Construction RS gas pressure regulator

- Cap
- Adjustment screw
- Spring plate
- Spring cap
- Control spring
- SBV adjusting screw
- Control device
- Regulator main diaphragm
- Piston
- Impulse connection
- Breathing connection
- Control device
- Intermediate diaphragm
- Control valve seat
- Actuator housing
- Control cone
- Valve disc
- Nut
- Spindle
- Feet disc
- Diaphragm disc
- Disc
- Bypass valve
- SSV valve seat
- Safety shut-off valve (SSV)

shown RS 254 DN050
# Table of contents

1 General Information 6
   1.1 Warranty and Liability 6
   1.2 Symbols, Notes 7
   1.3 Terms, Abbreviations 7

2 Application, Characteristics 8
   2.1 Application 8
   2.2 Characteristics 8
   2.3 Type of model (option) 8

3 Reasonably be foreseeable wrong use 8

4 Safety Instructions 9
   4.1 Hazards of Handling the Device 9
   4.2 Personnel Requirements 9
   4.3 Country-Specific Requirements 9
   4.4 Handover of the Operating and Maintenance Instructions 9
   4.5 Safety in Operation 10
   4.6 What To Do in Case of Danger 10

5 Responsibility of the Operator 10

6 Transport, Storage and Packaging 11
   6.1 Transport 11
   6.2 Storage 11
   6.3 Packaging 11

7 Mounting and Commissioning 12
   7.1 Safety Instructions and Preparation 12
   7.2 Mounting 13
   7.3 Leakage Test (Test for External Leakage) 14
   7.4 Initial Commissioning / Recommissioning 15
   7.5 Table setpoint spring control device 17
   7.6 Table setpoint spring SSV - control unit 19
   7.7 Decommissioning 21

8 Maintenance 21
   8.1 Maintenance Plan 21
   8.2 Maintenance Procedure 22
   8.3 Table of Screw Tightening Torques Mₘₐ 23
   8.4 Lubricants Table 24

9 Troubleshooting 24
   9.1 Gas Pressure Regulator 24
   9.2 Safety Shut-Off Valve 25

10 Replacement and Disposal 26

11 Spare Parts 27
   11.1 Spare Parts Drawing RS 254 / RS 255 DN 25 - DN200 27
   11.2 Spare parts drawing options 28
   11.3 Parts for maintenance work 29
   Intermediate Diaphragm 29
   Valve plate 29
   Valve Plate SSV / Diaphragm SSV 30
   O-Ring and Sealing Ring Sets 30
   Safety diaphragm 31

Notizen 32
12 Accessories / Options
   12.1 Noise reduction 33
   12.2 High pressure shaft 35
   12.3 Breathing valve BV 36
   12.4 Throttle valve RSD 37
   12.5 Signal transmitter / reed contact 38
   12.6 Inductive signal transmitter 41
   12.7 Choke washer 43
   12.8 SSV remote release 45
   12.9 Safety diaphragm 47

13 Tools
   13.1 Tightening tool SSV 48
   13.2 SSV tightening tool 48

Declaration of conformity 49
1 General Information

The personnel entrusted with installation, operation or maintenance of the gas pressure regulator must have completely read and understood beforehand the following documents:

- **Gas Pressure Regulator RS 254 / RS 255 Product Information**
  The product information contains technical data, dimensions and a description of the design and the mode of operation.

- **Gas Pressure Regulator RS 254 / RS 255 Operating and Maintenance Instructions**
  This document allows safe and efficient handling of the device and contains information on assembly, commissioning, maintenance, troubleshooting and repair according to regulations. It is an integral part of the scope of delivery of the device, must be kept in close proximity of the device and must be readily accessible to personnel at any time. The basic requirement of safe operation is compliance with all safety instructions and guidelines specified in these instructions. Accordingly, the information and instructions must be observed when working on the device or on the gas line. In addition, the local occupational safety regulations and the general safety regulations for the application range of the device shall apply. The figures in these instructions are provided for basic understanding and may differ from the actual design. The contents in these instructions are protected by copyright. They may be used as part of operating the device. Any other use and/or reproduction is not permitted without prior authorization by the MEDENUS Gas-Druckregeltechnik GmbH.

1.1 Warranty and Liability

Claims under warranty or liability for personal injury and material damage are generally void, if one or several of the following conditions are not observed:

- Work on the device during the warranty period may only be performed in consultation with the manufacturer
- Designated use of the device in accordance with the established conditions of use
- Proper installation, commissioning, operation and maintenance of the device
- Operation of the device with properly installed and functioning safety devices only
- Operating and maintenance instructions of the device or of the system
- Observance of the maintenance instructions
- Properly performed repairs
- Supply lines without defects
- The use of original MEDENUS© spare parts and lubricants listed in these instructions or
- Force majeure

It is generally prohibited

- to perform constructive modifications on the device
- to keep using the device despite the detection of a defect
1.2 Symbols, Notes

The instructions contain safety instructions marked with symbols to indicate possible consequences in case of non-observance:

This combination of symbol and signal word indicates a potentially hazardous situation which may result in light injuries, damage to the device, the breakdown of the system, and material or environmental damage if not avoided.

This combination of symbol and signal word indicates an imminent hazardous situation, resulting in death or serious injuries if not avoided.

This signal word highlights useful tips, recommendations and information for efficient and trouble-free operation.

1.3 Terms, Abbreviations

Terms and abbreviations are explained below:

<table>
<thead>
<tr>
<th>Term</th>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATC</td>
<td>Acceptance test certificate</td>
<td></td>
</tr>
<tr>
<td>DN</td>
<td>Nominal width</td>
<td></td>
</tr>
<tr>
<td>GPR</td>
<td>Gas pressure regulator</td>
<td></td>
</tr>
<tr>
<td>HDS</td>
<td>High-pressure screw spindle</td>
<td></td>
</tr>
<tr>
<td>( M_A )</td>
<td>Screw tightening torque</td>
<td></td>
</tr>
<tr>
<td>( p_d )</td>
<td>Outlet pressure</td>
<td></td>
</tr>
<tr>
<td>( p_{ds} )</td>
<td>Setpoint of the outlet pressure</td>
<td></td>
</tr>
<tr>
<td>SSV</td>
<td>Safety shut-off valve</td>
<td></td>
</tr>
<tr>
<td>SRV</td>
<td>Safety relief valve</td>
<td></td>
</tr>
<tr>
<td>MOP</td>
<td>Maximum operating pressure in a system</td>
<td></td>
</tr>
</tbody>
</table>
2 Application, Characteristics

2.1 Application

Gas pressure regulator (GDR), indirect-acting (operating with auxiliary power), for systems acc. to DVGW - work sheet G 491 (A) and G 600 (A) [TRGI]

Very suitable for dynamic control systems (e.g., gas fireplaces, natural gas supply systems, burner circuits, gas engine operation)

Can be used as an equipment component on gas consumption facilities as defined in EC Directive EU/2016/426 (GAR)

Can be used for the gases defined in DVGW - work sheet G 260 / G 262 and neutral non-aggressive gases. (other gases on request)

2.2 Characteristics

- Integral pressure-tight model (IS)
- Gas pressure regulator with or without integrated SSV
- Compact and maintenance-friendly modular design
- SSV functional class, optionally A or B to DIN EN 14382
- Open-air model*

2.3 Type of model (option)

- Oxygen version
- With built-in noise reduction
- With SSV manual release
- With SSV electromagnetic remote release when power is applied or in case of power failure
- With electric position indicator SSV ‘Closed’ via inductive proximity initiator or via Reed contact
- With BV breather valve or RSS switching valve (for SSV release in case of diaphragm breakage)
- With throttle valve (RSD) for the impulse line
- Coating with epoxy resin in RAL colours

3 Reasonably be foreseeable wrong use

- The controllers must not be used for controlling liquids.
- The controllers must not be used in temperature ranges of less than -20 °C or more than 60 °C
- The regulators must not be used for pressure ranges higher than the pressure „PS” on the rating plate is called used.
- The regulators may only be used for the application specified in section (2.1), in this operating manual Gases are used.
- Other gases, such as oxygen or hydrogen, must be explicitly mentioned on the nameplate.
- Please inform the manufacturer before use.
- The controllers must not be used without an upstream HTB fuse in high-temperature areas become

*) Categories C1 to C5-I are guaranteed without additional coatings.
For category C5-M, an epoxy resin coating is recommended.
4 Safety Instructions

National accident prevention regulations and the system operator’s safety regulations are not superseded by these operating and maintenance instructions and must be taken into consideration with priority (in Germany, see, among others, DVGW Code of Practice G 600, G 459/II, G 491 and G 495).

When performing work on the device, the current general and specific safety regulations must be observed. The application limits of the device with respect to the medium, operating pressure and operating temperature can be found on the type plate affixed to the device or on the acceptance test certificate. Using the device under different operating conditions must be agreed upon in consultation with MEDENUS Gas-Druckregeltechnik GmbH.

The mechanical components of the device do not have any potential ignition sources of their own nor any hot surfaces and are thus not within the scope of 2014/34/EU [ATEX]. The electronic accessories used comply with the ATEX requirements.

4.1 Hazards of Handling the Device

MEDENUS® devices conform with current standards and directives, the recognized technical rules and the recognized safety rules.

However, improper use can result in hazards to the user or to third parties. This can also result in damage to the device or to the system.

This is why the device may only be used:

- in accordance with its designated use
- in perfect condition
- while observing the notes given in these operating and maintenance instructions, and inspection and maintenance regulations, which apply to the functioning and safety of the overall system.

Malfunctions or faults must be eliminated immediately.

4.2 Personnel Requirements

The device may only be mounted by qualified personnel. Only authorised personnel in possession of the required qualification is allowed to perform settings or repairs on the device.

4.3 Country-Specific Requirements

The rules and regulations applicable at the place of use with respect to

- gas lines, installation of the gas system,
- gas supply,
- work on the gas system,
- accident prevention must be observed and complied with.

4.4 Handover of the Operating and Maintenance Instructions

The supplier of the system shall hand over these operating and maintenance instructions to the operator of the system no later than during commissioning and training of the operating personnel with the reminder to carefully store these instructions.
4.5 Safety in Operation

The device may only be used when all protective devices on the device or in the system are fully functional. The device must be inspected by a representative of the manufacturer or by a qualified person for externally visible damage and for proper functioning at least once a year. A more frequent inspection may become necessary, depending on the system conditions.

4.6 What To Do in Case of Danger

Information on what is to be done in case of danger and in case of accidents can be found in the respective operator’s or specialist companies’ work instructions.

5 Responsibility of the Operator

Operator

An operator is a person who operates the device himself for commercial or economic purposes or hands it over to a third party for use / application and is legally responsible for the safety of the user, personnel or third parties.

Operator’s obligations

The device is used in the industrial sector. Accordingly, the operator of the device is subject to the legal obligations concerning occupational safety. In addition to the safety instructions contained in these instructions, the established maintenance intervals must be observed, taking into account the respective national standard (alarm and hazard prevention plan).

In particular, the following applies:

• The operator is obliged to perform work on MEDENUS© devices during the warranty period only after consultation with the manufacturer. Otherwise the claims under warranty will become void.
• The operator must obtain information on the current occupational safety regulations and determine additional hazards resulting from the special work conditions at the place of use of the device in a risk assessment. The operator must implement them in the form of operating manuals for operating the device.
• During the entire time of use of the device, the operator must check whether the operating manuals drawn up by him conform to the current state of the regulations and, if necessary, adapt them.
• The operator must clearly regulate and define the responsibilities for installation, operation, troubleshooting, maintenance and cleaning.
• The operator must ensure that all persons handling the device have read and understood these instructions. In addition to that, he must train the personnel at regular intervals and inform it about the dangers.
• The operator must make available to the personnel the required protective equipment and oblige them to wear the required protective equipment.
• Moreover, the operator is responsible for the device always being in technically perfect condition.

Therefore, the following applies:

• The operator must make sure that the maintenance intervals described in these instructions are observed.
• The operator must have all safety devices checked regularly for functioning and completeness.
6 Transport, Storage and Packaging

6.1 Transport

The device is delivered with flange protective caps. They must be removed prior to installation. Make sure that the device is transported horizontally using suitable lifting gear. The device must be handled carefully and secured against impact and shock. In case of transport damage, we will require the following information from the type plate affixed to the device:

- Type of device
- Device model
- Year of construction / fabrication number

6.2 Storage

Equipment and spare parts must be stored under the following conditions:

- Do not store outdoors.
- Store in a dry and dust-free location.
- Store on a flat surface.
- Do not expose to aggressive media.
- Do not expose to ozone or ionising radiation.
- Do not store adjacent to direct heat sources.
- Avoid mechanical vibrations.
- Storage temperature: 0 to 25°C.
- Relative humidity: < 55 %.

Spare parts:

- Components susceptible to corrosion must be provided with a suitable preservative.
- Do not store O-rings and seals for more than 7 years even if stored properly.
- Spare parts must be stored in their original packaging until use.

Storage period for devices:

- Storage of the device for up to one year:
  Store the gas pressure regulator in its original packaging and original condition at the time of supply. All protective caps of the device must remain mounted.
- Storage of the device for more than 1 year (e.g. as a spare device):
  Store the device in its original packaging and original condition at the time of supply and check it for damage once a year. Check the housing surface for dirt, damage and corrosion. If necessary, clean all external parts. After 7 years, all O-rings and seals must be replaced.

6.3 Packaging

- The individual packaged items have been packaged in view of the transport conditions to be expected.
- The symbols on the packaging must be observed during transport and storage.
- Only environmentally-friendly materials have been used for packaging.
- The packaging is designed for protecting the individual components from transport damage, corrosion and other damage until mounting. This is why the packaging must not be destroyed and only be removed just prior to mounting.
7 Mounting and Commissioning

7.1 Safety Instructions and Preparation

Prior to starting work on pressurised components:

- Close all connections to the gas line.
- Depressurise all pressurised components. Also discharge residual energies.
- Defective components that are subject to pressure in operation must be replaced immediately by a suitable qualified person.

Prior to starting work, ensure sufficient clearance for mounting.

Before installing the device, check whether the performance data (type plate) and the scope of delivery coincide with the order or the system data, i.e., make sure that the provided devices are suitable for their intended purpose. In particular, the inlet pressure of the system must be lower than the maximum allowable pressure of the device.

A direct contact of gas valves and fittings, i.e., the control system, with hardening masonry, concrete walls or floors is not allowed. Provide suitable supports, working materials and protective equipment. Take into account the minimum clearances for maintenance as stated in the product information.

Before installing the device in the pipeline, check whether a shut-off device that interrupts the gas flow supply to the device has been mounted upstream and downstream of the device to be installed.

Prior to commissioning, make sure that all installation work has been carried out and completed in accordance with the data and information given in these instructions and that no unauthorised persons stay in the danger zone.
7.2 Mounting

- Remove packaging and protection from the connection flange surfaces.
- Install the device without twisting the pipeline. Tighten screws crosswise. Make sure to observe the direction of flow, i.e. the arrow on the housing must point in the direction of flow.
- In all installation positions other than horizontal, MEDENUS Gas-Druckregeltechnik GmbH must be consulted.
- The tightening torques of the flange connections and additional information is available in the DVGW GAS information issue no. 19 (Flanged Connections in Gas Installations).

- A separate installation of the SSV breather line (item 5.07) is recommended.
- All breather lines (items 7.04 / 7.07) must be vented to the outside atmosphere.
- Breather lines (items 7.04 / 7.07) may not be required if breather valves or safety diaphragms are being used.
- The measuring lines (items 7.05 / 7.08) must be connected in a pipeline section with a steady flow. There must be no installations that cause flow interference such as shutters, expansions, manifolds, junctions, isolation valves etc. directly upstream and downstream of the measurement point.
- The maximum flow rate at the measuring point must not exceed 25 m/s, depending on the system conditions.
- In certain system circuits, such as gas control systems for gas motors and in gas burners, higher flow rates than 25 m/s are also possible. Please contact us.
- The measuring line must be connected to the pipeline separately, laterally or at the top for each device (1 gas pressure regulator (item 7.03); 1 integrated SSV (item 7.06)).
- The SSV measuring line (Pos. 7.08) must always be connected to the measuring point in front of the first outlet-side shut-off valve (item 7.13).
7.3 Leakage Test (Test for External Leakage)

The devices are subjected to a strength and leakage test ex works at MEDENUS Gas-Druckregeltechnik GmbH.

The leakage test in the fully assembled system must be performed prior to commissioning and following maintenance work. For the external leakage test in the fully assembled system, the following applies:

For Germany:
According to DVGW Code of Practice G 491, the fully assembled system must be subjected to a leakage test with air or an inert gas at the installation site, using 1.1 times the maximum operating pressure of the system (MOP).
An exception is the room between the actuator installed in the gas pressure regulator and the first shut-off valve on the outlet side. This room must be checked using the test pressure corresponding to the maximum permissible pressure in the system in case of a malfunction (1.1 MOP). In this test, all detachable connections must be checked using a foaming agent.

In direct-acting devices (without power supply), the outlet pressure acting on the actuator (limited by the SSV) should not be more than 0.5 bar above the set setpoint. This should be taken into account when specifying the response pressure of the upstream SSVs.

Recommended upper response pressures:
- \( P_d \leq 100 \text{ mbar} \quad P_{d_{so}} = P_d + 50 \text{ mbar} \)
- \( P_d > 100 - 200 \text{ mbar} \quad P_{d_{so}} = P_d + 100 \text{ mbar} \)
- \( P_d > 200 - 1000 \text{ mbar} \quad P_{d_{so}} = P_d \times 1.5 \)
- \( P_d > 1000 \text{ mbar} \quad P_{d_{so}} = P_d + 500 \text{ mbar} \)

For other countries:
The relevant national and international standards shall apply.

Procedure
- Close the ball valves upstream of the valves and fittings (item 7.01).
- Close the downstream shut-off devices (item 7.13) (ball valves, solenoid or pneumatic valve).
- Depressurise the system (item 7.11).
- If there is a SRV (safety relief valve) in the controlled section and the test pressure is higher than the relief pressure of the SRV (item 7.09), the line upstream of the SRV (item 7.10) must be closed.
- Raise the test pressure always slowly and steadily.

While doing so, you must ensure:
Pressure in outlet chamber (item 7.12) \( \leq \) Pressure in inlet chamber (item 7.02)
Pressure build-up always from the inlet side (inlet chamber)
Pressure reduction always from the outlet side (outlet chamber)

- After leakage test:
  Open the ball valve in the SRV line (item 7.10) again.
7.4 Initial Commissioning / Recommissioning

Initial commissioning of the system components shall be carried out by the operator. For commissioning, please refer to the documents listed under item 1 "General Information" and the system operator's work instruction. The devices delivered by MEDENUS Gas-Druckregeltechnik GmbH are factory-set to the operating data specified by the customer. This data is listed on the Acceptance Test Certificate (ATC)* and the type plate.

**Note**
Prior to commissioning of the system, a functional test must be performed on the gas pressure regulator (GPR), if applicable, and the safety shut-off and safety relief valves.

**Procedure (fig. 7.1)**
- Close the ball valves upstream of the valves and fittings (item 7.01).
- Close the downstream shut-off devices (item 7.13) (ball valves, solenoid or pneumatic valve).
- Depressurise the system (item 7.11).
- Close venting ball valve (item 7.11).
- Slowly open ball valve upstream of the valves and fittings (item 7.01).

If the inlet shut-off device is equipped with a bypass, the latter must be slowly opened for pressure compensation as step 1. This is followed by slowly opening the inlet shut-off valve. The same is true of the outlet shut-off valve.

- Check the inner leakage of the SSV (item 7.06) by reading the pressure gauge installed downstream of the GPR (item 7.12).
- Unscrew the sealing cap (item 7.15) of the safety shut-off valve (SSV).
- Perform pressure compensation via the SSV by pulling at the pull knob (item 7.14) and allowing the SSV to engage. In GPR with bypass ball valve (item 7.28), open the ball valve (item 7.28) while pulling the pull knob (item 7.14) until the SSV engages to perform pressure compensation.
- A closing pressure corresponding to the set value is established on the GPR.

**Note**
An SSV with underpressure shut-off can only be engaged if the pressure at the measuring point exceeds the set value by at least the re-engagement differential.

- Testing the response pressure of the SSV by slowly increasing or decreasing the output pressure to response pressure.
- It may be necessary to correct the setpoint values of the response pressures. This is done by turning the SSV setpoint setting screws (items 7.17 / 7.19) to the right (pressure increase) or left (pressure decrease) in order to increase/decrease the setpoint value.

**Note**
The inner setting screw (item 7.17) sets the underpressure shut-off level (lower trigger level) and the outer setting screw (item 7.19) sets the upper trigger level.

- Perform pressure compensation via the SSV again by pulling the pull knob (item 7.14) and allowing the SSV to engage.

*) Acceptance Test Certificate (ATC) available optionally
For the functional test of the GPR, let gas flow via the discharge line (venting) (item 7.11) to the outside atmosphere and read the set regulating pressure on the outlet pressure gauge (item 7.12).

It may be necessary to correct the setpoint of the outlet pressure once again. This is done by turning the GPR setpoint setting screw (item 7.22) to the right or left, in order to increase and decrease the setpoint, respectively, after removal of the GPR sealing cap (item 7.21).

After closing the discharge line (item 7.11), a constant closing pressure within the closing pressure class can be read on the outlet pressure gauge (item 7.12).

Slowly open the shut-off valve (item 7.13), close the discharge line (item 7.11) and read the set regulating pressure on the outlet pressure gauge (item 7.12).

It may be necessary to correct the setpoint of the outlet pressure once again.

Screw on the sealing cap (item 7.15) of the safety shut-off valve (SSV) again.

Screw on the GPR sealing cap (item 7.21) again.

**Changing the control range**

Switching to the control range of a different setpoint spring can be done for the SSV as well as for the GPR while the device is pressurised.

**Gas pressure regulator**

- Take off the sealing cap (item 7.21) and unscrew the setting screw (item 7.22).
- Pull out the spring plate (item 7.24) with ball (item 7.23) and spring (item 7.25) and replace the spring with one that fits.
- Screw in the spring plate (item 7.24), the ball (item 7.23) and the setting screw (item 7.22) again.
- Set the desired setpoint and screw on the sealing cap (item 7.21) again.

**Safety shut-off valve**

- Remove the sealing cap (item 7.15) and screw off the pull button (item 7.14) for changing the spring of the underpressure shut-off device (item 7.16).
- Screw off the corresponding setting screw (items 7.17 / 7.19) for the upper or lower trigger level.
- Pull out the spring (item 7.16 / 7.18) and replace it with one that fits.
- Screw in the setting screw (item 7.17 / 7.19) again and fasten the pull button (item 7.14) on the spindle again.
- Set the desired setpoint and screw on the sealing cap (item 7.15).

The SSV closes if the overpressure setpoint spring (upper trigger level) is removed from a pressurised system.

**Note**
### 7.5 Control unit setpoint spring table

<table>
<thead>
<tr>
<th>Specific command range $W_{dS}$ [mbar]</th>
<th>Spring data</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE 205</td>
<td>RE 275</td>
</tr>
<tr>
<td>36 - 39</td>
<td>23 - 25</td>
</tr>
<tr>
<td>38 - 45</td>
<td>24 - 28</td>
</tr>
<tr>
<td>44 - 52</td>
<td>27 - 31</td>
</tr>
<tr>
<td>51 - 64</td>
<td>30 - 37</td>
</tr>
<tr>
<td>62 - 81</td>
<td>35 - 46</td>
</tr>
<tr>
<td>78 - 107</td>
<td>43 - 59</td>
</tr>
<tr>
<td>103 - 147</td>
<td>55 - 80</td>
</tr>
<tr>
<td>140 - 205</td>
<td>73 - 110</td>
</tr>
<tr>
<td>195 - 295</td>
<td>100 - 156</td>
</tr>
<tr>
<td>280 - 430</td>
<td>141 - 225</td>
</tr>
<tr>
<td>419 - 653</td>
<td>208 - 339</td>
</tr>
<tr>
<td>595 - 935</td>
<td>293 - 484</td>
</tr>
<tr>
<td>819 - 1408</td>
<td>436 - 726</td>
</tr>
<tr>
<td>1245 - 1976</td>
<td>607 - 1017</td>
</tr>
<tr>
<td>1212 - 2553</td>
<td>689 - 1333</td>
</tr>
<tr>
<td>1330 - 3012</td>
<td>785 - 1580</td>
</tr>
</tbody>
</table>

*FA spring series for RS254 DN 025 - DN 100 and RS255 DN 050 shown RS254 DN 080 with FA11

*) with high-pressure screw spindle (HDS shown on p.25)
<table>
<thead>
<tr>
<th>Specific command range $W_{ds}$ [mbar]</th>
<th>Spring data</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE 275-2</td>
<td>RE 385-2</td>
</tr>
<tr>
<td>59 - 69</td>
<td>31 - 35</td>
</tr>
<tr>
<td>68 - 83</td>
<td>34 - 41</td>
</tr>
<tr>
<td>80 - 105</td>
<td>40 - 51</td>
</tr>
<tr>
<td>96 - 127</td>
<td>50 - 61</td>
</tr>
<tr>
<td>112 - 156</td>
<td>60 - 77</td>
</tr>
<tr>
<td>146 - 207</td>
<td>76 - 100</td>
</tr>
<tr>
<td>184 - 266</td>
<td>98 - 127</td>
</tr>
<tr>
<td>238 - 358</td>
<td>125 - 167</td>
</tr>
<tr>
<td>302 - 450</td>
<td>165 - 215</td>
</tr>
<tr>
<td>397 - 596</td>
<td>212 - 285</td>
</tr>
<tr>
<td>542 - 814</td>
<td>280 - 390</td>
</tr>
<tr>
<td>742 - 1078</td>
<td>385 - 520</td>
</tr>
<tr>
<td>977 - 1442</td>
<td>515 - 671</td>
</tr>
<tr>
<td>1245 - 1878</td>
<td>661 - 873</td>
</tr>
<tr>
<td>1547 - 2469</td>
<td>712 - 1186</td>
</tr>
</tbody>
</table>

FB spring series for RS254 DN 150 - DN 200 and RS255 DN 080 - DN 100 shown RS254 DN 200 with FB707
7.6 Setpoint spring table - SSV

<table>
<thead>
<tr>
<th>Feder Nr.</th>
<th>Colour (RAL)</th>
<th>MD small ball lock</th>
<th>MD-R small ball lock</th>
<th>HD small ball lock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>up to (W_{ds-o}) 300mbar</td>
<td>up to (W_{ds-o}) 5000mbar</td>
<td>up to (W_{ds-o}) 14000mbar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lower response pressure</td>
<td>upper response pressure</td>
<td>lower response pressure</td>
</tr>
<tr>
<td>FE 900</td>
<td>1028</td>
<td>0 - 10</td>
<td>50</td>
<td>0 - 38</td>
</tr>
<tr>
<td>FE 901 VA</td>
<td>6202</td>
<td>6 - 30*</td>
<td>50</td>
<td>20 - 120*</td>
</tr>
<tr>
<td>FE 902 VA</td>
<td>6010</td>
<td>0 - 12*</td>
<td>20</td>
<td>24 - 74</td>
</tr>
<tr>
<td>FE 903</td>
<td>6014</td>
<td>4 - 14</td>
<td>20</td>
<td>36 - 78</td>
</tr>
<tr>
<td>FE 904 VA</td>
<td>9005</td>
<td>8 - 18</td>
<td>20</td>
<td>58 - 110</td>
</tr>
<tr>
<td>FE 905 VA</td>
<td>9010</td>
<td>18 - 42</td>
<td>20</td>
<td>110 - 160</td>
</tr>
<tr>
<td>FE 906</td>
<td>4007</td>
<td>48 - 70</td>
<td>20</td>
<td>162 - 250</td>
</tr>
<tr>
<td>FD 910</td>
<td>1028</td>
<td>35 - 45</td>
<td>20</td>
<td>100 - 135</td>
</tr>
<tr>
<td>FD 911</td>
<td>6202</td>
<td>45 - 80</td>
<td>20</td>
<td>130 - 250</td>
</tr>
<tr>
<td>FD 912</td>
<td>6010</td>
<td>70 - 120</td>
<td>20</td>
<td>220 - 360</td>
</tr>
<tr>
<td>FD 913</td>
<td>6014</td>
<td>100 - 170</td>
<td>20</td>
<td>320 - 510</td>
</tr>
<tr>
<td>FD 914</td>
<td>9005</td>
<td>140 - 230</td>
<td>20</td>
<td>440 - 700</td>
</tr>
<tr>
<td>FD 915</td>
<td>9010</td>
<td>210 - 370</td>
<td>20</td>
<td>630 - 1130</td>
</tr>
<tr>
<td>FD 916</td>
<td>6202</td>
<td>330 - 570</td>
<td>20</td>
<td>1060 - 1750</td>
</tr>
<tr>
<td>FD 917</td>
<td>5010</td>
<td>460 - 830</td>
<td>20</td>
<td>1420 - 2520</td>
</tr>
<tr>
<td>FD 918</td>
<td>9006</td>
<td>650 - 1080</td>
<td>20</td>
<td>1850 - 3200</td>
</tr>
<tr>
<td>FD 919</td>
<td>4002</td>
<td>980 - 1500</td>
<td>20</td>
<td>2800 - 4600</td>
</tr>
</tbody>
</table>
***)  The upper response pressure is rounded up to full tens, for example 251 mbar -> 260 mbar

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FM 400</td>
<td>1028</td>
<td>10 - 40*</td>
<td>20</td>
<td>10 - 180*</td>
<td>50</td>
<td>0 - 250</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM 402</td>
<td>6010</td>
<td>35 - 115</td>
<td>20</td>
<td>155 - 380</td>
<td>50</td>
<td>150 - 1000*</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM 404</td>
<td>9005</td>
<td>60 - 245</td>
<td>20</td>
<td>200 - 950</td>
<td>50</td>
<td>650 - 2050</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL 412</td>
<td>6010</td>
<td>40 - 180</td>
<td>20</td>
<td>145 - 670</td>
<td>50</td>
<td>380 - 1400</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL 413</td>
<td>5015</td>
<td>70 - 340</td>
<td>20</td>
<td>270 - 1230</td>
<td>50</td>
<td>800 - 2800</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL 415</td>
<td>9010</td>
<td></td>
<td></td>
<td>1200 - 4500</td>
<td>50</td>
<td>3200 - 5500</td>
<td>300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL 417</td>
<td>8230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4500 - 14000</td>
<td>300</td>
<td></td>
</tr>
</tbody>
</table>

***)  If the control device is set up for simultaneous monitoring of upper and lower response pressures, the difference between the setpoints for the upper and lower response pressures ($p_{dsu}$ and $p_{dsu}$) should be at least 10% greater than the total of values given for $\Delta p_{su}$ and $\Delta p_{su}$. 

*)  if possible not greater than 450 mbar

### Determining the upper response pressure

<table>
<thead>
<tr>
<th>Outlet pressure $P_d$ [mbar]</th>
<th>Upper response pressure $W_{dsu}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤200</td>
<td>$P_d + 100$ mbar</td>
</tr>
<tr>
<td>&gt;200 - ≤800</td>
<td>$P_d \times 1.5$</td>
</tr>
<tr>
<td>&gt;800 - ≤1600</td>
<td>$P_d \times 1.3$</td>
</tr>
<tr>
<td>&gt;1600</td>
<td>$P_d + 500$ mbar</td>
</tr>
</tbody>
</table>
8 Maintenance

8.1 Maintenance Plan

The following sections describe the maintenance work required for optimal and trouble-free operation of the device. If increased wear is detected during regular inspections, the required maintenance intervals must be shortened in accordance with the actual wear.

For any questions on maintenance work and intervals, please contact the manufacturer.

The intervals for monitoring and maintenance work are strongly dependent on the operating situation and the condition of the gas. This is why no fixed intervals can be given. For Germany, it is recommended to observe initially the maintenance periods according to the data given in DVGW Code of Practice G 495. For each system, this must be followed by determining the maintenance interval independently on a medium-term basis.

During maintenance work, the components must be cleaned and subjected to a thorough visual inspection. This is also necessary if irregularities in the operating behaviour have been detected during operation or during functional tests.

Damaged parts and O-rings dismounted during dismantling must be replaced with new ones.

The item numbers mentioned in chapter 6.2 (Maintenance Procedure) correspond to those listed in the spare parts drawings and spare parts lists.

It is recommended to stock the parts listed in chapter 9.3 for maintenance work.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Maintenance activities</th>
<th>Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>When required</td>
<td>Replacing O-rings</td>
<td>Qualified person</td>
</tr>
<tr>
<td></td>
<td>Replacing diaphragms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Replacing the valve plate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Replacing sealing rings for the connections of the breather lines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and measuring lines</td>
<td></td>
</tr>
</tbody>
</table>
8.2 Maintenance Procedure

The maintenance procedure is described in detail step-by-step in our video tutorial and our pictorial descriptions. Instructions for our products can be found in the download area of our website. Should you have any problems, please feel free to contact us directly.

If components have been removed, make sure they are mounted correctly, reinstall all fastening elements and observe the screw tightening torques.

Prior to recommissioning, observe the following:

- Make sure that all maintenance work has been carried out and completed in accordance with the data and information given in these instructions.
- Make sure that no unauthorised persons stay in the danger zone.
- Make sure that all covers and safety devices have been installed and are working properly.

For recommissioning, please refer to the relevant manufacturer’s documentation of the gas pressure regulator installed in the system or chapter 1 and 5.4 as well as the work instructions of the system operator, and the other safety regulations for the system in which the regulator is installed.

To guarantee smooth operation, we recommend always keeping a maintenance set in reserve.
8.3 Table of Screw Tightening Torques $M_A$

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Exception</th>
<th>M8 / 18 Nm</th>
<th>M10 / 36 Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>RE 205</td>
<td>RS 254 / 025</td>
<td>RS 254 / 150</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RS 254 / 050</td>
<td>RS 254 / 200</td>
</tr>
<tr>
<td>51</td>
<td></td>
<td>RS 254 / 080</td>
<td>RS 254 / 100</td>
</tr>
<tr>
<td>52</td>
<td>DN 200</td>
<td>RS 254 / 025</td>
<td>RS 255 / 080</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RS 254 / 050</td>
<td>RS 255 / 100</td>
</tr>
<tr>
<td>53</td>
<td>DN 200</td>
<td>RE 205</td>
<td>M10 / 36 Nm</td>
</tr>
<tr>
<td>54</td>
<td></td>
<td>M6 / 8 Nm</td>
<td>M8 / 18 Nm</td>
</tr>
</tbody>
</table>

8.4 Lubricants Table

<table>
<thead>
<tr>
<th>Components (apply a thin layer)</th>
<th>Lubricants</th>
</tr>
</thead>
<tbody>
<tr>
<td>All O-rings</td>
<td>Syntheso Proba 270</td>
</tr>
<tr>
<td>All fastening and locking screws</td>
<td>Ball</td>
</tr>
<tr>
<td>Stud bolts</td>
<td>Adhesive and sealing agent</td>
</tr>
</tbody>
</table>

8.5 Screw Retention

<table>
<thead>
<tr>
<th>Components (apply a thin layer)</th>
<th>Adhesive and sealing agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud bolts</td>
<td>Loctite-648</td>
</tr>
</tbody>
</table>
## 9 Troubleshooting

### 9.1 Gas Pressure Regulator

<table>
<thead>
<tr>
<th>Description of the error</th>
<th>Possible cause</th>
<th>Elimination</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Closing pressure too high</strong></td>
<td>Actuator dirty or damaged</td>
<td>Check valve plate (seal) and valve seat for damage and dirt, replace valve plate, if necessary</td>
</tr>
<tr>
<td></td>
<td>Static sealing elements defective</td>
<td>Replace O-rings</td>
</tr>
<tr>
<td></td>
<td>Clamping of the compensating diaphragm has come off</td>
<td>Check compensating diaphragm for fastening, damage, and correct fit, replace it, if necessary.</td>
</tr>
<tr>
<td></td>
<td>Compensating membrane is damaged or mounted incorrectly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clamping of the compensating diaphragm has come off</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compensating membrane is damaged or mounted incorrectly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve plate has become disconnected from the valve stem</td>
<td>Tighten nut under the valve plate</td>
</tr>
<tr>
<td><strong>No closing pressure</strong></td>
<td>Device is working in the closing pressure range</td>
<td>Check regulator design</td>
</tr>
<tr>
<td><strong>Unstable outlet pressure curve</strong></td>
<td>Vibration resonance in the control system</td>
<td>Install restrictor plate in breather line</td>
</tr>
<tr>
<td></td>
<td>Vibration resonance in the control system</td>
<td>Install baffle plate in measuring line</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continue closing restrictor in measuring line by turning clockwise *</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Install a harder spring (setpoint spring of the next higher control range)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check setting of gas consumption devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use of throttle valve RSD (optional accessory)</td>
</tr>
<tr>
<td><strong>Control deviation too large</strong></td>
<td>Unfavourable connection of the measuring line</td>
<td>Select a measuring point with steady flow, check measuring point</td>
</tr>
<tr>
<td></td>
<td>Sluggishness of the device due to dirt</td>
<td>Subject device to maintenance</td>
</tr>
<tr>
<td></td>
<td>Main diaphragm or compensating diaphragm defective or mounted incorrectly</td>
<td>Check diaphragm and replace if necessary</td>
</tr>
<tr>
<td></td>
<td>Wrong regulator size selected</td>
<td>Check controller design, setpoint spring / control cone and replace if necessary</td>
</tr>
<tr>
<td></td>
<td>Wrong setpoint spring selected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wrong control cone selection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inlet pressure supply is insufficient (pressure losses in the supply line too high)</td>
<td>Increase inlet pressure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check pipeline cross-section</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check built-in filter</td>
</tr>
<tr>
<td><strong>Inadmissible pressure peak</strong></td>
<td>Damping of the device too high</td>
<td>Continue opening restrictor in measuring line by turning anticlockwise</td>
</tr>
<tr>
<td><strong>Dynamic closing pressure too high</strong></td>
<td>Control system too dynamic</td>
<td>Remove restrictor plate from breather line</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check breather lines and dimension them larger, if necessary. Replace breather valve with safety diaphragm or breather line</td>
</tr>
<tr>
<td></td>
<td>Closing speed of downstream shut-off devices too high</td>
<td>Reduce closing speed of shut-off device</td>
</tr>
<tr>
<td><strong>Noise</strong></td>
<td>Gas velocity too high</td>
<td>Check regulator design</td>
</tr>
<tr>
<td></td>
<td>Sluggishness of the device due to dirt / wear</td>
<td>Perform maintenance on actuator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If worn-out mechanically, replace it, if necessary</td>
</tr>
<tr>
<td><strong>Gas escapes through breather line</strong></td>
<td>Fastening of the main diaphragm has come off</td>
<td>Check diaphragm for fastening, damage and correct fit</td>
</tr>
<tr>
<td></td>
<td>Main diaphragm is damaged or has been mounted incorrectly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal leakage gas SRV is set too low or is not tight</td>
<td>Correct settings of leakage gas SRV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check O-ring for damage and dirt, replace if necessary</td>
</tr>
</tbody>
</table>

*) Excessive damping limits the actuation speed.

**) Normal flow noise does not constitute a fault. However, this noise can be reduced by installing a noise reduction device.

Note
## 9.2 Safety Shut-Off Valve

<table>
<thead>
<tr>
<th>Description of the error</th>
<th>Possible cause</th>
<th>Elimination</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No internal tightness in closed position</strong></td>
<td>Actuator dirty or damaged</td>
<td>Check valve seat and valve plate [seal] for damage and dirt</td>
</tr>
<tr>
<td></td>
<td>Pressure compensation valve [internal bypass] in the actuator dirty or sealing elements damaged</td>
<td>Check O-rings in the pressure compensation valve or at the SSV spindle and replace them, if necessary</td>
</tr>
<tr>
<td><strong>SSV cannot be opened</strong></td>
<td>No pressure compensation at actuator</td>
<td>Pressure compensation by opening the bypass ball valve [item 5.28]</td>
</tr>
<tr>
<td><strong>SSV does not engage</strong></td>
<td>Difference between response pressure and operating pressure or between upper and lower response pressure is too small</td>
<td>Correct response pressure settings consider required re-engagement differential (see RS 254 / 251 product overview)</td>
</tr>
<tr>
<td></td>
<td>Only in case of underpressure switching: Diaphragm in the control device defective or incorrectly installed</td>
<td>Check diaphragm and replace it, if necessary</td>
</tr>
<tr>
<td></td>
<td>Pressure at the measuring point too high or low (only with underpressure switching)</td>
<td>Lower or increase pressure at measuring point to operating value (GPR setpoint value)</td>
</tr>
<tr>
<td></td>
<td>Sluggishness of the trigger mechanism due to dirt / wear</td>
<td>Service switching device and replace it, if worn-out mechanically</td>
</tr>
<tr>
<td><strong>Permissible response pressure group is exceeded</strong></td>
<td>Difference between response pressure and operating pressure or between upper and lower response pressure is too small</td>
<td>Correct response pressure settings consider required re-engagement differential (see RS 254 / 251 product overview) *</td>
</tr>
<tr>
<td><strong>Irregularities in response behaviour</strong></td>
<td>Diaphragm in the control device incorrectly installed</td>
<td>Check whether diaphragm is twisted</td>
</tr>
<tr>
<td></td>
<td>Sluggishness of the trigger mechanism due to dirt / wear</td>
<td>Service switching device and replace it, if worn-out mechanically</td>
</tr>
<tr>
<td><strong>Gas escapes through breather line</strong></td>
<td>Diaphragm clamping has become loose</td>
<td>Check diaphragm for fastening, damage and correct fit</td>
</tr>
<tr>
<td></td>
<td>Diaphragm is damaged or has been mounted incorrectly</td>
<td>Check 0-ring and replace it, if necessary</td>
</tr>
<tr>
<td></td>
<td>O-ring sealing [item 35] dirty or damaged</td>
<td></td>
</tr>
</tbody>
</table>

*) The pressure differences between GPR, SSV and system SRV must consider the response and closing pressure groups as well as the re-engagement differentials of the devices in order to avoid any unintended SRV switching.

**Note**
10 Replacement and Disposal

After the device has reached the end of its useful life, it must be dismounted and disposed of in an environmentally compatible manner. During dismounting, components that may present a risk of injury by contamination depending on the medium are removed. Depending on the processed medium, the components must be properly decontaminated. Components capable of diffusion (diaphragm, O-ring, etc.) may have to be taken to a special disposal unit, depending on the medium used. If no return or disposal agreement has been reached, dismantled components should be recycled:

- Metals should be scrapped
- The remaining components should be disposed of after sorting according to material.

For technical information, please contact our customer service:

MEDENUS Gas-Druckregeltechnik GmbH
Im Langen Feld 3
D-57462 Olpe

Phone +49 (0) 2761 / 82788-0
Fax +49 (0) 2761 / 82788-9
E-Mail info@medenus.de
Internet www.medenus.de

In addition, we are always interested in information and experience resulting from the application and which can be valuable for improving our products.
11 Spare Parts

11.1 Spare Parts Drawing RS 254 / RS 255 DN 25 - DN200

Caution: the cover is under tension!

E.g.: HD-SAV

*) 1x O-Ring for 385
**) 4x O-Ring for RE 320 / 390
8x O-Ring for RE 485
11.2 Optional Spare Parts Drawing

RS 254 / 251 shown with safety diaphragm
Version 1

RS 254 / 251 shown with safety diaphragm
Version 2

RS 254 / 251 shown with noise reduction

RS 254 / 251 shown with high pressure shaft
# 11.3 Parts for Maintenance Work

## Main diaphragm and O-ring

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Name</th>
<th>Quantity</th>
<th>RS 254 / 025</th>
<th>RS 254 / 050</th>
<th>RS 254 / 080; RS 254 / 100; RS 255 / 050</th>
<th>RS 255 / 080; RS 254 / 150; RS 255 / 100; RS 254 / 200</th>
<th>RE 205</th>
<th>RE 320</th>
<th>RE 205</th>
<th>RE 275</th>
<th>RE 385 / 390 MB</th>
<th>RE 385 / 390 GMB</th>
<th>RE 485</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>O-ring</td>
<td>1</td>
<td>O-029 0-033</td>
<td>O-029 0-041</td>
<td>0-042 0-042 0-043</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Diaphragm</td>
<td>1</td>
<td>M-111 M-121 M-141</td>
<td>M-122 M-132 M-152</td>
<td>M-162 M-172</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Main diaphragm set (Version 1)

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Name</th>
<th>Quantity</th>
<th>RS 254 / 025</th>
<th>RS 254 / 050</th>
<th>RS 254 / 080; RS 254 / 100; RS 255 / 050</th>
<th>RS 255 / 080; RS 254 / 150; RS 255 / 100; RS 254 / 200</th>
<th>RE 205</th>
<th>RE 320</th>
<th>RE 205</th>
<th>RE 275</th>
<th>RE 385 / 390 MB</th>
<th>RE 385 / 390 GMB</th>
<th>RE 485</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>O-ring</td>
<td>1</td>
<td>O-029 0-033</td>
<td>O-029 0-041</td>
<td>0-042 0-042 0-043</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Diaphragm</td>
<td>1</td>
<td>M-112 M-122 M-142</td>
<td>M-122 M-132 M-152</td>
<td>M-162 M-172</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Main diaphragm set (Version 2)

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Name</th>
<th>Quantity</th>
<th>RS 254 / 025</th>
<th>RS 254 / 050</th>
<th>RS 254 / 080; RS 254 / 100; RS 255 / 050</th>
<th>RS 255 / 080; RS 254 / 150; RS 255 / 100; RS 254 / 200</th>
<th>RE 205</th>
<th>RE 320</th>
<th>RE 205</th>
<th>RE 275</th>
<th>RE 385 / 390 MB</th>
<th>RE 385 / 390 GMB</th>
<th>RE 485</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>O-ring</td>
<td>1</td>
<td>O-029 0-033</td>
<td>O-029 0-041</td>
<td>0-042 0-042 0-043</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Diaphragm</td>
<td>1</td>
<td>M-112 M-122 M-142</td>
<td>M-122 M-132 M-152</td>
<td>M-162 M-172</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Intermediate Diaphragm

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Name</th>
<th>Quantity</th>
<th>Valve</th>
<th>RS 254 / 025</th>
<th>RS 254 / 050</th>
<th>RS 254 / 080; RS 254 / 100; RS 255 / 050</th>
<th>RS 255 / 080; RS 254 / 150; RS 255 / 100; RS 254 / 200</th>
<th>RE 205</th>
<th>RE 320</th>
<th>RE 205</th>
<th>RE 275</th>
<th>RE 385 / 390 MB</th>
<th>RE 385 / 390 GMB</th>
<th>RE 485</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Diaphragm</td>
<td>1</td>
<td>17.5</td>
<td>M-001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>27.5</td>
<td>M-002</td>
<td>M-003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32.5</td>
<td>M-004*</td>
<td>M-005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>42.5</td>
<td>M-006</td>
<td>M-007</td>
<td>M-007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>52.5</td>
<td>M-008**</td>
<td>M-009</td>
<td>M-009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>65</td>
<td>M-010</td>
<td>M-010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>85</td>
<td>M-011</td>
<td>M-011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>95</td>
<td>M-012</td>
<td>M-012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>115</td>
<td>M-013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Valve plate

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Name</th>
<th>Quantity</th>
<th>Valve</th>
<th>RS 254 / 025</th>
<th>RS 254 / 050</th>
<th>RS 254 / 080; RS 254 / 100; RS 255 / 050</th>
<th>RS 255 / 080; RS 254 / 150; RS 255 / 100; RS 254 / 200</th>
<th>RE 205</th>
<th>RE 320</th>
<th>RE 205</th>
<th>RE 275</th>
<th>RE 385 / 390 MB</th>
<th>RE 385 / 390 GMB</th>
<th>RE 485</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Valve plate</td>
<td>1</td>
<td>17.5</td>
<td>VT-001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>27.5</td>
<td>VT-002</td>
<td>VT-003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32.5</td>
<td>VT-004*</td>
<td>VT-005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>42.5</td>
<td>VT-006</td>
<td>VT-006</td>
<td>VT-006</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>52.5</td>
<td>VT-007**</td>
<td>VT-007</td>
<td>VT-007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>65</td>
<td>VT-008</td>
<td>VT-008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>85</td>
<td>VT-009</td>
<td>VT-009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>95</td>
<td>VT-010</td>
<td>VT-010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>115</td>
<td>VT-011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*) only in RS254 / 050 ** only in RS254 / 100 and RS255 / 050
## Valve Plate SSV / Diaphragm SSV

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Valve plate</td>
<td>1</td>
<td>VT-201</td>
<td>VT-202</td>
<td>VT-206</td>
<td>VT-208</td>
<td>VT-210</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Diaphragm</td>
<td>1</td>
<td>M-201</td>
<td>M-201</td>
<td>M-201</td>
<td>M-202</td>
<td>M-202</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Diaphragm</td>
<td>1</td>
<td>M-014</td>
<td>M-014</td>
<td>M-014</td>
<td>M-015</td>
<td>M-015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### O-Ring and Sealing Ring Sets

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>O-ring</td>
<td>1</td>
<td>0-014</td>
<td>0-018</td>
<td>0-036</td>
<td>0-044</td>
<td>0-046</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>DN 50</td>
<td>0-014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>before 1992</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>O-ring</td>
<td>1</td>
<td>0-014</td>
<td>0-018</td>
<td>0-037</td>
<td>0-044</td>
<td>0-046</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>O-ring</td>
<td>1</td>
<td>0-007</td>
<td>0-009</td>
<td>0-009</td>
<td>0-009</td>
<td>0-009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>O-ring</td>
<td>1</td>
<td>0-014</td>
<td>0-035</td>
<td>0-038</td>
<td>0-026</td>
<td>0-026</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RE 320</td>
<td>0-004</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>O-ring</td>
<td>1</td>
<td>0-019</td>
<td>0-039</td>
<td>0-040</td>
<td>0-031</td>
<td>0-031</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>RE 320</td>
<td>0-002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>RE 485</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>NBR-ring</td>
<td>2</td>
<td>N-001</td>
<td>N-002</td>
<td>N-002</td>
<td>N-002</td>
<td>N-002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Valve 27.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Valve 17.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>O-ring</td>
<td>1</td>
<td>0-007</td>
<td>0-009</td>
<td>0-009</td>
<td>0-009</td>
<td>0-009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Valve 27.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>NBR-ring</td>
<td>2</td>
<td>N-001</td>
<td>N-003</td>
<td>N-003</td>
<td>N-003</td>
<td>N-003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>O-ring</td>
<td>1</td>
<td>0-008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>O-ring</td>
<td>1</td>
<td>0-015</td>
<td>0-015</td>
<td>0-036</td>
<td>0-036</td>
<td>0-036</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>sealing cap Cast</td>
<td>0-014</td>
<td>0-014</td>
<td>0-015</td>
<td>0-015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>O-ring</td>
<td>1</td>
<td>0-012</td>
<td>0-012</td>
<td>0-016</td>
<td>0-016</td>
<td>0-016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>O-ring</td>
<td>1</td>
<td>0-007</td>
<td>0-009</td>
<td>0-009</td>
<td>0-009</td>
<td>0-009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>O-ring</td>
<td>1</td>
<td>0-001</td>
<td>0-001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>O-ring</td>
<td>1</td>
<td>0-007</td>
<td>0-007</td>
<td>0-007</td>
<td>0-009</td>
<td>0-009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>O-ring</td>
<td>1</td>
<td>0-007</td>
<td>0-007</td>
<td>0-007</td>
<td>0-009</td>
<td>0-009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>O-ring</td>
<td>1</td>
<td>0-013</td>
<td>0-013</td>
<td>0-013</td>
<td>0-014</td>
<td>0-014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>O-ring</td>
<td>1</td>
<td>0-052</td>
<td>0-052</td>
<td>0-052</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>O-Ring</td>
<td>1</td>
<td>0-022</td>
<td>0-022</td>
<td>0-022</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>O-Ring</td>
<td>1</td>
<td>0-034</td>
<td>0-034</td>
<td>0-034</td>
<td>0-025</td>
<td>0-025</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>O-Ring</td>
<td>1</td>
<td>0-011</td>
<td>0-011</td>
<td>0-011</td>
<td>0-009</td>
<td>0-009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**O-Ring Satz Bestellnummer:** OS-001 OS-002 OS-003 OS-004 OS-005

**O-Ringsatz Bestellnummer (für Stellgerät mit HD-SAV):** OS-301 OS-302 OS-303 OS-304 OS-305
## Safety diaphragm

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Name</th>
<th>Quantity pcs.</th>
<th>RS 254 / 025</th>
<th>RS 254 / 050</th>
<th>RS 254 / 080; RS 254 / 100; RS 255 / 050</th>
<th>RS 255 / 080; RS 254 / 150; RS 255 / 100; RS 254 / 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>O-ring</td>
<td>1</td>
<td>0-029</td>
<td>0-033</td>
<td>0-029</td>
<td>0-041</td>
</tr>
<tr>
<td>23</td>
<td>Diaphragm</td>
<td>1</td>
<td>M-123</td>
<td>M-143</td>
<td>M-123</td>
<td>M-133</td>
</tr>
<tr>
<td>26</td>
<td>O-ring</td>
<td>1</td>
<td>0-013</td>
<td>0-013</td>
<td>0-013</td>
<td>0-013</td>
</tr>
</tbody>
</table>

### Safety diaphragm set

Order number:
- MS-123
- MS-143
- MS-123
- MS-133
- MS-163
- MS-173

### Example:

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>DN - nominal width</th>
<th>RE - Control device</th>
<th>D - nozzle (valve diameter)</th>
<th>SSV Control unit</th>
<th>Main-diaphragm</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas pressure regulator:</td>
<td>RS254</td>
<td>080</td>
<td>390*</td>
<td>27,5</td>
<td>MD-R</td>
<td>MB*</td>
<td>SM...</td>
</tr>
</tbody>
</table>

**Spare parts according to tables in 11.3**

- Main diaphragm and O-ring: **MS-152**
- Intermediate diaphragm: **M-003**
- Valve plate: **VT-003**
- Valve plate SSV: **VT-202**
- Diaphragm SSV: **M-201**
- O-ring and sealing ring set: **OS-002**
- Safety diaphragm: **MS-163**

The allocation of individual parts is done according to the item no. in the tables in 11.3, conforming to the spare parts drawings in 11.1 and 11.2.

When ordering, please state the serial number from the type plate.

**Example Composition of the factory number**

![Type plate example]

The replacement of parts must be performed only by trained and authorized persons.

---

*When selecting the main diaphragm set for control device RE 385 / 390, a distinction has to be made between MB and GMB. The GMB diaphragm is standard equipment and is therefore not mentioned separately in the controller designation.*
12 Accessories / Options

12.1 Noise reduction

12.1.1 Use

- Gas pressure regulators RS 250 / RS 251
- Gas pressure regulators RS 254 / RS 255
- Gas pressure regulators RSP 254 / RS 255
- Gas pressure regulators R 101

12.1.2 Application / Function

The noise reduction made of metallic foam is inserted into the housing of the gas pressure regulator between the valve seat and the housing cover and reduces noise in the gas pressure regulator produced by the flow rate by up to -15 dB (±3 dB).

12.1.3 Mounting

- Unscrew the cover
- Slide the noise reduction (metallic foam) over the spindle and the valve plate until it makes contact with the valve seat.
- Screw down the cover again, thus pressing the noise reduction firmly against the valve seat*
12.1.4 Determination of the sound pressure level $L_A$

The noise of gas expansion at a maximum flow rate of approx. 65 m/s on the outlet side is shown.

<table>
<thead>
<tr>
<th>Inlet pressure $P_i$ [bar]</th>
<th>Pipe wall thickness $a$ [mm]</th>
<th>Sound pressure level $L_A$ [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$P_i = 12.0$ bar</td>
<td>2.9 mm</td>
<td>$L_A = 96 + 2 = 98$ dB ±3 dB</td>
</tr>
<tr>
<td>$P_i = 1.2$ bar</td>
<td></td>
<td>$L_A = 96 + 2 - 15 = 83$ dB ±3 dB</td>
</tr>
</tbody>
</table>

Type of gas: Propane determined:

Correction factors for some gases and gas mixtures:

<table>
<thead>
<tr>
<th>Gas, gas mixtures</th>
<th>$\Delta L_A$ [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylene</td>
<td>0</td>
</tr>
<tr>
<td>Natural gas</td>
<td>0</td>
</tr>
<tr>
<td>Helium</td>
<td>-5.5</td>
</tr>
<tr>
<td>Air</td>
<td>+1</td>
</tr>
<tr>
<td>Methane</td>
<td>0</td>
</tr>
<tr>
<td>Propane</td>
<td>+2</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>-9</td>
</tr>
</tbody>
</table>

Reference site: Outlet of the gas pressure regulator, lateral distance 1 m
Accuracy: ±3 dB
Correction factor for metallic foam design: $\Delta L_A$ up to -15 dB
12.2 High-pressure spindle

12.2.1 Use
- Gas pressure regulators RS 250 / RS 251
- Gas pressure regulators RS 254 / RS 255
- Gas pressure regulators R 100 / R 100-U
- Gas pressure regulators R 101

12.2.2 Application / Function
The HDS high-pressure spindle is used for simplified adjustment of the control spring in the gas pressure regulator. For the adjustment of particularly strong control springs, the use of a high-pressure spindle is mandatory. (See p. 16 - 17.)

12.2.3 Mounting
- Unscrew the sealing cap
- Unscrew the setting screw anticlockwise
- Take off the spring plate from the spring
  Notice! Do not lose the steel ball!
- Remove the built-in spring
- Insert a new spring
- Replace spring plate
  Notice! Do not forget the steel ball!
- Screw high-pressure cap with high-pressure spindle into the spring dome

Do not forget the O-Ring
- On the width across flats (AF 17) of the spindle, set the desired outlet pressure
- Screw on the sealing cap
  Do not forget the O-Ring

12.2.4 Mounting instructions
- Setting with HD spindle (small spring dome / Ø 70mm)
  - Screw-in depth T min: 111 mm
  - Screw-in depth T max: 65 mm
- Setting with HD spindle (large spring dome / Ø 105mm)
  - Screw-in depth T min: 130 mm
  - Screw-in depth T max: 70 mm
- Dismounting height HD spindle (small spring dome / Ø 70mm)
  - X: 260 mm
- Dismounting height HD spindle (large spring dome / Ø 105mm)
  - X: 410 mm

⚠️ **NOTICE** All threads must be oiled!
12.3 BV breather valve

12.3.1 Use

- On SAV control devices
- On regulators (pilots)
- With low-dynamic regulation sections (one full stroke)
- On the SRV (SL10)

12.3.2 Application / Function

The breather valve is used as replacement for the costly and time-consuming laying of breather lines and for securing the installation room against inadmissible gas escape from diaphragm comparator compartments of gas pressure regulators and safety shut-off valves.

In compliance with § 7.5 of EN 12186:2000+A1, the use of the BV guarantees that in case of a defect of the working diaphragm, escape of gas from the breather connection of the gas pressure regulator or of the safety shut-off valve of more than 30 l/h is prevented.

12.3.3 Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>BV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. allowable pressure $P_S$</td>
<td>25 bar</td>
</tr>
<tr>
<td>Max. operating pressure $p_{max}$</td>
<td>25 bar</td>
</tr>
<tr>
<td>Max. allowable flow rate</td>
<td>30 l/h</td>
</tr>
</tbody>
</table>

- Connection type
  - 3/8” or G 1/4”
- Temperature range class 2
  - (operating/ambient temperature)
  - -20 °C to +60 °C

Application example on the SSV
12.4 RSD restrictor valve

12.4.1 Use

- For installation in the measurement line of the gas pressure regulator

12.4.2 Application / Function

- For finer adjustment of the control behaviour of the regulator
- For vibration-free outlet pressure regulation

The RSD is a restrictor valve that affects the volumetric flow in the measurement line from outside by means of a continuously adjustable narrowing of the cross-section. The adjustment is done by means of an Allen key (4mm).

12.4.3 Technical Data

- Type: RSD
- Max. allowable pressure $P_S$: 5 bar*
- Max. operating pressure $p_{\text{max}}$: 5 bar*
- Connection type: on both sides G 1/4” Female thread
- Material: Stainless steel
- Temperature range, Class 2 (operating/ambient temperature): -20°C to +60°C
- Ex protection: The mechanical components of the device do not have any potential ignition sources of their own and are thus not covered by the scope of ATEX 95 (94/9/EC).

* on request: also available for 25 bar

12.4.4 Application example

To completely open the restrictor valve when closed max.: 5 turns

**NOTICE**
12.5 Signal transmitter / Reed contact

12.5.1 Use

- On SAV control devices

12.5.2 Application / Function

The signal transmitter, in conjunction with products from Medenus GmbH, is used for monitoring the position (position closed or open) of the safety shut-off valve via remote display.

A built-in neodymium magnet in the pull knob of the SSV and a set switching distance to the Reed contact cause a sensor to query the position of the safety shut-off valve and to transmit a signal via remote display. If the SSV drops into the closed position, the switching distance will be exceeded and the sensor will lose the signal. This guarantees continuous monitoring of the SSV control devices.

12.5.3 Technical Data

**Signal transmitter model**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verdrahtung</td>
<td>3 Draht</td>
</tr>
<tr>
<td>Output</td>
<td>NPN</td>
</tr>
<tr>
<td>Application</td>
<td>IC control/ PLC relay</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>5/12/24VDC (4.5 to 28VDC)</td>
</tr>
<tr>
<td>Current consumption</td>
<td>max. 10 mA</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>-</td>
</tr>
<tr>
<td>Load current</td>
<td>max. 40mA</td>
</tr>
<tr>
<td>Internal voltage</td>
<td>max. 0.8V</td>
</tr>
<tr>
<td>Leakage current</td>
<td>max. 100 μA at 24VDC</td>
</tr>
<tr>
<td>Response time</td>
<td>max. 1ms</td>
</tr>
<tr>
<td>Operational status indicator</td>
<td>ON: Red LED</td>
</tr>
<tr>
<td>Electrical inputs</td>
<td>potted cables</td>
</tr>
<tr>
<td>Connecting cables</td>
<td>oil-resistant vinyl cables</td>
</tr>
<tr>
<td></td>
<td>2.7 x 3.2 oval, 0.15 mm², 3-wire [D-M9P]</td>
</tr>
</tbody>
</table>

- Shock resistance 1000 m/s²
- Insulation resistance max. 50M Ω at 500VDC Mega
- Test voltage AC 1000 V over 1 minute (connecting cable, between housings)
- Ambient temperature -10 to 60°C
- Degree of protection IP67 IEC60529, JISC0920

12.5.4 ATEX marking

II 3G Ex nA II T5 X -10°C ≤ Ta ≤ +60°C
II 3D tD A22 IP67 T93°C X

- Device group II
- Category 3
- Gas- [G] and dust-containing [D] environments
- Ex – Conformity with European standards
- nA – spark-free device
- II – For all types of gas
- T5 – Temperature classification
- tD – protected by housing
- A22 – for Zone 22
- IP67 – Degree of protection
- Ta – Ambient temperature
- T93°C – max. surface temperature
- X – Special conditions, see instructions
12.5.4 Mounting

- Replace the pull knob of the SSV spindle with the pull knob with the neodymium magnet.
- With the SSV open, slide the signal transmitter into the groove provided for this purpose at the SSV cap. (Until the operational status indicator is lit)
- Finally fasten the signal transmitter to the desired position by tightening* the fastening screw M2.5 x 4 using a precision screwdriver.

- Perform a functional test by removing the SSV cap and thus the Reed contract from the neodymium magnet. When the contact gets lost, the operational status indicator will go out.

*] Tightening torque between 0.1 and 0.2 Nm

With the SSV open, the operational status indicator will light in red. (Neodymium magnet in the pull button)

With the SSV closed, the operational status indicator will go out. (Neodymium magnet in the pull button)
Safety instructions

Must be read prior to using the neodymium magnet!
Important safety instructions for general and responsible handling of the neodymium magnet

Please pass on these instructions to all employees, customers and other people who are handling our products or parts derived from them.
Please read these instructions carefully before using the neodymium magnets. For any further questions, please feel free to contact us.
“magnets4you GmbH” shall not assume any liability for damage caused by improper handling of the magnets.

Hazards caused by magnets

- Risk of injury caused by crushing
- Risk of injury caused by splinters
- Hazards caused by magnetic fields
- Pacemakers, magnetic data carriers (credit cards, memory cards, etc.)
- Electronic devices (mobile phones, computers, monitors, etc.)
- Risk of fire
- Health risks in contact with foods and drinking water

Handling

Do not place any iron-containing parts (tools, nails, knives, etc.) in the vicinity of the magnets.
Magnets can collide or adhere to other metallic surfaces, possibly resulting in splinters or brittleness.
Wear safety goggles and protective gloves – in order to avoid eye injuries and crushing!
Persons wearing pacemakers must not be exposed to magnetic fields.
Electronic devices and magnetic data carriers must be kept away from magnetic fields.
Magnets should not be processed mechanically, sawed or drilled.
The resulting drilling/magnet dust is extremely flammable.
Alternatively, magnets can be glued / sunk for fastening.
Keep the magnets away from open heat and flames!
The magnets are provided with a thin coating [nickel, gold or zinc] that can be removed or changed by excessive use.

It is recommended never to use AlNiCo magnets in direct contact with foods, since metal ions can dissociate in water-containing media.

Transport

When shipping magnets, the current regulations for scattered magnetic fields during air transport must be observed (IATA Hazardous Goods Regulations).
These regulations also apply to built-in magnets.

Neodymium magnets and end products prepared from them may not be imported directly or indirectly to the following countries: USA, Canada and Japan.

Increased caution for children

Keep neodymium magnets out of the reach of children. Children are at risk of playing with the magnets, inserting them into sockets, swallowing them or their fingers getting caught!
Children under the age of 10 should not handle magnets at all.

12.6 Inductive signal transmitter

12.6.1 Use

• On SAV control devices

12.6.2 Application / Function

The inductive transmitter, in conjunction with products from Medenus GmbH, is used for monitoring the position (position closed or open) of the safety shut-off valve via remote display.

A sensor queries the position of the safety shut-off valve and a signal is transmitted via remote display. If the SSV drops into the closed position, the switching distance will be exceeded and the sensor will lose the signal. This guarantees continuous monitoring of the SSV control devices.

12.6.3 ATEX marking

<table>
<thead>
<tr>
<th>Field of application</th>
<th>Certificate</th>
<th>Group, category, type of ignition protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEX 1G</td>
<td>PTB 00 ATEX 2048 X</td>
<td>☑ Il 1G Ex ia IIC T6...T1 Ga The Ex-relevant marking can also be printed on the enclosed adhesive label.</td>
</tr>
<tr>
<td>ATEX 2G</td>
<td>PTB 00 ATEX 2048 X</td>
<td>☑ Il 1G Ex ia IIC T6...T1 Ga The Ex-relevant marking is shown on the enclosed adhesive label.</td>
</tr>
<tr>
<td>ATEX 3G (ic)</td>
<td>PF 13 CERT 2895 X</td>
<td>☑ Il 3G Ex ic IIC T6...T1 Gc The Ex-relevant marking is shown on the enclosed adhesive label.</td>
</tr>
<tr>
<td>ATEX 1D</td>
<td>PTB 00 ATEX 2048 X</td>
<td>☑ Il 1D Ex ia IIIC T135°C Da The Ex-relevant marking can also be printed on the enclosed adhesive label.</td>
</tr>
</tbody>
</table>

12.6.4 Technical Data

- Switching element function: NAMUR opener
- Switching distance $s_n$: 2 mm
- Installation: flush
- Safe switching distance $s_a$: 0 ... 1.62 mm
- Reduction factor $r_{Al}$: 0.23
- Reduction factor $r_{Cu}$: 0.21
- Reduction factor $r_{V2A}$: 0.7
- Rated voltage $U_o$: 8 V
- Operating voltage $U_B$: 5 ... 25 V
- Switching frequency $f$: 0 ... 1000 Hz
- Hysteresis $H$: 1 ... 10 typ. 3 %
- Polarity reversal protection polarity reversal: protected against
- Short-circuit protection: yes
- Current consumption: Measuring plate does not detect 3 mA; Measuring plate detects 1 mA
- Switching state indication: Multi-hole LED, yellow
- EMC according to: IEC / EN 60947-5-2:2004; NE 21
- Standards: DIN EN60947-5-6 (NAMUR)
- Ambient temperature: -25 ... 100 °C (248 ... 373 K)
- Storage temperature: -40 ... 100 °C (233 ... 373 K)
- Connection type: V1 Device plug
- Enclosure material: Stainless steel
- Front face: PBT
- Degree of protection: IP67
- Use in hazardous area instructions: see operating
- Category: 1G; 2G; 1D
12.6.5 Mounting

- Unscrew the SSV cap of your Medenus gas pressure regulator (-) and replace it with the SSV cap with M12 threaded hole for the inductive transmitter and the pull knob, if necessary.

  (During mounting, make sure that the O-ring has been inserted into the SSV cap)

- Now screw the inductive transmitter into the thread provided for this purpose, ensuring that the inductive transmitter has a max. switching distance to the pull knob of 2mm.

- Then secure the inductive transmitter with the enclosed locknuts AF 17. (lock the ribbed sides against each other)

- Finally connect the delivered connecting cable to the inductive transmitter by means of a screw cap.

- Check the function of the display in the open and closed positions of the SSV.

With the SSV open, the operational status indicator of the inductive transmitter will light in yellow. With the SSV closed, the operational status indicator of the inductive transmitter will go out.
12.7 Choke washer

12.7.1 Use

- On regulators (pilots)

12.7.2 Application / Function

If the outlet pressure of the regulator varies too much, this can be remedied by installing restrictor and baffle plates in the breather line or the impulse (measurement) line.

A set of the restrictor and baffle plates is located in the sealing cap (pos. 7) on the spring cap (pos. 4) of the regulator.

12.7.3 Mounting

1. Remove the choke washer by unscrewing the sealing cap (pos. 7) from the regulator and then the locking screw (pos. 8) from the sealing cap (pos. 7).

2. Installation of the restrictor plate in the breather line

   First the choke washer (pos. 9) is installed in the breather line. The choke washer is installed behind the Ermeto screw fitting (pos. 5) in the bore of the diaphragm hood top (pos. 3). Screw the sealing cap (pos. 7) again onto the spring cap (pos. 4) and put the gas regulation section into operation again. If the installation of the choke washer (pos. 9) has given the desired result, the outlet pressure no longer varies, and the regulator reacts as desired, continue with item 4. If it has given the desired result, continue with item 3.

   The restriction must not make the regulator so sluggish that the SSV drops when starting or switching off the gas regulation section.

3. Installation of the choke washer in the impulse line

   The regulator flow can be restricted by installing a choke washer (pos. 10, 11 or 12) in the impulse line. To do so, the ball valve upstream of the gas pressure regulator must be closed, and the gas regulation section must be depressurized by discharging the gas to the atmosphere as prescribed (see operating manual). The choke washer (pos. 10) is then installed in the impulse line between the Ermeto screw fitting (pos. 6) and the impulse line and screwed down again. The gas regulation section is then put into operation as specified (see operating manual).
If the outlet pressure remains stable during operation and the regulator reacts as desired, continue with item 4.

If the outlet pressure still varies, the installation process of the choke washer (pos. 11) can be repeated. If this still doesn’t give the desired result, the installation process can be repeated with the choke washer (pos. 12). If the outlet pressure remains stable during operation and the regulator reacts as desired, continue with item 4.

If this procedure is not successful, contact MEDENUS to find out other solution options. The restriction must not make the regulator so sluggish that the SSV drops when starting or switching off the gas regulation section.

4. Put the choke washers that are not required back into sealing cap (pos. 7) and screw down the locking screw (pos. 8). Seal the spring cap (pos. 4) of the regulator as prescribed using the sealing cap (pos. 7). After completion of all of the work, a leakage test must be performed on the gas regulation section.

Legend

1. Enclosure
2. Diaphragm cover bottom
3. Diaphragm cover top
4. Spring cap
5. Ermeto screw fitting breather connection
6. Ermeto screw fitting pulse connection
7. Sealing cap
8. Locking screw
9. Choke washer
10. Choke washer Ø 3mm
11. Choke washer Ø 2mm
12. Choke washer Ø 1mm
12.8. SSV remote release

12.8.1 Use

- On SAV control devices

12.8.2 Application / Function

The direct-acting solenoid valve is used as electromagnetic remote release for closing the safety shut-off valve. Only for SSV control devices of functional class A.

Upon being energized or in case of power failure, the valve closes the impulse line, resulting in the pressure falling below the response pressure to be monitored. As a result, the SSV actuator shuts off the gas flow gas-tight.

After being released, the safety shut-off valve can only be opened by hand and engaged in the open position.

12.8.3 Technical Data

- Housing material: Brass or stainless steel, polyamide (Flange)
- Sealing material: FKM (EPDM upon request)
- Media: Neutral gases and liquids (e.g. compressed air, city gas, grid gas, water, hydraulic oil, petrol). Suitable for technical grade vacuum.
- Media temperature: -10° to +100 °C (PA coil) up to 120 °C epoxy
- Polyamid coil [FKM seal]: Coil
- Ambient temperature: max. +55 °C
- Viscosity: max. 21 mm²/s
- Line connection: G 1/8, G 1/4, flange [SFB]
- Operating voltage: 24 V DC, 24 V/50 Hz, 230 V/50 Hz (other voltages upon request)
- Voltage tolerance: ±10%
- Nominal operating mode / Single valve: Permanent operation 100%
- Electrical connection: DIN EN 175301-803 Form A for device socket
- Type 2508 (see ordering table accessories)
- ATEX/IECEx version potted with 3 m cable
- Installation position: Any, preferably drive pointing upwards
- Degree of protection: IP65 with device socket, ATEX/IECEx terminal connection version
- and cable connection version
- NEMA 4x with device socket 2508 or 2509
- for VA versions (other versions upon request)
- Thermal insulation class coil: Polyamide class B (epoxy class H upon request)
- Coil material polyamide: (epoxy upon request)
- Nominal width: DN 1.5 - 2.5

Further technical data and information on the 3/2-way valve, such as information on ATEX, are available for download on the manufacturer’s homepage.

Note
12.8.4 Application example
12.9. SM safety diaphragm

12.9.1 Use

- Gas pressure regulators RS 250 / RS 251
- Gas pressure regulators RS 254 / RS 255
- Gas pressure regulators R 100 / R 100-U
- Gas pressure regulators R 101

12.9.2 Application / Function

In the model with safety diaphragm, the safety diaphragm is located above the main diaphragm. When the main diaphragm ruptures, the safety diaphragm makes contact with the top cover of the diaphragm assembly and prevents any inadmissible escape of gas into the surrounding atmosphere.

12.9.3 Application example

Example: Gas pressure regulator RS254 with safety diaphragm

1. Ball valve
2. Cellular gas filter with differential pressure gauge
3. Adapter
4. Pushbutton valve
5. P1 pressure gauge
6. MQMe quantometer with electronic counter
7. Safety shut-off valve*
8. BV breather valve
9. SSV impulse line
10. Bypass valve*
11. Calming section
12. Gas pressure regulator with safety diaphragm
13. Regulator impulse line
14. Omit breather line
15. SSV test valve
16. SL 10 safety relief valve [SRV]
17. SL 10 relief line
18. BV breather valve
19. Vent cock
20. P2 pressure gauge
21. Compensator

* Only for regulators with integrated safety shut-off valve (SSV)
** Flow rate at measuring points < 25m/s

© 11.2020
13 tools

13.1 Brace and bit with 4-jaw chuck

The 3.5 - 16 mm brace and bit with 4-jaw chuck and the accessories available for it are used for precise adjustment of the setpoint spring in your MEDENUS gas pressure regulator.

For further information for use and on the spring data of the setpoint springs, please refer to pages 12 - 13 “Initial commissioning / Recommissioning” and pages 14 - 15 “Regulator device setpoint spring table”.

13.1.1 Accessories for brace and bit with 4-jaw chuck

Gedore screwdriver bit 1/2” slotted 18x2.5 mm

- Hexagon square drive to DIN 3120 - C 12.5, ISO 1174, with ball groove
- Hand-operated, with slip-proof cross knurling
- Chrome-plated
- With pressed-in pin made of GEDORE vanadium special steel, manganese-phosphatized
- Cutting blade to DIN ISO 2380-1 form B

Gedore extension 1/2” 76 mm

- Model to DIN 3123, ISO 3316
- For hand-operated socket wrench inserts with square drive to DIN 3120, ISO 1174, with ball detent
- GEDORE vanadium steel 31CrV3, chrome-plated

13.2 SSV tightening tool

The tightening tool made of stainless steel is used for replacing the SSV diaphragm in your MEDENUS safety shut-off valve.

- Width across flats 22
- Stainless steel 42CrMo4
Declaration of Conformity

Manufacturer: Medenus Gas-Druckregeltechnik GmbH
Address: Im Langen Feld 3
D-57462 Olpe

declares under sole responsibility that the products:
R 254 / RS 254 / RP 254 / RSP 254
R 255 / RS 255 / RP 255 / RSP 255

Gas Pressure regulator [spring-loaded proportional regulator], optionally with safety shut-off valve [SSV] for upper and lower shut-off pressure, and / or with pilot support, have been subjected to an EC-type examination and conform to the basic requirements of the directives GAR (EU) 2016/426 EC-Gas Appliances Regulation and 2014/68/EU A III B EC-Pressure Equipment Directive in the respective current version.

Marking [PIN] according to Pressure Equipment Directive and Gas Appliances Regulation
CE-0085AQ0882 model R 254 / RS 254 / RP 254 / RSP 254
CE-0085AQ0883 model R 255 / RS 255 / RP 255 / RSP 255

Notified body (EU type examination: Module B) DVGW CERT GmbH
Josef Würner Straße 1-3
D-53123 Bonn, Germany
Notified Body number: 0085

The basis of the EC type examination are the harmonized European standards and / or national standards, as well as the European directives and / or regulations:

GAR (EU) 2016/426 A III B EC Gas Appliances Regulation (09.03.2016)
DIN EN 334 (01.11.2019)
DIN EN 14382 (01.11.2019)

Monitoring of the EC quality assurance system (module D) DVGW CERT GmbH
Notified Body number: 0085

Registration No. Pressure Equipment Directive SD-0085BQ0510
Registration No. Gas Appliances Regulation SE-0085BQ0510

Olpe,
01.10.2020

Alexander Christiani
Managing Director
In the download area of our homepage, this document is available in different languages. You can use the following QR codes and links to go directly to the corresponding documents.

**Deutsch:**

**Englisch:**