Pressure Reducing Valve C 7105

General

The pressure reducing valve is primarily used to prevent chlorine recondensing and thus avoid the destruction of PVC components.

A few points of interest:

Chlorine is the most commonly used disinfectant for water treatment. It is stored as a liquid in steel tanks. Liquid elementary chlorine does not corrode unalloyed steel. It does, however, attack PVC and the material loses its original form. Since most metering units for chlorine gas are made of PVC, it is essential to ensure that the various components are protected against liquid chlorine.

Important

Liquid chlorine must not be confused with chlorine gas dissolved in water. PVC is resistant to such aqueous solutions of chlorine gas.

Problems do not arise if the saturated chlorine gas withdrawn from the chlorine tanks remains in the gaseous state. However, if the chlorine gas condenses in the pipes on account of certain temperatures (as water vapour condenses on cold surfaces), the downstream plants and equipment can suffer serious damage.

The slightest loss of energy will immediately result in the precipitation of liquid chlorine. Energy is lost when the pipes downstream of the chlorine tank are colder than the liquid chlorine in the tank.

It is important to know that this applies at all temperatures. In other words, chlorine will always recondense regardless of whether the gas flows from a chlorine tank at 15 °C into a pipe at 12 °C or from a tank at 30 °C into a pipe at 28 °C.

How can chlorine be prevented from recondensing?

The aforementioned loss of energy can be compensated by supplying energy through a heating block which, however, requires a constant supply of energy in the form of electricity.

A pressure reducing valve is very much more effective and does not require any auxiliary energy. It reduces the pressure so far that the chlorine would only recondense at a temperature far below 0 °C in the downstream piping. Such temperatures are effectively never encountered. The greatest advantage is that a constant pressure and the absolute pressure value after the pressure reducing valve are less important than the fact that this pressure is generally considerably below that in the tank with liquid chlorine.

Functional description

The pressure of approx. 2 bar is determined by the spring cap (1) which presses the compressive spring (2) against the diaphragm (3) by a certain amount.

The diaphragm (3) presses the valve ball (5) against the compressive spring (6) so that the valve opens. Chlorine gas streams in at E, passes through the valve seat (4) to the space below the diaphragm (3) and leaves the reducing valve through A. The pressure is reduced until it equals the force of the prestressed compressive spring (2) multiplied by the area of the diaphragm. If the equilibrium is disturbed, for instance because more or less chlorine gas is withdrawn or on account of fluctuations in the supply pressure at E, the diaphragm changes its position so that the ball (5) adopts a different position in relation to the valve seat (4). The volume of gas flowing through the valve is adjusted so that the pressure under the diaphragm (3) is once again equal to the pretension of the compressive spring (2).

Due to the design of the valve, the pressure deviates from the setpoint since the compressive spring (2) has a different pretension depending on the opening position of the control wedge and this pretension then produces a different pressure for achieving an equilibrium (permanent proportional deviation). The pressure reducing valve is set to approx. 2.5 bar (with zero flow) by the manufacturer. The pressure adjusts to approx. 2 bar at a flow of 20 kg/h.

If the diaphragm ruptures, chlorine does not escape, but the pressure increases without reduction until the upstream pressure is reached.

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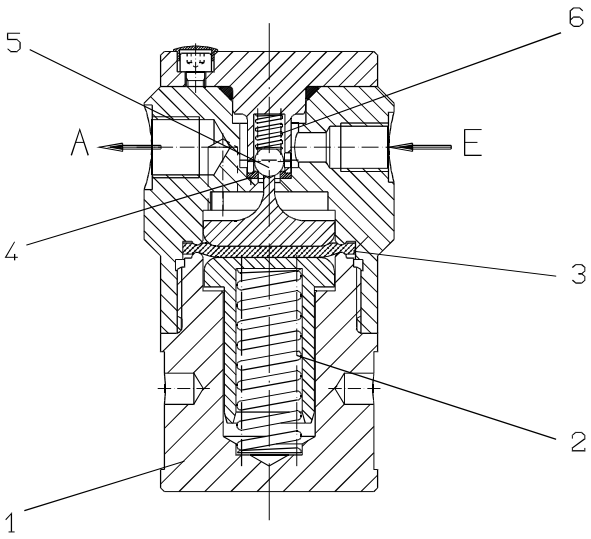
Technical data

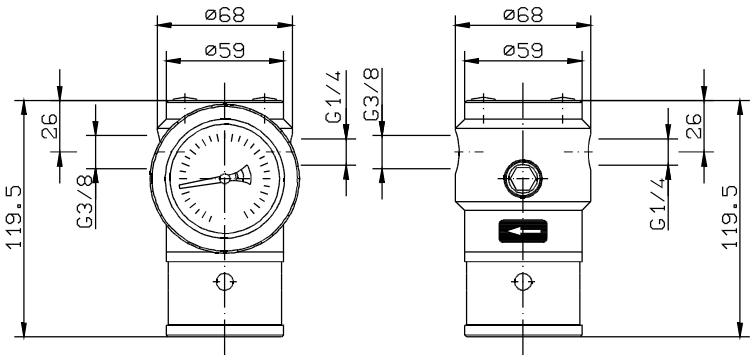
Supply pressure max.	15 bar
Reduced pressure	Invariable, approx. 2 bar
Capacity max.	60 kg/h Cl_2
Materials in contact with chlorine gas: Steel, Monel, Hastelloy, Viton	
Surface finish	Chemical nickel plating
Weight	Approx. 2 kg

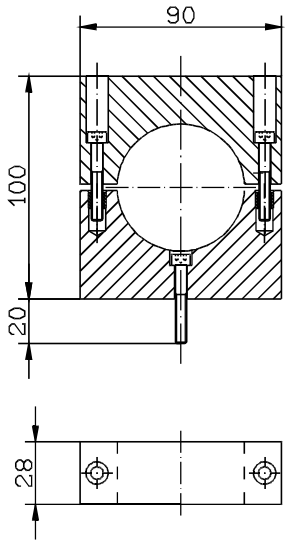


Part No.

C 7105 assembly	Part Number
without pressure gauge Connections G 1/4i-G 3/8i	20729202
without pressure gauge Connections for pipe d 12x1	20733766
without pressure gauge Connections for pipe d 8x1	20733765
with pressure gauge 0-16 bar Connections G 1/4-G 3/8i	20733764
with pressure gauge 0-16 bar Connections for pipe d 12x1	20733763
with pressure gauge 0-16 bar Connections for pipe d 8x1	20733762

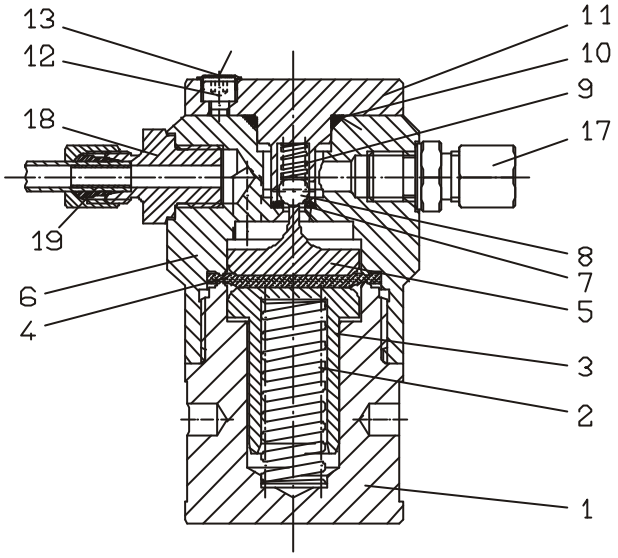
Dimensions

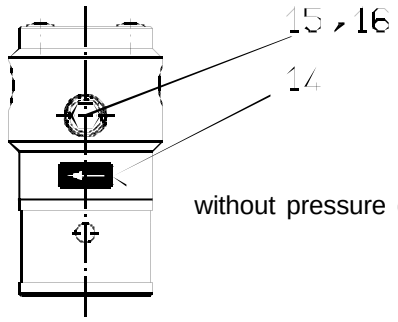




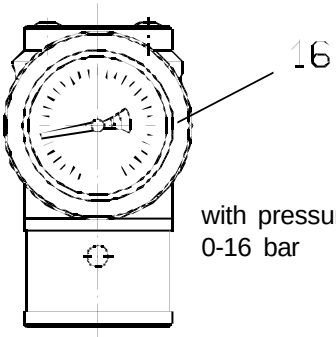
Retaining clamp, Part No. 24508

Pressure Reducing Valve C 7105





without pressure gauge



with pressure gauge
0-16 bar

Item	Description	Material	Part No.	C 7105 cpl. without press.gauge G1/4i-G3/8i	C 7105 cpl. without press.gauge Pipe d12x1	C 7105 cpl. without press.gauge Pipe d8x1	C 7105 cpl. with press.gauge G1/4-G3/8	C 7105 cpl. with press.gauge Pipe d12x1	C 7105 cpl. with press.gauge Pipe d8x1
1	Housing cap	Brass Ms58	29203	1	1	1	1	1	1
2	Compr. spring (Lo=60)	Spring steel	26448	1	1	1	1	1	1
3	Spring plate	Brass Ms58	29204	1	1	1	1	1	1
4	Diaphragm	Viton	25277	2	2	2	2	2	2
5	Valve plate	Brass	29205	1	1	1	1	1	1
6	Valve housing	Brass Ms58	29206	1	1	1	1	1	1
7	Valve seat	Viton	10032	1	1	1	1	1	1
8	Ball	Ceramic	10033	1	1	1	1	1	1
9	Compr. spring (Lo=18)	Hastelloy	10051	1	1	1	1	1	1
10	O-ring	Viton	80590	1	1	1	1	1	1
11	Valve cover	Brass Ms58	29209	1	1	1	1	1	1
12	Cheese head screw	A2	83608	4	4	4	4	4	4
13	Cap	PVC, grey	29117	4	4	4	4	4	4
14	Arrow sign	Plastic	87395	1	1	1	1	1	1
15	Gasket	AF*	81723	1	1	1	—	—	—
16	Press. gauge 0-16 bar	St/AG	24087129	—	—	—	1	1	1
16	Screw plug	Brass	18369	1	1	1	—	—	—
17	Screwed socket d 8x1	Brass	82193	—	—	1	—	—	1
17	Screwed socket d 12x1	Brass	82042	—	1	—	—	1	—
18	Screwed socket d 8x1	Brass	88029	—	—	1	—	—	1
18	Screwed socket d 12x1	Brass	82039	—	1	—	—	1	—
19	Supporting sleeve	Brass	88180	—	—	2	—	—	2
	Supporting sleeve	Brass	88181	—	2	—	—	2	—
	Pressure reducing valve assembly C 7105			20729202	20733766	20733765	20733764	20733763	20733762

*asbestos-free

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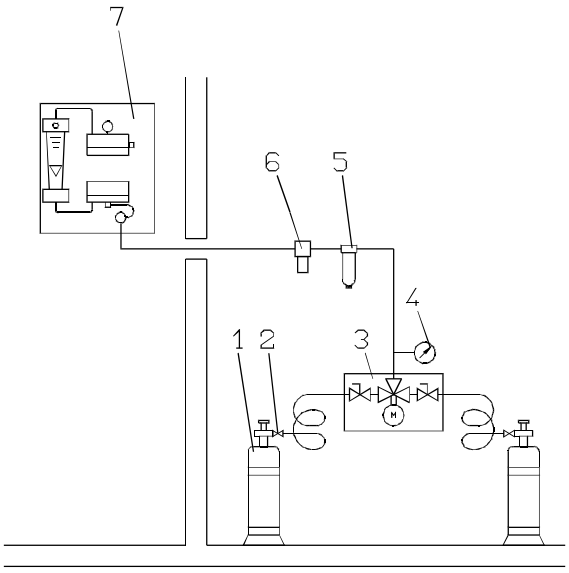
General
Nitrogen or dry air can be used to test and adjust the pressure reducing valve.

Assembly
The pressure reducing valve is installed in the pipe in the direction of the arrow. It is advisable to install a filter before the pressure reducing valve.
If the pressure reducing valve is to prevent recondensation of the chlorine, it must be installed directly after the chlorine tank if possible. If a chlorine changeover valve is fitted, it should be installed as close as possible to the chlorine tanks and before the pressure reducing valve.
The reducing valve can be fitted in steel pipes without support. A wall bracket must be used if it is fitted in soft copper pipes.

Installation drawing



Legend

1	Chlorine cylinder	
2	Chlorine tank fitting	MB 2 22 01
3	Chlorine changeover valve C 7501	MB 2 24 01
4	Contact pressure gauge	MB 2 40 01
5	Chlorine gas filter	
6	Pressure reducing valve C 7105	MB 2 07 02
7	Chlorinator	MB 2 02 25

Setpoint
The setpoint is invariably set to approx. 2.5 bar. The pressure decreases to approx. 2 bar as more and more chlorine is withdrawn.

Maintenance
The diaphragm and the valve seat in particular must be tested every 6 months.
The chlorine supply must be shut off for this purpose and the piping system evacuated.
The pressure reducing valve must be dismantled.
Important!
The pipe ends must be sealed throughout the maintenance work in order to prevent corrosion due to the ingress of moisture.
The reducing valve must be disassembled and immediately rinsed with warm water, then dried completely and lightly greased with Vaseline. The condition of the diaphragm (3) must be examined, particularly with regard to its elasticity and degree of deformation at the clamped edge. The diaphragm must be replaced if the edge remains compressed by more than 0.2 mm after dismantling the diaphragm.
The diaphragm comprises two identical Viton discs 1.5 mm thick placed one on top of the other.
The valve seat (2) must always be replaced. All parts must be fitted as shown in the drawing and the spring cover secured tightly.