

Self-operated Pressure Regulator



Pressure Reducing Valve Type M 44-2



Type M 44-2, connection G 1, $K_{VS} = 6$



Type M 44-2, connection G $\frac{1}{4}$, $K_{VS} = 0.15$

Fig. 1 · Type M 44-2 Pressure Reducing Valve

Mounting and operating instructions



EB 2530 EN

Edition November 2000

1 Design and principle of operation

Type M 44-2 Pressure Reducing Valves mainly consist of one spring-loaded single-seated globe valve including actuator spring and operating diaphragm.

Special features

- ▶ Proportional regulator requiring no auxiliary energy
- ▶ Single-seated valve
- ▶ All parts made of CrNiMo steel with smooth surfaces
- ▶ Flanged connection, sizes DN 15 to 50
- ▶ Female thread G $\frac{1}{8}$ to G 2

The pressure regulators are used to maintain the downstream pressure of the valve at the adjusted set point.

If the pipeline is depressurized, the valve is open.

Safety instructions



CAUTION

Assembly, start-up and operation of the devices may only be performed by trained personnel familiar with this product.

According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize potential hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

Any hazards which could be caused at the pressure reducing valve by the process medium to be controlled or the operating pressure must be prevented by means of appropriate measures.

Moreover, it must be ensured that the regulators are only used in applications where operating pressure and temperatures do not exceed the operating values which are based on the valve sizing data submitted with the order.

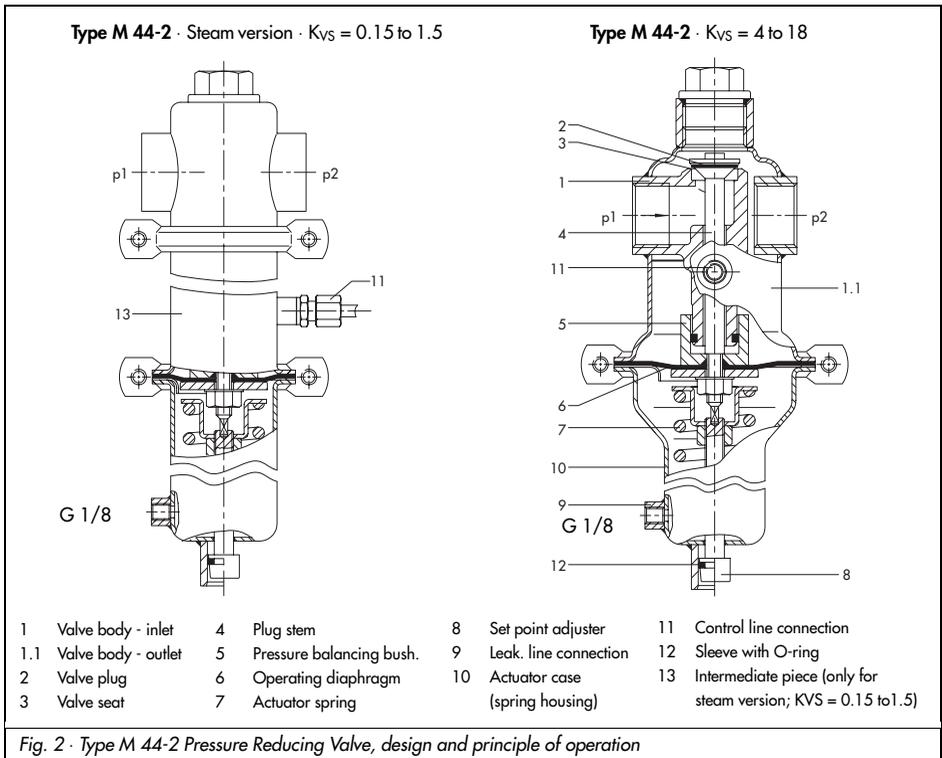
Proper and safe operation must be ensured by appropriate means of transportation, professional storage including assembly and installation as well as careful operation and maintenance.

1.1 Principle of operation

The medium flows through the valve in the direction indicated by the arrow. The position of the valve plug (2) determines the flow rate via the cross-sectional area between valve plug (2) and valve seat (3). If there is no pressure across the valve, the valve is open. If there is pressure across the valve, the medium flows from the supply side through the valve seat (3) into the body. At the diaphragm, the downstream pressure p_2 to be regulated is converted into a positioning force and balanced against the force of the actuator spring (7). The positioning force is

used to adjust the valve plug depending on the spring force which is adjustable via the set point adjuster (8). If the force resultant from p_2 exceeds the value adjusted via the set point adjuster, the valve plug approaches the seat, thus reducing the flow rate: the valve closes.

To keep the influence of disturbance variables relatively small, the regulator (version for $K_{VS} = 4$ to 18) is pressure balanced. The force resultant from the upstream pressure p_1 and acting on the plug, is compensated for in the pressure balancing bushing (5).



2 Assembly and installation

Please note ...

- ▶ Flush pipeline thoroughly prior to installation of the pressure reducing valve. Impurities or foreign particles carried along by the process medium may impair the proper operation of the pressure reducing valve, especially tight shut-off. Therefore, we recommend that an appropriate strainer be installed upstream of the pressure reducing valve (e.g. SAMSON Type 1NI).
- ▶ Remove wrapping material including any plastic plugs you may find. Choose the position of installation such that the valve can be installed in a horizontal section of pipeline that is not subjected to turbulent flow. Elbows, shut-off valves, or other restriction devices should not be installed directly upstream or downstream of the pressure reducing valve.
- ▶ Make sure that the pressure reducing valve can still be easily accessed after completion of the plant.
- ▶ Install one hand-operated shut-off valve upstream of the strainer and one downstream of the valve. This allows the plant to be "depressurized", if required. In addition, it serves to relieve the operating diaphragm of pressure when the plant is not operated for extended periods .
- ▶ To monitor the prevailing pressures in the plant, it is recommended that pressure gauges be installed both upstream and downstream of the pressure reducing valve. The pressure gauge downstream of the regulator then allows the pressure set point to be checked for controlling the downstream pressure p_2 .



CAUTION

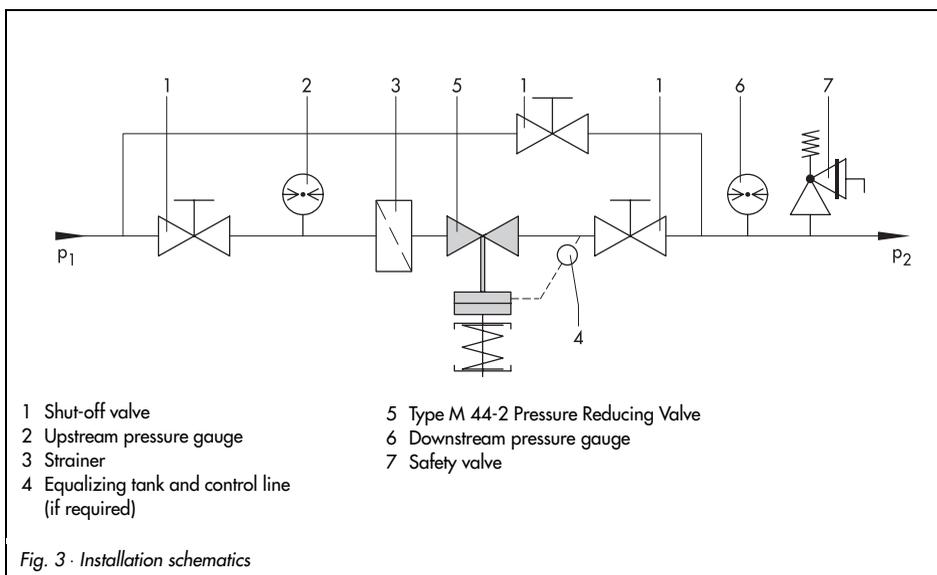
The permissible pressure in the overall system must not be exceeded. The relevant safety equipment must be provided for (e.g. safety valve).

Unless indicated otherwise, the pressure reducing valve must be protected so that the pressure does not exceed the max. set point pressure by more than 150 per cent, and so that the nominal pressure of the body is not exceeded.

Do not insulate valves intended for use with steam.

Use an actuator case (spring casing) featuring a leakage line connection and an adjustment screw seal when controlling toxic, explosive or flammable media.

In case of a possible diaphragm rupture, carry off the escaping "hazardous" medium to a safe place via the leakage line connection.



2.1 Installation

Liquids, gases and steam

- Install pressure reducing valve in the horizontal pipeline free of stress. If necessary, support the pipeline near the mounting position of the regulator.
- Observe the direction of flow as indicated by the arrow on the valve body.

Steam and liquids

- Install the actuator case with set point adjuster vertically "suspended" to prevent gas from accumulating in the regulator and thus from causing oscillations.

Gases

- The actuator case may point upwards or downwards, if not indicated otherwise.

2.2 Steam control

For steam versions without equalizing tank and to protect the diaphragm from excessive temperatures, fill the chamber above the diaphragm with water via the control line connection prior to start-up.

- The following applies for regulator version 0.02 to 12 bar ($K_{VS} = 4$ to 18) and version 0.005 to 12 bar ($K_{VS} = 0.15$ to 1.5) at up to 200 °C, downstream pressure $p_2 \leq 1.1$ bar: Lay and connect the external control line to the pipeline at the mounting position of the valve (see 2.3.1 Control line connection).
- Install an equalizing tank in the control line for steam applications with regulators for 0.02 to 12 bar ($K_{VS} = 4$ to 18) and a downstream pressure of up to 1.1 bar.

2.3 Control line, leakage line, equalizing tank

2.3.1 Control line connection

For the following regulators, a control line has to be installed at the mounting position:

- Version for $K_{VS} = 4, 6, 12, 16$ and 18
- Version for $K_{VS} = 0.15; 0.4; 0.9$ and 1.5
- for steam and $p_2 \leq 1.1$ bar only -

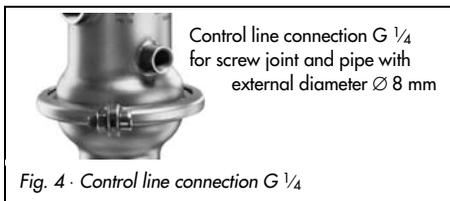


Fig. 4 · Control line connection G 1/4

For connection, use screw joints with cylindrical screwed plugs acc. to DIN 2353 for stainless steel pipes with an external diameter of 8 mm.

Please note ...

- Spacing between pressure sensing point and pressure reducing valve **at least 10 x DN** (see Fig. 6).
- Install a throttle to damp oscillations, if necessary. Never completely close the throttle during operation. Do not use any shut-off devices instead of the throttle!
- The control line must be rigid to prevent oscillations which might occur if flexible hoses are used.
- For steam and liquids, install the control line with a descending slope toward the regulator.

2.3.2 Leakage line connection

When controlling toxic or hazardous media, the pressure reducing valve must feature a closed actuator case with an adjustment screw seal and a leakage line connection.

Install the leakage line on site in such a way that the escaping medium can be carried off safely in the event of a diaphragm rupture. The leakage line connection G 1/8 is located at the side of the actuator case.

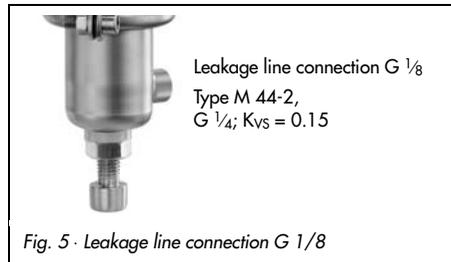


Fig. 5 · Leakage line connection G 1/8

2.3.3 Equalizing tank

Required for steam applications and regulators for $K_{VS} = 4$ to 18 and $p_2 \leq 1.1$ bar; to protect the diaphragm from excessive temperatures.

- The mounting position of the equalizing tank is indicated by the mark "top" on the tank.
- Install the tank in the control line at the highest point between the pressure sensing point and the regulator. Connect the control line laterally in the center of the pipe with a descending slope toward the equalizing tank and the regulator.
- Prior to start-up, fill the tank with water via the connecting sleeve located on top.

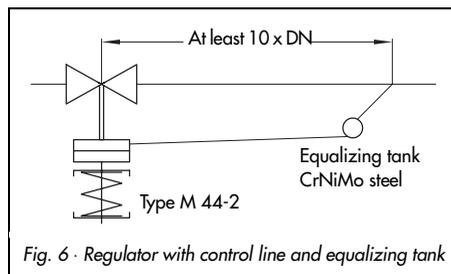


Fig. 6 · Regulator with control line and equalizing tank

3 Start-up

Function and tightness of the pressure regulator have been tested by the manufacturer prior to delivery. The set point adjustment spring is not loaded.

Be sure to ...

- open all valves on the consumer side.
- *s l o w l y* open the shut-off valves in any order.

Avoid pressure surges during start-up and operation!

3.1 Operation

Adjusting the set point

Use the set point adjustment screw to adjust the set point pressure.



Monitor the adjusted set point pressure with the downstream pressure gauge.



CAUTION

Do not tighten the set point adjustment screw so that the travel is impaired or the valve is blocked in its open position.

By applying axial pressure to the set point adjustment screw, you can check the mobility of the plug; there will be a short-term pressure increase.

- Clockwise turning
▣▣▣▣ high set point pressure
- Counterclockwise turning
▣▣▣▣ low set point pressure



CAUTION

*During a system check (e.g. pressure test), the pressure applied to the regulator must not be higher than max. **150 per cent** of the set point pressure.*

Shut-down

Close the shut-off valves on the supply side in any order.

4 Service

Clean the Type M 44-2 Pressure Reducing Valve regularly and maintain it together with the plant!

In the event of extraordinary operating conditions, malfunctions or defects, SAMSON's customer service is prepared to help you.

In case of doubt, return the pressure reducing valve to the SAMSON works in Frankfurt.

For troubleshooting and to clarify under which conditions the valve is installed, we require the following data:

- ▶ Order and model numbers
- ▶ Type, nominal size and set point range of the regulator
- ▶ Flow rate (K_{VS} value) in m^3/h
- ▶ Pressures in the plant (upstream pressure p_1 and downstream pressure p_2)
- ▶ Medium and medium temperature
- ▶ Flow velocity
- ▶ Has a strainer been installed?
- ▶ Installation drawing of the plant with all additionally installed components (shut-off valves, pressure gauges etc.)

