

**MANKENBERG**

Industriearmaturen  
Industrial Valves



Your Specialist and Partner in the Domain  
of Pipeline and Storage Tank Applications

# Surge Relief Valve

SR 6.2P

## Special Feature

Self-actuated valve

No external energy, no nitrogen back-up system, no temperature compensation device and no skid mounting required

Flow optimised design (CFD)

Least possible flow losses,  $\alpha_f$  max. 0,6

Valve in welded construction

By comparison it features a low weight, an adapted building length, special materials and individual flange standards are possible, short delivery times

Inner parts, pilot valve, piping and operating elements of CrNiMo-steel, painting as per DIN ISO 12944 part 5 C5-M

High corrosion protection

Exchangeable filter in the pilot system

Filter may be changed during operation, trouble-free function

MOD

Manual Opening Device

Function control, bleeding, flushing, filling of the valve

Pilot operation, closing time and response pressure can be adjusted

Optimal response behaviour, low-stress closure

Balanced cone, specific customer  $K_{vs}$ -value

High seat tightness until the response pressure is reached, smaller slop tanks possible, independent from counter-pressure

Earthquake-proof

Can be used world-wide

Resistant to vacuum

Also suitable for dry running systems

## Options

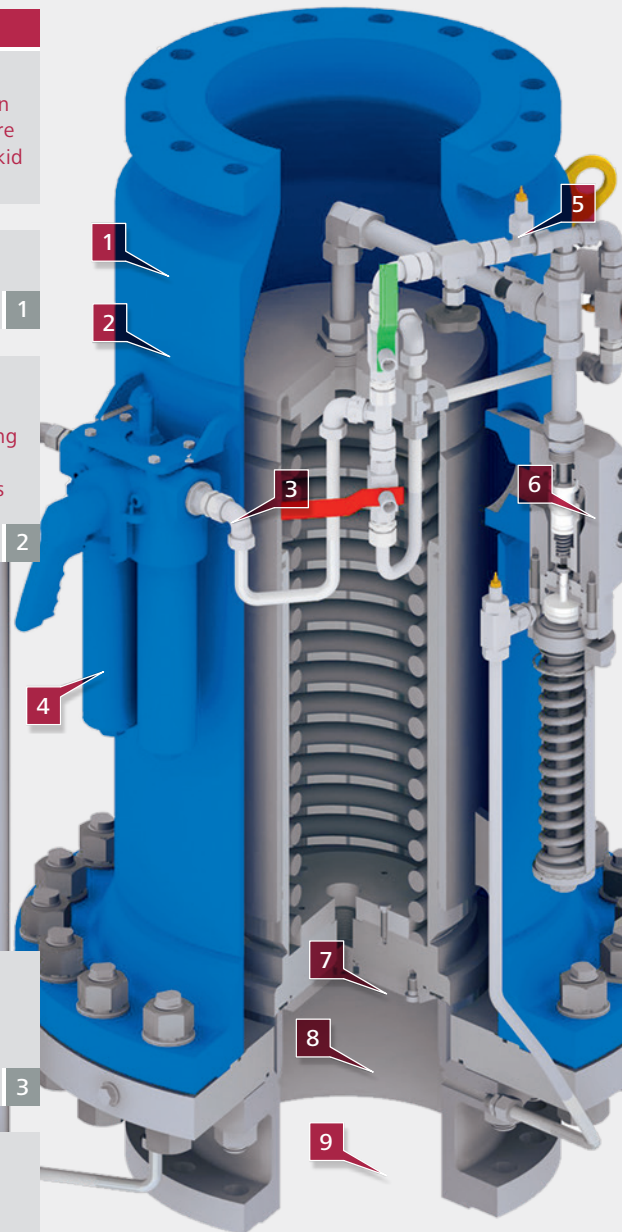
Second pilot valve

Switchable response pressure



Flow indicator and/or stroke sensor

Function monitoring, recording



## Surge Relief Valve (Peak Load)

SR 6.2

Self-actuated for extreme flow rates | straightway valve with optimised design with least possible flow loss | directly acting or pilot-operated | shortest possible response times | suitable for nearly all liquids | valve of welded steel, CrNiMo steel or special stainless steel | can be designed for any application, any problem with regards to pressure relief can be solved | versions for vertical or horizontal installation

DN	150 - 400	PN	16 - 160
$p_1$	max 160 bar	T	-30 to +130 °C / - 22 to + 266 °F
$C_{vs}$	465 - 2,791 US gal/min.	$K_{vs}$	400 - 2,400 m <sup>3</sup> /h





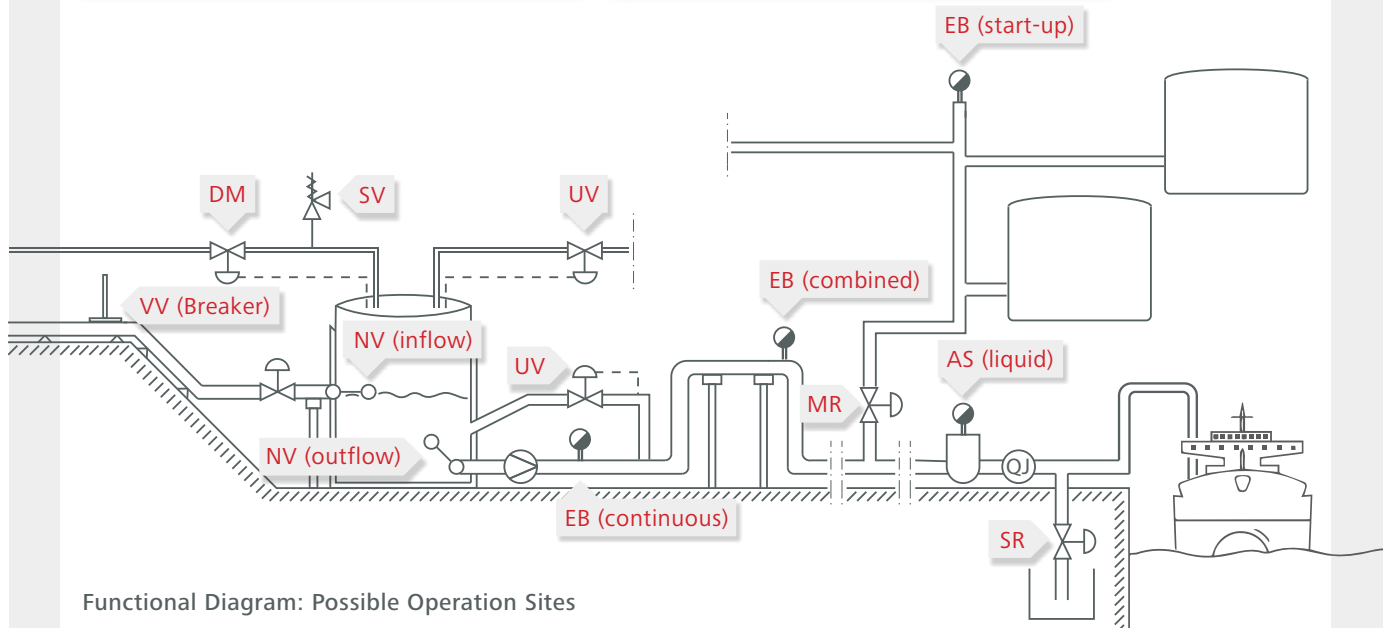
# Extract from the Variety of our Valves for Pipeline and Storage Tank Applications

## Spring-operated Pressure Control Valves

Pressure Reducing Valves (DM)  
Back Pressure Regulators (UV)  
Pilot-operated Control Valves (RP)  
Flow Controllers (MR)  
Differential Pressure Regulators (DV)  
Vacuum Control Valves (VV)  
Vacuum Breakers (VV)  
Surge Relief Valves (SR)  
Safety Valves (SV)

## Float-operated Control Valves

Start-up Bleeding and Venting Valves (EB)  
Continuous Bleeding and Venting Valves (EB)  
Combined Bleeding and Venting Valves (EB)  
Combined Bleeding and Venting Valves with Vacuum Breaker (EB)  
Steam Traps (KA)  
Float Valves (NV)  
Liquid Separators (AS)  
Gas Separators (AS)



## Pilot-operated Control Valve

RP 810, 820

Cast steel pilot-operated pressure reducing valve or backpressure regulator for large flow rates | suitable for liquids and gases | body made of GGG-40, GS-C 25, CrNiMo steel | maintenance work can be done from above at the installed valve, special versions available | hard-faced valve cone and seat available for high pressure drops

DN	40 - 400	PN	10 - 160
$p_1$	2 - 40 bar	T	130 °C
$p_2$	1 - 40 bar	$K_{vs}$	20 - 900 m <sup>3</sup> /h

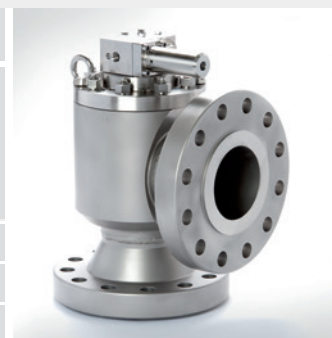


## Pilot-operated Control Valve

RP 810ECK, 820ECK

Pilot-operated pressure reducing valve or backpressure regulator | single-seat, angled design suitable for high flow rates and high pressures | usable for liquids and gas | body made of C-steel, CrNi-Mo-steel, special materials such as Duplex, Superduplex or Hastelloy® available | NACE-compatible | pilot valve and throttle block with integrated strainer and throttle valves completely of CrNiMo-steel | hard-faced valve cone and seat available for high pressure drops

DN	40 - 150	PN	10 - 160
$p_1$	2 - 63 bar	T	130 °C
$p_2$	1 - 40 bar	$K_{vs}$	20 - 250 m <sup>3</sup> /h



# Mankenberg Valves for Pipeline Applications in Action

## Pilot-operated Control Valve

RP 814, 815, 824, 825

Pilot-operated pressure reducing valve or backpressure regulator for large flow rates | inline design, welded construction | RP 815, RP 825 with extended casing for maximum  $K_{vs}$ -values, high pressure at large flow rates | body made of steel, CrNiMo steel | special versions available

DN	100 - 800	PN	10 - 160
$p_1$	2 - 20 bar	T	130 °C
$p_2$	1 - 40 bar	$K_{vs}$	60 - 2,100 m <sup>3</sup> /h



## Pressure Reducing Valve for Tank Inertisation

DM 586

Single-seat straight-way valve with balanced cone for high flow rates, especially for the control of millibar ranges | completely made of deep-drawn CrNiMo-steel (316L) – surface finish of the body  $Ra \leq 1.6 \mu\text{m}$  | adjusting screw as a function of display, corrosion-resistant, very lightweight and compact | very precise owing to large control surfaces and a large number of different control ranges, available in many different versions | various connections and special versions available | can be actuated pneumatically, spring cap available with leakage line connection and adjusting screw

DN	20 - 50	PN	16
G	¾ - 2	T	130 °C
$p_1$	0.008 - 0.96 bar	$K_{vs}$	7 - 22 m <sup>3</sup> /h



## Pressure Reducing Valve for Tank Inertisation

DM 762

Single-seat straight-way valve for medium flow rates, especially for the control of millibar ranges | usable for liquids and gases | completely made of deep-drawn CrNiMo-steel (316L) – surface finish of the body  $Ra < 1.6 \mu\text{m}$  | corrosion-resistant, very lightweight and compact | very precise owing to large control surfaces and a large number of different control ranges, available in many different versions

DN	15 - 50	PN	16
G	1/2 - 2	T	130 °C
$p_1$	0.002 - 0.52 bar	$K_{vs}$	0.2 - 3.6 m <sup>3</sup> /h



## Pilot-operated Pressure Reducing Valve for Tank Inertisation

RP 840

Millibar control valve for large flow rates, very precise, available in various versions | completely made of deep-drawn CrNiMo steel | optimal surface characteristics, highest regulating accuracy, lowest control ranges up to a limit of 2 millibar

DN	25 - 150	PN	16
		T	130 °C
$p_2$	0.002 - 0.52 bar	$K_{vs}$	4 - 160 m <sup>3</sup> /h



## Backpressure Regulator for Tank Inertisation

UV 3.9

Single-seat valve in the straight-way, angle-type or U-shaped version for very small inlet pressures | completely made of deep-drawn CrNiMo-steel (316L) – surface finish of the body  $Ra \leq 1.6 \mu\text{m}$  | high regulating accuracy, low control ranges, good surface characteristics, various  $K_{vs}$ -values and versions possible

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



## Vacuum Breaker with Setting Scale

VV 34, 35, 36

VV 34 with flange connection, with spring cap (CrNiMo steel) and setting scale, VV 35 screw-in version | VV 36 without spring cap and setting scale | suitable for liquids and gases | body made of CrNiMo steel, flange of steel, CrNiMo steel | available in special materials, e.g. seawater resistant material, NACE compatible | nearly universally usable

DN	20 - 250	PN	6 - 40
G	1/2 A - 2 1/2 A	T	300 °C
p <sub>2</sub>	0.05 - 0.95 bar	K <sub>Vs</sub>	1.2 - 388 m <sup>3</sup> /h



## Combined Valve especially for Clean Water

EB 1.74

For large air volumes at startup, continuous bleeding or venting under pressure, opens with large ventilation capacity if a vacuum is present | suitable for nearly all liquids | completely made of deep-drawn CrNiMo steel (316L) – surface finish of the body Ra ≤ 1.6 µm | corrosion-resistant, very lightweight and compact | long operational lifespan, manageable installation, easy-to-maintain, owing to the clamp system – high effectiveness with compact design

DN	50 - 150	PN	16
p	0.2 - 8 bar	T	130 °C
		Q	1,783 Nm <sup>3</sup> /h



## Bleeding and Venting Valve for highest Flow Rates

EB 6.54

Suitable for high operational pressures | large bleed air volumes during startup, large vent air volumes during draining | bleeding under pressure owing to adapted continuous venting valve | avoids cavitation peaks | suitable for nearly all liquid media, also for petrol, oil and chemicals | body made of steel, CrNiMo-steel, massive welded construction, extremely sturdy, also available in seawater-resistant materials | optimal triple functionality

DN	25 - 300	PN	6 - 40
		T	130 °C
p	0.3 - 40 bar	Q	18,550 Nm <sup>3</sup> /h



## Sieve Basket Strainer for large Nominal Diameters

SF 2.001

Low pressure drop, different sieve finenesses, clear mesh width 0.01 - 5 mm | usable for liquids, gases and steam | body made of steel, CrNiMo-steel | sieve basket made of stainless steel 316 with mesh made of stainless steel 316L | cover with bleeding plug, drain plug in body bottom | very sturdy welded construction of steel or CrNiMo-steel, specific customised versions available

DN	50 - 1,000	PN	16 - 40
		T	450 °C



## Customised Solutions – Your operating data determine the solution.

Customer-specific solutions are individually designed valves for our customers' special requirements. Mankenberg checks with every enquiry the customer-specific technical operating data and subsequently quotes the technical solution. If the operating data require solutions which cannot be realised with Mankenberg standard valves, our engineers will be happy to develop special solutions in accordance with our customer's enquiry. This may lead to either slightly modified valve type series or to a complex system.

Discover our strength also in this case and send us your enquiry.



Example



# Mankenberg Valves for Pipeline and Storage Tank Applications in Action

## Constant Pressure Control in a Gas Treatment Plant

Natural gas is composed nearly entirely of highly combustible methane, but during extraction from the wellhead it contains various impurities, for example ethane, propane, butane, hydrogen, hydrogen sulphides, helium and others, which must be separated and removed prior to further processing.

In a natural gas separation plant the incoming gas firstly flows through a filter, the so-called slug catcher, in which for example sand and other solid particles, water and/or crude oil are removed. Having a pressure of 34 - 40 bar, the gas is then conducted to a high pressure separator unit that is to separate all of the condensates from the gas. Since the separator works at a pressure of 30 bar, the Mankenberg pressure control valve **MRP 810 ECK** has been installed upstream of the unit. The valve constantly reduces the gas pressure to the required pressure of 30 bar. The flow rate varies between 1,890 and 26,295 Nm<sup>3</sup>/h at temperatures between 25 °C and 45 °C.

The pilot-operated pressure control valve **MRP 810 ECK** consists of a main valve with a pilot valve, a throttle unit with integrated strainer, non-return valve and throttle valves which are permanently attached on the cover. The material is particularly corrosion-resistant in accordance with NACE. The medium-wetted parts (springs and mesh of the integrated strainer) are made of Inconel, the adjusting spring was produced from Duplex steel. The valve has a special hydraulic damping for gas applications, thus adapting in an optimal way the regulating behaviour to the plant.



## Pipeline Protection in an Oil Camp

In an oil camp the crude is pumped through miles of oil pipelines. Natural hazards or technical problems may require the pump station to be shut down so that the fluid column in motion is stopped abruptly and generates a pressure surge. If the surge cannot escape from the system, there is reason to fear serious damage to the pipelines and the plant.

A leading oil and gas company in the Sultanate of Oman produces around 70,000 barrels of crude oil in the south of the country, which are then pumped to the north. The company protects the electronically controlled emergency shutdown system of its pump station by means of a Mankenberg surge relief valve **MSR 6.2**.

Two pressure transmitters arranged at both sides of the pipeline are linked to the two pilot valves of the **MSR 6.2** by sense lines. In the event of a pressure surge arising after an emergency shutdown, the pilot valves open the surge relief valve that discharges the pressure surge out of the system into a pit. The identical pilot valves comply with severe safety standards. Every individual valve can generate sufficient stroke motion to activate the **MSR 6.2**. The surge relief valve has been specifically designed for this station and is completely made of stainless steel in accordance with NACE (MR0175).





## Pipeline Ventilation of an Oil Tank Depot

The pipeline at this oil depot with docking and loading facilities is only used for liquids when a tanker has to be filled up. Due to this fact the pipeline is regularly put into operation afresh. At the plant, liquid fossil fuels are transported and processed. That is why protection against excess pressure and vacuum damage is essential. For security reasons, gases found in the pipe are collected and then disposed of.

During the start-up / filling process with liquid fossil fuels four venting and bleeding valves, type Mankenberg **EB 6.54** DN 80 (3") and DN 100 (4"), dispose the escaping gases according to the fluid level and avoid a vacuum during the draining of the system thanks to a systematic ventilation.



## Pressure Reduction in a Gas Compressor Station

Natural gas is a fossil combustible which can either be compressed or liquefied for transport. However, liquefaction is not suitable in the event of high gas quantities being pumped through mile-long pipelines. In that case the pipelines would have to be insulated or the medium would have to be maintained at a constant temperature of less than  $-100^{\circ}\text{C}$ . It is more appropriate to increase the gas pressure to abt. 100 bar.

Distances and altitude differences in the pipeline routing cause pressure losses of abt. 20 bar. Consequently, pressure boosting stations are set up along the pipelines at a distance of approx. 100 km from each other that compress the gas in turbo compressors and restore the previous pressure level. The gas turbine of the pressure boosting station uses a proportion of the incoming natural gas for combustion to drive the turbocompressor.

The gas pressure of abt. 80 - 85 bar within the pipeline must not act directly on the combustion chamber of the gas turbine, otherwise it would be destroyed. Two Mankenberg pressure regulating valves **RP 810** with high regulating accuracy therefore reduce the inlet pressure to 2 - 3 bar in two steps.

The **RP 810** has been combined with hydraulic dampening which compensates system-inherent fluctuations and prevents vibrations from being transmitted to the gas turbine. Filters integrated in the regulating valve avoid blocking by possible dirt particles and increase the operational safety of the entire system.





# Mankenberg Valves for Pipeline and Storage Tank Applications in Action

We reserve the right to make technical changes. Images are non-binding. 06/2017

## Protection of Tank Systems and of Products by Tank Blanketing with Nitrogen

Since the entry into force of the Kyoto protocol the demand for tank blanketing systems has continuously increased. This is due to the rising demand for fuel with bioethanol. Although such fuels featuring a bioethanol percentage of up to 10 % are a good contribution to climate protection, they introduce new challenges to the tank system operators.

When reacting with water (atmospheric humidity) bioethanol can be converted to methyl esters. These are very aggressive and can severely damage the tank foundations made of concrete. In addition, of course, the fuel loses quality during storage. To solve this problem technically, Mankenberg has developed the pressure reducing valve **RP 840** in close cooperation with its customers. A millibar reducing valve proven for decades controls a main valve customised to the tank system. Thus the high regulating accuracy at very low pressures (~5 mbar(g)) combines with the high volume flow necessary for big tanks and pumps. The customer thereby obtains a very economic solution for his plant.



Please send us your enquiry  
and allow us to advise you.

Mankenberg GmbH  
Spenglerstrasse 99  
23556 Luebeck | Germany

Phone: +49 (0) 451-8 79 75 0  
Fax: +49 (0) 451-8 79 75 99

info@mankenberg.de  
www.mankenberg.de

