation position:
- horizontal or vertical, for small flow rates (v < 1 m/s)

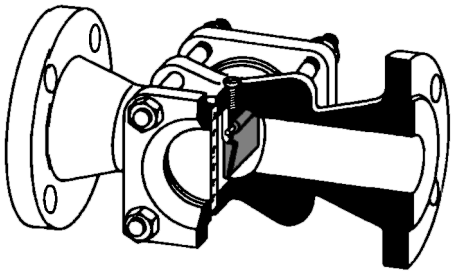
With ball, for constant flow direction:
DA 3.40 with one glass.
DA 4.40 with two glasses.
Installation position:
- vertical, only with flow from below upwards

Response threshold according to data sheet DA/2.1.061.1

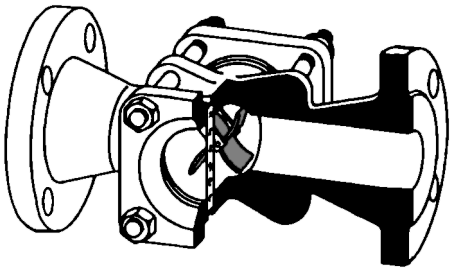
DA 4.10



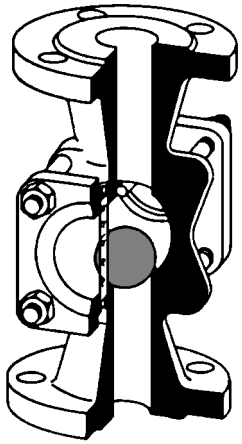
DA 4.20



DA 4.30



DA 4.40



STANDARD EQUIPMENT

- Soda lime glass

OPTIONS

- Various seal materials suitable for your medium
- PTFE indicating vane or ball
- Borosilicate glass
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. DA 3.10/2.1.061.1 - issue 12.06.2006

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Accessories DA 3.10 - 3.40, 4.10 - 4.40

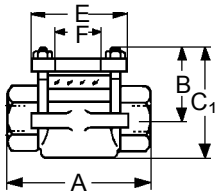
Flow controller with indicator flag, impeller or ball,
with one or two glasses, up to 280 °C

Materials				
Type	3.10	4.10	3.20	4.20
Temperature	150 / 280 °C			
Body PN 16	grey cast iron			
PN 25 - 40	C 22.8 / St37-2			
PN 16 - 40	CrNiMo-steel			
Seal	C4400			
Glasses	soda lime glass up to 150 °C optional maxos glass up to 280 °C			
Internals	CrNiMo-steel	CrNiMo-steel / Ms		
Screws	5.6 zinced	5.6 zinced	5.6 zinced	5.6 zinced

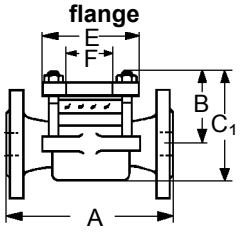
Materials				
Type	3.30	4.30	3.40	4.40
Temperature	80 °C		100 °C	
Body PN 16	grey cast iron			
PN 25 - 40	C 22.8 / St37-2			
PN 16 - 40	CrNiMo-steel			
Seal	C4400			
Glasses	soda lime glass, optional maxos glass			
Internals	CrNiMo-steel / PBTP		CrNiMo-steel / Ms / PA	
Screws	5.6 zinced	5.6 zinced	5.6 zinced	5.6 zinced

DA 3.10
DA 3.20
DA 3.30
DA 3.40

sleeve

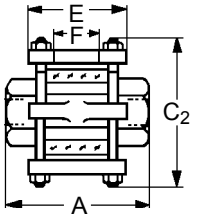


flange

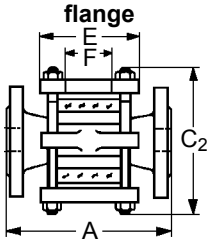


DA 4.10
DA 4.20
DA 4.30
DA 4.40

sleeve



flange



Dimensions [mm] (sleeve)								
		nominal diameter G						
size	nominal pressure PN	3/8	1/2	3/4	1	1 1/4	1 1/2	2
A	PN 16 (GG-20)*	105	105	110	110	115	145	165
	PN 16 (CrNiMo-steel)	90	90	90	90	90	90	110
	PN 25/40	90	90	90	90	90	90	110
B	PN 16 - 40	70	70	70	70	70	70	90
C_1		110	110	110	110	110	110	140
C_2		140	140	140	140	140	140	180
E	PN 16 (GG-20)*	□ 85	□ 85	□ 85	□ 85	□ 85	□ 85	□ 110
	PN 16 (CrNiMo-steel)	ø 115	ø 115	ø 115	ø 115	ø 115	ø 115	ø 150
	PN 25/40	ø 115	ø 115	ø 115	ø 115	ø 115	ø 115	ø 150
F	PN 16 - 40	ø 50	ø 50	ø 50	ø 50	ø 50	ø 50	ø 66

* PN 16 made of GG-20 not available:
type 3.10 - 3.40 G 1 1/4, type 4.10 - 4.40 G 1 1/2

Dimensions [mm] (flange)														
		nominal diameter DN												
size	nom. pressure PN	15	20	25	32	40	50	65	80	100	125	150	200*	250*
A	PN 16 (GG-20)	140	150	160	180	200	230	200	260	300	350	400	600	650
**	PN 16 (CrNiMo-st)	164	168	168	172	178	202	290	on request					
**	PN 25/40	166	170	170	174	180	208	290						
B	PN 16 - 40	70	70	70	70	70	90	90	110	125	135	135	230	250
C_1		110	110	110	110	110	140	140	160	195	205	205	340	390
C_2		140	140	140	140	140	180	180	220	250	270	270	460	500
E	PN 16 (GG-20)	□ 85	□ 85	□ 85	□ 85	□ 85	□ 110	□ 120	□ 130	ø 190	ø 210	ø 210	ø 285	ø 285
	PN 16 (CrNiMo-st)	ø 115	ø 115	ø 115	ø 115	ø 115	ø 150	ø 150	on request					
	PN 25/40	ø 115	ø 115	ø 115	ø 115	ø 115	ø 150	ø 150						
F	PN 16 - 40	ø 50	ø 50	ø 50	ø 50	ø 50	ø 66	ø 66	ø 80	ø 100	ø 110	ø 110	ø 175	ø 175

* DN 200 and 250 made of St37-2 ** allowance ± 2 mm

Weights [kg]																							
		nominal diameter G							nominal diameter DN													
design		3/8	1/2	3/4	1	1 1/4	1 1/2	2	15	20	25	32	40	50	65	80	100	125	150	200	250
with	PN 16	2,6	2,6	2,8	2,9	3,1	3,3	5,4	3,8	4,2	5,2	6,2	6,7	11,5	13	18	26	36	43	80	126
1 glass	PN 25/40	4,5	4,5	4,5	4,5	4,5	4,5	9,0	6,3	6,8	7,3	8,5	9,3	14,0	14,5	on request					
with	PN 16	2,6	2,6	2,8	3,0	3,2	3,5	6,5	3,5	4,0	5,0	6,0	7,0	10,0	13	17	26	36	43	80	126
2 glasses	PN 25/40	4,5	4,5	4,5	4,5	4,5	4,5	10,0	6,0	7,0	7,5	8,5	9,0	15,0	15	on request					

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

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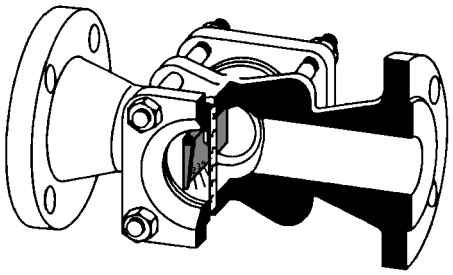
Sheet no. DA 3.10/3.1.061.1 - issue 12.06.2006

Flow Controller with indicator flag and scale (m^3/h), for liquids up to 150 °C, with two glasses

Technical Data

Connection	DN 15 - 150
Nominal Pressure	DN 15 - 50 : PN 16
	DN 65 - 150 : PN 10
max. Operating Press	DN 15 - 50 : 16 bar
	DN 65 - 150 : 8 bar
Temperature	DN 15 - 50 : 150 °C
	DN 65 - 150 : 90 °C
Glasses	2 glasses,
	1 glass with calibrated scale
Accuracy	± 5 % of the end scale value



Description

The DA 4.11 flow meter with vane and calibrated scale is used for metering the flow of low-viscosity transparent liquids and for visually checking the fluid through the sightglasses.

The internal weight-loaded indicating vane indicates the flow volume on a calibrated scale in m^3/h water at 20 °C. From size DN 65 up two different measuring ranges are available. The indication is only local, i.e. readings cannot be taken remotely.

Installation: horizontal, with vane pointing downward
Flow direction: from left to right

STANDARD EQUIPMENT

- 2 soda lime glasses, 1 glass with calibrated scale

OPTIONS

- Various seal materials suitable for your medium
- Rubber or plastic coating for corrosive media
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Measuring Ranges [m^3/h] for water 20 °C					
nom. dia.	DN	15	25	40	50
range	m^3/h	0.15-1.2	0.3-3	0.7-7	1.2-12

Measuring Ranges [m^3/h] for water 20 °C						
nom. dia.	DN	65	80	100	125	150
range	m^3/h	2.5-25	5-50	5-50	5-50	5-60
		5-50	7-70	10-120	10-140	10-160

Sheet no. DA 4.11/2.1.061.1 - issue 12.06.2006

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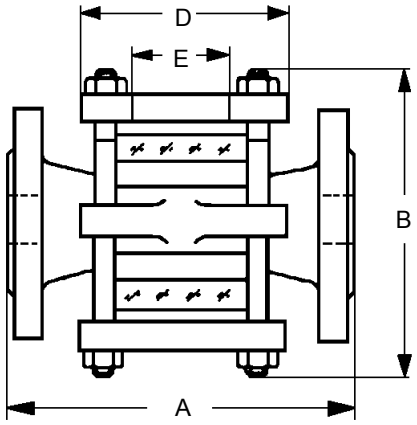
Flow Controller with indicator flag and scale (m^3/h),
for liquids up to 150 °C, with two glasses

Materials			
Nom. Diameter	DN 15 - 40	DN 50	DN 65 - 150
Body	up to DN 25 grey cast iron from DN 40 spheroidal cast iron		
Seal	Nova Universal	Nova Universal	NBR
Glasses	soda lime glass, 1 glass with scala		
Internals	CrNiMo-St	CrNiMo-St / brass	CrNiMo-St



Dimensions [mm]									
	nominal diameter DN								
size	15	25	40	50	65	80	100	125	150
A	140	160	200	230	290	310	350	400	400
B	140	140	140	180	200	240	280	295	325
D	□85	□85	□85	□110	ø 210	ø 235	ø 280	ø 300	ø 300
ø E	50	50	50	66	145	170	210	220	220

Weights [kg]								
nominal diameter DN								
15	25	40	50	65	80	100	125	150
3.5	5	7	10	20	27	48	64	71

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. DA 4.11/3.1.061.1 - issue 12.06.2006

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Flow Controller without internal parts, with internal indicator flag, external indicator or impeller, with one glass, up to 130 °C

HIGH GRADE

Technical Data

Connection	G 1/2 -2
	DN 15 - 50
Nominal Pressure	PN 16

Description

Flow sightglasses without flow indicator may be used for easy checking of fill levels, consistency, bi- or multiphase flows or condensate. They may also be used for mixtures of liquids, gases and vapours.

Flow indicators fitted with a vane can be used for monitoring the flow of liquids, gases and biphase fluids.

Flow indicators fitted with a vane are used for liquids and small flow volumes.

Flow indicators fitted with a ball can be used for liquids and gases.

DA 6.00 Flow sightglass without internal components:
Installation:
- in any position

DA 6.10 Flow indicator with internal vane for uniform flow direction:
With graduated scale 1 – 10 for horizontal or vertical installation.
Sizes ½ - 1 or DN 15 - 25 are supplied without return spring; they can be supplied with return spring as an option; return springs can be fitted retrospectively. All other sizes are fitted with return springs as standard equipment.
Installation:
- with spring: in any position
- without spring: horizontal only if vane points downward; vertical only if flow is upward.

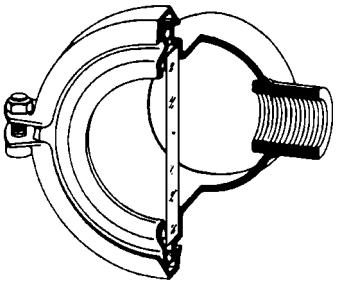
DA 6.12 with external indicator for uniform flow direction, for turbid or opaque fluids:
With graduated scale 1 – 10 for horizontal or vertical installation.
Sizes G ½ - G 1 or DN 15 - 25 are supplied without return spring; they can be supplied with return spring as an option; return springs can be fitted retrospectively. All other sizes are fitted with return springs as standard equipment.
Installation:
- with spring: in any position
- without spring: horizontal only if pointer points downward; vertical only if flow is upward.

For flow indicator with additional electrical switch see flow switch SW 6.14.

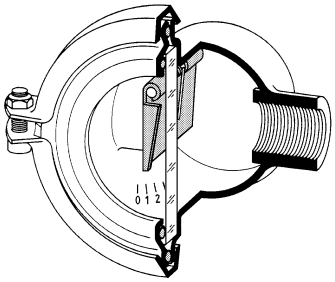
DA 6.30 with impeller wheel uniform flow direction, for small flow volumes (v < 1 m/s):
Installation:
- in any position

Body and cover are connected by a clamp ring and 2 bolts. Servicing/maintenance is easy and does not call for special tooling.

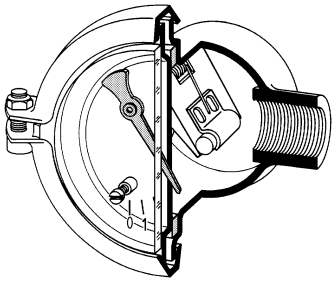
DA 6.00



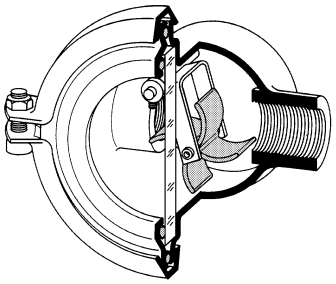
DA 6.10



DA 6.12



DA 6.30



STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring

OPTIONS

- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. DA 6.00/2.1.072.1 - issue 07.06.2007

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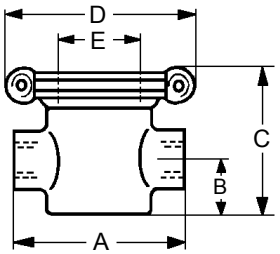
Accessories DA 6.00, 6.10, 6.12, 6.30

Flow Controller without internal parts, with internal indicator flag, external indicator or impeller, with one glass, up to 130 °C

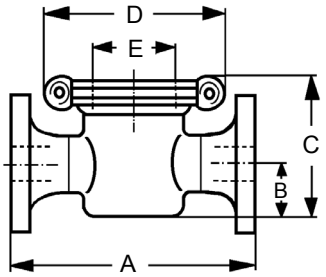
Materials		
Type	DA 6.00 + DA 6.10	
Temperature	80 °C	130 °C
Body	CrNiMo-steel	CrNiMo-steel
Seal	EPDM optional Nova Universal	EPDM optional Nova Universal
Glass	soda lime glass	soda lime glass
Internals	without	CrNiMo-steel
Cover Fastening	profile clamp made of CrNiMo-steel G 2 and DN 50 with 2 screws	

Materials		
Type	6.12	6.30
Temperature	80 °C	80 °C
Body	CrNiMo-steel	CrNiMo-steel
Seal	EPDM	NBR / C4400 optional Nova Universal
Glass	without	soda lime glass
Internals	CrNiMo-steel	CrNiMo-steel, PBTP
Cover Fastening	profile clamp made of CrNiMo-steel G 2 and DN 50 with 2 screws	

sleeve



flange



Dimensions [mm]							
		nominal diameter G					
size		1/2	3/4	1	1 1/4	1 1/2	2
A	(tolerance ± 2)	100	105	140	182	190	225
B		25	25	25	25	25	50
C		75	75	75	75	75	150
D		140	140	140	140	140	135
ø E	DA 6.00/6.10/6.30	65	65	65	65	65	90
	DA 6.12	80	80	80	80	80	90

Dimensions [mm]							
		nominal diameter DN					
size		15	20	25	32	40	50
A	(tolerance ± 2)	170	180	215	220	226	230
B		25	25	25	25	25	50
C		75	75	75	75	75	150
D		140	140	140	140	140	135
ø E	DA 6.00/6.10/6.30	65	65	65	65	65	90
	DA 6.12	80	80	80	80	80	90

Weights [kg]											
nominal diameter G						nominal diameter DN					
1/2	3/4	1	1 1/4	1 1/2	2	15	20	25	32	40	50
0.85			1.1		1.8	2.3	3.0	3.3	4.5	4.9	5.8

Sensitivy for water 20 °C, horizontal installation [m³/h]						
type	nominal diameter G					
	1/2	3/4	1	1 1/4	1 1/2	2*
6.10	0.20	0.25	0.3	1.8	1.8	2.3
6.12	0.40	0.60	0.8	2.0	2.0	2.3
6.30	0.15	0.40	0.5	0.5	0.6	1.0

Sensitivy for water 20 °C, horizontal installation [m³/h]						
type	nominal diameter DN					
	15	20	25	32	40	50*
6.10	0.20	0.25	0.3	1.8	1.8	2.3
6.12	0.40	0.60	0.8	2.0	2.0	2.3
6.30	0.15	0.40	0.5	0.5	0.6	1.0

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. DA 6.00/3.1.072.1 - issue 07.06.2007

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Flow Controller without internal parts or with indicator flag
with two glasses, up to 130 °C

Technical Data

Connection	G 1/2 -2
	DN 15 - 50
Nominal Pressure	PN 16

Description

Flow sightglasses without flow indicator may be used for easy checking of fill levels, consistency, bi- or multiphase flows or condensate. They may also be used for mixtures of liquids, gases and vapours.

Flow indicators fitted with a vane can be used for monitoring the flow of liquids, gases and biphase fluids.

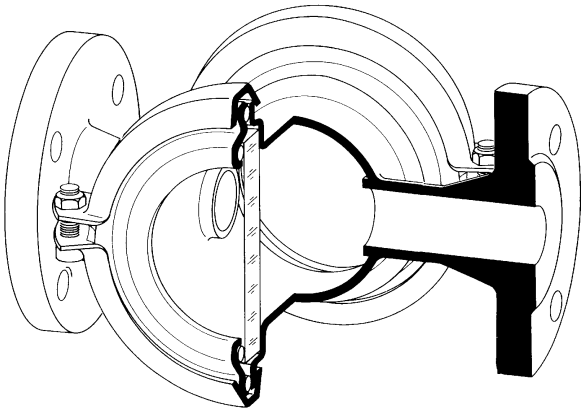
DA 7.00 and DA 7.10 are flow sightglasses with two glasses. A good view of the fluid is provided by the two opposite glasses. They are manufactured from stainless steel featuring excellent corrosion resistance.

Body and cover are connected by a clamp ring and 2 bolts. Servicing/maintenance is easy and does not call for special tooling.

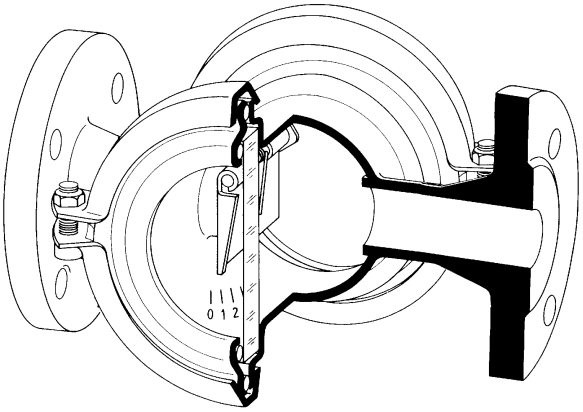
DA 7.00 Flow sightglass without internal components:
Installation:
- in any position

DA 7.10 Flow indicator with internal vane for uniform flow direction: With graduated scale 1 – 10 for horizontal or vertical installation. Sizes G ½ - G 1 or DN 15 - 25 are supplied without return spring; they can be supplied with return spring as an option; return springs can be fitted retrospectively. All other sizes are fitted with return springs as standard equipment.
Installation:
- with spring: in any position
- without spring: horizontal only if vane points downward; vertical only if flow is upward.

DA 7.00



DA 7.10



STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring

OPTIONS

- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. DA 7.00/2.1.071.1 - issue 09.01.2007

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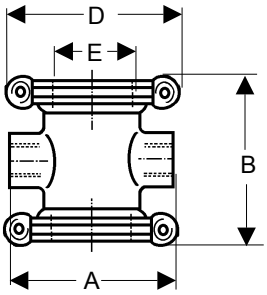
Flow Controller without internal parts or with indicator flag
with two glasses, up to 130 °C

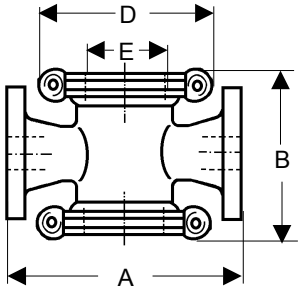
Materials DA 7.00		
Temperature	80 °C	130 °C
Body	CrNiMo-steel	CrNiMo-steel
Seals	EPDM optional Nova Universal	EPDM optional Nova Universal
Glasses	soda lime glasses otional maxos glasses	
Cover Fastening	profile clamp made of CrNiMo-Stahl G 2 and DN 50 with screws	

Materials DA 7.10		
Temperature	80 °C	130 °C
Body	CrNiMo-steel	CrNiMo-steel
Seals	EPDM optional Nova Universal	EPDM
Internals	CrNiMo-steel	CrNiMo-steel
Glasses	soda lime glasses otional maxos glasses	
Cover Fastening	profile clamp made of CrNiMo-Stahl G 2 and DN 50 with screws	

sleeve



flange



Dimensions [mm]						
	nominal diameter G					
size	1/2	3/4	1	1 1/4	1 1/2	2
A*	100	105	140	182	190	225
B	100	100	100	110	110	200
ø D	140	140	140	140	140	135
ø E	65	65	65	65	65	90

* tolerance: ± 2 mm

Dimensions [mm]						
	nominal diameter DN					
size	15	20	25	32	40	50
A*	170	180	215	220	226	230
B	100	100	100	110	110	200
ø D	140	140	140	140	140	135
ø E	65	65	65	65	65	90

* tolerance: ± 2 mm

Weights [kg]												
nominal diameter G						nominal diameter DN						
1/2	3/4	1	1 1/4	1 1/2	2	15	20	25	32	40	50	
1.4			1.6		2.5	2.7	3.3	3.7	5	5.3	6.8	

Sensitivy DA 7.10 for water 20 °C, horizontal installation [m³/h]					
nominal diameter G					
1/2	3/4	1	1 1/4	1 1/2	2
0.2	0.25	0.3	1.8	1.8	2.3

Sensitivy DA 7.10 for water 20 °C, horizontal installation [m³/h]					
nominal diameter DN					
15	20	25	32	40	50
0.2	0.25	0.3	1.8	1.8	2.3

Special designs on request.
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Sheet no. DA 7.00/3.1.071.1 - issue 09.01.2007

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Accessories

sensitivy for water, 20 °C,
horizontal istallation, app. rate in m^3/h / l/h

Flange Connection PN 16/40														
Type	DN	15	20	25	32	40	50	65	80	100	125	150	200	250
3.10	m^3/h	0.18			1.2		1.5		2.5	5	8		on request	
3.12		1.5			1.7		1.9	2	-		-		-	
3.20		0.2			0.8		0.9	1.2	1.6	2	2.5		on request	
3.22		1.5			1.7		1.9	2	-		-		-	
3.30		0.12	0.15	0.2	0.25	0.3	1.2	-	-		-		-	
3.40		0.15	0.2	0.35	0.5	0.6	1	-	-		-		-	
4.10		0.18			1.2		1.5		2.5	5	8		on request	
4.20		0.2			0.8		0.9	1.2	1.6	2	2.5		on request	
4.30		0.12	0.15	0.2	0.25	0.3	1.2	-	-		-		-	
4.40		0.15	0.2	0.35	0.5	0.6	1	-	-		-		-	

BSPT-Female Connection PN 16/40								
Type	BSPT	3/8	1/2	3/4	1	1 1/4	1 1/2	2
3.10	m^3/h	0.2			0.25	1.2	1.4	1.5
3.12		1.5				1.7		1.9
3.20		0.2				0.8		0.9
3.22		1.5				1.7		1.9
3.30		0.1	0.12	0.15	0.3	0.4		1.3
3.40		0.15		0.35	0.4	0.6	0.8	1.3
4.10		0.2			0.25	1.2	1.4	1.5
4.20		0.2				0.8		0.9
4.30		0.1	0.12	0.15	0.3	0.4		1.3
4.40		0.15		0.35	0.4	0.6	0.8	1.3

Small Model, BSPT-Female Connection PN 16/40							
Type	installation	PN	resetting spring	BSPT	3/8	1/2	3/4
1.10	horizontal	16	with	l/h	380	400	450
			without		50	70	75
		40	with		400	450	450
			without		90	110	120
1.30	horizontal	16			90	90	110
		40			120	150	220
1.40	vertical	16			100	150	150
		40			70	100	100

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. DA/2.1.061.1 - issue 12.06.2006

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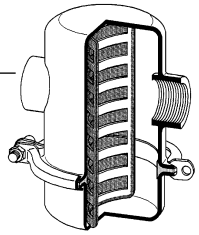
Strainers, Filters

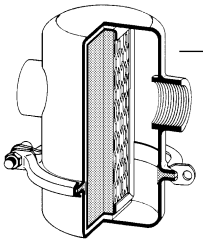
Pot strainer, stainless steel — SF 6.00

Top Seller



flat mesh strainer for low pressure drop
mesh width 0.25 - 2.5 mm
all stainless steel SST 316 construction

PN..... 16
DN..... 15 - 100
G..... 1/2 - 2
T..... 130 °C



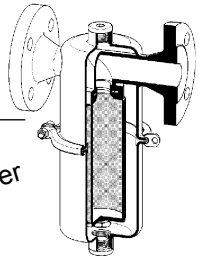
FI 6.01 Gas filter, stainless steel

low pressure drop
filter medium polyester foam, pore size 0.15 - 0.58 mm
all stainless steel SST 316 construction

PN..... 16
DN..... 15 - 100
G..... 1/2 - 2
T..... 80 °C

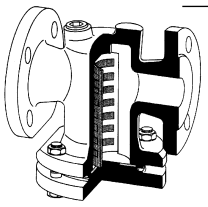
Filter, stainless steel — FI 6.06

Top Seller



specially recommended for sterile steam
filter medium sintered stainless steel or pleated stainless steel mesh
retained particle size 5, 20 or 25 µm
all stainless steel SST 316 construction

PN..... 16
DN..... 15 - 50
G..... 1/2 - 2
T..... 140/190 °C

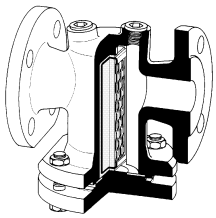


SF 1.00 Pot strainer, for high pressures

low pressure drop
body grey cast iron, spheroidal cast iron, cast steel

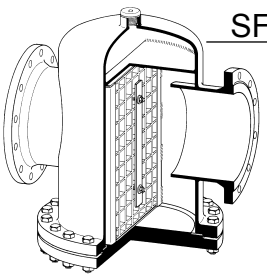
PN..... 16 - 160
DN..... 15 - 150
G..... 3/8 - 2
T..... 200/400 °C

Gas filter, for high pressures — FI 1.01



low pressure drop
filter medium polyester foam, pore size 0.15 - 0.58 mm
body grey cast iron, spheroidal cast iron, cast steel

PN..... 16 - 160
DN..... 15 - 150
G..... 3/8 - 2
T..... 80 °C

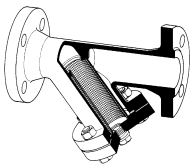


SF 2.00 Pot strainer, for large diameter

low pressure drop
mesh size 0.25 - 2.5 mm
body steel, stainless steel

PN..... 6 - 40
DN..... 25 - 400
T..... 200 °C

Standard y-type strainer — SF 1.22



body grey cast iron, spheroidal cast iron, cast steel

PN..... 16 - 40
DN..... 15 - 400
T..... 300/400 °C

Sheet no. SF-FI/14.1.081.1 - issue 06.02.2008

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Know how • Strainers and filters

Strainers and filters protect plant, plant components and equipment against damage and malfunctioning caused by contamination

In what cases should a strainer be installed

After a pipeline system or plant has been commissioned, equipment or valves have been installed or repaired or pipes have been installed or welded, it may well be that dirt, welding nuggets, bits of sealing materials etc. have entered the system. Even during operation particles lodged in the pipes or fittings can become detached. These can cause malfunctioning by blocking small orifices or by forming deposits in control valves etc. For this reason we recommend that you should install strainers, gas filters or filters upstream of any equipment, control valves or fittings which may be at risk.

Even clean media such as sterile steam require suitable filter.

To protect our own pressure and flow control valves we always recommend fitting an upstream strainer or filter. This applies especially to regulating valves with small seat diameters i.e. small K_{VS} values. Mankenberg fit such protection devices to the pilot valves of pilot-controlled valves as standard equipment.

Selection

The type of strainer to be selected depends on the medium and temperature.

- Liquids

Strainers featuring one or more layers of mesh are particularly well suited for liquids. The mesh size depends on the downstream equipment. The smaller the control or measuring orifices, the finer must be the mesh size.

- Gases

For gases we use gas filters featuring non-woven filter fabric or, if a high degree of purity is required, a cartridge-type filter. As with strainers, the retained particle size of the filter is governed by the requirements of the downstream equipment.

- Steam

Our filter FI 6.06 is especially suitable for sterile and clean steam. Filter cartridges offering various retained particle sizes may be fitted.

Limits of application

Owing to the use of a synthetic fibre filter medium, the maximum temperature for gas filters is limited to 80 °C. Filter 6.06 is designed for temperatures up to 190 °C. Strainers must be used for all media exceeding this temperature.

Selecting valve type and nominal size

You must first ask which pressure drop is acceptable. If this is not all that important you should select the simplest equipment. In the case of strainers this is type 1.22 in Y-form. If the pressure drop is important you should select the pot-type. With this type the mesh area which is relatively large compared with the nominal diameter, produces a considerably smaller pressure drop than a Y-type strainer with its small circular strainer mesh.

By using the Design Data sheet you can calculate the flow resistance. The flow resistance is a function of the retained particle size of the mesh or filter cartridge and of the mesh area. With strainers the larger nominal diameters feature larger mesh areas i.e. smaller pressure drops. If the calculated pressure loss should prove to be excessive you should check whether a larger mesh size can be used; if not, select a larger nominal diameter.

Valves free of oil and grease or silicone

Please pay attention to order an fit only spares free of oil and grease resp. free of silicone.

Please consult our engineer if extreme operating conditions apply or whenever you are in doubt.

Notes on Safety, operating instructions etc. MUST be followed

Sheet no. SFGF/13.1.041.1 - issue 26.04.2004

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Strainers

T °C	PN	Connection screwed	Connection flanged DN	v	SS	Notes	Type
400	16 - 160	3/8 - 2	15 - 250			pot design with minimised pressure drop, body cast iron or cast steel	1.00
400	16 - 40		15 - 400			Y-design, economical valve	1.22
300	6 - 40		25 - 600	v		pot design with minimised pressure drop, body steel welded	2.00
550	160 - 400	3/8 - 2	15 - 200	v		high pressure design with welding ends or socket weld ends	3.00
130	16	1/2 - 2	15 - 100	v	i	economical stainless steel valve	6.00

v other connections available
i stainless steel deep drawn

Screen Netting for 1.00, 2.00, 3.00, 6.00

light screen aperture [mm]	open screen area [%]
0.25	41
0.5	51
1	67
2.5	69

Screen Netting for 1.22

Body Size DN	light screen aperture standard screen [mm]	light screen aperture fine screen [mm]
15 + 20	0.5	0.25
25 - 65	0.75	0.25
80 200	1.2	0.25
250 - 400	2.2	0.25

Filter

T °C	PN	Connection screwed	Connection flanged DN	v	SS	Notes	Type
80	16 - 160	3/8 - 2	15 - 250			pot design with minimised pressure drop, body cast iron or cast steel	1.01
80	16	1/2 2	15 - 100	v	i	economical stainless steel valve	6.01
190	16	1/2 2	15 - 50	v	i	filter also for clean steam and for sterile applications	6.06

v other connections available
i stainless steel deep drawn

Filter mat for 1.01 and 6.01

Body Size DN	Matt 1 Size of Pores [mm]	Matt 2 Size of Pores [mm]	Matt 3 Size of Pores [mm]
G 3/8 - G 2	265	-	-
15 - 50	265	-	-
65 - 125	0.37	265	-
150 - 200	0.58	0.37	265

Filter insert for 6.06

Design	Kind of Filter	Filter [µm]
sintered	standard	20
sintered	fine	5
3 layers	standard	25
3 layers	fine	5

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. SF-FI/11.1.061.1 - issue 12.06.2006

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Strainer for pipelines, straight-through style, up to 400 °C

Technical Data

Connection	G 3/8 - 2
	DN 15 - 150
Nominal Pressure	PN 16 - 160

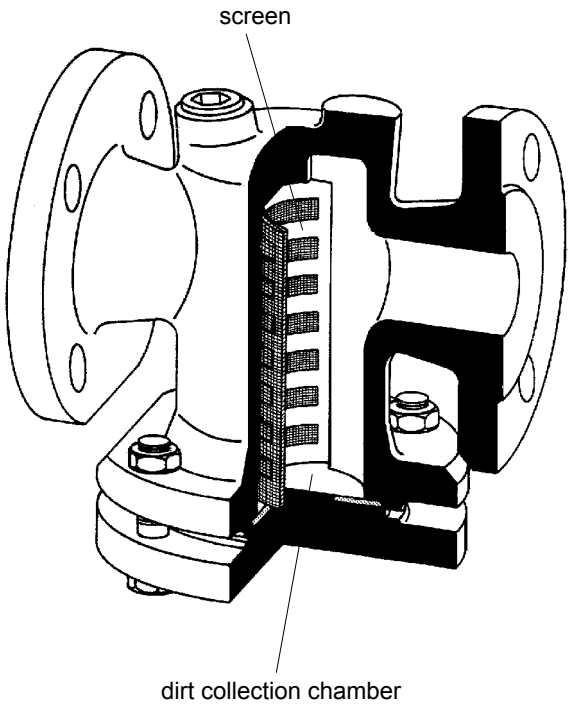
Description

Strainers protect plant and equipment such as regulators, valves, measuring equipment against damage or operational failure caused by contamination. They are essential for start-up as well as continuous operation.

SF 1.00 is manufactured from cast iron and has a drain plug in its cover. The flat strainer mesh which is positioned perpendicular to the flow, and the straight-through flow result in a minimum pressure drop and a large sludge collecting chamber.

Cleaning is extremely simple and quick. Only the cover has to be removed for dismantling.

The strainer may be installed in any position; installation with the cover at the bottom is recommended.



STANDARD EQUIPMENT

- Stainless steel mesh, mesh size 0.5 mm
- Drain plug

OPTIONS

- Special versions for up to 400 °C
- Strainer mesh sizes 0.25 mm, 1 mm or 2.5 mm
- Pressure gauges upstream and downstream of the strainer
- Various seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Screen Netting

screen no. (Nr. 4 = standard screen)	light screen aperture mm	open screen area %
3	0.25	41
4	0.50	51
5	1.0	67
7	2.5	69

Sheet no. SF 1.00/2.1.061.1 - issue 12.06.2006

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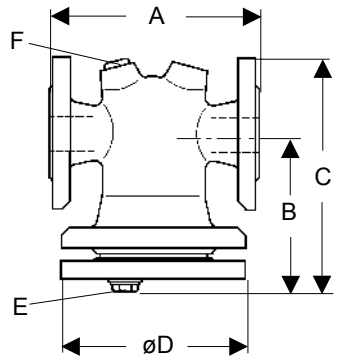
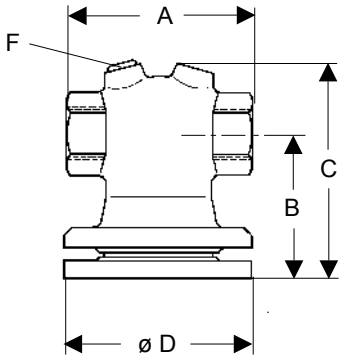
Strainer for pipelines, straight-through style, up to 400 °C

Materials		
Nom. Press.	PN 16	PN 25 - 160
Temperature	200 °C	200 °C
Body	up to DN 25 grey cast iron from DN 32 spheroidal cast iron	cast steel
Seal	Nova Universal	Nova Universal
Screen	1.4571	1.4571
Screen Frame	up to DN 80 CrNiMo-steel from DN 100 grey cast iron optional CrNiMo-steel	

Diensions [mm]

size	nominal pressure	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150	200	250
A	PN 16	130	150	160	180	200	230	290	310	350	400	400	480	570
	PN 40	196	200	-	244	-	-	-	-	-	-	-	-	-
	PN 63	210	230	-	-	-	-	-	-	-	-	-	-	-
	PN 100	210	230	-	-	-	-	-	-	-	-	-	-	-
	PN 160	210	230	-	-	-	-	-	-	-	-	-	-	-
B	PN 16	65	110	125	130	135	150	170	160	190	250	275	345	465
	PN 40	120	120	-	130	-	-	-	-	-	-	-	-	-
	PN 63/160	120	145	-	-	-	-	-	-	-	-	-	-	-
C	PN 16	120	160	185	215	220	255	285	275	345	410	490	595	720
	PN 40	170	170	-	215	-	-	-	-	-	-	-	-	-
	PN 63/160	170	200	-	-	-	-	-	-	-	-	-	-	-
ø D	PN 16	110	110	140	140	170	170	210	220	255	320	350	435	540
	PN 40	110	110	-	140	-	-	-	-	-	-	-	-	-
	PN 63/160	110	150	-	-	-	-	-	-	-	-	-	-	-
E	PN 16 -160	-	-	-	-	-	-	G 1/2		G 1				
F	PN 16 -160	G 1/4									G 1/2		G 1	





Weights [kg]

nominal pressure	nominal diameter DN 15	20	25	32	40	50	65	80	100	125	150	200	250
PN 16	2.5	4.5	6	8.5	13	17	25	30	46	67	90	158	260
PN 40	5.5	6.5	-	11	-	-	-	-	-	-	-	-	-
PN 63	8	16	-	-	-	-	-	-	-	-	-	-	-
PN 100/160	8	16	-	-	-	-	-	-	-	-	-	-	-

Dimensions [mm]

size	nominal pressure	nominal diameter G 3/8	1/2	3/4	1	1 1/4	1 1/2	2
A	PN 16	90	90	120	140	140	170	170
	PN 40	120	120	120	-	160	-	-
	PN 63/160	120	120	120	-	-	-	-
B	PN 16	65	65	110	125	130	135	150
	PN 40	120	120	120	-	130	-	-
	PN 63/160	120	120	120	-	-	-	-
C	PN 16	120	120	165	185	215	220	255
	PN 40	170	170	170	-	215	-	-
	PN 63/160	170	170	170	-	-	-	-
ø D	PN 16	65	110	110	140	140	170	170
	PN 40	110	110	110	-	140	-	-
	PN 63/160	110	110	110	-	-	-	-
F	PN 16 - 160	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4

Weights [kg]

nominal pressure	nominal diameter G 3/8	1/2	3/4	1	1 1/4	1 1/2	2
PN 16	1.5	1.5	3	4	5	7.5	10.5
PN 40	5	5	5	-	7	-	-
PN 63	6	6	6	-	-	-	-
PN 160	8	8	8	-	-	-	-

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. SF 1.00/3.1.061.1 - issue 12.06.2006

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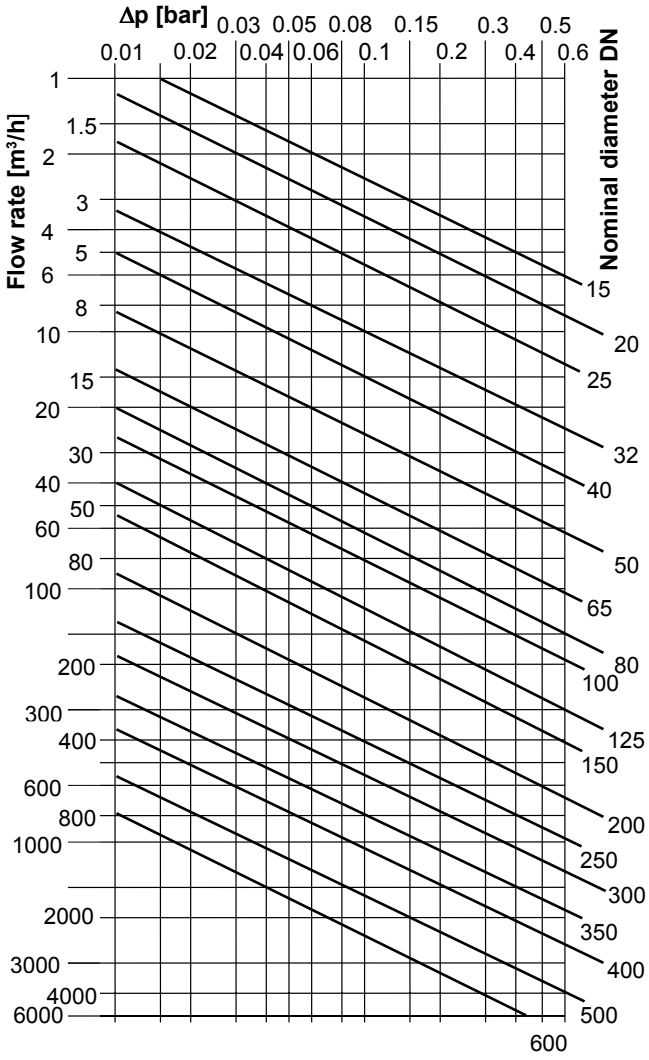
Strainer flow resistance Δp in bar for water, screen no. 4, clean
calculation of flow resistance, and correction factor for strainer SF 1.00 and SF 2.00

Flow resistance Δp [bar] for water, screen no. 4, clean



Calculation of flow resistance

$\Lambda p = \zeta \cdot w^2/2 \cdot \rho \cdot 10^{-5}$ [bar]

ζ : Coeffizient of flow resistance (see table below). The values are based on a cleane screen no. 4

w [m/s] : Flow velocity in cross-section of connection (nominal diameter). Please refer to our flow data charts.

ρ = [kg/m³] : Density of medium

Coeffizient of flow resistance for clean screen no. 4										
Flange connection	DN	15	20	25	32	40	50	65	80	100	125
Mesh size	cm²	16	26	30	40	52	68	86	106	160	220
Coefficient	ζ	1.2	1.9	2.0	1.6	1.8	1.4	1.5	1.7	2.4	2.7

Coeffizient of flow resistance for clean screen no. 4									
Flange connection	DN	150	200	250	300	350	400	500	600
Mesh size	cm²	330	480*	760*	1500	2100	2500	4400	6500
Coefficient	ζ	2.9	3.3	3.5	3.6	3.6	3.5	3.5	3.6

* for SF 2.00 the mesh size is
for DN 200: 650 cm²
for DN 250: 1050 cm²

Coeffizient of flow resistance for clean screen no. 4						
Screwed connection	G	3/4	1	1 1/4	1 1/2	2
Mesh size	cm²	26	30	40	52	68
Coefficient	ζ	1.9	2.0	1.6	1.8	1.4

For screens other than no. 4 the resistance value is given in the tables above should be multiplied by a correction factor.

Mesh size [mm]				
Screen no.	3	4	5	7
Mesh size	0.25	0.5	1	2.5

Correction factor for other mesh sizes			
Screen no.	3	5	7
Correction factor	1.15	0.9	0.85

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. SF 1/2.1.061.2 - issue 12.06.2006

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Strainer for pipelines, straight-through style up to 200 °C

Technical Data

Connection	DN 25 - 400	
Nominal Pressure	PN 6 - 25	: DN 200 - 400
	PN 16	: DN 50 - 150
	PN 40	: DN 25 - 150

Description

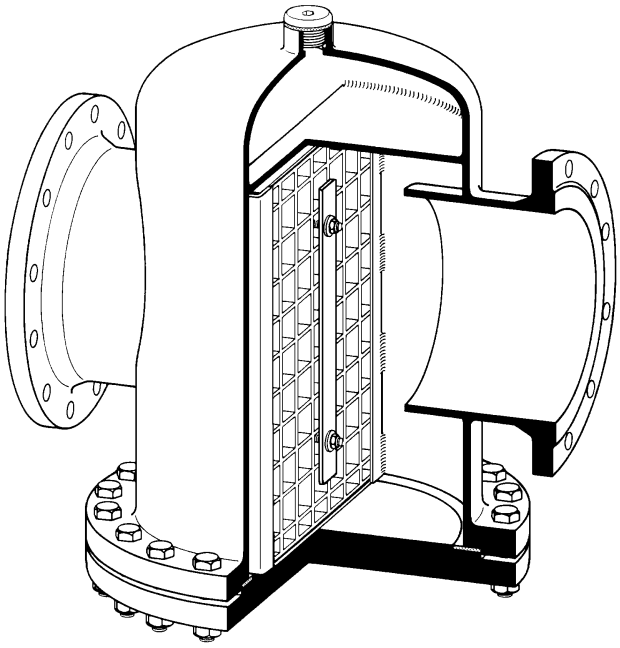
Strainers protect plant and equipment such as regulators, valves, measuring equipment against damage or operational failure caused by contamination. They are essential for start-up as well as continuous operation.

SF 2.00 is a welded steel construction and has a drain plug in its cover and in the bottom of the body. The flat strainer mesh which is positioned perpendicular to the flow, and the straight-through flow result in a minimum pressure drop and a large sludge collecting chamber.

Cleaning is extremely simple and quick. Only the cover has to be removed for dismantling.

It is recommended that the larger strainer sizes (from DN 200) should be installed with the cover at the top.

The SF 2.00 strainer may be fitted with pressure gauges upstream and downstream of the strainer.



STANDARD EQUIPMENT

- Stainless steel mesh
  DN 25 - 150 mesh size 0.5 mm
  DN 200 - 600 mesh size 1 mm
- Drain plug in cover and body bottom

OPTIONS

- Strainer sizes DN 500 – 1000
  see Data sheet SF 2.00K/2.1.041.1
- Strainer mesh sizes 0.25 mm, 1 mm or 2.5 mm
- Pressure gauges upstream and downstream of the strainer
- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Screen Netting

screen-no.	light screen aperture mm	open screnn area %	standard
3	0.25	41	
4	0.5	51	DN 25 - 150
5	1.0	67	DN 200 - 400
7	2.5	69	

Sheet no. SF 2.00/2.1.061.1 - issue 12.06.2006

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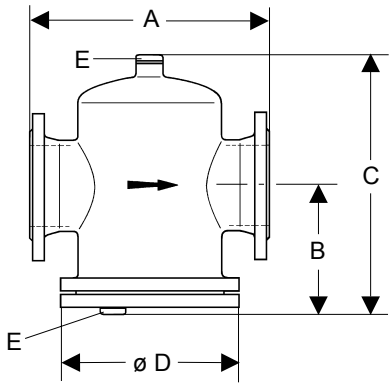
Strainer for pipelines, straight-through style up to 200 °C

Materials			
Nominal Diameter	DN 25 - 80	DN 100 - 150	DN 200 - 600
Temperature	200 °C	200 °C	200 °C
Body	St 37-2	St 37-2	St 37-2
Seal	Nova Universal	Nova Universal	Nova Universal
Screen	CrNiMo-steel	CrNiMo-steel	CrNiMo-steel
Screen Frame	CrNiMo-steel	grey cast iron	steel zinced



Dimensions [mm]										
		nominal diameter DN								
size	PN	25	32	40	50	65	80	100	125	150
A	up to PN 40	160	180	200	230	290	310	350	400	480
B*		140	140	160	190	200	200	230	260	300
		250	250	310	350	360	360	430	490	600
C		200	200	240	320	340	340	400	470	560
ø D		185	185	200	235	270	270	300	375	450
E		G 1/4	G 1/4	G 1/4	G 1/4	G 1/2	G 1/2	G 3/4	G 3/4	G 1

* size C with screen pulled out

Dimensions [mm]								
		nominal diameter DN						
size	PN	200	250	300	350	400	500	600
A	6 - 16	500	600	700	800	900	1100	1300
A	25	550	650	750	900	950	1150	1350
B	up to PN 25	310	360	420	480	550	680	790
*		750	900	1050	1150	1350	1600	1900
C		600	700	820	930	1050	1300	1500
ø D		450	530	580	710	750	940	1100
E		G 1	G 1 1/4	G 1 1/4	G 1 1/2	G 1 1/2	G 2	G 2

* size C with screen pulled out

Weights [kg]									
nominal	nominal diameter DN								
pressure	25	32	40	50	65	80	100	125	150
PN 16	-	-	-	-	25	35	45	55	75
PN 40	12	15	19	28	35	45	70	90	125

Weights [kg]							
nominal	nominal diameter DN						
pressure	200	250	300	350	400	500	600
PN 6, 10	85	145	205	310	430	660	1150
PN 16	120	160	215	340	510	920	1500
PN 25	170	250	320	460	650	1170	1900

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. SF 2.00/3.1.061.1 - issue 12.06.2006

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Strainer for pipelines
High pressure version made of forged steel, straight-through style, up to 550 °C

Technical Data

Connection	DN 15 - 100
Nominal Pressure	PN 160 - 500

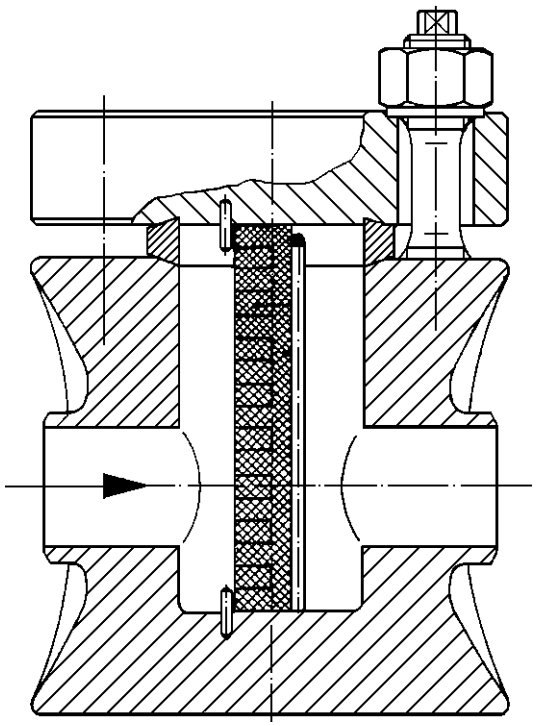
Description

Strainers protect plant and equipment such as regulators, valves, measuring equipment against damage or operational failure caused by contamination. They are essential for start-up as well as continuous operation.

SF 3.00 is manufactured from forged steel and features a lenticular-section metallic body seal. The standard model has welding spigot connections. The flat stainless steel strainer mesh which is positioned perpendicular to the flow, and the straight-through flow result in a minimum pressure drop and a large sludge collecting chamber.

Cleaning is extremely simple and quick. Only the cover has to be removed for dismantling.

The strainer may be installed in any position.



STANDARD EQUIPMENT

- Stainless steel mesh, mesh size 0.5 mm

OPTIONS

- Strainer mesh sizes 0.25 mm, 1 mm or 2.5 mm
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Screen Netting

screen no. (4 = standard screen)	light screen aperture mm	open screen area %
3	0.25	41
4	0.50	51
5	1.0	67
7	2.5	69

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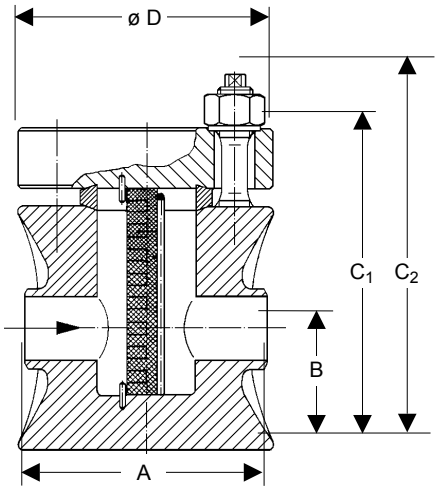
Strainer for pipelines
High pressure version made of forged steel, straight-through style, up to 550 °C

Materials				
Nominal Pressure	PN 160 - 500			
Temperature	400 °C	450 °C	520 °C	550 °C
Body	C22.8	15Mo3	13CrMo44	
Seal	St35.8	15Mo3	13CrMo44	10CrMo910
Screen	CrNiMo-steel			
Screen Frame	CrNiMo-steel			



Dimension [mm]										
		nominal diameter DN								
PN	size	15	20	25	32	40	50	65	80	100
160	A	125		165	165	180	180	205	250	280
	B	45		65	80	75	100	105	105	130
	C_1	125		175	205	200	250	265	270	335
	C_2	150		205	240	240	285	305	310	375
	ø E	130		170	170	190	190	220	270	300
250	A	125		175	175	190	190	225	250	280
	B	45		70	80	80	100	115	110	135
	C_1	130		195	215	220	260	290	300	355
	C_2	165		230	255	265	300	330	350	400
	ø E	130		180	180	200	200	240	270	305
315	A		140	175		200	200	225	260	285
	B		62.5	70		82.5	100	112.5	110	140
	C_1		170	195		220	265	300	300	365
	C_2		205	235		270	310	350	350	415
	ø E		145	180		210	210	245	280	315
400	A	130	145	185		205	195	230	270	295
	B	45	65	70		82,5	95	115	110	140
	C_1	125	180	195		225	250	310	310	375
	C_2	160	220	230		275	295	355	365	430
	ø E	135	150	190		215	205	250	290	320
500	A			195	185		200			
	B			70	75		100			
	C_1			200	215		270			
	C_2			245	255		310			
	ø E			200	190		210			

Weights [kg]									
nominal	nominal diameter DN								
pressure	15	20	25	32	40	50	65	80	100
PN 160	9	16	25	31	35	42	65	90	130
PN 250	13	18	30	35	41	50	76	105	160
PN 315	15	22	33	38	48	58	85	110	175
PN 400	16	24	35	42	53	60	105	140	190
PN 500	18	28	37	45	55	63	115	150	250

Special designs on request.
The pressure has always been indicated as overpressure.
Mankenberg reserves the right, to alter or improve the designs or specifications of the products described herein without notice.

Sheet no. SF 3.00/3.1.041.1 - issue 26.04.2004

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Strainer for pipeline, Y-type up to 400 °C

Technical Data

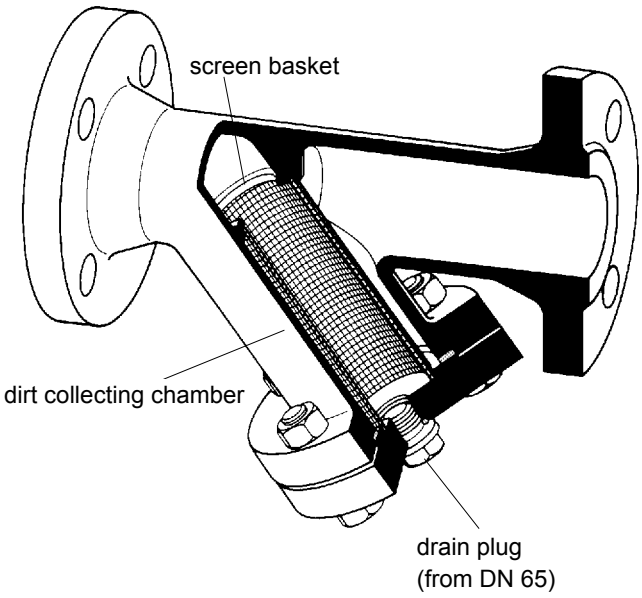
Connection	DN 15 - 400
Nominal Operating	PN 16 - 40

Description

Strainers protect plant and equipment such as regulators, valves, measuring equipment against damage or operational failure caused by contamination. They are essential for start-up as well as continuous operation.

SF 1.22 is a Y-shaped strainer having an internal strainer cylinder. Depending on the strainer size the available mesh sizes are 0.5 / 0.75 / 1.2 / 2.2 mm. For all strainer sizes a fine strainer (twin mesh) of mesh size 0.25 mm can be supplied at extra cost.

Because of their design and shape Y-shaped strainers exhibit larger pressure drops than pot strainers.



STANDARD EQUIPMENT

- Stainless steel mesh

OPTIONS

- Fine mesh 0.25 mm
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Sheet no. SF 1.22/2.1.061.1 - issue 12.06.2006

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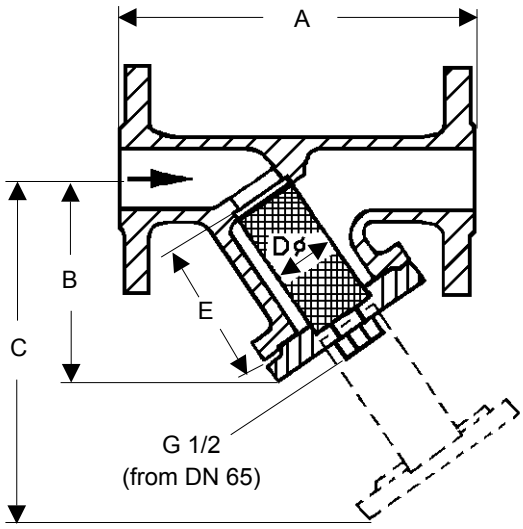
Strainer for pipeline, Y-type up to 400 °C

Materials		
Nominal Pressure	PN 16	PN 25/40
Temperature	300 °C	400 °C
Body	bis DN 25 grey cast iron ab DN 32 spheroidal cast iron	cast steel
Seeve Inlet	1.4301	1.4301
Seal	graphite	graphite



Dimensions [mm] and weights [kg] PN 16							
DN	size A	B	C	ø D	E	weight kg	light screen aperture
15	130	75	115	25	53	2.2	0.5
20	150	75	115	25	53	3	
25	160	90	135	31	68	3.8	0.75
32	180	90	135	38	71	5	
40	200	110	170	47	91	6.5	
50	230	120	190	57	105	8.5	
65	290	140	220	73	123	12	
80	310	165	265	88	144	16.6	1.2
100	350	220	340	108	184	25	
125	400	260	410	135	221	39	
150	480	300	475	160	260	61	
200	600	360	580	208	360	120	
250	730	550	830	260	370	230	2.2
300	850	610	950	304	485	300	
350	980	590	950	354	460	480	
400	1100	640	1150	430	540	570	

Dimensions [mm] and Weights [kg] PN 25/40							
DN	size A	B	C	ø D	E	weight kg	light screen aperture
15	130	65	120	18	50	2.5	0.5
20	150	75	125	25	53	3	
25	160	85	150	31	68	4	0.75
32	180	100	170	38	71	5	
40	200	110	205	47	91	7	
50	230	125	250	57	105	11	
65	290	145	285	73	123	18	
80	310	160	330	88	145	23	1.2
100	350	190	415	107	184	31	
125	400	220	485	134	221	48	
150	480	250	535	160	260	61	
200	600	310	720	208	360	153	

Flow Resistance ζ								
	nominal diameter DN							
PN	15	20	25	32	40	50	65	80
16	3.07	3.25	2.14	2.58	2.83	3.11	3.51	4.02
25/40	2.14	3.25	2.14	2.58	2.83	3.11	3.51	4.02

Flow Resistance ζ								
	nominal diameter DN							
PN	100	125	150	200	250	300	350	400
16	3.92	3.49	3.26	5.5	3.8	4.2	4.2	3.5
25/40	3.92	3.49	3.26	5.5	3.8	4.2	4.2	3.5

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. SF 1.22/3.1.061.1 - issue 12.06.2006

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Strainer for pipelines, straight-through style up to 130 °C

Technical Data

Connection	G 1/2 - 2
	DN 15 - 100
Nominal Pressure	PN 16

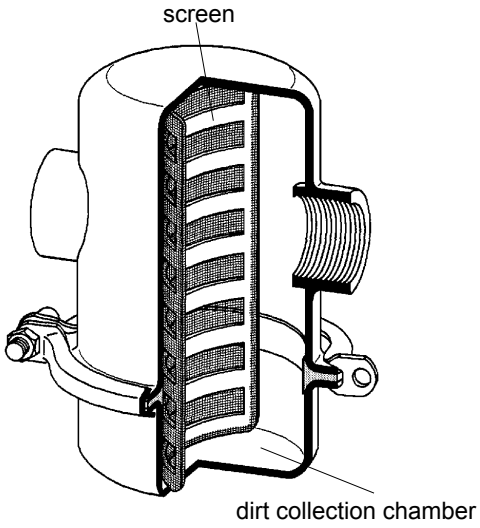
Description

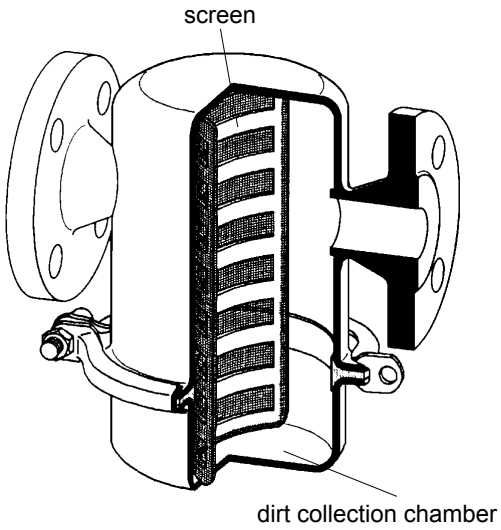
Strainers protect plant and equipment such as regulators, valves, measuring equipment against damage or operational failure caused by contamination. They are essential for start-up as well as continuous operation.

SF 6.00 is entirely manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. The flat stainless steel strainer mesh which is positioned perpendicular to the flow, and the straight-through flow result in a minimum pressure drop and a large sludge collecting chamber.

Top and bottom sections of the body are connected by a clamp ring and 2 bolts. Servicing/maintenance is easy and does not call for special tooling.

The strainer may be installed in any position; installation with the cover at the bottom is recommended.





STANDARD EQUIPMENT

- All stainless steel construction
- Strainer mesh size 0.5 mm
- Quick-release body clamp ring

OPTIONS

- Strainer mesh sizes 0.25 mm, 1 mm or 2.5 mm
- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Screen Netting		
screen-no. (4 = standard screen)	light screen aperture mm	open screen area %
3	0.25	41
4	0.50	51
5	1.0	67
7	2.5	69

Screen Plane cm²		
	nominal diameter	
DN 15 - 50	DN 65 - 80	DN 100
G 1/2 - 2	-	-
60	114	152

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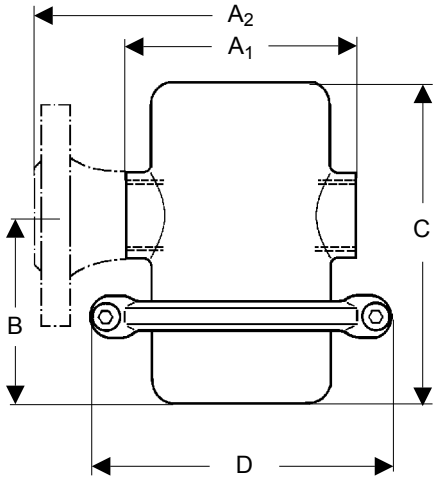
Strainer for pipelines, straight-through style up to 130 °C

Materials	
Body	CrNiMo-steel
Seal	EPDM
Screen	CrNiMo-steel
Screen Frame	CrNiMo-steel
Profile Clamp	CrNiMo-steel



Dimensions [mm]						
	nominal diameter G					
size	1/2	3/4	1	1 1/4	1 1/2	2
A_1*	110	110	110	110	110	160
B	105	105	105	105	105	105
C	155	155	155	155	155	155
D	140	140	140	140	140	140

* tolerance ± 2 mm

Weights [kg]					
nominal diameter G					
1/2	3/4	1	1 1/4	1 1/2	2
1.2	1.4	1.4	1.6	1.6	2.3

Dimensions [mm]									
	nominal diameter DN								
size	15	20	25	32	40	50	65	80	100
A_2*	150	150	160	180	200	230	290	310	350
B	108	108	108	108	108	108	148	1478	207
C	157	157	157	157	157	157	212	212	270
D	140	140	140	140	140	140	200	200	200

* tolerance ± 2 mm

Weights [kg]									
nominal diameter DN									
15	20	25	32	40	50	65	80	100	
2.6	3.2	3.6	5	5.1	6.3	9.4	10.7	13.5	

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. SF 6.00/3.1.061.1 - issue 12.06.2006

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Gas Filter for pipelines, straight-through style up to 80 °C

Technical Data

Connection	G 3/8 - 2 DN 15 - 250
Nominal Pressure	PN 16 - 160

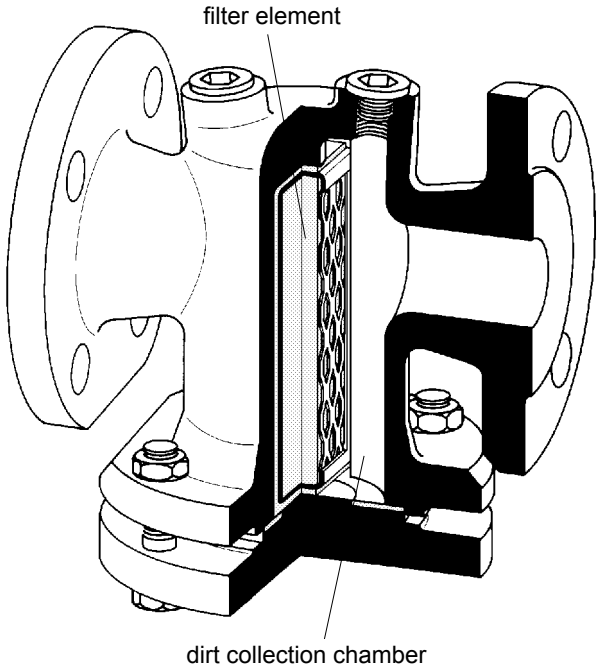
Description

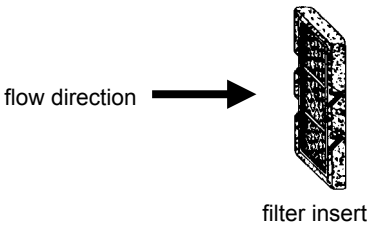
Gas filters protect plant and equipment such as regulators, valves, measuring equipment, safety valves and burners against damage or operational failure caused by contamination. They are essential for start-up as well as continuous operation.

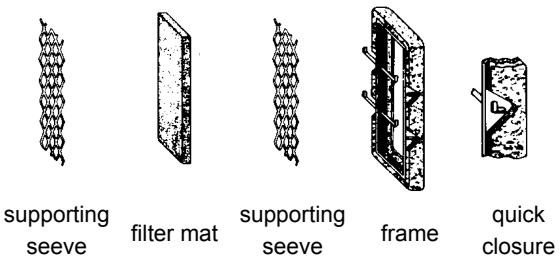
In systems equipped with multiple tube filters GF 1.01 may be used as a bypass filter instead of costly additional standby filters.

Cleaning is extremely simple and quick thanks to the quick-release locking of the filter element.

The filter may be installed in any position; installation with the cover at the bottom is recommended.







STANDARD EQUIPMENT

- Filter medium made of skeletal polyester foam (for pore size and number of sheets see tables on right)
- Stainless steel support frame fitted with quick-release locking

OPTIONS

- Filter medium in various pore sizes (see table on right)
- Pressure gauges upstream and downstream of the filter element
- Various seal materials suitable for your medium
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.

The pressure has always been indicated as overpressure.

We reserve the right to alter technical specifications without notice.

Filter Mat			
mat no.	size of pores mm	dust restraint capacity with testdust, limit grain 0.005 mm %	
80 (special)	0.150	clean	71
		medium	85
		dirty	91
60	0.265	clean	63
		medium	78
		dirty	86
45	0.370	clean	56
		medium	72
		dirty	82
30	0.580	clean	55
		medium	65
		dirty	70

Number of Filter Mats			
nominal diameter			
G 3/8 - 2	DN 15 - 50	DN 65 - 125	DN 150 - 250
1 x no. 60	1 x no. 60	1 x no. 60 1 x no. 45	1 x no. 60 1 x no. 45 1 x no. 30

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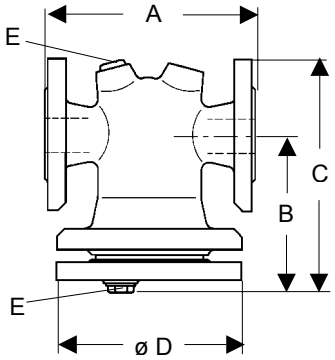
Gas Filter for pipelines, straight-through style up to 80 °C

Werkstoffe		
Body	PN 16	up to DN 25 grey cast iron from DN 32 spheroidal cast iron
	PN 25	cast steel
Seal		Nova Universal
Filter Mat		Polyesterfoam with skeleton construction
Supporting Frame		CrNiMo-steel

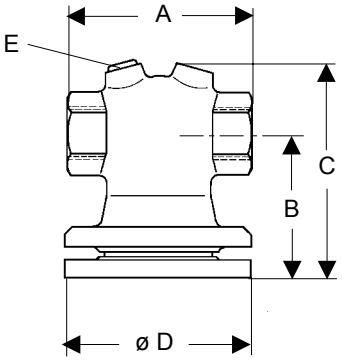


Dimensions [mm] flange connection

		nominal diameter DN												
size	PN	15	20	25	32	40	50	65	80	100	125	150	200	250
A	16	130	150	160	180	200	230	290	310	350	400	400	480	570
	40	196	200	-	244	-	-	-	-	-	-	-	-	-
	63/160	210	230	-	-	-	-	-	-	-	-	-	-	-
B	16	65	110	125	130	135	150	170	160	190	250	275	345	465
	40	120	120	-	130	-	-	-	-	-	-	-	-	-
	63/160	120	145	-	-	-	-	-	-	-	-	-	-	-
C	16	120	160	185	215	220	255	285	275	345	410	490	595	720
	40	170	170	-	215	-	-	-	-	-	-	-	-	-
	63/160	170	200	-	-	-	-	-	-	-	-	-	-	-
ø D	16	110	110	140	140	170	170	210	220	255	320	350	435	540
	40	110	110	-	140	-	-	-	-	-	-	-	-	-
	63/160	110	150	-	-	-	-	-	-	-	-	-	-	-
E	16 - 160	G 1/4									G 1/2			

Weights [kg] flange connection

	nominal diameter DN												
PN	15	20	25	32	40	50	65	80	100	125	150	200	250
16	22.5	4.5	6	8.5	13	17	25	30	46	67	90	158	260
40	5.5	6.5	-	11	-	-	-	-	-	-	-	-	-
63/160	8	16	-	-	-	-	-	-	-	-	-	-	-



Dimensions [mm] BSP female connection

		nominal diameter G						
size	PN	3/8	1/2	3/4	1	1 1/4	1 1/2	2
A	16	90	90	120	140	140	170	170
	40	120	120	120	-	160	-	-
	63/160	120	120	120	-	-	-	-
B	16	65	65	110	125	130	135	150
	40	120	120	120	-	130	-	-
	63/160	120	120	120	-	-	-	-
C	16	120	120	165	185	215	220	255
	40	170	170	170	-	215	-	-
	63/160	170	170	170	-	-	-	-
ø D	16	65	110	110	140	140	170	170
	40	110	110	110	-	140	-	-
	63/160	110	110	110	-	-	-	-
E	16 - 160	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4

Weights (kg) BSP female connection

	nominal diameter G						
PN	3/8	1/2	3/4	1	1 1/4	1 1/2	2
16	1.5	1.5	3	4	5	7.5	10.5
40	5	5	5	-	7	-	-
63	6	6	6	-	-	-	-
160	8	8	8	-	-	-	-

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. GF 1.01/3.1.061.1 - issue 12.06.2006

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Gasfilter for pipelines, straight-through style up to 80 °C

Technical Data

Connection	G 1/2 - 2
	DN 15 - 100
Nominal Pressure	PN 16

Description

Gas filters protect plant and equipment such as regulators, valves, measuring equipment, safety valves and burners against damage or operational failure caused by contamination. They are essential for start-up as well as continuous operation.

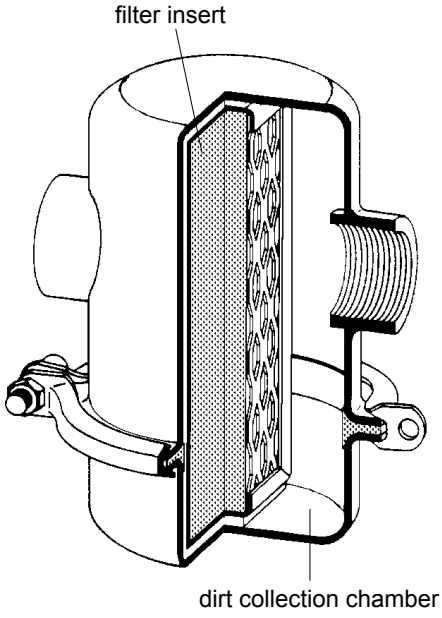
In systems equipped with multiple tube filters GF 6.01 may be used as a bypass filter instead of costly additional standby filters.

GF 6.01 is entirely manufactured from deep-drawn stainless steel featuring excellent corrosion resistance.

Top and bottom sections of the body are connected by a clamp ring and 2 bolts.Cleaning is extremely simple and quick thanks to the quick-release locking of the filter element.

Servicing/maintenance is easy and does not call for special tooling.

The filter may be installed in any position; installation with the cover at the bottom is recommended.



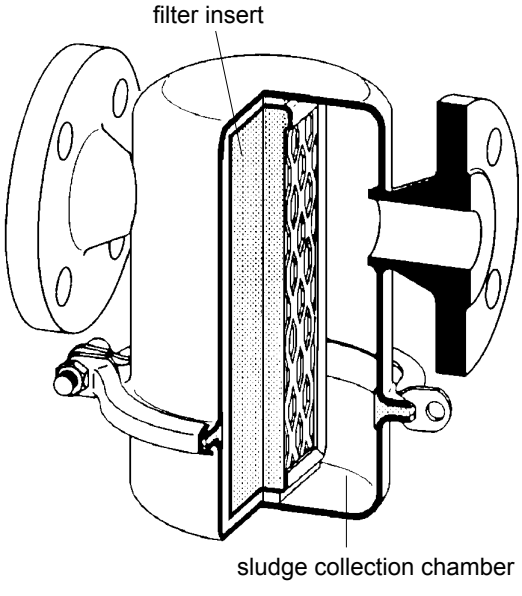
STANDARD EQUIPMENT

- Filter medium made of skeletal polyester foam (for pore size and number of sheets see overleaf)
- Stainless steel support frame fitted with quick-release locking
- Quick-release body clamp ring

OPTIONS

- Filter medium in various pore sizes (see table on right)
- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.



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Gasfilter for pipelines, straight-through style up to 80 °C

Materials	
Body	CrNiMo-steel
Seal	EPDM
Filter Mat	Polyesterfoam with skeleton construction
Supporting Frame	CrNiMo-steel
Profile Clamp	CrNiMo-steel

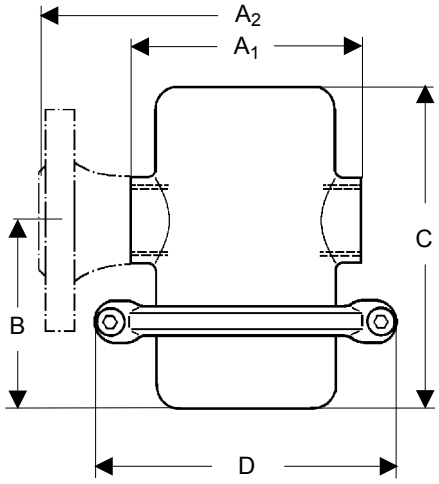
Dimensions [mm]

	nominal diameter G					
size	1/2	3/4	1	1 1/4	1 1/2	2
A_1	110	110	110	110	110	160
B	105	105	105	105	105	105
C	155	155	155	155	155	155
D	140	140	140	140	140	140

* tolerance ± 2 mm

Weights [kg]

nominal diameter G					
1/2	3/4	1	1 1/4	1 1/2	2
1.2	1.4	1.4	1.6	1.6	22.3



Dimensions [mm]

	nominal diameter DN								
size	15	20	25	32	40	50	65	80	100
A_2	150	150	160	180	200	230	290	310	350
B	105	105	105	105	105	105	135	135	210
C	155	155	155	155	155	155	205	205	280
D	140	140	140	140	140	140	195	195	195

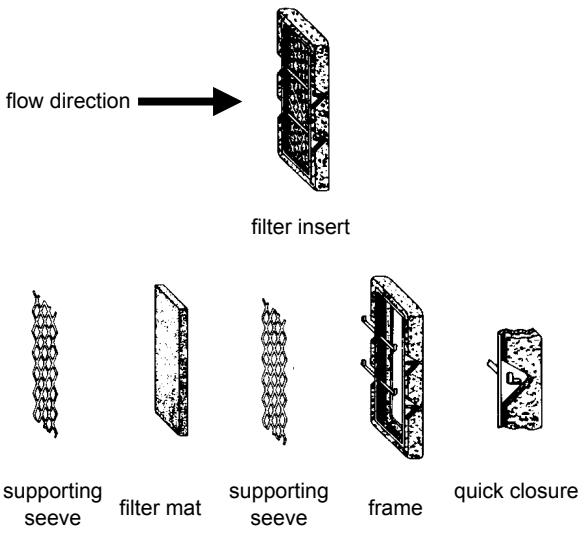
* tolerance ± 2 mm

Weights [kg]

nominal diameter DN								
15	20	25	32	40	50	65	80	100
2.6	3.2	3.66	5	5.4	6.3	9.4	10.7	13.5

Filter Mats

Mat no.	size of pores	dust restraint capacity % with testdust, limit grain 0,005 mm	
80	0.150 mm	clean	71
		medium	85
		dirty	91
60	0.265 mm	clean	63
		medium	78
		dirty	86
45	0.370 mm	clean	56
		medium	72
		dirty	82



Number of Filter Mats

nominal diameter G 1/2 - 2	DN 15 - 50	DN 65 - 100
1 x no. 60	1 x no. 60	1 x no. 60 1 x no. 45

Special designs on request.
The pressure has always been indicated as overpressure.
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Filter for steam, gases and corrosive media up to 190 °C

Technical Data

Connection	G 1/2 - 2 DN 15 - 50
Nominal Pressure	PN 16

Description

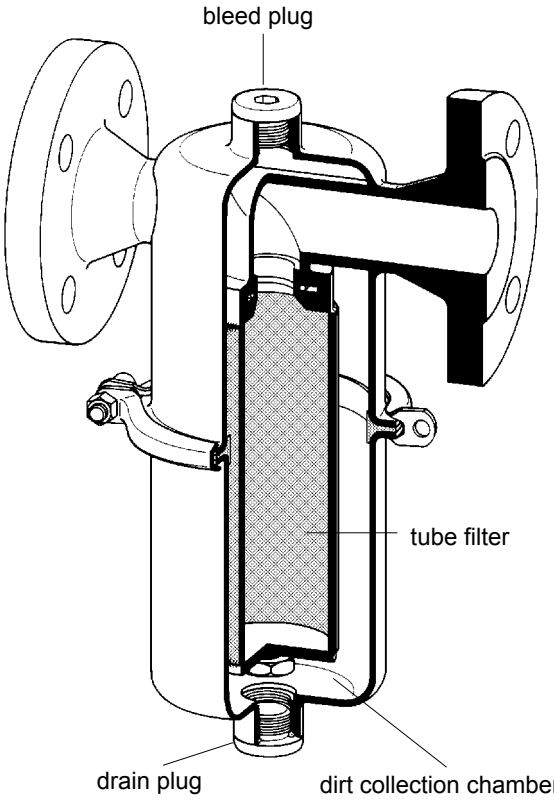
Filters are used to retain contaminants present in fluids.
F 6.06 is entirely manufactured from deep-drawn stainless steel featuring excellent corrosion resistance. For this reason it is used for the filtration of corrosive gases and liquids.

Top and bottom sections of the body are connected by a clamp ring and 2 bolts. Servicing/maintenance is easy and does not call for special tooling.

Two different types of tube filters can be fitted in the filter body.
Type P: High quality pleated 3-ply filter element (fabric/metallic fibre fleece/ fabric)
Type S: Filter element made of sintered stainless steel

Low pressure loss and large dirt retention capacity ensure long life and minimise servicing and maintenance.

The filter may be cleaned by blowing-through with compressed air or steam or flushing-through using a suitable cleaning agent. The best results are obtained by ultrasonic cleaning in an aqueous solution.



STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring
- Retained particle size: type P - 25 µm; type S - 20 µm
- Drain plug in body bottom section
- Bleed plug in body top section

OPTIONS

- Retained particle size 5 µm for types P and S
- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Resistance Coefficient ζ

filter element type	particle size µm	nominal diameter G 1/2 - 1 1/4 DN 15 - 32	nominal diameter G 1 1/2 + 2 DN 40 + 50
P	25	15	13
	5 (option)	17	16
S	20	16	15
	5 (option)	28	25

Max. permitted Pressure Drop [bar]

design		nominal diameter G 1/2 - 1 1/4 DN 15 - 32	nominal diameter G 1 1/2 + 2 DN 40 + 50
P	5/25 µm	16	5
S	5 µm	12	11
	20 µm	8	7

Calculating the pressure drop

$\Delta p = \zeta \cdot \omega^2/2 \cdot \rho \cdot 10^{-5}$ [bar]

ζ	resistance coefficient (see table)
ω [m/s]	fflow velocity within the connection cross section (nominal diameter)
ρ [kg/m^3]	density of fluid

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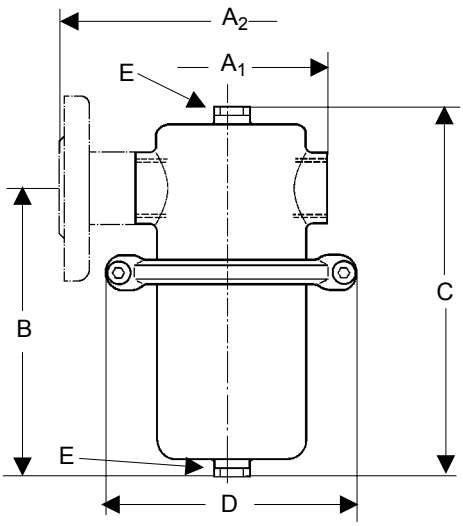
Filter for steam, gases and corrosive media up to 190 °C

Materials		
Design	P	S
Body	CrNiMo-steel	CrNiMo-steel
Seal	FPM-D	FPM-D
Filter Element	CrNiMo-steel, EP	1.4404
Profile Clamp	CrNiMo-steel	CrNiMo-steel



Dimensions [mm]						
	nominal diameter G					
size	1/2	3/4	1	1 1/4	1 1/2	2
A_1	160	158	156	204	192	192
B	235	235	235	235	350	350
C	275	275	275	275	420	420
D	140	140	140	140	200	200
E	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4

Weights [kg]					
nominal diameter G					
1/2	3/4	1	1 1/4	1 1/2	2
3.1	3.2	3.3	3.7	6.8	7

Dimensions [mm]						
	nominal diameter DN					
size	15	20	25	32	40	50
A_2	160	160	160	180	200	230
B	235	235	235	235	350	350
C	275	275	275	275	420	420
D	140	140	140	140	200	200
E	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4

Weights [kg]					
nominal diameter DN					
15	20	25	32	40	50
4.2	4.7	5	6	7.4	10.3

Special designs on request.
The pressure has always been indicated as overpressure.
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Sheet no. F 6.06/3.1.062.1 - issue 25.09.2006

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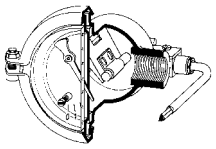
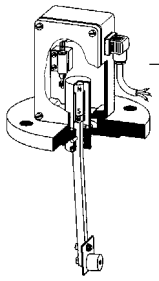
Flow Switches

For installation in pipelines — SW 6.14



with internal flag and external indicator
for horizontally pipelines
all stainless steel SST 316 construction
PN..... 16 G..... 1/2 - 1 1/2
T..... 80 °C

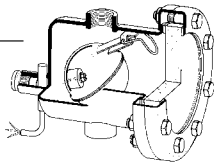


SW 1.10 / 1.20 / 1.40 — For installation on a pipeline

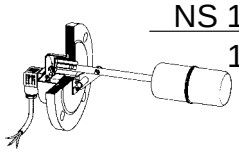
pendulum-type flow switch for horizontally pipelines
SW 1.20 and SW 1.40 with switching point adjustment
flange C 22.8, stainless steel
PN..... 16 - 40 DN..... 50 - 200
T..... 120/170 °C

Float Switches

Closed type — NS 5 / 6



NS 5 without sightglass , NS 6 with sightglass
all CrNiMo-steel construction
PN..... 10 G..... 1/2
T..... 80 °C



NS 15 / 16 — For installation in tanks

NS 15 horizontally installation Einbau
NS 16 vertically installation
flange C 22.8, stainless steel
PN..... 16 - 25 DN..... 65
T..... 120 °C

Sheet no. SW/NS 14.1.081.1 - issue 06.02.2008

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Flow Switches with flapper-sensor and external pointer
for liquids up to 80 °C

HIGH GRADE

Technical Data

Connection	G 1/2 - 1 1/2
Nominal Pressure	PN 16

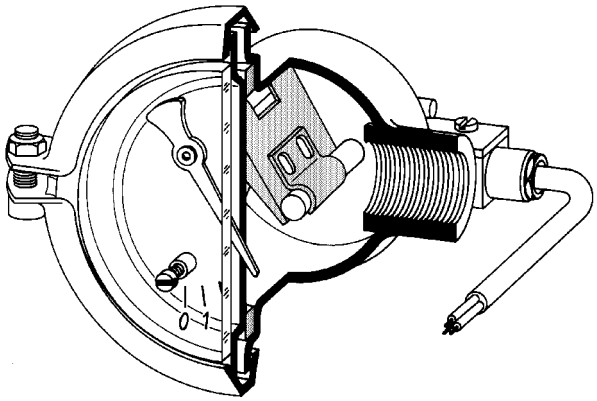
Description

Flow switch for horizontal installation featuring a vane as sensor element. The flow moves a pivoted vane fitted with a permanent magnet which operates a reed switch and an external pointer through a non-magnetic pressure-proof panel.

SW 6.14 is manufactured from deep-drawn stainless steel featuring excellent corrosion resistance and is therefore especially suitable for all laboratory and food industry applications as well as corrosive fluids used in the chemical industry.

The flow volume can be estimated by means of an external pointer and scale with 10 divisions.

Top and bottom sections of the body are connected by a clamp ring and 2 bolts. Servicing/maintenance is easy and does not call for special tooling.



STANDARD EQUIPMENT

- All stainless steel construction
- Quick-release body clamp ring
- External pointer
- Acrylic glass with 10-division scale
- Reed switch with 1 m cable tail

OPTIONS

- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Switching Rate for water m^3/h (horizontally installation Einbau)

G	flow rate increasing	flow rate decreasing	design
1/2	0.6	0.3	without resetting spring
3/4	0.8	0.5	with wightloaded,
1	0.8	0.5	hanging flapper
1 1/4	3	2	with
1 1/2	3	2	resetting spring

Switching Tube
magnetic switch DRU with 1 meter cable tail

max. Electric Data			
V	A	VA~	W-
250	1	40	40

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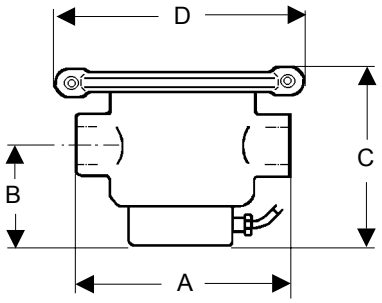
Flow Switches with flapper-sensor and external pointer
for liquids up to 80 °C

Materials	
Body	CrNiMo-steel
Seal	NBR
Glass	acrylic-glass
Internals	CrNiMo-steel
Profile Clamp	CrNiMo-steel



Dimensions [mm]					
	nominal diameter G				
size	1/2	3/4	1	1 1/4	1 1/2
A	100	105	130	182	190
B	50	50	50	50	50
C	100	100	100	100	100
D	ø 140	ø 140	ø 140	ø 140	ø 140

Weights [kg]				
nominal diameter G				
1/2	3/4	1	1 1/4	1 1/2
0.95	0.95	0.95	1.2	1.2

Special designs on request.
The pressure has always been indicated as overpressure.
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Float Switches with flow sensor / pendulum,
up to 170 °C

Technical Data

Connection	DN 50 for pipelines up to DN 200
Nominal Pressure	PN 16 - 40

Description

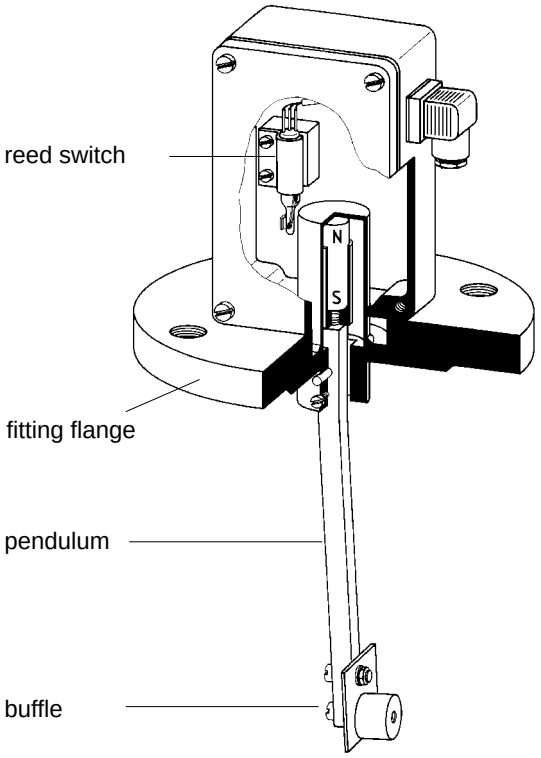
Flow switch for installation in horizontal pipe runs featuring a robust flow sensor which by its reciprocating movement operates a reed switch.

In the case of SW 1.10 the switching threshold is set at the factory according to the information provided on the order form. This threshold my be varied on-site by fitting a different size of impact baffle.

In the case of SW 1.20 and SW 1.40 the threshold can be varied from outside.

SW 1.10 and 1.20 are fitted with a two-way reed switch; type 1.40 is fitted in its standard version with a normally closed switch (switch closes when flow decreases).

All types of flow switch have an aluminium switchgear box. Standard types SW 1.10 and SW 1.20 feature a built-in angled electrical connector as per DIN 43650.



OPTIONS

- Stainless steel connecting flange
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

Type	Switching Point Adjustment
SW 1.10	no, point fixed at 0.2 - 0.5 m/s
SW 1.20	yes, via spring 0.5 - 1 m/s or 1 - 1.5 m/s
SW 1.40	yes, via magnet 0.2 - 0.5 m/s or 0.5 - 1 m/s

Switching Capacities				
Typ	V	A	VA~	W-
1.10	24 - 250	1	200	130
1.20	24 - 250	1	200	130
1.40	24 - 250	1	200	130

Sheet no. SW 1.10/2.1.061.1 - issue 12.06.2006

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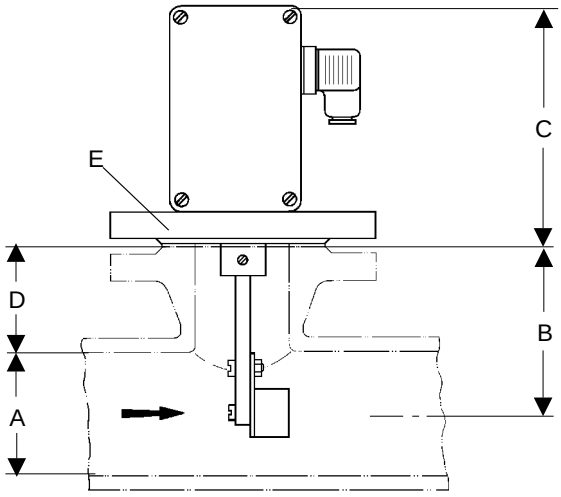
Float Switches with flow sensor / pendulum,
up to 170 °C

Materials			
Type	SW 1.10	SW 1.14	SW 1.15
Temperature	120 (170) °C	80 °C	80 °C
Connection Flange	C 22.8	C 22.8	C 22.8
Internals	CrNiMo-steel, brass		CrNiMo-steel
Switch Housing	aluminium	aluminium	aluminium
Explosion Proof Switch	-	Ex sG5	
Other Details	angled connector	fly lead 1 m	cable gland PG 16

Materials			
Type	SW 1.20	SW 1.24	SW 1.40
Temperature	120 (170) °C	80 °C	120 °C
Connection Flange	C 22.8	C 22.8	C 22.8
Internals	CrNiMo-steel, brass		CrNiMo-steel
Switch Housing	aluminium	aluminuim	aluminium
Explosion Proof Switch	-	Ex sG5	-
Other Details	angled connector	fly lead 1 m	cable gland PG 16



Dimensions [mm]											
	nominal diameter DN										
size	50	65	80	100	125	150	200	250	300	350	400
B	105	113	120	130	143	155	180	205	230	255	280
C	150 (175 for SW 1.20 and SW 1.24)										
	250 for 170 °C version										
D	80										
E	for all nominal diameter: flange DN 50										

Weights [kg]	
version	DN 50 - 400
80 / 120 °C	5
170 °C	6

Special designs on request.
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Sheet no. SW 1.10/3.1.061.1 - issue 12.06.2006

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Electrical Float Switches
up to 120 °C

Technical Data

NS 5, NS 6:	
Connection	G 1/2
Nominal Pressure	PN 10
NS 15, NS 16:	
Connection	DN 65
Nominal Pressure	PN 16 - 25

Beschreibung

Float switches featuring magnetic coupling signal changes in liquid levels. They can be used for indicating liquid levels, for 2-point level control and as alarm units to ensure that minimum or maximum liquid levels are maintained.

The differential switching level is the difference in the liquid levels between switching on and switching off. By installing 2 float switches at different levels and using a latching relay, any differential swiching levels may be obtained (see circuit diagram overleaf).

Types NS 15 and NS 16 feature a built-in angled electrical connector as per DIN 43650 for especially easy installation.

Fitting position:
NS 5, NS 6 and NS 15 for vertical installation, NS 16 for horizontal installation.

STANDARD EQUIPMENT

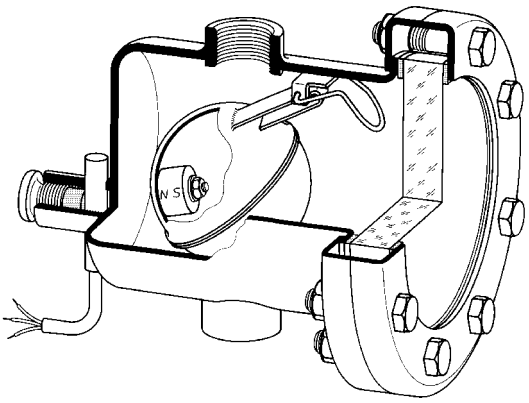
- NS 5, NS 6: all stainless steel construction
- NS 6 with sightglass for visual control
- NS 15, NS 16: float and internal components stainless steel
- NS 15, NS 16: built-in angled electrical connector as per DIN 43650 for especially easy installation

OPTIONS

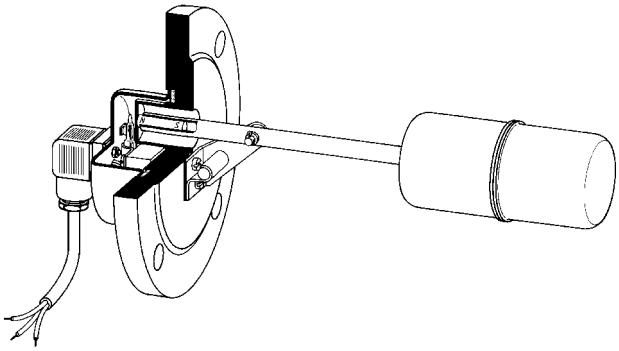
- Various seal materials suitable for your medium
- Special connections: Aseptic, ANSI or DIN flanges, welding spigots; other connections on request
- Special versions on request

Operating instructions, Know How and Safety instructions must be observed.
The pressure has always been indicated as overpressure.
We reserve the right to alter technical specifications without notice.

NS 6



NS 15



type	max. Electrical Switching Capacities		
NS 5, 6	max. 250 V	1 A	30 VA~
NS 5, 6	max. 250 V	1 A	20 W-
NS 15, 16	max. 250 V	1 A	200 VA~
NS 15, 16	max. 250 V	1 A	130 W-

Differential Switching Levels	
type	mm
NS 5, 6	5
NS 15, 16	15

min. Liquid Density	
type	kg/m^3
NS 5, 6	900
NS 15, 16	750

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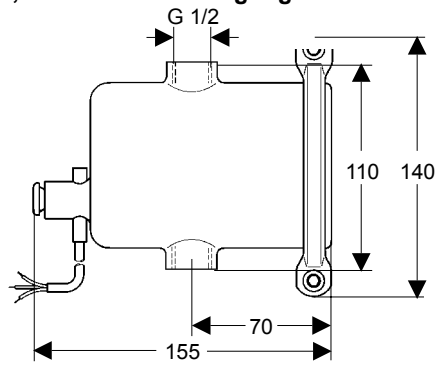
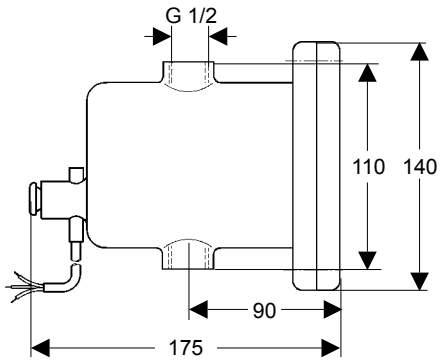
Electrical Float Switches
up to 120 °C

Materials		
Type	5, 6, 5 Ex, 6 Ex	15, 16
Body	CrNiMo-steel	-
Float	CrNiMo-steel	CrNiMo-steel
Internals	CrNiMo-steel	CrNiMo-steel
Connection Flange	-	C22.8 optional CrNiMo-steel

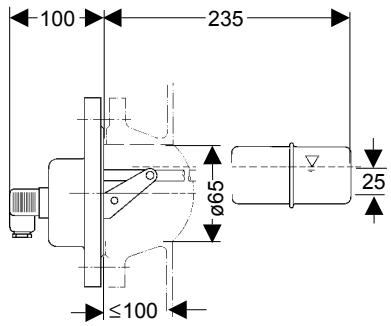
NS 5, NS 5 Ex without sight glass



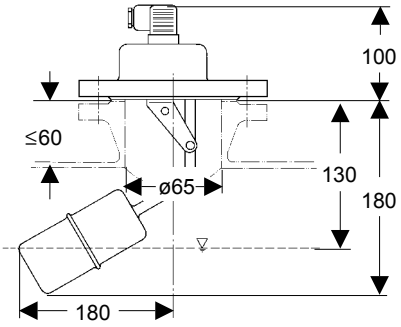
Typ NS 6, NS 6 Ex with sight glass



NS 15

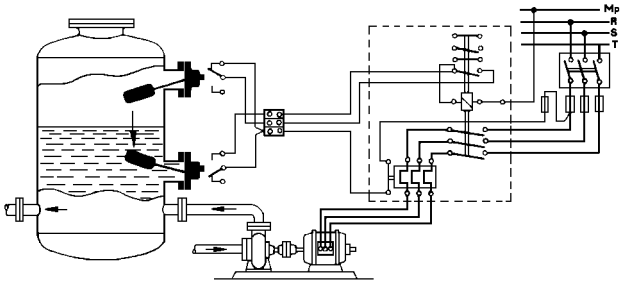


NS 16



Liquid feed to vessel controlled by 2 type 15 float switches and electric pump.

The two float switches are wired to open as the float rises. As the liquid level drops to the level of the lower float switch, the feed pump is switched on. When the liquid reaches the level of the upper float switch the pump is switched off.



Special designs on request.
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Sheet no. NS 5/3.1.061.1 - issue 12.06.2006

WIR REGELN DAS SCHON
FIRMLY IN CONTROL

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Approvals and Certificates

Unsere Qualität ist Ihre Sicherheit. **Our quality is your security.**

- ISO 9001 seit 1994, since 1994
- Druckgeräterichtlinie 97/23/EG, pressure equipment directive 97/23/EG
- Geprüfte Schweißer nach Grundlage EN 729-2, examined welder according to basis EN 729-2
- Framatome ANP, KTA 1401 und QSP 4a seit 1983, since 1983

- **Abnahmeprüfzeugnisse und Materialzertifikate nach: inspection and material certificates according to:**

EN 10204/2.1
EN 10204/2.2
EN 10204/3.1B
EN 10204/3.1A

- **Abnahmen durch: inspections by:**

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