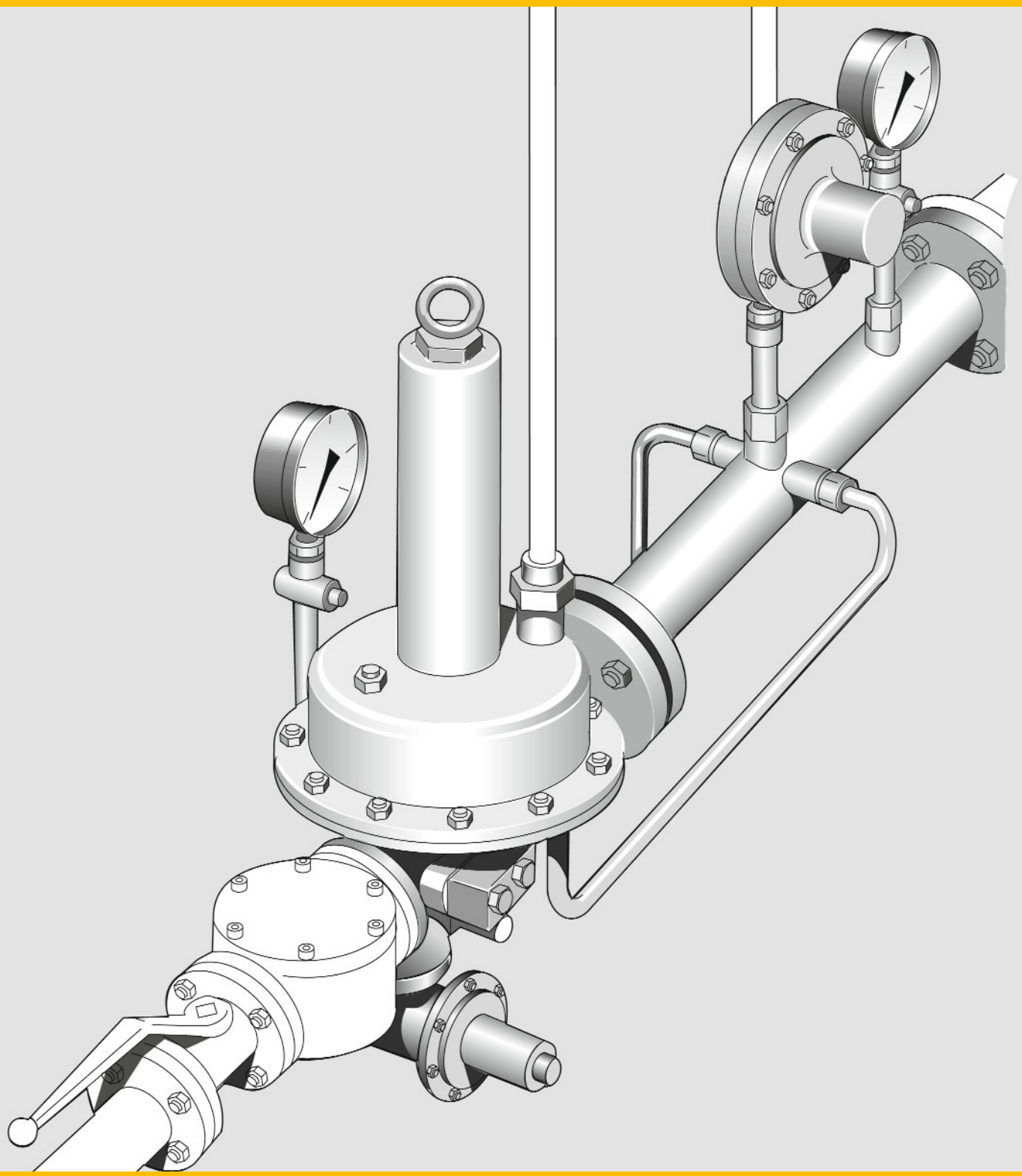
–weishaupt–

info

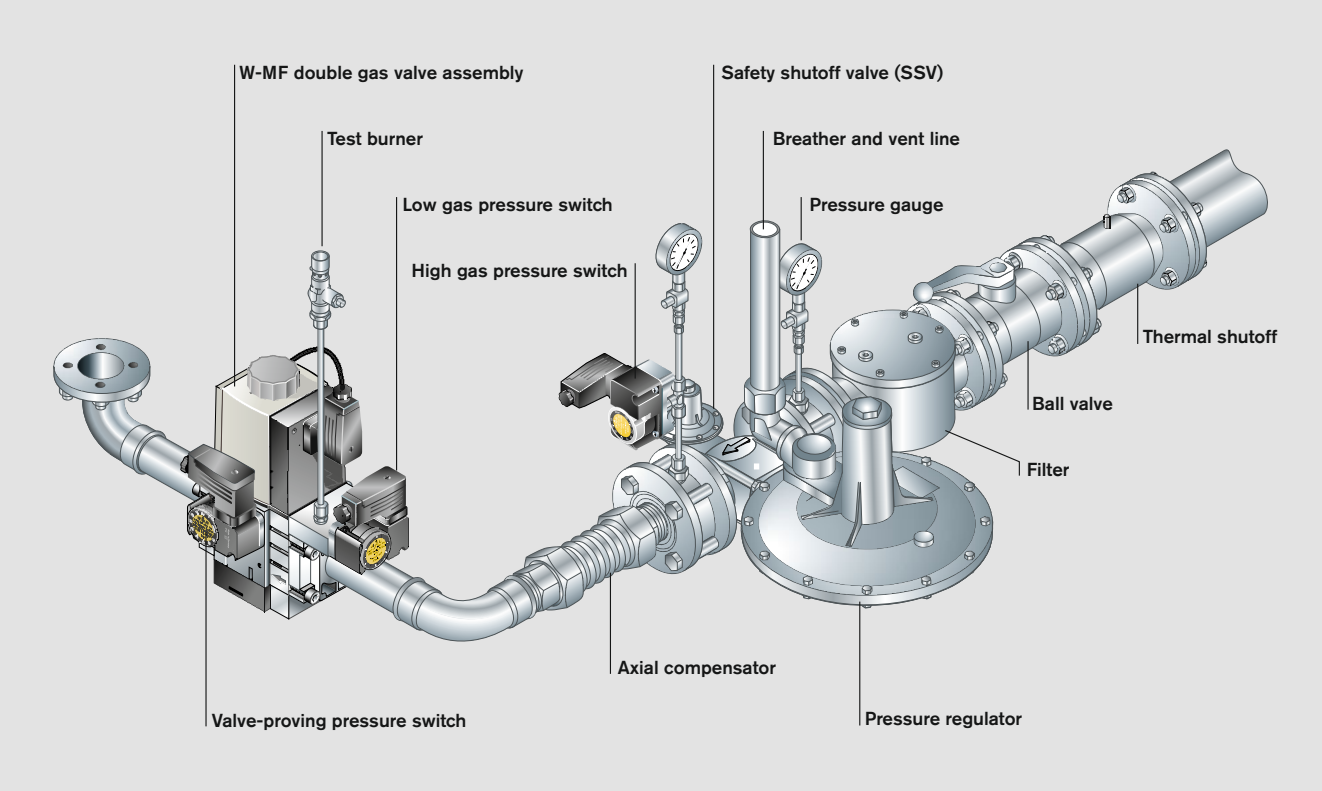
Information on high-pressure gas regulators



Regulators for gas supply pressures up to 4000 mbar

High-pressure gas supply – Heating centre at Weishaupt's main works in Schwendi, Germany

Description



High-pressure gas supply – Compact regulator, type 4/1, connected to a screwed double gas valve assembly

General
The pressure regulators supplied with gas and dual-fuel burners are subject to high dynamic demands because of abrupt opening and closing and the small volumes of gas between the regulator and the safety shutoff equipment on the burner.

The gas pressure regulators described in this booklet are direct-acting units which comply with the requirements of EN 676, *automatic forced-draught burners for gaseous fuels*.

The opening and closing times are short so that the regulators can respond to the rapid changes in burner load. They also have to cope with the emergency shut-down of a burner operating at full load. In these cases the safety equipment (SRV / SSV and high gas pressure switch) may also be triggered.

The correct installation of the pressure regulators and safety equipment, together with their associated impulse lines, is crucial for correct operation. The impulse lines are arranged and sized to ensure correct functionality and thus to ensure the required reaction speed of the units.

Only the breather and vent lines have to be connected to the equipment, provided regulators without safety diaphragms are being used. Relevant notes can be found in the *installation examples and notes* section of this booklet.

The complete assemblies are equipped according to the rules and standards of the German Technical and Scientific Association for Gas and Water (DVGW). Certain provisions in the relevant DVGW worksheets for pressure regulating equipment in the public gas supply do not apply to burner installations. The problem of back pressure does not exist here.

Description

Matched to the Weishaupt burner range
The pressure regulators with safety equipment covered in this booklet are specially matched to Weishaupt gas burners. The entire Weishaupt burner range is covered. Connections are the right size for all of the usual burner valve train components.

Standard outlet gas pressures of 200, 140, 100, and 50 mbar are catered for. Adjustments for higher or lower operating pressures can be made through the selection of appropriate governor springs. The safety equipment is preset at the factory.

The pre-assembled regulator sets have been individually tested for soundness and correct functionality. A further test is carried out during commissioning.

On installations with multiple burners, each burner must be equipped with its own pressure regulator.

The units are designed only for burner operation. They are not intended for use as transfer stations. This principle also applies in reverse; transfer stations are not suitable gas burner operation.

Furthermore, it has to be born in mind that burner commissioning technicians are not authorised to work on the gas supplier's equipment, but are familiar with burner gas valve trains and have access to them at all times.

Constituent burner components and type approval
The relevant standards for forced-draught gas burners stipulate that the gas burner must be treated as a single functional unit, including all of the gas and air-side equipment needed for burner operation. As a consequence, high-pressure regulators with safety equipment are considered a constituent burner component and undergo testing as such. This booklet forms part of the test report. If different devices are used, the burner cannot be supplied with a CE Product Identification Number.

The pressure regulators must be fitted in the immediate vicinity of the burner as part of its gas valve train.

Capacity, functionality, and safety can only be ensured if the correct units matched to the burners are used.

Maximum inlet pressures
Supply pressures below 300 mbar are classified as low-pressure supplies, whereas supply pressures above 300 mbar are classified as medium or high-pressure supplies.

The high-pressure regulators described in this booklet have specific maximum inlet pressures. These are detailed in the various tables.

Please refer to the relevant DVGW worksheets for information regarding the design and equipping of upstream gas pressure regulating systems. Gas supply pressures that exceed 5000 mbar make particular demands in terms of space and the equipment required, such that their use in plant rooms is possible only in very limited circumstances.

Safeguard against excess gas throughput
The gas pressure regulator ensures a virtually constant gas pressure to the burner across all load points.

For gas inlet pressures above 300 mbar, additional protection is provided in the form of a safety shutoff valve (SSV) and safety relief valve (SRV). These also protect the downstream components from pressures that are in excess of their maximum operating pressures (MOP).

Purpose of the pressure regulator
Gas pressure regulators have the job of maintaining the outlet pressure for every burner load point, regardless of the inlet pressure and throughput.

The gas regulator restricts incoming pressure, and shuts tightly under zero flow conditions.

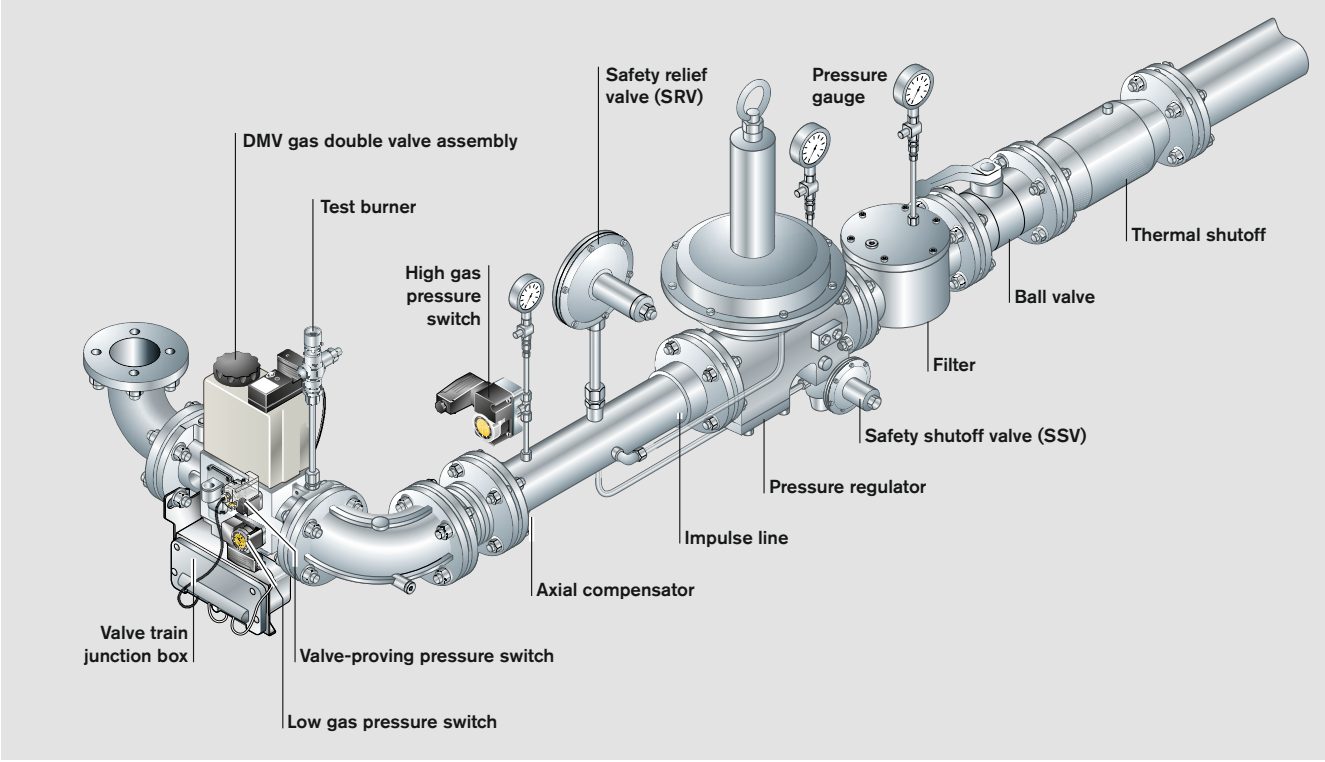
Purpose of the safety shutoff valve (SSV)
The safety shutoff valve serves as the primary safeguard against excess gas pressure. It acts to protect downstream valve train components and has no combustion monitoring function. The SSV, which is open during normal operation, shuts off the gas supply if the upper pressure setpoint is reached. Once activated, the SSV is not permitted to re-open automatically; it must be manually reset.

The SSV forms part of the gas pressure regulator assembly. It senses the outlet pressure from the stabilisation section immediately after the pressure regulator, to which it is connected via an impulse line.

The SSV is set and checked during burner commissioning. This includes checking the closing process, i.e. making sure the SSV functions correctly.

The SSV's setpoint is determined on site and depends on the regulated pressure, closing pressure, venting pressure, and shutoff pressure. The values are predetermined and relate to the maximum operating pressure (MOP) of the gas components used.

Please note the setting advice given on page 27.



High-pressure gas supply – Regulator type 8/1 – 80/80 with DMV double gas valve assembly

Purpose of the safety relief valve (SRV)
Safety relief valves are incorporated as an additional safety device. If internal gas leakage is detected, i.e. if the gas pressure regulator does not close its seat, the SRV prevents an inadvertent response from the main safety equipment.

An impermissible increase in pressure is possible if the pressure regulator supplies an excess outlet pressure due to faulty operation, or if an SSV does not close tightly and leakage occurs via its seat.

If the pressure setpoint is exceeded, the valve opens against the closing spring. Once the excess pressure has decreased the SRV closes again automatically. A vent line to atmosphere should be provided to ensure that any internal gas leakage can be vented safely.

By setting the vent pressure of the SRV below the setpoint of the SSV, it is possible to make the SRV respond first, and then only with a further increase in pressure will the SSV trip. The SRV is fitted on the outlet side of the gas pressure regulator.

On regulator types 06/1 to 09/1 and 1/1 to 5/1 (models 133..., 233..., 244...), the SRV is integrated into the pressure regulator and cannot be adjusted.

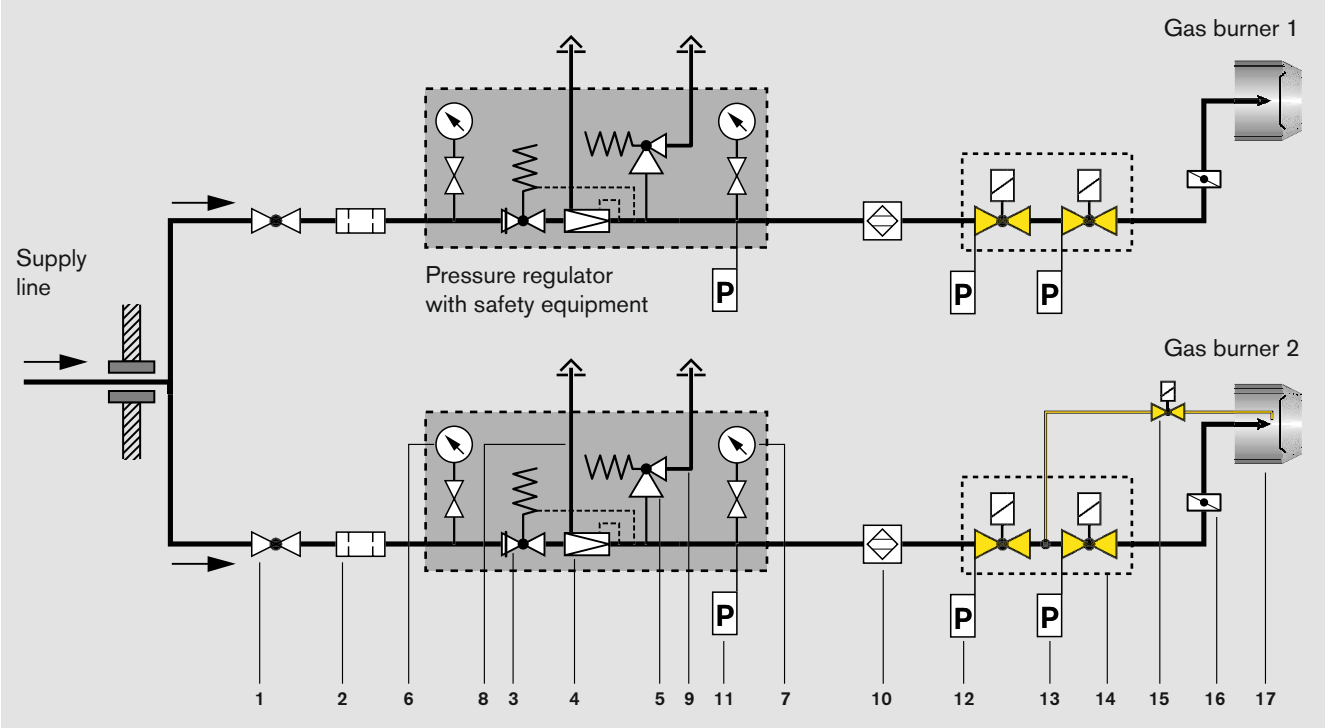
On regulator types 5/1-25/50 to 9/1-100/150, the SRV is a separate component and can be adjusted by means of its spring pressure.

Purpose of the safety diaphragm
Pressure regulator types 06/15S to 09/1S and 1/1S to to 4/1S, which are suitable for gas inlet pressures up to 1000 mbar, have this different feature.

The safety diaphragm prevents a dangerous amount of gas from leaking into the plant room in the event of the main working diaphragm being breached. This eliminates the need to connect a breather and vent line (SRV).

Additional documentation
High-pressure regulators suitable for gas supply pressures in excess of 4000 mbar can be found in Print No. 83197902. Print No. 83525902 details special regulators with high outlet pressures for WK 80 burners.

High-pressure gas supply with two burners



Each burner is equipped with its own pressure regulator and safety equipment, executed in accordance with DVGW worksheet G 491.

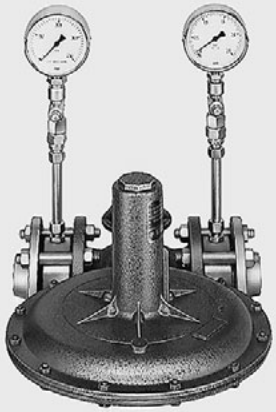
In many cases transfer stations are fitted upstream. These units are used to govern inlet pressures of 4000–100 000 mbar down to 4000 mbar, thereby achieving an operating pressure that is suitable for the high-pressure pressure regulators described in this booklet.

Legend

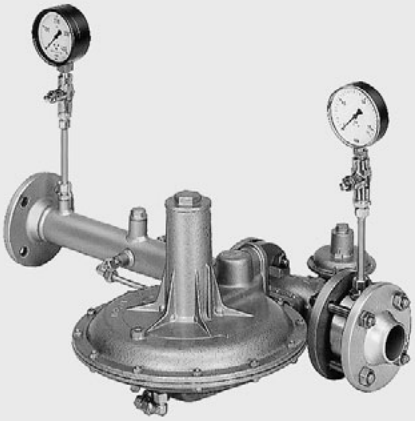
1 Ball valve
2 Filter
3 Safety shutoff valve (SSV)
4 Pressure regulator
5 Safety relief valve (SRV)
6 Inlet pressure gauge with pushbutton valve
7 Outlet pressure gauge with pushbutton valve
8 Breather line (except on compact regulators with safety diaphragms)
9 Vent line (except on compact regulators with safety diaphragms)
10 Gas meter
11 High gas pressure switch
12 Low gas pressure switch
13 Valve-proving pressure switch
14 Double gas valve assembly
15 Ignition gas solenoid valve
16 Gas butterfly valve
17 Mixing assembly

Regulators with breather and vent line

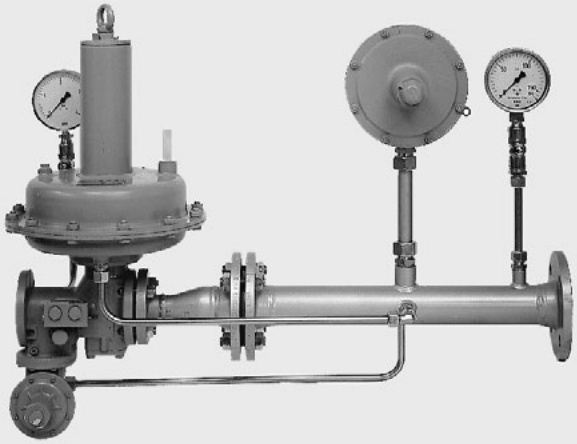
Types 06/1 to 09/1



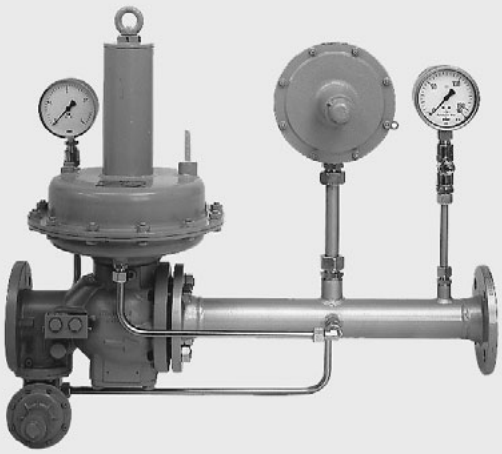
Types 1/1 to 4/1



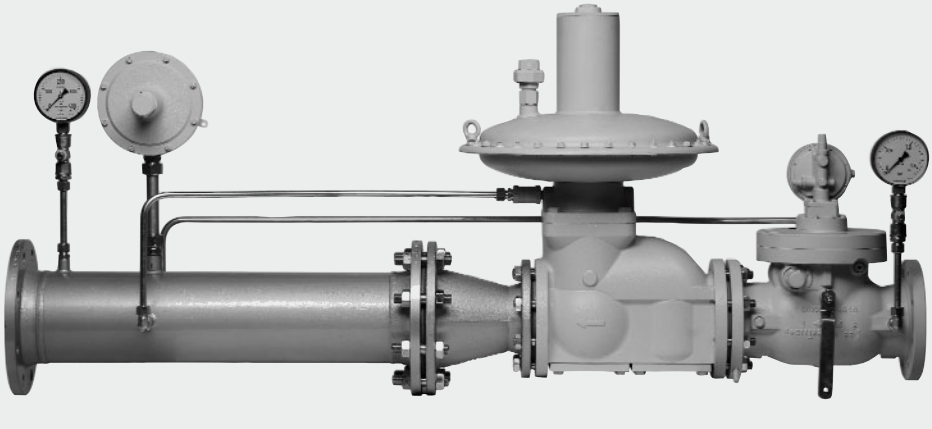
Type 5/1



Type 5/1–25/50



Type 8/1–80/80



Type 9/1–100/150

Use

The following overview tables show the operational limits of the high-pressure regulators.

Setpoint of the pressure regulator
The pressure setpoint of the regulator is always based on the regulator's standard spring.

Safeguarding the gas supply under fault conditions – MIP
The supplier must safeguard the gas flow pressure such that, in the event of failure, the flow pressure cannot exceed the maximum incidental pressure (MIP) of the burner's gas valve train.

(MIP = MOP x 1.1)

Maximum operating pressure (MOP)
The maximum gas flow pressure before the ball valve at full burner load must not exceed the MOP of the high-pressure regulator used.

Operational limits for standard regulators

Regulator types	**06/1 07/1**	**08/1**	**09/1**
Gas flow pressure before the ball valve at max. burner load, p_i	300–4000 mbar	300–3000 mbar	300–1500 mbar
Pressure setpoint, p_o	≤ 210 mbar	≤ 210 mbar	≤ 210 mbar
Maximum operating pressure (MOP) of the gas supply	5000 mbar	5000 mbar	5000 mbar
Minimum required MOP for components (low-pressure side of the valve train)	500 mbar	500 mbar	500 mbar

Operational limits for standard regulators

Regulator types	**1/1, 2/1 5/1**	**3/1**	**4/1**
Gas flow pressure before the ball valve at max. burner load, p_i	300–4000 mbar	300–2500 mbar	300–1000 mbar
Pressure setpoint, p_o	≤ 210 mbar	≤ 210 mbar	≤ 210 mbar
Maximum operating pressure (MOP) of the gas supply	5000 mbar	5000 mbar	5000 mbar
Minimum required MOP for components (low-pressure side of the valve train)	500 mbar	500 mbar	500 mbar

Operational limits for standard regulators

Regulator types	**5/1-25/50 to 7/1-25/100**	**8/1-80/80 to 8/1-80/150**	**9/1-100/100 9/1-100/150**
Gas flow pressure before the ball valve at max. burner load, p_i	300–4000 mbar	300–4000 mbar	300–4000 mbar
Pressure setpoint, p_o	≤ 210 mbar	≤ 210 mbar	≤ 210 mbar
Maximum operating pressure (MOP) of the gas supply	5000 mbar	4000 mbar	5000 mbar
Minimum required MOP for components (low-pressure side of the valve train)	500 mbar	500 mbar	500 mbar

Operational limits for regulators with safety diaphragm

Regulator types	**06/1S to 09/1S**	**1/1S to 4/1S**
Gas flow pressure before the ball valve at max. burner load, p_i	300–1000 mbar	300–1000 mbar
Pressure setpoint, p_o	≤ 210 mbar	≤ 210 mbar
Maximum operating pressure (MOP) of the gas supply	1000 mbar	1000 mbar
Minimum required MOP for components (low-pressure side of the valve train	500 mbar	500 mbar

Operational limits ≥ 4000 mbar

Regulator types	**07/2-25/50 08/2-25/50**	**1/2-50/50 2/2-50/50**	**5/2-25/80 to 6/2a-50/100**
Gas flow pressure before the ball valve at max. burner load, p_i	1000–6000 mbar	1000–6000 mbar	1000–10 000 mbar
Pressure setpoint, p_o	≤ 210 mbar	≤ 210 mbar	≤ 210 mbar
Maximum operating pressure (MOP) of the gas supply	6000 mbar	6000 mbar	16 000 mbar
Minimum required MOP for components (low-pressure side of the valve train)	500 mbar	500 mbar	500 mbar

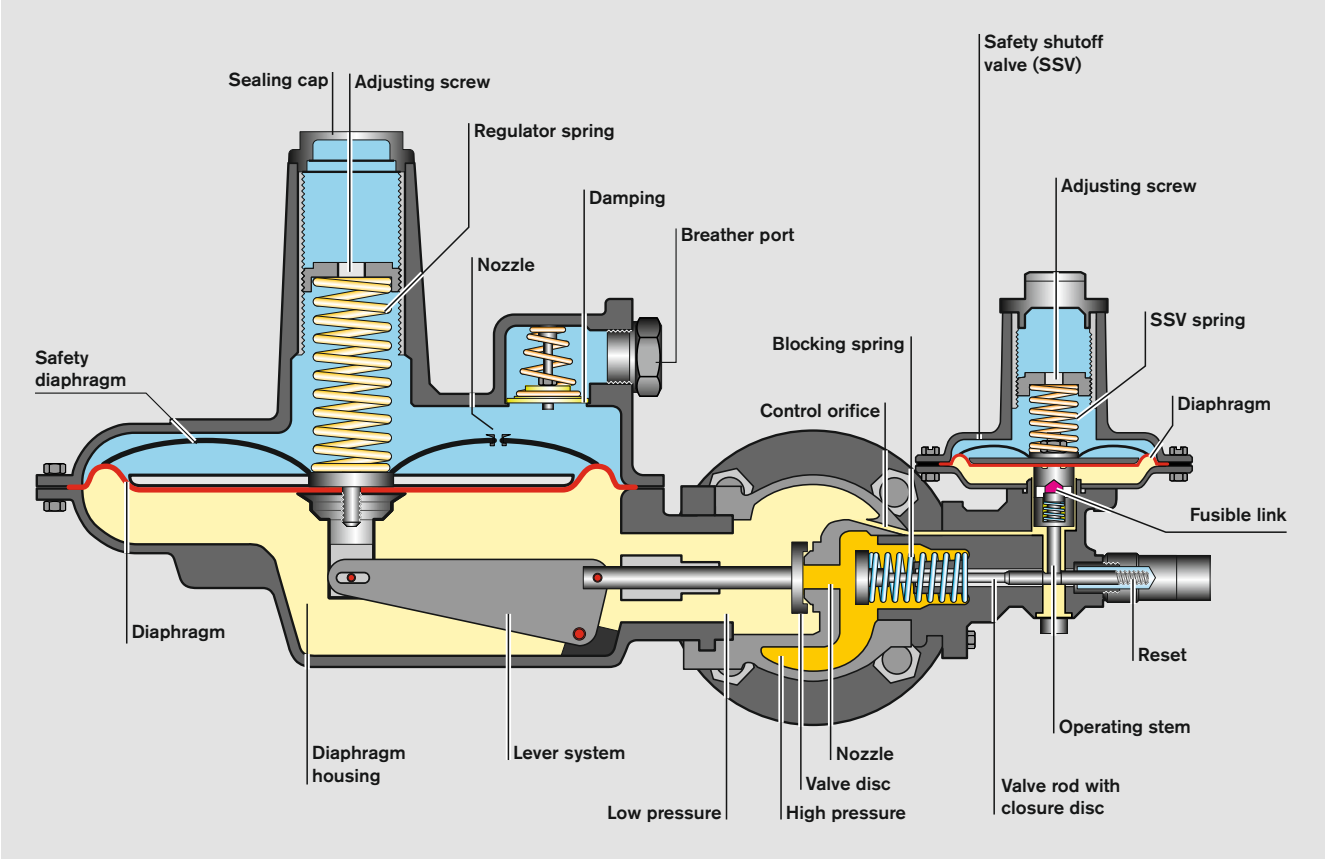
Operational limits for So regulators for WKmono 80 and WK 70 / 80 burners see print No. 83197902

Regulator types	**5/2a-So-25/80 to 6/2a-So-50/150**	**7/1-So-50/100 7/1-So-50/150**	**8/1-So-80/150**	**9/1-So-100/150**
Gas flow pressure before the ball valve at max. burner load, p_i	500–10 000 mbar	500–5000 mbar	500–4000 mbar	500–5000 mbar
Pressure setpoint, p_o	≤ 350 mbar	≤ 350 mbar	≤ 350 mbar	≤ 350 mbar
Maximum operating pressure (MOP) of the gas supply	16 000 mbar	16 000 mbar	4000 mbar	5000 mbar
Minimum required MOP for components (low-pressure side of the valve train)	500 mbar	500 mbar	500 mbar	500 mbar

Operational limits for SoH regulators for WK 80 burners see print No. 83197902

Regulator types	**6/2a-SoH-50/150**	**7/1-SoH-50/150**	**8/1-SoH-80/150**	**9/1-SoH-100/150**
Gas flow pressure before the ball valve at max. burner load, p_i	3500–10 000 mbar	1800–5000 mbar	800–3500 mbar	700–1800 mbar
Pressure setpoint, p_o	≤ 500 mbar	≤ 500 mbar	≤ 500 mbar	≤ 500 mbar
Maximum operating pressure (MOP) of the gas supply	16 000 mbar	16 000 mbar	16 000 mbar	5000 mbar
Minimum required MOP for components (low-pressure side of the valve train)	700 mbar	700 mbar	700 mbar	700 mbar

Weishaupt regulator types 06/1S to 4/1S with safety diaphragm



Schematic representation, types 06/1S to 09/1S and 1/1S to 4/1S

Function of the safety diaphragm
The safety diaphragm prevents a dangerous amount of gas from leaking into the plant room in the event of the main working diaphragm being breached. This eliminates the need to connect a breather and vent line.

Function of the pressure regulator and safety shutoff valve (SSV)
As described for the compact units without safety diaphragm.

Scope of delivery:
Refer to page 15, but note these units are equipped with a safety diaphragm and consequently do not have a SRV.

Technical data
Gas pressure regulator and SSV springs

These units differ from the compact units on pages 12 and 13 in that they have a safety diaphragm. For this reason, it is not necessary to connect a breather and vent line and, as a consequence, the units are not equipped with a safety shutoff valve.

Regulators with safety diaphragms can be selected from the charts on pages 22 and 23, referencing the equivalent type without safety diaphragm. Maximum inlet pressure 1000 mbar!

The dimensions of these units are the same as units without a safety diaphragm.

Technical data:

Type	Inlet size DN	Outlet size DN	Max. inlet pressure mbar	MOP mbar	Order No.	Regulator type	Size DN	Nozzle Ø mm	Outlet pressure mbar	Approx. mass kg	CE Product ID No. DIN-DVGW Reg. No.
06/1S	25	25	1000	1000	151 336 26 680	133-730	25	3.0	30–70	15	CE-0085 CM 0154
07/1S	25	25	1000	1000	151 336 26 690	133-730	25	4.7	30–70	15	CE-0085 CM 0154
08/1S	25	25	1000	1000	151 336 26 700	133-730	50	6.3	30–70	15	CE-0085 CM 0154
09/1S	25	25	1000	1000	151 336 26 710	133-730	50	12.5	30–70	15	CE-0085 CM 0154
1/1S	50	50	1000	1000	151 336 26 720	233-12-730	50	10.0	70–140	27	CE-0085 CM 0155
2/1S	50	50	1000	1000	151 336 26 730	233-12-730	50	12.5	70–140	27	CE-0085 CM 0155
3/1S	50	50	1000	1000	151 336 26 740	233-12-730	50	20.0	70–140	27	CE-0085 CM 0155
4/1S	50	50	1000	1000	151 336 26 750	233-12-730	50	25.0	70–140	27	CE-0085 CM 0155

Outlet pressure springs and labels

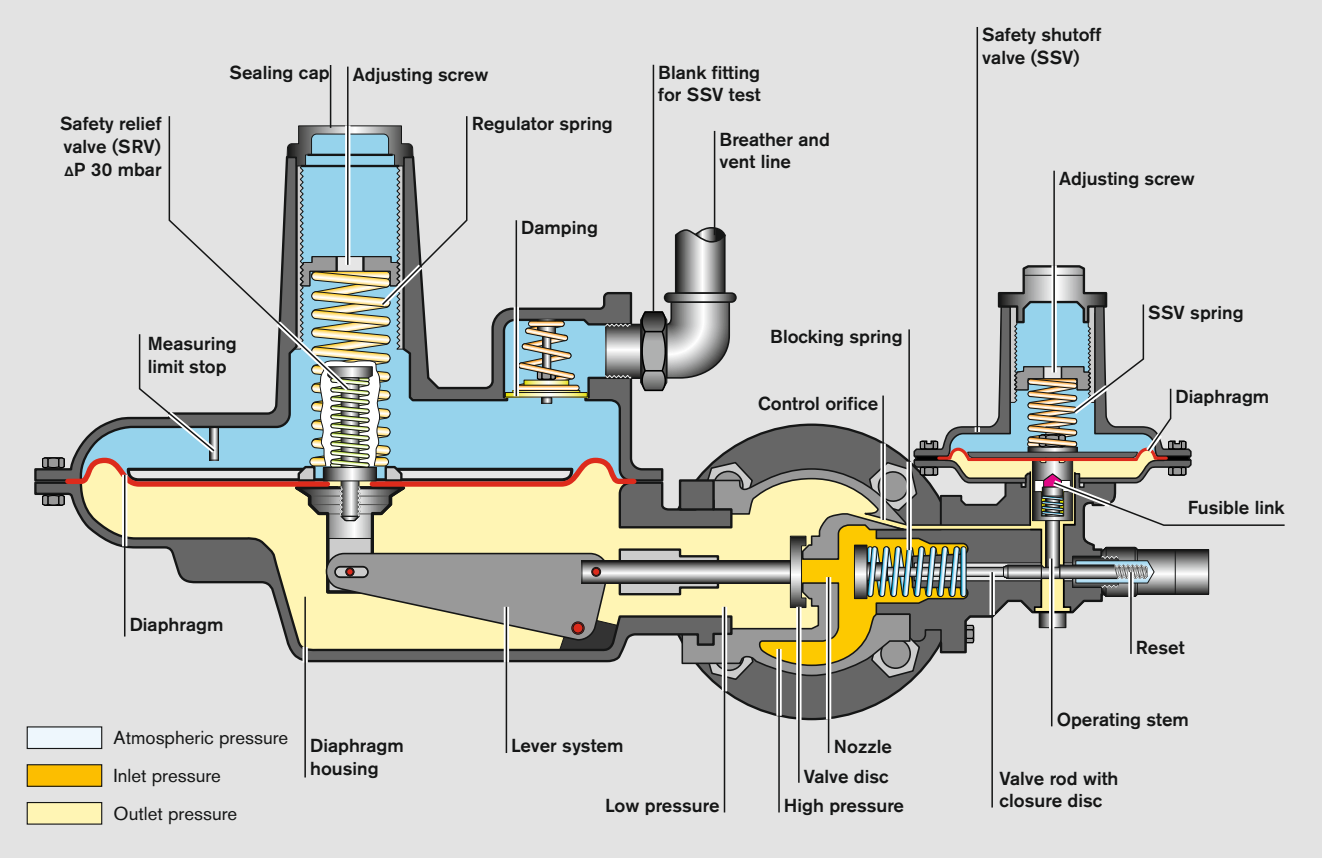
Type	Outlet pressure mbar	Colour	Order No.	Label order No.
06/1S to 09/1S	12–20	blue	490 031	201 000 08 107
06/1S to 09/1S	15–35	green	490 032	201 000 08 117
06/1S to 09/1S	30–70 [1)]	orange	490 033	201 000 08 127
06/1S to 09/1S	50–140	black/white	490 030	201 000 08 137
06/1S to 09/1S	100–210	silver	490 029	201 000 08 157
1/1S to 4/1S	15–35	green	490 085	201 000 08 117
1/1S to 4/1S	30–70	orange	490 086	201 000 08 127
1/1S to 4/1S	70–140 [1)]	black	490 087	201 000 08 147
1/1S to 4/1S	100–210	silver	490 088	201 000 08 157

SSV spring activation pressures

Setting range mbar	Colour
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green

[1)] Standard

Weishaupt regulator types 06/1 to 5/1 with breather / vent line



Schematic representation, types 06/1 to 09/1 and 1/1 to 4/1

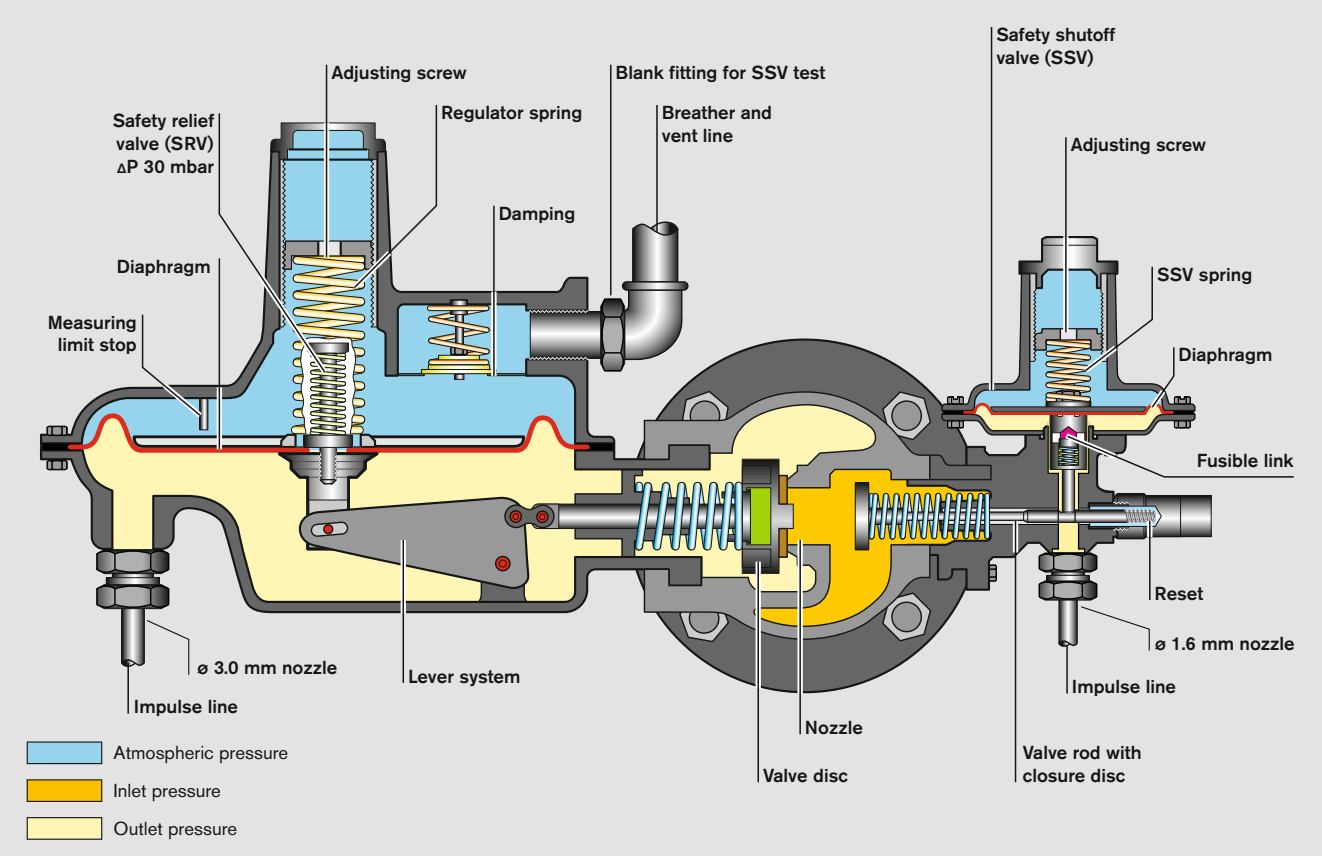
Function of the pressure regulator
The diaphragm of the pressure regulator is loaded by a spring and transfers its movements via a lever system to the valve disc. The level of outlet pressure is achieved by an appropriate spring load.

Without gas pressure the regulator is open, i.e. the tension of the regulator spring presses the diaphragm and the lever system downwards so that the valve disc is raised from the orifice. As the gas flow is released, it passes through the orifice, allowing the pressure below the diaphragm to increase and thus producing a force that counteracts the spring tension. If the resulting force from the gas pressure exceeds the set spring loading, the lever system is raised by the diaphragm and the valve disc starts to constrict the orifice, thereby throttling the gas flow and terminating the pressure increase. When, due to the reducing gas flow, the pressure behind the orifice and thus in the diaphragm housing drops, the valve disc is opened once more by the force of the spring.

This alternating process repeats itself until a balance prevails between the force of the spring and the force of the gas pressure on the diaphragm.

Function of the safety shutoff valve (SSV)
If damage occurs to the orifice, or if the lever rods jam, the pressure in the diaphragm area and behind the orifice can rise only until the SSV responds and interrupts the gas supply.

The SSV's measuring mechanism is connected to a spring loaded operating stem and transfers its movement to the valve disc. The activation pressure is taken via an impulse line from the outlet pressure area of the regulating section and is temporarily delayed by the throttling effect of the control orifice. Therefore a momentary pressure increase will not cause the SSV to trip.



Schematic representation, type 5/1

If the pressure rises above the value set with the SSV spring then the measuring mechanism overcomes the resistance of the operating stem. The blocking spring consequently presses the valve disc against the valve seat thereby closing the gas supply.

The measuring mechanism is separated from the inlet pressure space by an O ring seal.

Function of the safety relief valve (SRV)

The SRV is sized so the flow capacity of the orifice can be vented without any inadmissible rise in outlet pressure if the regulator fails. The venting pressure is approximately 30 mbar above the outlet pressure, ± 10%. The excess pressure is released to the vent connection via the SRV and from there it is vented safely to open atmosphere.

Preset outlet pressure and activation pressure

The outlet pressure of the regulator and the activation pressure of the SSV are preset at the factory:

Pressure regulator ..... as ordered
SSV ..... approx. 350 mbar

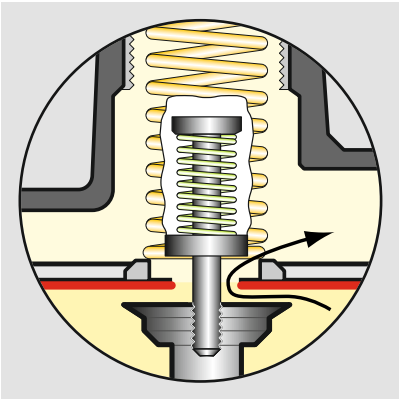
If a different outlet pressure is required, this can be achieved by adjusting the setting screw. Please refer to page 26 for instructions on setting the pressure.

Installation

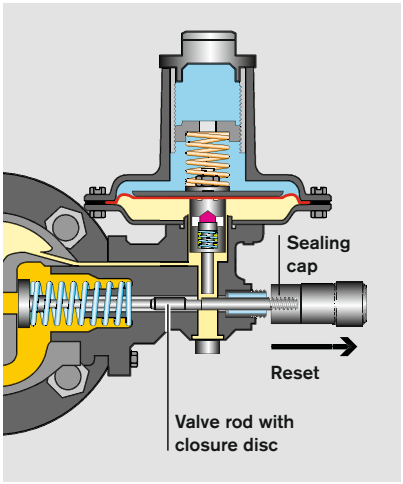
- To avoid damage or operational faults, care must be taken to ensure that the supply line and the regulator are free from contamination.
- Jointing rings must be in place.
- The pressure regulator is installed in such a way that the directional arrow on the casing points in the direction of the gas flow. Due to the spring load, the installation of the pressure regulator is independent of its position. Due to the flange connection between valve body and the casing of the diaphragm on the one hand, and the valve body and the casing of the SSV on the other, various installation possibilities are available. In standard execution, the regulator, SSV, and gas flow are horizontal. The assembly may however be installed in any position, but care must be taken that the outlet pressure is re-adjusted accordingly.
- A breather and vent line leading into safe open atmosphere is connected to the breather port (refer to page 28 for installation instructions).
- A soundness test must be carried out in accordance with the burner manual after the pressure regulating assembly has been installed in the burner's gas valve train.
- Additional testing of the gas pressure regulating assembly must be carried out prior to burner commissioning (see page 26).
- All local legislation and regulations must be observed.

Commissioning

- Function test of the burner with ball valve closed (see the burner manual).
- The regulator's installation-specific outlet pressure is preset at the factory (the setpoint may vary under actual operating conditions).
- The ball valve can be opened slowly.
- It is usually necessary to re-adjust the outlet pressure. To do this the sealing cap must be removed. By turning the adjusting screw, the pressure can be set to the required value. Pressure is increased by turning the screw clockwise. Adjustments should only be made under gas flow conditions. This can be done during operation, as all gas-carrying areas of the regulator are sealed.
- Should a fault on the pressure regulator result in a closure of the SSV, the valve can be reset manually once the cause of the fault has been eliminated (refer to page 27 for description).



Safety relief valve open



Safety shutoff valve activated

Maintenance and fault finding

A visual inspection of the burner gas valve train is carried out during annual maintenance or when fault finding. This checks the condition and operation of the units for deviations from the desired conditions (gas throughput, gas pressure, setpoints).

Tightness / function tests

After the visual inspection, tightness and other tests are carried out (please refer to the notes on pages 26 and 27).

Maintenance

The gas pressure regulators require practically no maintenance. However, a gas filter must be fitted upstream of the pressure regulator.

Technical data
Gas pressure regulator and SSV springs

These units incorporate an integral, non-adjustable safety relief valve and a separate, adjustable safety shutoff valve. A common breather and vent line leading to atmosphere is required. Please refer to page 28 for sizing.

Regulators can be selected from the charts on pages 22 and 23.

The dimensions of these units can be found on page 32.

Technical data:

Type	Inlet size DN	Outlet size DN	Max. inlet pressure mbar	MOP mbar	Order No.	Regulator type	Size DN	Nozzle Ø mm	Outlet pressure mbar	Approx. mass kg	CE Product ID No. DIN-DVGW Reg. No.
06/1	25	25	4000	5000	151 336 26 660	133-5-72	25	3.0	30–70	15	CE-0085 CM 0154
07/1	25	25	4000	5000	151 336 26 670	133-5-72	25	4.7	30–70	15	CE-0085 CM 0154
08/1	25	25	3000	5000	151 336 26 460	133-5-72	50	6.3	30–70	15	CE-0085 CM 0154
09/1	25	25	1500	5000	151 336 26 470	133-5-72	50	12.5	30–70	15	CE-0085 CM 0154
1/1	50	50	4000	5000	151 336 26 480	233-12-5-72	50	10.0	30–70	27	CE-0085 CM 0155
2/1	50	50	4000	5000	151 336 26 490	233-12-5-72	50	12.5	30–70	27	CE-0085 CM 0155
3/1	50	50	2500	5000	151 336 26 500	233-12-5-72	50	20.0	70–140	27	CE-0085 CM 0155
4/1	50	50	1000	5000	151 336 26 510	233-12-5-72	50	25.0	70–140	27	CE-0085 CM 0155
5/1	50	50	4000	5000	151 336 26 520	244-12-5-72	50	27.5	70–140	31	CE-0085 CM 0156

Outlet pressure springs and labels

Type	Outlet pressure mbar	Colour	Order No.	Label order No.
06/1 to 09/1	12–20	blue	490 031	201 000 08 107
06/1 to 09/1	15–35	green	490 032	201 000 08 117
06/1 to 09/1	30–70 [1)]	orange	490 033	201 000 08 127
06/1 to 09/1	50–140	black / white	490 030	201 000 08 137
06/1 to 09/1	100–210	silver	490 029	201 000 08 157
1/1 to 5/1	15–35	green	490 085	201 000 08 117
1/1 to 5/1	30–70	orange	490 086	201 000 08 127
1/1 to 5/1	70–140 [1)]	black	490 087	201 000 08 147
1/1 to 5/1	100–210	silver	490 088	201 000 08 157

SSV spring activation pressures

Setting range mbar	Colour
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green
140–450	green

[1)] Standard

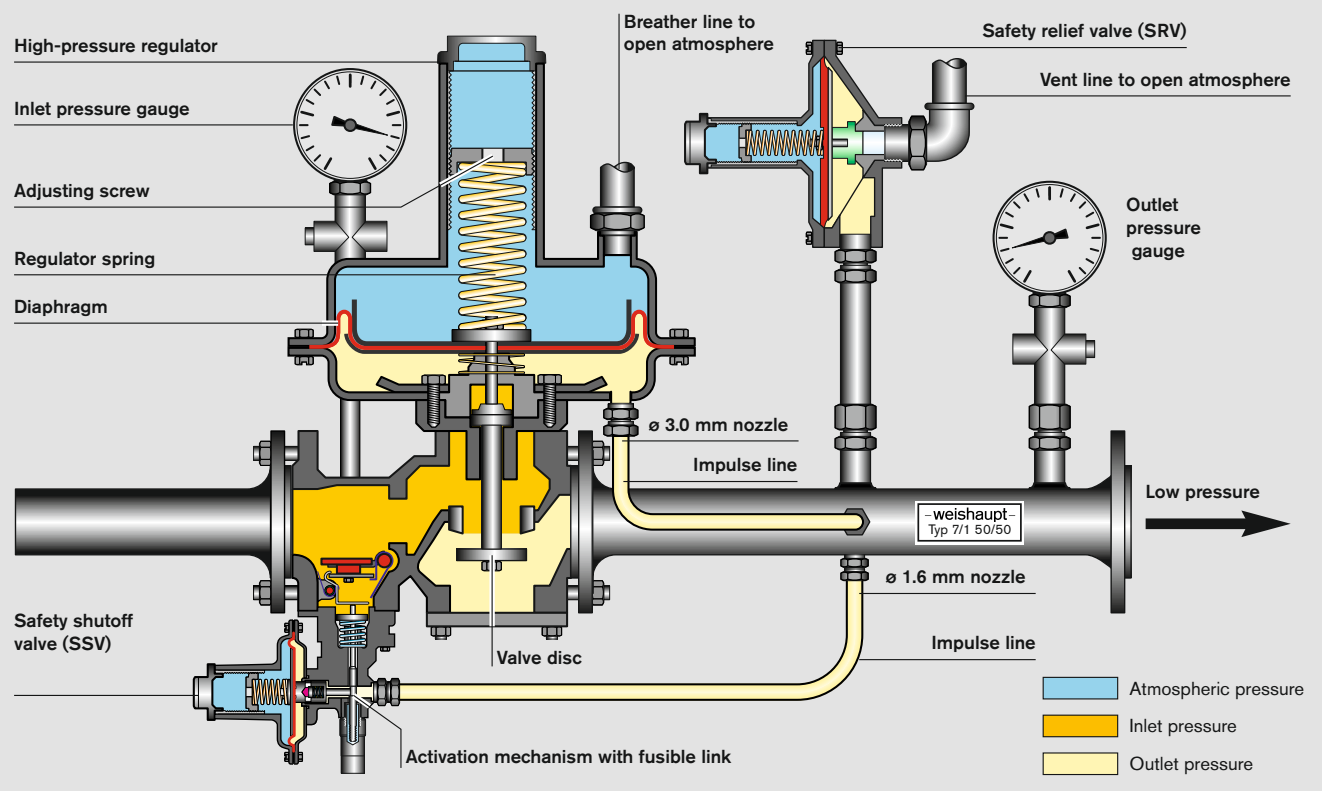
Note:
The specific outlet pressure has to be determined for each individual installation. This outlet pressure should be quoted when ordering, as well as the spring required. The pressure regulator will then be supplied with the correct spring and label.

Scope of delivery:
1 Pressure regulating unit, comprising regulator, SSV, and integrated SRV.
1 Inlet pressure gauge with push-button valve, mounted on the intermediate ring.
1 Outlet pressure gauge with push-button valve, mounted on the intermediate ring.

Connection pieces, screws, nuts, gaskets, and, additionally for type 5/1, a stabilising section with connections and control line for the regulator and SSV.

The unit is supplied pressure tested.

Weishaupt regulator types 5/1-25/… with safety relief valve

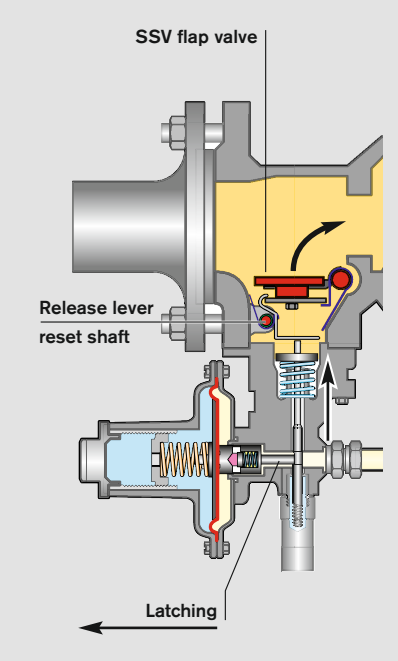


Schematic representation, types 5/1-25/50 to 8/1-80/150

Function of the pressure regulator
The pressure regulator's diaphragm transfers movement via the valve stem to the valve disc. The outlet pressure is transferred via the impulse line into the space below the diaphragm. This pressure is set with the setting screw and can be varied by adjusting the spring loading. At zero gas flow the pressure regulator is closed. The valve disc tightly closes the orifice. Without gas pressure the regulator is open. The spring tension presses the diaphragm and the valve stem downward, thereby raising the valve disc from the orifice. When gas flows through the orifice, pressure can build up via the impulse line below the diaphragm. If the gas pressure exceeds the set spring tension, the valve stem and valve disc are lifted and the orifice is constricted. The gas flow is thus reduced and the pressure rise terminated. If the gas pressure behind the orifice drops due to reduced gas flow, the valve cross section is again enlarged by the increased spring tension.

Function of the safety shutoff valve (SSV)
During normal operation the SSV is open. It automatically shuts off the gas flow if the pressure rises above the 350 mbar setpoint preset at the factory. After responding it remains shut and can only be re-opened manually. The SSV disc, coated with vulcanised synthetic rubber, is spring loaded and is latched by the release lever in the open position. Once the activation pressure downstream of the valve has been reached, the SSV is tripped and the spring tension closes the valve.

As the gas flow presses the valve tightly onto the valve seat, a tight seal is achieved. The SSV is reset by the reset shaft. The activation point of the SSV, which is preset by the manufacturer, is set via the setting screw.



SSV activation mechanism

Function of the safety relief valve (SRV)
During normal operation the SRV is closed. The SRV is preset at the factory to 300 mbar, so that this valve will be the first to respond to an excess outlet pressure. Only then will the SSV become operative. The gas is vented into safe open atmosphere via the vent line. With a pressure rise the diaphragm is raised by the valve disc and gas can thus flow through the valve. When the diaphragm drops again following a reduction in pressure, the valve is closed. The appropriate venting pressure level is set via the setting screw

Preset outlet pressure and activation pressure
The outlet pressure of the regulator, the activation pressure of the SSV, and the venting pressure of the SRV are preset at the factory:

Pressure regulator ..... as ordered
SSV ..... approx. 350 mbar
SRV ..... approx. 300 mbar

Installation
- To avoid damage or operational faults, care must be taken to ensure that the supply line and the regulator are free from contamination.
- Install horizontally, with the spring housing of the gas pressure regulator vertically upwards.
- The assembly is installed in such a way that the directional arrows on the regulator and SSV point in the direction of the gas flow.
- Particular care must be taken during installation to ensure the impulse lines are not damaged.
- An R¾ vent line leading into safe open atmosphere should be connected to the vent line port.
- A soundness test must be carried out in accordance with the burner manual after the pressure regulating assembly has been installed in the burner's gas valve train.
- Additional testing of the gas pressure regulating assembly must be carried out prior to burner commissioning (see page 26).

Commissioning
- Function test of the burner with ball valve closed (see the burner manual).
- The regulator's installation-specific outlet pressure is preset at the factory (the setpoint may vary under actual operating conditions).
- The ball valve can be opened slowly.
- It is usually necessary to re-adjust the outlet pressure. The adjustment can be made during operation (refer to page 27 for description).
- Should a fault on the pressure regulator result in a closure of the SSV, the valve can be reset manually once the cause of the fault has been eliminated (refer to page 27 for description).

Maintenance and fault finding
A visual inspection of the burner gas valve train is carried out during annual maintenance or when fault finding. This checks the condition and operation of the units for deviations from the desired conditions (gas throughput, gas pressure, setpoints).

Tightness / function tests
After the visual inspection, tightness and other tests are carried out (please refer to the notes on page 26).

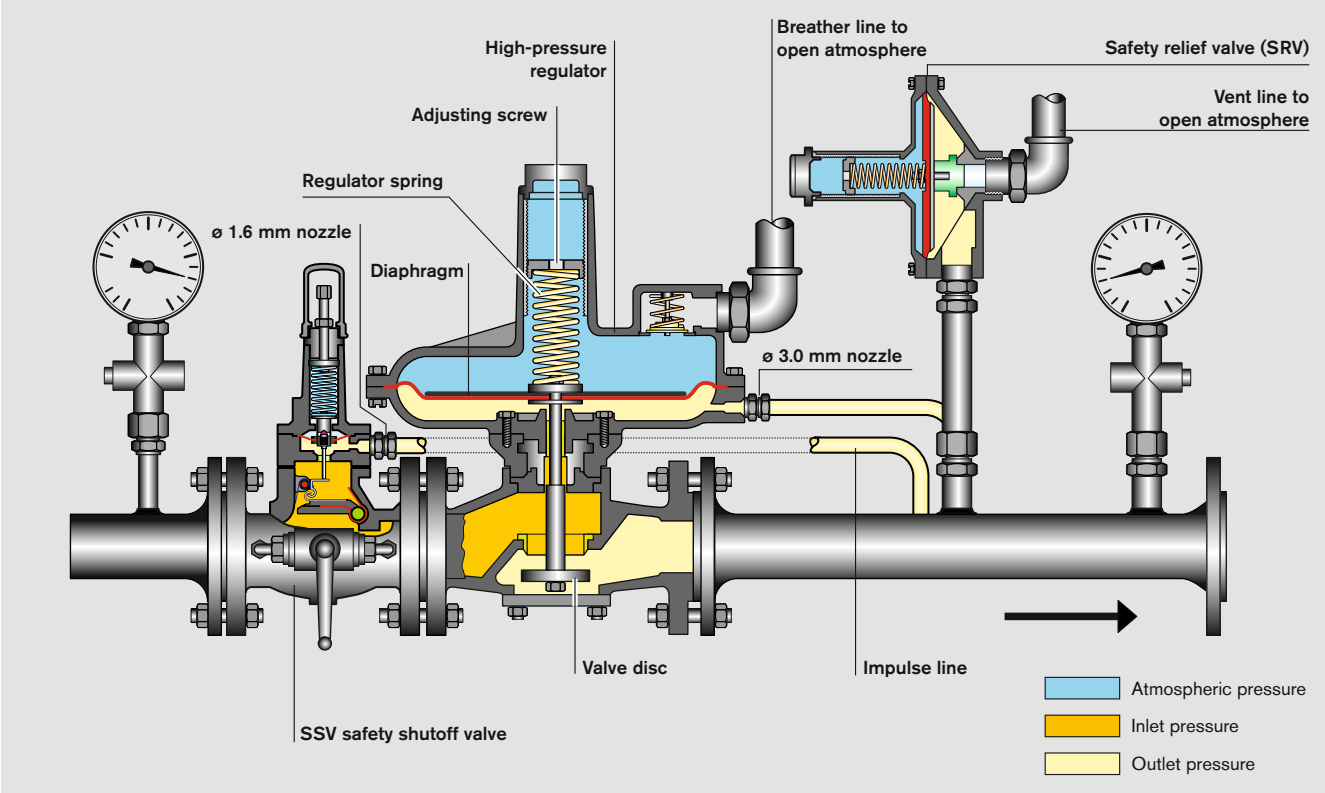
Maintenance
The gas pressure regulators require practically no maintenance. However, a gas filter must be fitted upstream of the pressure regulator.

Faults
Vibrations: The regulator is frequently held responsible for vibrations, whereas in reality vibrations originate mainly in the pipeline. A close check should therefore be made first, as to whether the pipeline is well-supported and does not have any points causing vibrations (half-opened valves, pipework with many changes in direction, etc.).

Vibration in the regulator can only be caused by a distorted diaphragm or valve rods, which happens very rarely.

Fluctuations (surges): The regulator has a large orifice and consequently a very large throughput in comparison to its connection size. At very low throughputs the valve disc barely lifts from the orifice. When this happens the regulator

Weishaupt regulator types 9/1-100/… with safety relief valve



Schematic representation, types 9/1-100/100 and 9/1-100/150

may become unstable. To overcome this proceed as follows:

If the regulator surges at normal throughput, the fault can be rectified by throttling the impulse line. Generally, a reduction in the cross section of the impulse line effects an attenuation and consequently a slower response period for the pressure regulator.

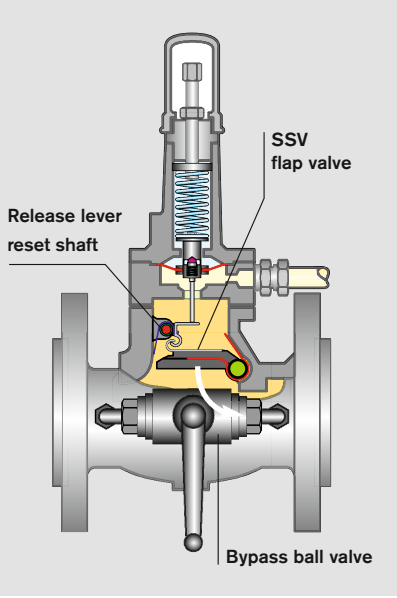
Surging of the regulator can often be eliminated by reducing the breather cross section (see rubber washer, page 31).

Where operating conditions permit, a different spring may also be used. If the regulator response is too slow, remove the ø 3 mm nozzle from the coupling.

No zero cutoff:
The cause may be a damaged valve seat, or a non-tight orifice.

Note:
All SSV impulse connections are fitted as standard with a ø 1.6 mm orifice (screwed connection to stabilising section, pages 13, 16, and 18).

All of the RR16 regulators are fitted as standard with a ø 3 mm orifice (screwed connection can be removed, page 18). This should be checked if the equipment does not function correctly.



SSV activation mechanism, type 022-1

Technical data
Gas pressure regulator, SSV, and SRV springs

Technical data

Type	Inlet size DN	Outlet size DN	Max. inlet pressure mbar	MOP mbar	Order No.	Regulator type	Size DN	Nozzle Ø mm	Outlet pressure mbar	Approx. mass kg	CE Product ID No. DIN-DVGW Reg. No.
5/1-25/50	25	50	4000	5000	151 336 26 370	RR 16-25-31-8N-033	25	31	100–210	46	CE-0085 AQ 1103
5/1-25/80	25	80	4000	5000	151 336 26 530	RR 16-25-31-8N-033	25	31	100–210	58	CE-0085 AQ 1103
6/1-50/50	50	50	4000	5000	151 336 26 380	RR 16-50-31-8N-033	50	31	100–210	44	CE-0085 AQ 1103
6/1-50/80	50	80	4000	5000	151 336 26 390	RR 16-50-31-8N-033	50	31	100–210	57	CE-0085 AQ 1103
6/1a-50/50	50	50	4000	5000	151 336 26 630	RR 16-50-42-8N-033	50	42	100–210	44	CE-0085 AQ 1103
6/1a-50/80	50	80	4000	5000	151 336 26 640	RR 16-50-42-8N-033	50	42	100–210	57	CE-0085 AQ 1103
6/1a-50/100	50	100	4000	5000	151 336 26 650	RR 16-50-42-8N-033	50	42	100–210	62	CE-0085 AQ 1103
7/1-50/50	50	50	4000	5000	151 336 26 400	RR 16-50-54-12N-033	50	54	100–210	54	CE-0085 AQ 1103
7/1-50/80	50	80	4000	5000	151 336 26 410	RR 16-50-54-12N-033	50	54	100–210	68	CE-0085 AQ 1103
7/1-50/100	50	100	4000	5000	151 336 26 420	RR 16-50-54-12N-033	50	54	100–210	73	CE-0085 AQ 1103
8/1-80/80	80	80	4000	4000	151 336 26 430	RR 16-80-82-12N-033	80	82	100–210	86	CE-0085 AQ 1103
8/1-80/100	80	100	4000	4000	151 336 26 440	RR 16-80-82-12N-033	80	82	100–210	100	CE-0085 AQ 1103
8/1-80/150	80	150	4000	4000	151 336 26 450	RR 16-80-82-12N-033	80	82	100–210	120	CE-0085 AQ 1103
9/1-100/100	100	100	4000	5000	151 336 26 760	RBE4020	100	100	100–210	136	CE-0085 BU 0091
9/1-100/150	100	150	4000	5000	151 336 26 770	RBE4020	100	100	100–210	163	CE-0085 BU 0091

Outlet pressure springs and labels

Type	Outlet pressure mbar	Colour	Order No.	Label order No.
5/1-25/50 to 6/1a-50/100	15–35	orange / grey	490 190	201 000 08 117
7/1-50/50 to 8/1-80/150	15–35	yellow / black	490 191	201 000 08 117
5/1-25/50 to 6/1a-50/100	30–70	yellow / black	490 191	201 000 08 127
7/1-50/50 to 8/1-80/150	30–70	red / blue	490 192	201 000 08 127
5/1-25/50 to 6/1a-50/100	70–140	red / blue	490 192	201 000 08 147
7/1-50/50 to 8/1-80/150	70–140	blue / green	490 193	201 000 08 147
5/1-25/50 to 6/1a-50/100	100–210 [1]	green / white	490 194	201 000 08 157
7/1-50/50 to 8/1-80/150	100–210 [1]	black	490 195	201 000 08 157
9/1-100/100 to 9/1-100/150	120–240 [1]	blue	–	201 000 08 857

[1] Standard

Note:
The pressure regulators are fitted as standard with springs for the highest outlet pressure (see technical data table). The actual outlet pressure has to be determined for each individual installation. This outlet pressure should be quoted when ordering, as well as the spring required. The pressure regulator will then be supplied with the correct spring and label.

Safety shutoff and safety relief valves

SSV / SRV	Regulator type	SSV / SRV type	Max. inlet pressure mbar	MOP mbar	Outlet pressure mbar	Spring colour	Preset pressure mbar	Nominal diameter DN	CE Product ID No. DIN-DVGW Reg. No.
SSV	5/1-25/50 to 7/1-50/100	033	4000	4000	140–450	green	350	Integrated	CE-0085 AQ 1103
SSV	8/1-80/80 to 8/1-80/150	033	4000	4000	140–450	green	350	Integrated	CE-0085 AQ 1103
SSV	9/1-100/100 to 9/1-100/150	022-1	4000	1600	100–450	green	350	100	CE-0085 CL 0186
SRV	5/1-25/50 to 9/1-100/150	811 R	1000	1000	30–450	red	300	¾"	CE-0085 CQ 0160

Conversion of LPG, town gas, etc. to an equivalent natural gas throughput:

$V_{nat\ gas} = V_{gas} \cdot f$

$V_{gas} = Q_{bnr} / LHV_{gas}$

$f = \sqrt{d_{gas} / d_{nat\ gas}} = \sqrt{d_{gas} / 0.641}$

Examples:

Gas type	LHV kWh/Nm^3	Density kg/m^3	Relative density, d	Correction factor, f
Propane	25.89	2.011	1.555	1.557
Butane	34.39	2.708	2.094	1.807
Town gas 1	4.89	0.513	0.397	0.787
Town gas 2	4.30	0.624	0.483	0.868
Town gas 3	6.40	1.060	0.820	1.131
Town gas 4	4.20	0.801	0.620	0.967
Bio-/sewage gas	8.00	0.930	0.750	1.082
Bio-/sewage gas	7.00	1.054	0.850	1.152
Bio-/sewage gas	6.00	1.178	0.950	1.217
Bio-/sewage gas	5.00	1.287	1.040	1.274

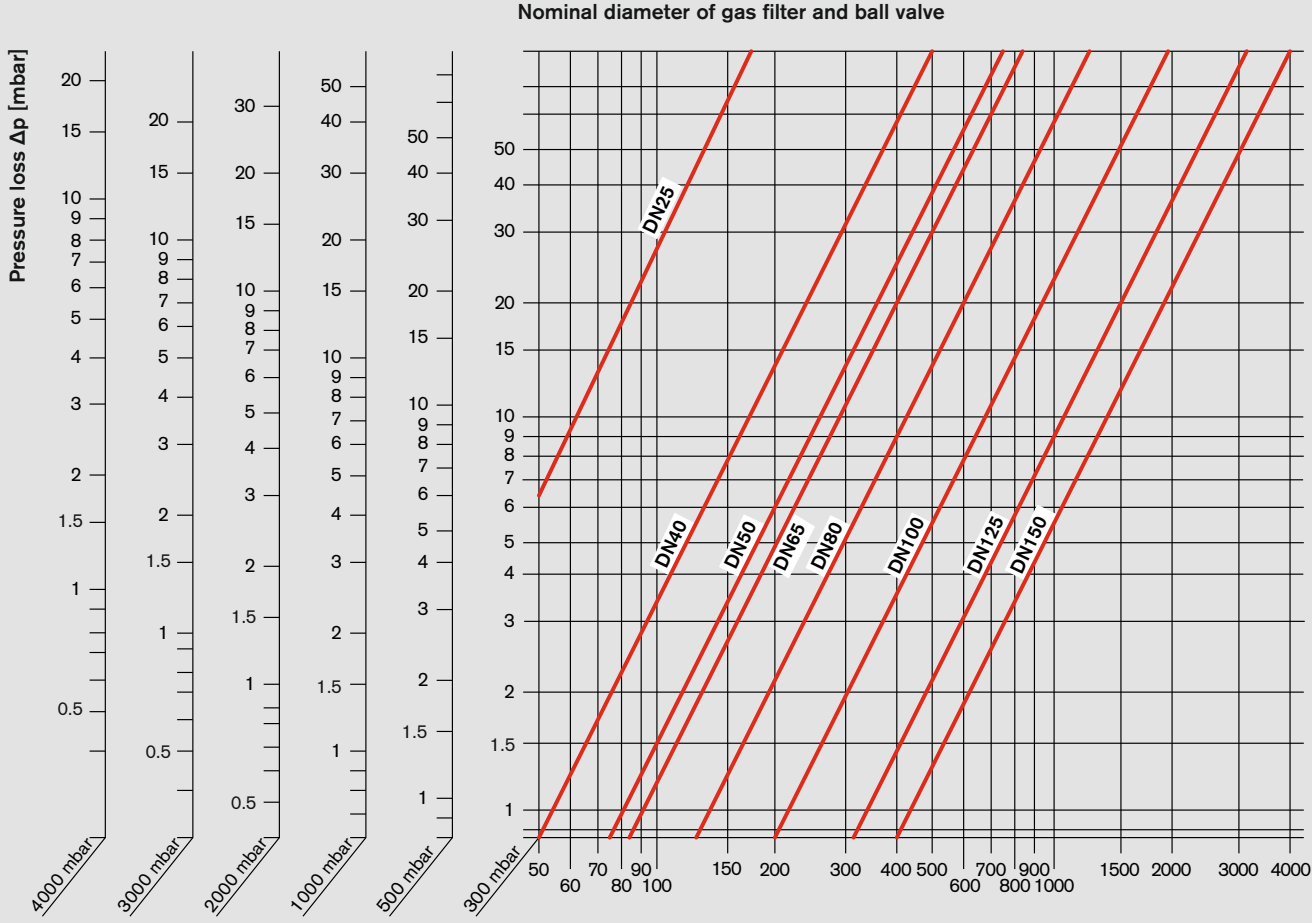
Application :

Burner rating Q_{bnr} = 1500 kW, propane

$V_{propane}$ = 1500 / 25.89 = 57.9 Nm^3/h

Value to read on natural gas axis $V_{nat\ gas}$ = 57.9 · 1.557 = 90.1 Nm^3/h

Pressure loss chart: Gas filter with ball valve



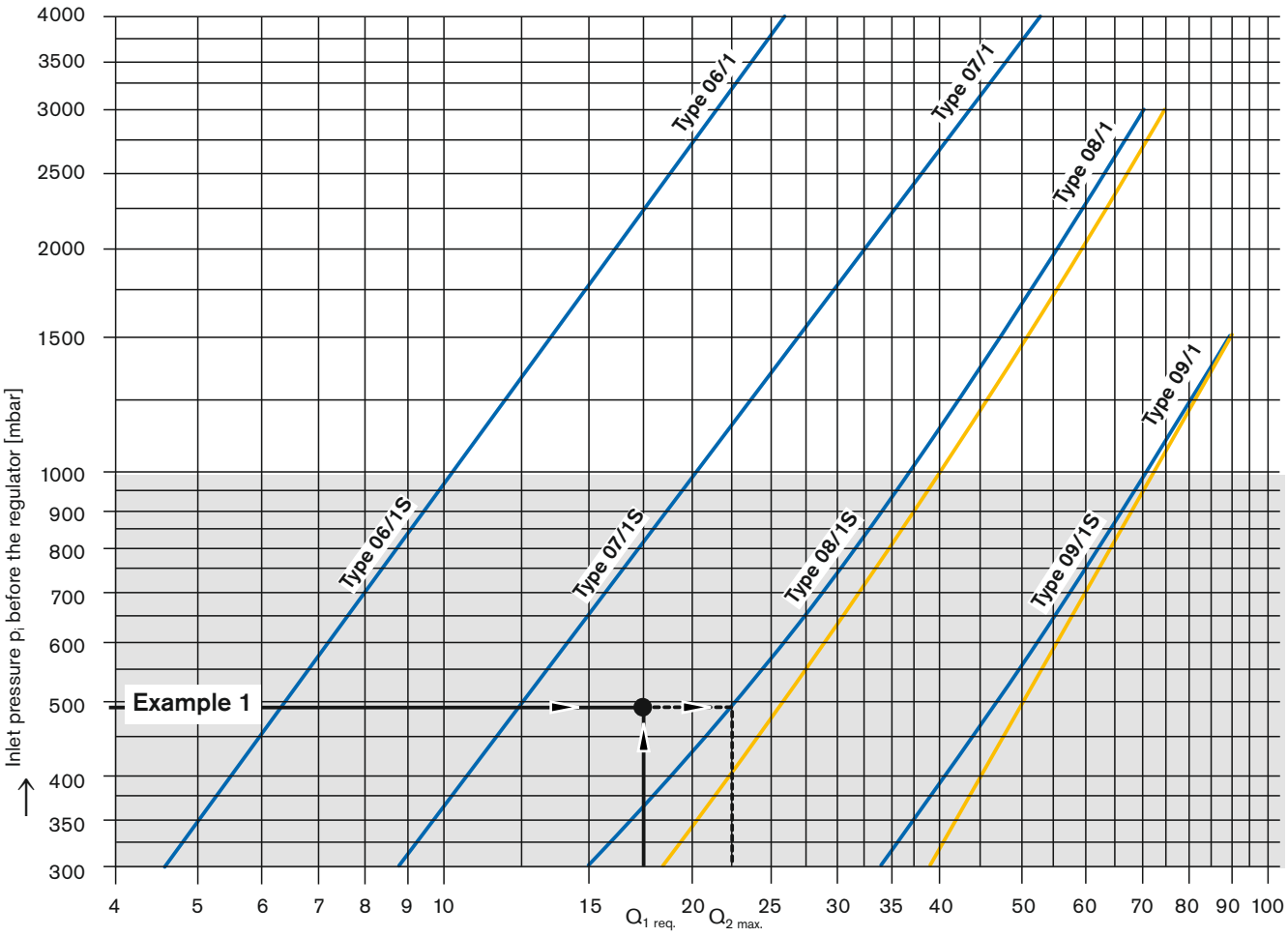
Please note:
The pressure loss across the selected gas filter and ball valve should not exceed 50 mbar.

Below this value the permissible flow velocity is not exceeded and filtration will be satisfactory. The nominal diameter selected should be the same or larger than the nominal diameter of the high-pressure regulator's inlet.

Note:
The pressure loss of the gas filter and ball valve has been included in the nominal diameter curve.

Where flow rates are below 50 m^3/h the pressure loss is less than 6 mbar and a more precise consideration is not required.

Selection chart, types 06/1(S) to 09/1(S)
Outlet pressure p_o: 100, 50 mbar



→ Flow rate V [m3/h] Natural gas E, LHV = 10.35 kWh/Nm3, d = 0.606
Natural gas LL, LHV = 8.83 kWh/Nm3, d = 0.641

The type of regulator required can be selected using the chart. The following must be known:

- Gas type (LHV, density)
- Burner rating
- Inlet pressure [mbar]
- Required outlet pressure, p_o

The type is determined by referring to the intersection point of the flow rate and inlet pressure, and selecting **the regulator shown to the right**.

If a gas filter and ball valve are installed upstream, the pressure loss of these components must be deducted from the inlet pressure (see example).

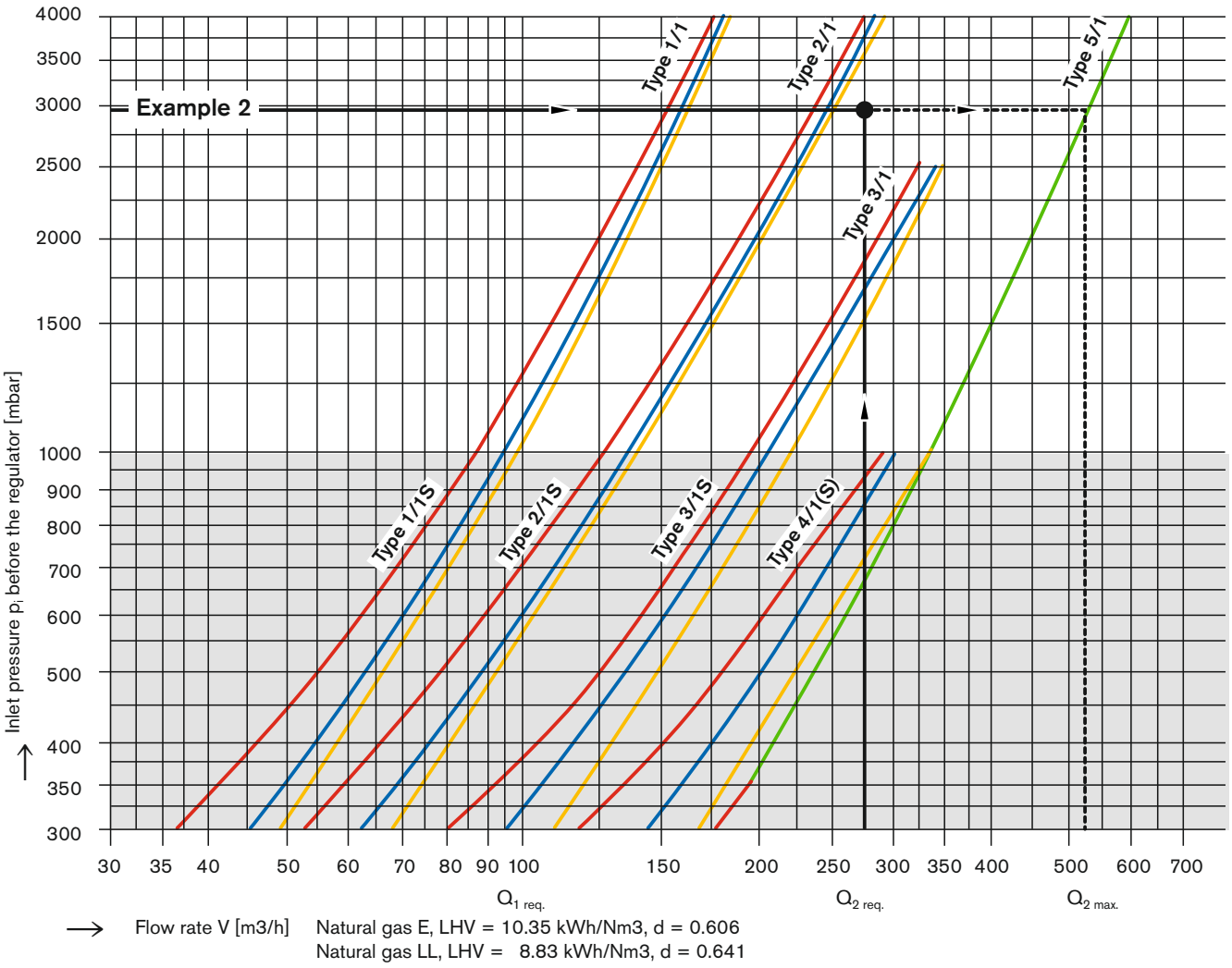
Selection example 1

Gas type:	Natural gas
LHV:	10.35 kWh/Nm^3
Density, d:	0.606
Throughput:	17.5 Nm^3/h
Inlet pressure, p_i:	480 mbar
Outlet pressure, p_o:	100 mbar

(refer to valve train selection tables)

1. Pressure loss from filter and ball valve is below 6 mbar.
2. Regulator selected is type 08/1.

Selection chart, types 1/1(S) to 4/1(S) & 5/1
Outlet pressure p_o: 200, 140, 100, 50 mbar



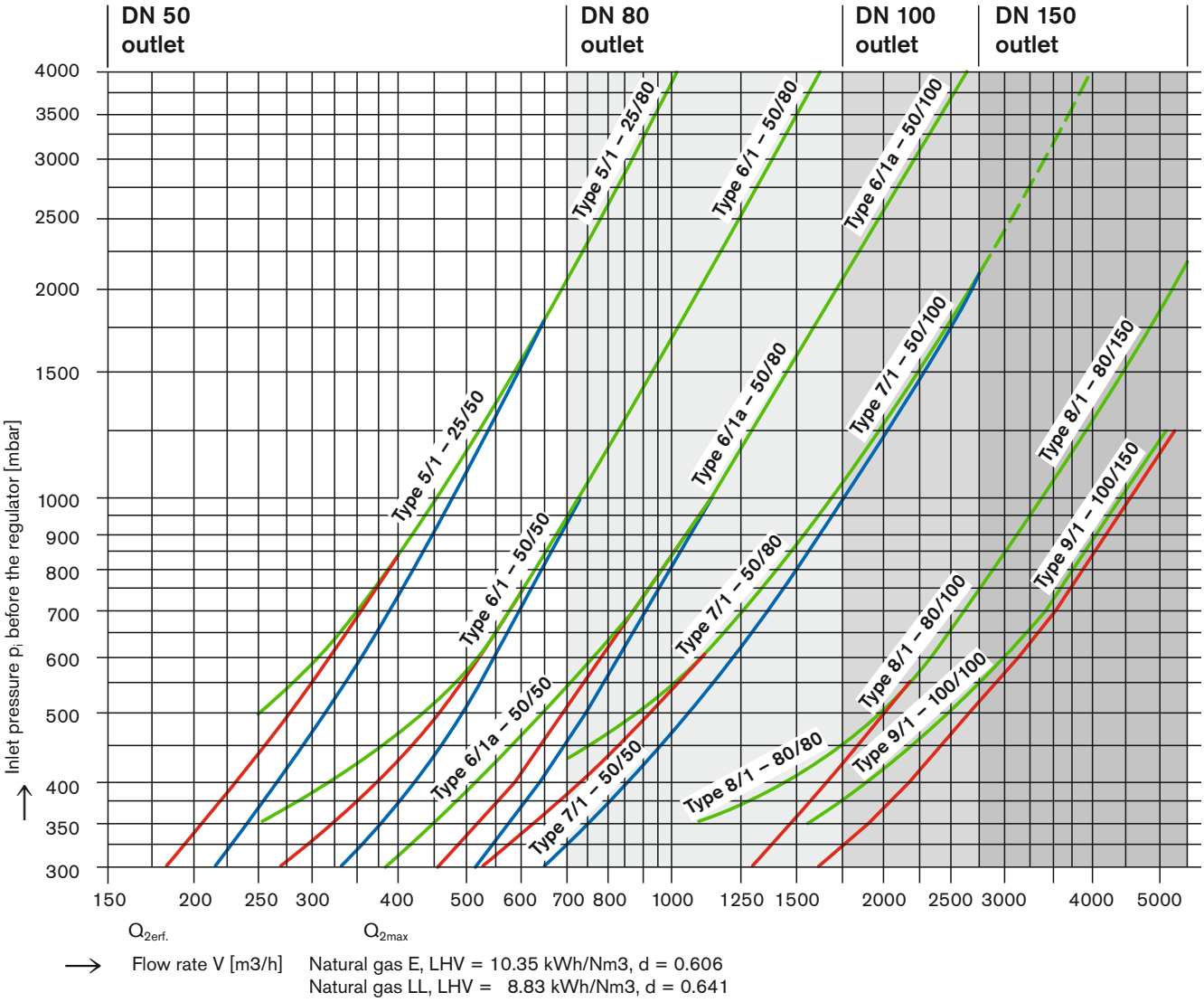
Selection example 2

Gas type:	LPG, propane
LHV:	25.89 kWh/Nm^3
Density, d	1.555
Throughput:	4 556 kW
Throughput V_{Gas}:	176 Nm^3/h
Throughput, ref. to natural gas: (see page 20)	275 Nm^3/h
Inlet pressure, p_i:	2.9 bar

1. Pressure loss Δp from DN50 filter and ball valve is approx. 1 mbar.
2. Regulator selected is type 5/1 (MOP for regulator type 3/1 is exceeded).
3. Check turndown for 1500 kW partial load:
   $Q_{2\ max}$ = 520 Nm^3/h (natural gas)
   = 520/1.557 = 333 Nm^3/h (prop.)
   Q_{min} = 1500 / 25.89 = 58 Nm^3/h
   ➪ Turndown 5.8:1 < 20:1.
   Thus the application is acceptable.

Note:
The gas pressure regulators are direct-acting units and have a turndown ratio of 20:1, which means the lowest regulated flow rate is 5 % of the maximum. The maximum flow rate can be read off the flow rate curve for the appropriate inlet pressure (see example 2).

Selection chart , types 5/1-25/… to 9/1-100/…
Outlet pressure p_o: 200, 140, 100 mbar



→ Flow rate V [m3/h]

Natural gas E, LHV = 10.35 kWh/Nm3, d = 0.606
Natural gas LL, LHV = 8.83 kWh/Nm3, d = 0.641

- < 700 m^3/h _____ DN 50
- 700–1750 m^3/h _____ DN 80
- 1750–2700 m^3/h _____ DN 100
- > 2700 m^3/h _____ DN 150

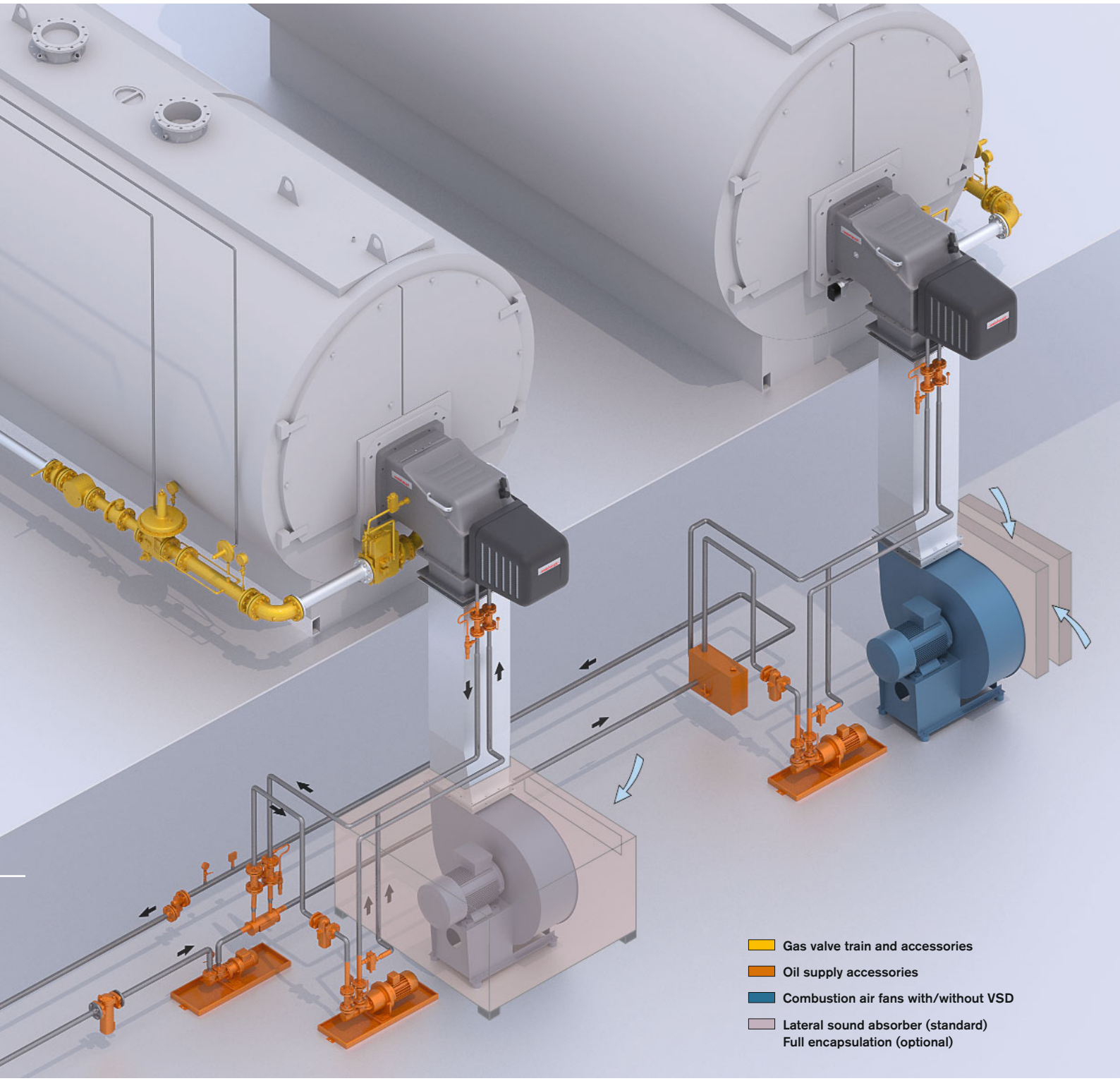
The stabilising section at the outlet must be enlarged in accordance with the gas flow rate, so that the permissible velocity is not exceeded.

Note:
The gas pressure regulators are direct-acting units and have a turndown ratio of 20:1, which means the lowest regulated flow rate is 5 % of the maximum. The maximum flow rate can be read off the flow rate curve for the appropriate inlet pressure (see example 2 on page 23).

Scope of delivery:
1 Pressure regulator
1 Safety shutoff valve (SSV)
1 Safety relief valve (SRV)
1 Inlet press. gauge with button valve
1 Outlet press. gauge with button valve
1 Bypass line with ball valve
1 Impulse line (pressure regulator)
1 Impulse line (SSV)
1 Stabilising piece with connections
1 SSV reset key with screw and gaskets

Supplied assembled and pressure tested.

Weishaupt system technology: Perfectly matched components



Notes on commissioning

Tightness test:
Once the pressure regulating assembly has been installed in the burner's gas valve train, a tightness test must be carried out in accordance with the burner manual. As with low-pressure trains, the tightness test is undertaken in three stages. Once the tightness test has been completed, the additional tests described below then have to be carried out.

Note:
The ball valve must not be opened until the valve train is gas tight.

Additional tests for regulator types *06/1 to 09/1, 1/1 to 5/1, 06/1S to 09/1S, and 1/1S to 4/1S*

SSV tightness test

- Close the ball valve.
- The SRV on high-pressure regulator types 06/1 to 09/1 and 1/1 to 5/1 cannot be adjusted. To enable the pressure to build up to the SSV activation point, a blanking plate has to be inserted into the vent line. It should also be ensured that the screw cap on the regulator is properly closed. This is not necessary on the high-pressure regulators with safety diaphragms (.../1S).
- Use a hand pump to increase the outlet pressure to 350 mbar. The SSV should activate. If it does not activate, reduce the tension of the SSV spring until the SSV trips.
- Release the pressure by opening a test point after the regulator (with the ball valve closed).
- Connect a suitable pressure measuring device to the test point and check whether the pressure increases after opening the ball valve.
- If no pressure increase can be detected then the SSV has closed tightly and can be reset.
- If a pressure increase can be detected then the SSV has not closed tightly and must be repaired by a suitably qualified person.

Tightness test – regulator zero cutoff:

- Open the ball valve and monitor the increase in the outlet pressure. The pressure must not increase beyond a point equal to the set outlet pressure plus the regulator's closing group (see the regulator's rating plate). If the zero cutoff is not tight the high-pressure regulator must be replaced.

Integrated SRV tightness test

- Close the ball valve.
- Remove the blanking plate
- Check the outlet pressure of the regulator. If it remains unchanged (set outlet pressure plus closing group) then the SRV is tight. If the pressure drops then the SRV is not tight, which is leading to a continuous loss of gas. The high-pressure regulator must be replaced.

Additional tests for regulator types *5/1-25/50 to 9/1-100/150*

SSV tightness test:

- Close the ball valve.
- The SRV on high-pressure regulator types 5/1-25/50 to 9/1-100/150 can be adjusted. To enable the pressure to build up to the SSV activation point, the vent pressure of the SRV has to be increased so that it lies beyond the SSV's activation point.
- Use a hand pump to increase the outlet pressure to 350 mbar. The SSV should activate. If it does not activate, reduce the tension of the SSV spring until the SSV trips.
- The tension on the SRV spring is then reduced until the vent pressure of 300 mbar is reached. If this remains unchanged then the SRV is closing tightly and no further testing is required.
- Release the pressure by opening a test point after the regulator (with the ball valve closed).
- Connect a suitable pressure measuring device to the test point and check whether the pressure increases after opening the ball valve.
- If no pressure increase can be detected then the SSV has closed tightly and can be reset as described below.
- If a pressure increase can be detected then the SSV has not closed tightly and must be repaired by a suitably qualified person.

Tightness test – regulator zero cutoff:

- Open the ball valve and wait until the outlet pressure is constant.
- Close the ball valve.
- Check the inlet pressure. If the zero cutoff is tight this pressure must not drop. If it is determined that it is not tight, this must be rectified by a suitably qualified person.

Notes on setting

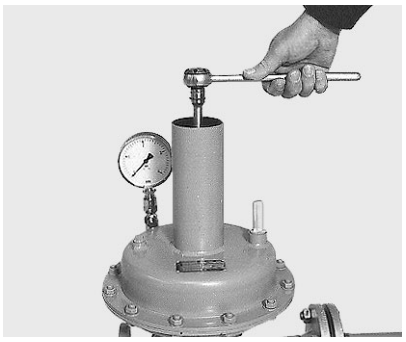


Fig. 1

Adjusting the outlet pressure (Fig. 1)

- When reading the pressure gauge, the push-button valve must be depressed.
- The outlet pressure of the regulator can be decreased by turning the setting screw anticlockwise, and increased by turning the screw clockwise.

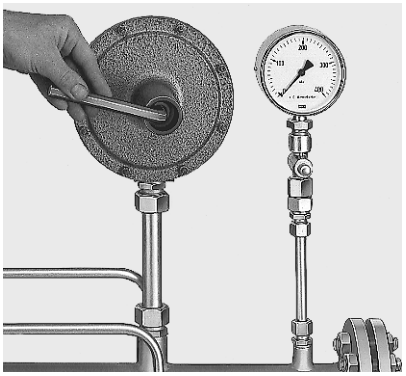


Fig. 2

Adjusting the SRV (Fig. 2)

- The SRV is preset at the factory to 300 mbar.
- This setting does not normally require an adjustment.
- The setting pressure of the SRV can be decreased by turning the setting screw anticlockwise and increased by turning the screw clockwise.

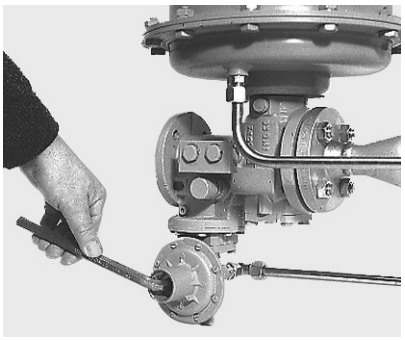


Fig. 3

Adjusting the SSV (Fig. 3)

- The SSV is preset at the factory to 350 mbar.
- This setting does not normally require an adjustment.
- The setting pressure of the SSV can be decreased by turning the setting screw anticlockwise and increased by turning the screw clockwise.

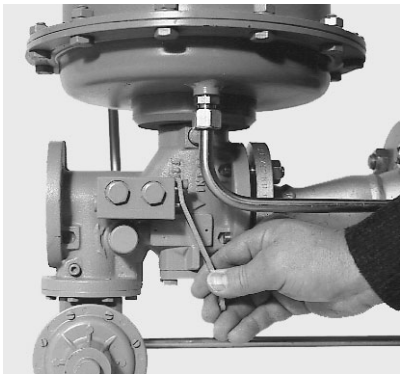


Fig. 4

Resetting the SSV, step 1 (Fig. 4)

- Close the ball valve
- Equalise the pressure by opening the bypass valve (Fig. 4).

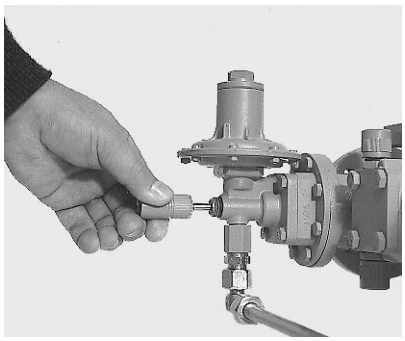


Fig. 5

Resetting the SSV, step 2 (Fig. 5)

- Unscrew sealing cap and pull back valve rod until it engages (Fig. 5, only possible if the outlet pressure is less than the SSV activation pressure).

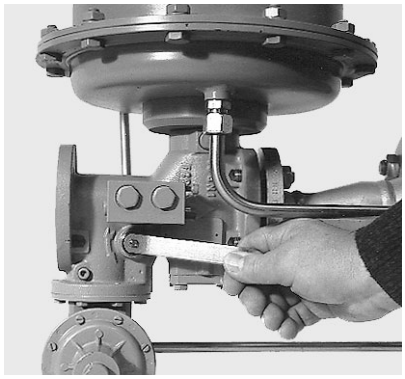
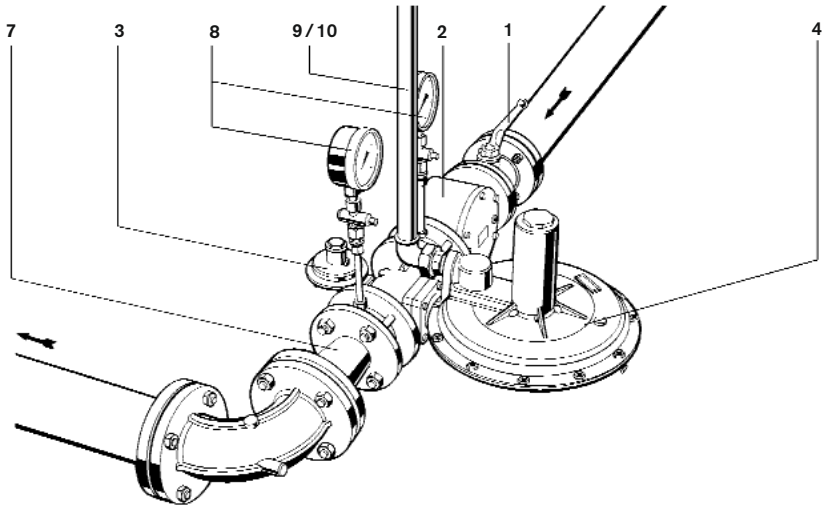


Fig. 6

Resetting the SSV, step 3 (Fig. 6)

- Turn the reset shaft anticlockwise until the valve disc is latched by the release lever (Fig. 6).
- Screw on the sealing cap and check for gas tightness (soap bubble test).
- The manual bypass valve must be closed (type 9/1-100/…).

Installation examples and notes



Example of an installation with pressure regulator types 06/1 to 09/1 and 1/1 to 4/1

Legend:

1 Ball valve
2 Gas filter
3 Safety shutoff valve
4 Pressure regulator
5 Safety relief valve (SRV)
6 Compensator
7 Reducing flange
8 Pressure gauge with push-button valve
9 SRV vent line
10 Pressure regulator breather line
11 Double nipple
12 Valve
13 N4 nipple
14 M4 sleeve
15 Gas meter

Installation instructions

- In many cases the pressure regulator's inlet and outlet sizes are smaller than those of the gas valve train's other components, particularly with high gas pressures. A range of flanged reducers in all the necessary sizes is available to enable installation to be carried out quickly and correctly (see pages 30 and 31).

- The distance between the gas valve assembly and the pressure regulator can be short, or several metres long. With large distances the gas flow can "stabilise" and a buffer volume is obtained.

- The pressure regulators and safety assemblies require an ambient temperature of -15 °C to +60 °C. If necessary, the regulators should be shielded from heat radiation or from excessively low temperatures. The equipment must also be protected against damp, dust, and dirt.

- The breather line is the connection between the space above the regulator's diaphragm and the open atmosphere. Correct operation can only be guaranteed if the air column above the diaphragm can move quickly without undue resistance. The line diameters below must be provided for the various lengths of line as shown:

ø mm	Length m
20	3
25	5
40	> 5

For longer lengths, up to 30 m, a line of ø 40 mm remains sufficient.

- Due to the SSV shutoff cap, which is fitted with a diaphragm, it is not necessary to fit a breather line from the SSV diaphragm housing to open atmosphere.

- Multiple regulator breather lines can be run together or separately to open atmosphere. A common line must be of a larger diameter. It should be noted that no mutual interference is caused by this.

- The vent line is the connection between the SRV and the open atmosphere. This line must be run separately.

  Connection for
  Types 5/1-25/50
  to 9/1-100/150 ..... R ¾

- There is a combined breather and vent line on regulator types 06/1 to 09/1 and 1/1 to 5/1. Separate lines must be installed for each regulator. The same instructions as for the breather line apply with regard to the nominal diameter.

  Breather / vent line connection for
  types 06/1 ro 09/1 ..... R ¾
  types 1/1 to 5/1 ..... R 1
  The connections must be seperable.

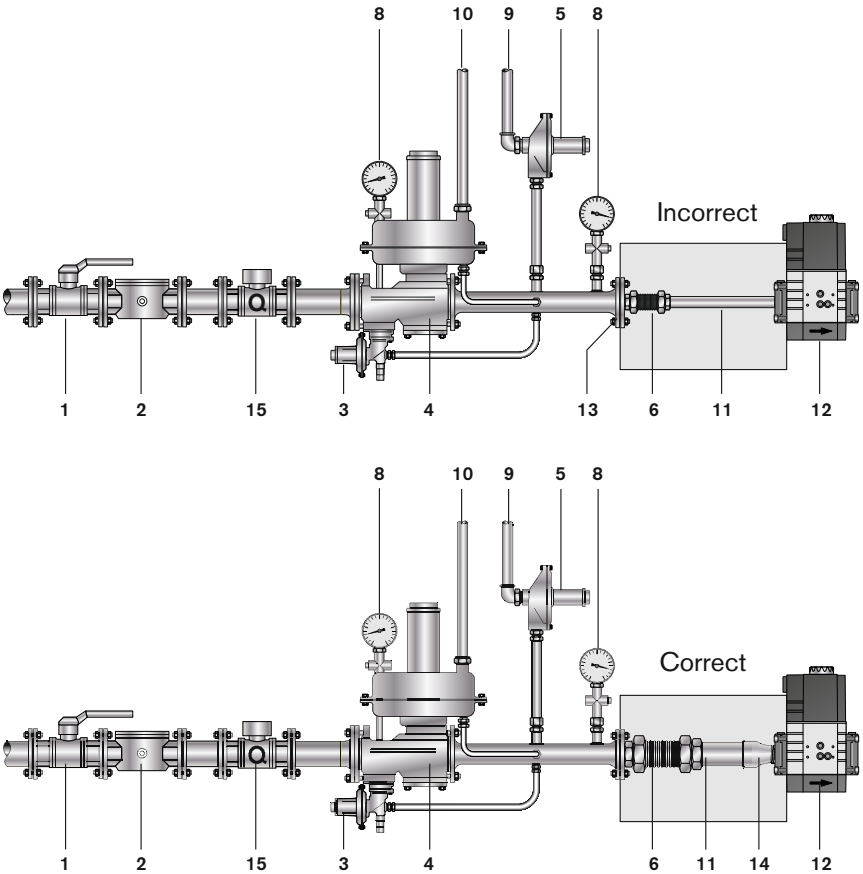
- The termination of vent lines must be an adequate distance from sources of ignition (at least 3 m) and installed so that any outflowing gas cannot enter buildings. The line must also be protected against the entry of rainwater and against blockages.

- To enable the tension-free mounting of the valve train, the fitting of a compensator is recommended.

- The supplied gaskets must be fitted between the flanges.
- The complete assembly must be tested for tightness before burner commissioning. The outlet side is tested according to the instructions given in the burner manual. For the tightness testing of the inlet side see page 27.
- Prior to commissioning, check for correct function, including the closed position test of the SSV. The installation must be purged carefully and the pressure increased slowly when filling with gas.

Diameter reduction between the regulator and the gas valve assembly

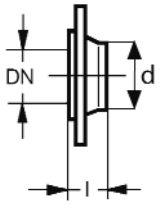
To avoid problems setting the high gas pressure switch due to an excessive pressure drop across the screwed train section, there should be no immediate reduction in diameter after the high-pressure regulator's stabilisation section. The reduction in diameter should instead be made immediately before the double gas valve assembly. The guidelines below must be followed.



Example of an installation with pressure regulator types 5/1 to 8/1

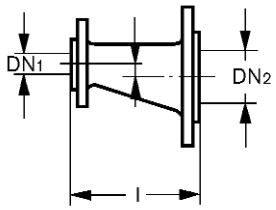
Regulator size	Compensator size	Bend size	Reducer at valve inlet M4 sleeve EN 10242 No. 246 Order No.		Gas valve assembly size
DN 25	R 1	R 1	453 741	(R 1 → R ¾)	R ¾
DN 25	R 1	R 1	–		R 1
DN 50	R 1½	R 1½	453 758	(R 1½ → R ¾)	R ¾
DN 50	R 2	R 2	453 747	(R 2 → R 1)	R 1
DN 50	R 2	R 2	453 745	(R 2 → R 1½)	R 1½
DN 50	R 2	R 2	–		R 2

Connecting parts / accessories



Weldable flange
Flanged connection per EN 1092-1

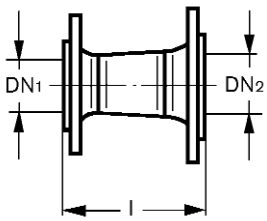
DN / PN	**d** mm	**l** mm	**Mass** kg	**Order No..**
20 / 40	26.9	40	1.0	452 940
25 / 40	33.7	40	1.2	452 941
32 / 40	42.4	42	1.6	452 901
40 / 40	48.3	45	1.8	452 942
50 / 40	60.3	48	2.5	452 936
65 / 16	76.1	45	3.0	452 910
80 / 16	88.9	50	3.7	452 911
100 / 16	114.3	52	4.6	452 913
125 / 16	139.7	55	6.3	452 914
150 / 16	168.3	55	7.7	452 918



Eccentric reducing flange, aluminium
(MOP 3000 mbar, flanged connection per EN 1092-1 PN 16.
Installation downstream of the high-pressure regulator only).

DN1	**DN2**	**l** mm	**b** mm	**Mass *** kg	**Order No.**
25	40	144	7.5	2.6	151 329 26 302
25	50	159	12.5	2.7	151 329 26 312
25	65	172	20.0	3.3	151 329 26 322
25	80	177	27.5	3.7	151 329 26 832
40	50	163	5.0	3.7	151 329 26 342
40	65	177	12.5	4.1	151 329 26 352
40	80	181	20.0	4.4	151 329 26 842
40	100	195	31.0	6.0	151 329 26 372
50	65	180	7.5	4.4	151 329 26 382
50	80	185	15.0	5.1	151 329 26 852
50	100	197	26.0	6.3	151 329 26 402
65	80	185	7.5	5.1	151 329 26 862
65	100	197	18.5	6.6	151 329 26 422
65	125	227	31.0	7.7	151 329 26 432
80	100	207	11.0	7.0	151 329 26 872
80	125	232	23.5	8.2	151 329 26 882
100	125	234	12.5	9.4	151 329 26 462
100	150	247	26.5	12.0	151 329 26 472
125	150	250	14.0	12.8	151 329 26 482

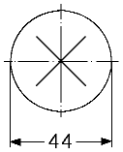
Complete with bolts, nuts, and gaskets for two connections.



Concentric reducing flange, steel / ductile cast iron
(MOP 16 000 mbar, flanged connection per EN 1092-1 PN 16).

DN1	**DN2**	**l** mm	**Material**	**Mass *** kg	**Order No.**
25	40	150	Steel	4.5	151 327 26 712
25	50	165	Steel	5.3	151 327 26 802
25	65	173	Steel	6.0	151 330 26 202
25	80	182	Steel	7.0	151 330 26 212
40	50	200	Grey cast iron	7.0	151 330 26 252
50	65	200	Grey cast iron	9.0	151 327 26 822
50	80	200	Ductile cast iron	7.2	151 329 26 892
50	100	200	Ductile cast iron	8.1	151 327 26 442
50	125	200	Ductile cast iron	9.2	151 330 26 162
50	150	300	Ductile cast iron	15.0	151 332 26 272
65	80	200	Ductile cast iron	8.2	151 330 26 082
80	100	200	Ductile cast iron	9.3	151 329 26 902
80	125	200	Ductile cast iron	10.5	151 329 26 912
80	150	200	Ductile cast iron	12.0	151 330 26 222
100	125	200	Ductile cast iron	11.4	151 327 26 892
100	150	200	Ductile cast iron	12.8	151 328 26 262
125	150	200	Ductile cast iron	14.1	151 330 26 232

Complete with bolts, nuts, and gaskets for two connections.



Rubber washer

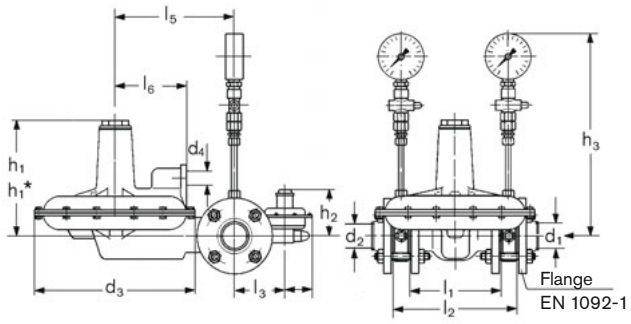
Diameter mm	**Thickness** mm	**Order No.**
44	2	151 336 26 167

Please refer to page 18 for notes and installation.

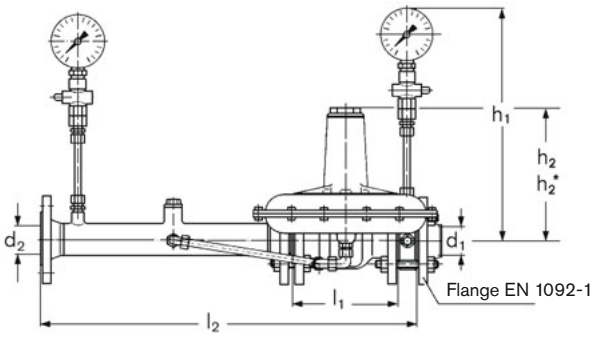
* Masses include bolts, nuts, and gaskets.
All dimensions are approximate. Weishaupt reserve the right to make changes in light of future developments.

Dimensions

Types 06/1(S) to 09/1(S) and 1/1(S) to 4/1(S)



Type 5/1(compact)



Type	d_1/d_2	d_3	d_4	h_1	h_1*	h_2	h_3
06/1(S) to 09/1(S)	25	190	¾"	155	345	100	380
1/1(S) to 4/1(S)	50	350	1"	250	445	100	490

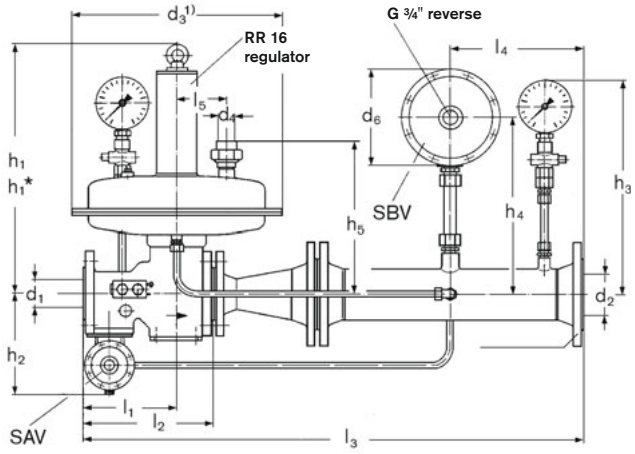
Type	l_1	l_2	l_3	l_4	l_5	l_6
06/1(S) to 09/1(S)	160	250	100	60	160	100
1/1(S) to 4/1(S)	200	290	110	60	260	150

*) Clearance for removing spring.
Dimensions are in millimetres and are approximate.
Counter flange not included in delivery.
Refer to page 15 for full scope of delivery.

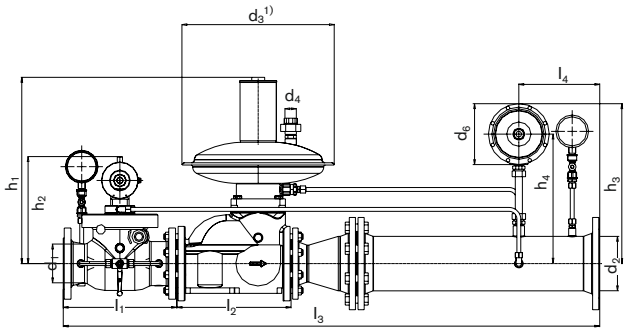
Type	d_1	d_2	l_1	l_2	h_1	h_2	h_2*
5/1	50	50	200	750	490	250	445

*) Clearance for removing spring.
Please refer to the table for pressure regulator types 1/1 to 4/1 for all other dimensions.

Types 5/1 to 8/1



Type 9/1



Type	d_1	d_2	d_3 [1)]	d_4	d_6	h_1	h_1*	h_2
5/1-25/50	25	50	310	1"	180	470	660	195
5/1-25/80	25	80	310	1"	180	470	660	195
6/1-50/50	50	50	310	1"	180	485	680	195
6/1-50/80	50	80	310	1"	180	485	680	195
6/1a-50/50	50	50	310	1"	180	485	680	195
6/1a-50/80	50	80	310	1"	180	485	680	195
6/1a-50/100	50	100	310	1"	180	485	680	195
7/1-50/50	50	50	405	1"	180	485	680	195
7/1-50/80	50	80	405	1"	180	485	680	195
7/1-50/100	50	100	405	1"	180	485	680	195
8/1-80/80	80	80	405	1"	180	545	735	240
8/1-80/100	80	100	405	1"	180	545	735	240
8/1-80/150	80	150	405	1"	180	545	735	240

Type	h_3	h_4	h_5	l_1	l_2	l_3	l_4	l_5
5/1-25/50	430	350	280	133	180	847	250	95
5/1-25/80	430	360	280	133	180	1016	250	95
6/1-50/50	430	350	295	179	250	752	250	95
6/1-50/80	430	350	295	179	250	1104	250	95
6/1a-50/50	430	350	295	179	250	752	250	95
6/1a-50/80	430	350	295	179	250	1104	250	95
6/1a-50/100	460	370	295	179	250	1204	250	95
7/1-50/50	430	350	295	179	250	752	250	95
7/1-50/80	450	360	295	179	250	1104	250	95
7/1-50/100	460	370	295	179	250	1204	250	95
8/1-80/80	450	360	355	210	300	952	250	95
8/1-80/100	460	370	355	210	300	1254	250	95
8/1-80/150	480	400	355	210	300	1254	250	95

Type	d_1	d_2	d_3 [1)]	d_4	d_6	h_1	h_1*
9/1-100/100	100	100	360	¾"	180	576	770
9/1-100/150	100	150	360	¾"	180	576	770

Type	h_2	h_3	h_4	l_1	l_2	l_3	l_4
9/1-100/100	400	467	372	350	352	1456	250
9/1-100/150	400	494	400	350	352	1658	250

[1)] Diaphragm diameter and greatest width
*) Clearance for removing spring

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The Weishaupt Group has over 3400 employees and is a market leader for burners, condensing boilers, heat pumps, solar energy, and building automation.

The business was founded in 1932 and encompasses three companies operating in the fields of energy technology, energy recovery, and energy management.

The core division is Max Weishaupt GmbH (energy technology), which is located in the southwest German town of Schwendi, and which is where all burners are manufactured. It is also the group's administrative headquarters, and home to the group's own Research and Development Institute.

Heating systems are manufactured by Weishaupt's sister company, Pyropac, which is located in the Swiss town of Sennwald. DHW cylinders are made by Power Engineers in Donaueschingen, Germany.

Neuberger building automation (energy management), sited in Rothenburg ob der Tauber in Germany, has been a group subsidiary since 1995.

Germany's Bad Wurzach is home to the geothermal engineering company, BauGrund Süd, which has been part of the Weishaupt Group since 2009.

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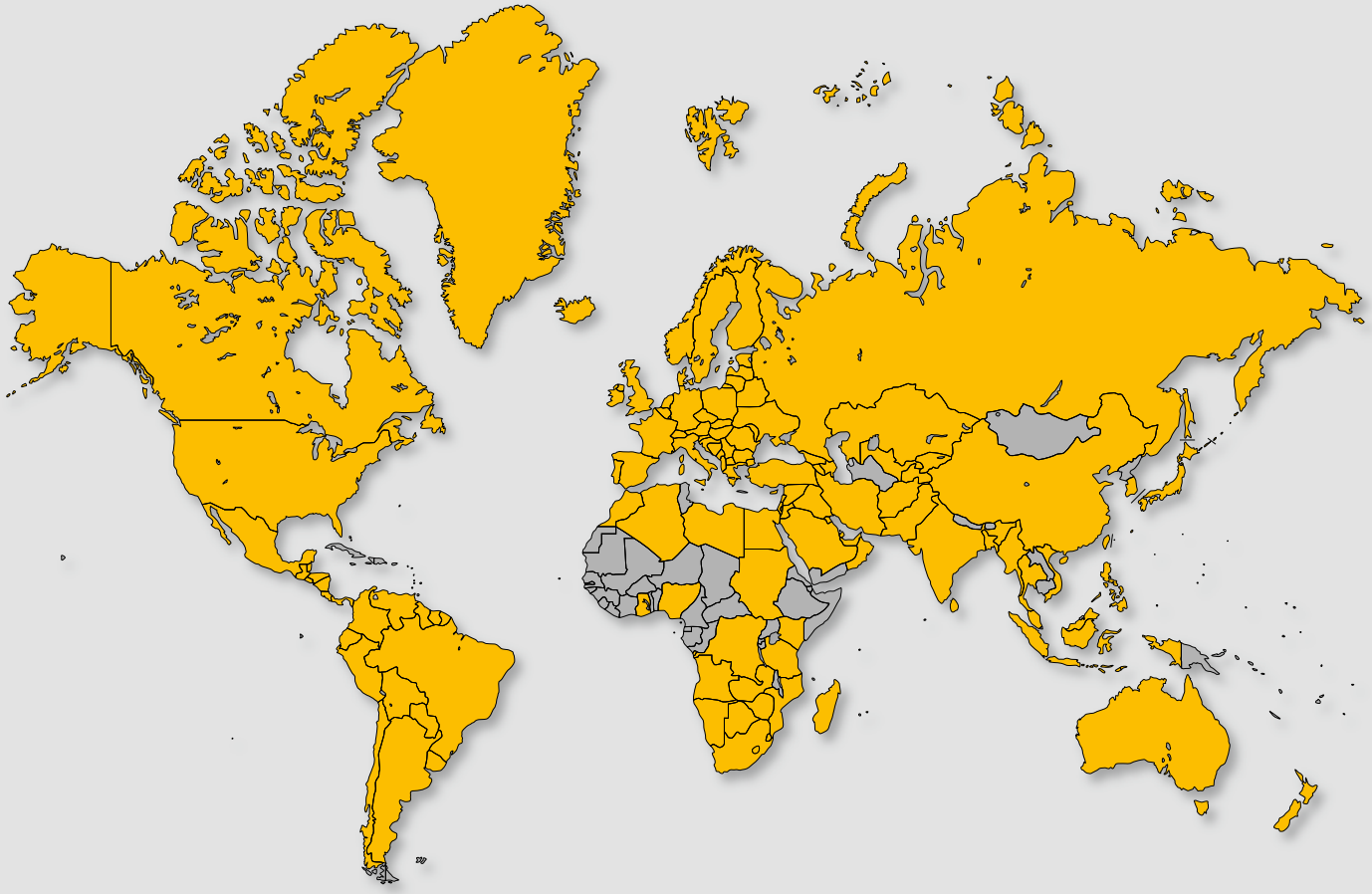

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