Type 3256 Valve · ANSI version

In combination with an actuator, e.g. a SAMSON Type 3271 or Type 3277 Pneumatic Actuator
Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

➔ For the safe and proper use of these instructions, read them carefully and keep them for later reference.

➔ If you have any questions about these instructions, contact SAMSON’s After-sales Service Department (aftersalesservice@samson.de).

The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at www.samson.de > Service & Support > Downloads > Documentation.

Definition of signal words

⚠️ DANGER
Hazardous situations which, if not avoided, will result in death or serious injury

⚠️ WARNING
Hazardous situations which, if not avoided, could result in death or serious injury

⚠️ NOTICE
Property damage message or malfunction

ℹ️ Note
Additional information

💡 Tip
Recommended action
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1 Safety instructions and measures

Intended use
The SAMSON Type 3256 Angle Valve in combination with an actuator (e.g. Type 3271 or Type 3277 Pneumatic Actuator) is designed to regulate the flow rate, pressure or temperature of liquids, gases or vapors. The valve with its actuator is designed to operate under exactly defined conditions (e.g. operating pressure, process medium, temperature). Therefore, operators must ensure that the control valve is only used in applications that meet the specifications used for sizing the valve at the ordering stage. In case operators intend to use the control valve in other applications or conditions than specified, contact SAMSON. SAMSON does not assume any liability for damage resulting from the failure to use the valve for its intended purpose or for damage caused by external forces or any other external factors.

⇒ Refer to the technical data and nameplate for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse
The control valve is not suitable for the following applications:
− Use outside the limits defined during sizing and in the technical data
− Use outside the limits defined by the valve accessories mounted on the control valve

Furthermore, the following activities do not comply with the intended use:
− Use of non-original spare parts
− Performing service and repair work not described in these instructions

Qualifications of operating personnel
The control valve must be mounted, started up, serviced, and repaired by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.
Safety instructions and measures

Personal protective equipment
We also recommend checking the hazards posed by the process medium being used (e.g. GESTIS (CLP) hazardous substance database).

- Provide protective equipment (e.g. safety gloves, eye protection) appropriate for the process medium used.
- Wear hearing protection when working near the valve.
- Check with the plant operator for details on further protective equipment.

Revisions and other modifications
Revisions, conversions or other modifications to the product are not authorized by SAMSON. They are performed at the user’s own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

Safety devices
Upon supply air or control signal failure, the valve moves to its fail-safe position (see section 3.1). The fail-safe action of the actuator is the same as its direction of action and is specified on the nameplate of SAMSON actuators (see actuator documentation).

Warning against residual hazards
To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in the control valve by the process medium, the operating pressure, the signal pressure or by moving parts by taking appropriate precautions. They must observe all hazard statements, warning and caution notes in these mounting and operating instructions, especially for installation, start-up, and service work.

We also recommend checking the hazards posed by the process medium being used (e.g. GESTIS (CLP) hazardous substance database).

- Observe safety measures for handling the device as well as fire prevention and explosion protection measures.

Responsibilities of the operator
The operator is responsible for proper operation and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions as well as the referenced documents to the operating personnel and to instruct them in proper operation. Furthermore, the operator must ensure that operating personnel or third persons are not exposed to any danger.
Responsibilities of operating personnel

Operating personnel must read and understand these mounting and operating instructions as well as the referenced documents and observe the hazard statements, warning and caution notes specified in them. Furthermore, the operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards and regulations

The control valves comply with the requirements of the European Pressure Equipment Directive 2014/68/EU. Valves with a CE marking have a declaration of conformity, which includes information about the applied conformity assessment procedure. This declaration of conformity is included in the Appendix of these instructions (see section 10.2).

Non-electric valve versions whose bodies are not lined with an insulating material coating do not have their own potential ignition source according to the risk assessment stipulated in EN 13463-1: 2009, section 5.2, even in the rare incident of an operating fault. Therefore, such valve versions do not fall within the scope of Directive 2014/34/EU.

For connection to the equipotential bonding system, observe the requirements specified in section 6.4 of EN 60079-14 (VDE 0165 Part 1).

Referenced documentation

The following documents apply in addition to these mounting and operating instructions:

- Mounting and operating instructions for mounted actuator, e.g. EB 8310-X for SAMSON Type 3271 and Type 3277 Actuators
- Mounting and operating instructions for mounted valve accessories (positioner, solenoid valve etc.)
- AB 0100 for tools, tightening torques, and lubricant
1.1 Notes on possible severe personal injury

⚠️ DANGER

Risk of bursting in pressure equipment.
Control valves and pipelines are pressure equipment. Improper opening can lead to valve components bursting.

- Before starting any work on the control valve, depressurize all plant sections concerned as well as the valve.
- Drain the process medium from all the plant sections concerned as well as the valve.
- Wear personal protective equipment.

1.2 Notes on possible personal injury

⚠️ WARNING

Crush hazard arising from moving parts.
The control valve contains moving parts (actuator and plug stems), which can injure hands or fingers if inserted into the valve.

- Do not insert hands or fingers into the yoke while the valve is in operation.
- While working on the control valve, disconnect and lock the pneumatic air supply as well as the control signal.

Risk of personal injury when the actuator vents.
While the valve is operating, the actuator may vent during closed-loop control or when the valve opens or closes.

- Install the control valve in such a way that the actuator does not vent at eye level.
- Use suitable silencers and vent plugs.
- Wear eye protection when working in close proximity to the control valve.
**Warning**

**Risk of personal injury due to preloaded springs.**

Valves in combination with pneumatic actuators with preloaded springs are under tension. These control valves with SAMSON pneumatic actuators can be identified by the long bolts protruding from the bottom of the actuator.

- Before starting any work on the actuator, relieve the compression from the preloaded springs (see associated actuator documentation).

**Risk of personal injury due to residual process medium in the valve.**

While working on the valve, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns.

- If possible, drain the process medium from all the plant sections concerned and the valve.
- Wear protective clothing, safety gloves, and eyewear.

**Risk of burn injuries due to hot or cold components and pipelines.**

Depending on the process medium, valve components, and pipelines may get very hot or cold and cause burn injuries.

- Allow components and pipelines to cool down or heat up.
- Wear protective clothing and safety gloves.

### 1.3 Notes on possible property damage

**Notice**

**Risk of valve damage due to contamination (e.g. solid particles) in the pipeline.**

The plant operator is responsible for cleaning the pipelines in the plant.

- Flush the pipelines before start-up.
- Observe the maximum permissible pressure for valve and plant.

**Risk of valve damage due to unsuitable medium properties.**

The valve is designed for a process medium with defined properties.

- Only use the process medium specified for sizing the valve.
Safety instructions and measures

**NOTICE**

Risk of leakage and valve damage due to excessively high or low tightening torques.

Observe the specified torques on tightening control valve components. Excessively tightened torques lead to parts wearing out quicker. Parts that are too loose may cause leakage.

➤ Observe the specified tightening torques (➤ AB 0100).

Risk of valve damage due to the use of unsuitable tools.

Certain tools are required to work on the valve.

➤ Only use tools approved by SAMSON (➤ AB 0100).

Risk of valve damage due to the use of unsuitable lubricants.

The lubricants to be used depend on the valve material. Unsuitable lubricants may corrode and damage the valve surface.

➤ Only use lubricants approved by SAMSON (➤ AB 0100).
### Markings on the control valve

#### 2.1 Valve nameplate

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PED (Pressure Equipment Directive), &quot;Art. 4, Abs. 3&quot;</td>
</tr>
<tr>
<td>2</td>
<td>ID of the notified body, fluid group, and category</td>
</tr>
<tr>
<td>3</td>
<td>Type designation</td>
</tr>
<tr>
<td>4</td>
<td>Material</td>
</tr>
<tr>
<td>5</td>
<td>Year of manufacture</td>
</tr>
<tr>
<td>6</td>
<td>Valve size:</td>
</tr>
<tr>
<td>7</td>
<td>DIN: DN · ANSI: NPS · JIS: DN … A/B</td>
</tr>
<tr>
<td>8</td>
<td>Pressure rating:</td>
</tr>
<tr>
<td>9</td>
<td>DIN: PN · ANSI: CL · JIS: K</td>
</tr>
<tr>
<td>10</td>
<td>Order no. with modification index</td>
</tr>
<tr>
<td>11</td>
<td>For after-sales service orders: AA prefix</td>
</tr>
<tr>
<td>12</td>
<td>Position in order</td>
</tr>
<tr>
<td>13</td>
<td>For after-sales service orders: configuration ID</td>
</tr>
<tr>
<td>14</td>
<td>Flow coefficient:</td>
</tr>
<tr>
<td>15</td>
<td>DIN: $K_{VS}$ · ANSI: $C_V$ · JIS: $C_V$</td>
</tr>
<tr>
<td>16</td>
<td>Characteristic:</td>
</tr>
<tr>
<td>17</td>
<td>%: equal percentage · Lin: linear · NO/NC: quick opening</td>
</tr>
<tr>
<td>18</td>
<td>Seat-plug seal:</td>
</tr>
<tr>
<td>19</td>
<td>ME: metal (see section 3.3)</td>
</tr>
<tr>
<td>20</td>
<td>HA: carbide metal</td>
</tr>
<tr>
<td>21</td>
<td>ST: Stellite® facing</td>
</tr>
<tr>
<td>22</td>
<td>KE: ceramic</td>
</tr>
<tr>
<td>23</td>
<td>PT: soft seal with PTFE</td>
</tr>
<tr>
<td>24</td>
<td>PK: soft seal with PEEK</td>
</tr>
<tr>
<td>25</td>
<td>Seat code (trim material) · On request</td>
</tr>
<tr>
<td>26</td>
<td>Pressure balancing:</td>
</tr>
<tr>
<td>27</td>
<td>DIN: D · ANSI: B · JIS: B</td>
</tr>
<tr>
<td>28</td>
<td>Flow divider: 1: ST 1 · 2: ST 2 · 3: ST 3</td>
</tr>
<tr>
<td>29</td>
<td>AC trim: AC-1 to AC-5</td>
</tr>
<tr>
<td>30</td>
<td>Perforated plug: LK1 to 3</td>
</tr>
<tr>
<td>31</td>
<td>Country of origin</td>
</tr>
</tbody>
</table>

**Fig. 1:** Valve nameplate
The nameplate (80) is affixed to the yoke of the valve (see Fig. 2).

![Diagram of control valve with nameplate 80](image)

Fig. 2: Location of the nameplate

### 2.2 Actuator nameplate

See associated actuator documentation.

### 2.3 Material number

The seat and plug of the valves have an article number written on them. Specifying this article number, you can contact us to find out which material is used. Additionally, a seat code is used to identify the trim material. This seat code is specified on the nameplate (17 on nameplate). For more details on the nameplate, see section 2.1.
3 Design and principle of operation

The Type 3246 Angle Valve is preferably combined with a SAMSON Type 3271 or Type 3277 Pneumatic Actuator (see Fig. 3). It can also be combined with other actuators. The seat (4) and plug with plug stem (5) are installed in the body (1). The plug stem is connected to the actuator stem (A7) by the stem connector clamps (A26) and is sealed by a spring-loaded V-ring packing (15). Alternatively, an adjustable high-temperature packing can be used.

The springs in the pneumatic actuator are located either above or below the diaphragm (A4) depending on the selected fail-safe action (see section 3.1). A change in the signal pressure acting on the diaphragm causes the plug to move. The actuator size is determined by the diaphragm area.

The medium flows through the valve in the direction indicated by the arrow. A rise in signal pressure causes the force acting on the diaphragm in the actuator to increase. The springs are compressed. Depending on the selected direction of action, the actuator stem retracts or extends. As a result, the plug position in the seat changes and determines the flow rate through the valve.

The direction of flow is different for the version with a ceramic anti-wear sleeve: the medium flows through the valve in the flow-to-close direction.

3.1 Fail-safe positions

The fail-safe position depends on the mounted actuator.

Depending on how the compression springs are arranged in the pneumatic actuator, the valve has two different fail-safe positions:

Actuator stem extends (FA)

When the signal pressure is reduced or the air supply fails, the springs move the actuator stem downward and close the valve. The valve opens when the signal pressure is increased enough to overcome the force exerted by the springs.

Actuator stem retracts (FE)

When the signal pressure is reduced or the air supply fails, the springs move the actuator stem upwards and open the valve. The valve closes when the signal pressure is increased enough to overcome the force exerted by the springs.

Tip

The actuator’s direction of action can be reversed, if required. Refer to the mounting and operating instructions of the pneumatic actuator:

▶ EB 8310-X for Type 3271 and Type 3277
Design and principle of operation

Fig. 3: Type 3256 Angle Valve with Type 3271 Pneumatic Actuator
3.2 Versions

Insulating section or bellows seal
The modular design allows an insulating section or metal bellows to be fitted to the standard valve version.

Trims
Flow dividers (▶ T 8081) can be used to reduce the noise emission.
AC trims (▶ T 8082 and ▶ T 8083) can be used for low-noise pressure letdown of liquids.
Perforated plugs (▶ T 8086) can be used to handle critical medium states (e.g. saturated steam).
Ceramic trim parts (▶ T 8071) can be used when the valve is subject to considerable erosion and abrasion (e.g. through flashing service and in applications involving corrosive media containing solid particles).

Actuators
In these instructions, the preferable combination with a Type 3271 or Type 3277 Pneumatic Actuator is described. The pneumatic actuator (with or without handwheel) can be replaced by another pneumatic actuator in a different size, but with the same travel.

➤ Observe the maximum permissible actuator force.

Note
If the travel range of the actuator is larger than the travel range of the valve, the spring assembly in the actuator must be preloaded so that the travel ranges match. See associated actuator documentation.

The basic pneumatic actuator can be replaced by a pneumatic actuator with additional handwheel or by an electric actuator.

3.3 Technical data

The nameplates on the valve and actuator provide information on the control valve version. See section 2.1 and the associated actuator documentation.

Note
More information is available in Data Sheet ▶ T 8066.

Noise emission
SAMSON is unable to make general statements about noise emission as it depends on the valve version, plant facilities, and process medium.

WARNING
Risk of hearing loss or deafness due to loud noise.
Wear hearing protection when working near the valve.
### Table 1: Technical data for Type 3256

<table>
<thead>
<tr>
<th>Material</th>
<th>Cast steel A216 WCC</th>
<th>Cast steel A217 WC6</th>
<th>Cast stainless steel A351 CF8M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve size and pressure rating</td>
<td>NPS ½ to 12 in Class 150 to 2500 NPS 16 to 20 on request</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of connection</td>
<td>Flanges</td>
<td>All ANSI versions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Welding ends</td>
<td>According to ANSI B16.25</td>
<td></td>
</tr>
<tr>
<td>Seat-plug seal</td>
<td>Metal seal · Soft seal · High-performance metal seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Equal percentage · Linear · Quick opening (T 8000-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rangeability</td>
<td>50:1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance</td>
<td>CE · EAC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Temperature ranges** in °F (°C) · Permissible operating pressures acc. to pressure-temperature diagram (see Information Sheet T 8000-2)

<table>
<thead>
<tr>
<th>Body without insulating section</th>
<th>14 to 428 °F (–10 to +220 °C) · Up to 662 °F (up to 350 °C) with high-temperature packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body with insulating section or bellows seal</td>
<td>–20 to +800 °F (–29 to +427 °C) · –20 to +932 °F (–29 to +500 °C) · –325 to +1022 °F (–196 to +550 °C)</td>
</tr>
<tr>
<td>Valve plug 2)</td>
<td>Standard Metal seal –325 to +1022 °F (–196 to +550 °C) 2) Standard Soft seal –325 to +428 °F (–196 to +220 °C) 2) Balanced with PTFE ring –58 to +428 °F (–50 to +220 °C) 3) Balanced with graphite ring 428 to +1022 °F (220 to 550 °C)</td>
</tr>
</tbody>
</table>

**Leakage class** according to ANSI/FCI 70-2

<table>
<thead>
<tr>
<th>Valve plug</th>
<th>Metal seal</th>
<th>Standard: IV · High-performance metal seal: V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>Soft seal</td>
<td>VI</td>
</tr>
<tr>
<td>Balanced, metal seal</td>
<td>With PTFE ring (standard): IV · High-performance metal seal: V</td>
<td>With graphite ring: IV</td>
</tr>
</tbody>
</table>

1) Only in combination with suitable body material
2) Note: The temperature limits are not directly converted temperatures.
3) Lower temperatures on request
Design and principle of operation

Dimensions and weights
Table 2 and Table 3 provide a summary of the dimensions and weights of the standard version of Type 3256 Valve. The lengths and heights in the dimensional drawing are shown on p. 19.

Dimensions in mm · Weights in kg

Table 2: Dimensions for Type 3256 Valve

<table>
<thead>
<tr>
<th>Valve</th>
<th>NPS</th>
<th>1/2</th>
<th>1</th>
<th>1 1/2</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>15</td>
<td>25</td>
<td>40</td>
<td>50</td>
<td>80</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>Class 150</td>
<td>in</td>
<td>3.62</td>
<td>3.62</td>
<td>4.37</td>
<td>5.00</td>
<td>5.88</td>
<td>6.94</td>
<td>8.88</td>
<td>10.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>92</td>
<td>92</td>
<td>111</td>
<td>127</td>
<td>149</td>
<td>176</td>
<td>225</td>
<td>272</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 300</td>
<td>in</td>
<td>3.75</td>
<td>3.88</td>
<td>4.62</td>
<td>5.25</td>
<td>6.25</td>
<td>7.25</td>
<td>9.31</td>
<td>11.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>95</td>
<td>99</td>
<td>117</td>
<td>133</td>
<td>159</td>
<td>184</td>
<td>236</td>
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<tr>
<td>Class 600</td>
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<td>3.98</td>
<td>4.12</td>
<td>4.94</td>
<td>5.62</td>
<td>6.62</td>
<td>7.75</td>
<td>10.00</td>
<td>12.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>101</td>
<td>105</td>
<td>125</td>
<td>143</td>
<td>168</td>
<td>197</td>
<td>254</td>
<td>305</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 900</td>
<td>in</td>
<td>4.25</td>
<td>5.00</td>
<td>6.00</td>
<td>7.25</td>
<td>7.50</td>
<td>9.00</td>
<td>12.00</td>
<td>14.50</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>mm</td>
<td>108</td>
<td>127</td>
<td>152</td>
<td>184</td>
<td>190</td>
<td>229</td>
<td>305</td>
<td>368</td>
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<td></td>
</tr>
<tr>
<td>Class 1500</td>
<td>in</td>
<td>4.25</td>
<td>5.00</td>
<td>6.00</td>
<td>7.25</td>
<td>9.25</td>
<td>10.75</td>
<td>13.88</td>
<td>16.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>108</td>
<td>127</td>
<td>152</td>
<td>184</td>
<td>235</td>
<td>273</td>
<td>353</td>
<td>416</td>
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<td></td>
</tr>
<tr>
<td>Class 2500</td>
<td>in</td>
<td>5.19</td>
<td>6.06</td>
<td>7.56</td>
<td>8.88</td>
<td>11.38</td>
<td>13.25</td>
<td>18.00</td>
<td>20.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>132</td>
<td>154</td>
<td>192</td>
<td>226</td>
<td>289</td>
<td>337</td>
<td>457</td>
<td>511</td>
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<td></td>
</tr>
<tr>
<td>Height H4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>On request</td>
<td></td>
</tr>
<tr>
<td>Class 150 to 600</td>
<td>in</td>
<td>5.28</td>
<td>5.08</td>
<td>5.08</td>
<td>6.89</td>
<td>6.30</td>
<td>6.69</td>
<td>9.13</td>
<td></td>
<td>On request</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>134</td>
<td>129</td>
<td>129</td>
<td>175</td>
<td>160</td>
<td>170</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 900</td>
<td>in</td>
<td>6.89</td>
<td>6.69</td>
<td>6.69</td>
<td>8.70</td>
<td>6.30</td>
<td>6.69</td>
<td>9.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>175</td>
<td>170</td>
<td>170</td>
<td>221</td>
<td>160</td>
<td>170</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 1500 to 2500</td>
<td>in</td>
<td>6.89</td>
<td>6.69</td>
<td>6.69</td>
<td>8.70</td>
<td>9.53</td>
<td>11.65</td>
<td>14.61</td>
<td>21.54</td>
<td>On request</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>175</td>
<td>170</td>
<td>170</td>
<td>221</td>
<td>242</td>
<td>296</td>
<td>371</td>
<td>547</td>
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</tr>
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</table>
## Design and principle of operation

### Valve

<table>
<thead>
<tr>
<th>Valve</th>
<th>NPS</th>
<th>1/2</th>
<th>1</th>
<th>1 1/2</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN</td>
<td>15</td>
<td>25</td>
<td>40</td>
<td>50</td>
<td>80</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
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<td>240</td>
<td>240</td>
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<td>240</td>
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</tr>
<tr>
<td></td>
<td>mm</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>240</td>
<td>240</td>
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<td>240</td>
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<td></td>
<td>mm</td>
<td>240</td>
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<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
</tbody>
</table>

### H8 for actuator

<table>
<thead>
<tr>
<th>H8 for actuator</th>
<th>1000 cm²</th>
<th>in</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9.45</td>
<td>11.61</td>
<td>295</td>
</tr>
<tr>
<td></td>
<td>18.90</td>
<td>18.90</td>
<td>480</td>
</tr>
<tr>
<td></td>
<td>2800 cm²</td>
<td>18.90</td>
<td>480</td>
</tr>
<tr>
<td></td>
<td>2 x 2800 cm²</td>
<td>18.90</td>
<td>480</td>
</tr>
</tbody>
</table>

1) H8 = 25.60 inch/650 mm with 250 mm seat bore

### Dimensional drawing

![Dimensional drawing](image)

Type 3256
### Design and principle of operation

#### Table 3: Weights for Type 3256 Valve

<table>
<thead>
<tr>
<th>Valve</th>
<th>NPS</th>
<th>1/2</th>
<th>1</th>
<th>1 1/2</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>lbs</td>
<td></td>
<td>kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 150</td>
<td></td>
<td></td>
<td></td>
<td>26</td>
<td>33</td>
<td>49</td>
<td>77</td>
<td>128</td>
<td>165</td>
<td>419</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>15</td>
<td>22</td>
<td>35</td>
<td>58</td>
<td>75</td>
<td>190</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without actuator (approx.)</td>
<td></td>
<td></td>
<td></td>
<td>On request</td>
<td>128</td>
<td>203</td>
<td>58</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 600</td>
<td></td>
<td></td>
<td></td>
<td>On request</td>
<td>84</td>
<td>126</td>
<td>201</td>
<td>243</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>38</td>
<td>57</td>
<td>91</td>
<td>110</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Class 1500 to 2500</td>
<td></td>
<td></td>
<td></td>
<td>On request</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Note

Refer to the following data sheets for more dimensions and weights:
- T 8066 for valves with bellows seal, insulating section or heating jacket
- The associated actuator documentation applies to actuators, e.g. for SAMSON pneumatic actuators:
  - T 8310-1 for Type 3271 and Type 3277 Actuators up to 750 cm² actuator area
  - T 8310-2 for Type 3271 Actuator with 1000 cm² actuator area and larger
  - T 8310-3 for Type 3271 Actuator with 1400-60 cm² actuator area
4 Measures for preparation

After receiving the shipment, proceed as follows:

1. Check the scope of delivery. Compare the shipment received against the delivery note.

2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).

4.1 Unpacking

Do not remove the packaging until immediately before installing the valve into the pipeline.

Proceed as follows to lift and install the valve:

1. Remove the packaging from the valve.

2. Dispose of the packaging in accordance with the valid regulations.

4.2 Transporting and lifting

DANGER
Hazard due to suspended loads falling.
Stay clear of suspended or moving loads.

WARNING
Risk of lifting equipment tipping and risk of damage to lifting accessories due to exceeding the rated lifting capacity.

– Only use approved lifting equipment and accessories whose minimum lifting capacity is higher than the weight of the valve (including actuator, if applicable).

– Refer to section 3.3 or Data Sheet T 8066 for weights.

WARNING
Risk of personal injury due to control valve tipping.

– Observe the valve’s center of gravity.

– Secure the valve against tipping over or turning.
Measures for preparation

**NOTICE**
Risk of valve damage due to incorrectly attached slings.
The welded-on lifting eyelet on SAMSON actuators is only intended for mounting and removing the actuator as well as lifting the actuator without valve. Do not use this lifting eyelet to lift the entire control valve assembly.
- When lifting the control valve, make sure that the slings attached to the valve body bear the entire load.
- Do not attach load-bearing slings to the actuator, handwheel or any other parts.
- Observe lifting instructions (see section 4.2.2).

SAMSON’s After-sales Service department can provide more detailed transport and lifting instructions on request.

4.2.1 Transporting
The control valve can be transported using lifting equipment (e.g. crane or forklift).
- Leave the control valve in its transport container or on the pallet to transport it.
- Observe the transport instructions.

Transport instructions
- Protect the control valve against external influences (e.g. impact).
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the control valve against moisture and dirt.
- The permissible transportation temperature of standard control valves is –20 to +65 °C (–4 to +149 °F).

**Note**
Contact SAMSON’s After-sales Service department for the transportation temperatures of other valve versions.

4.2.2 Lifting
To install a large valve into the pipeline, use lifting equipment (e.g. crane or forklift) to lift it.

Lifting instructions
- Secure slings against slipping.
- Make sure the slings can be removed from the valve once it has been installed into the pipeline.
- Prevent the control valve from tilting or tipping.
- Do not leave loads suspended when interrupting work for longer periods of time.
- Make sure that the axis of the pipeline is always horizontal during lifting and the axis of the plug stem is always vertical.
- Make sure that the additional sling between the lifting eyelet and rigging equipment (hook, shackle etc.) does not bear any load when lifting valves larger than NPS 6. The sling only protects the control valve from tilting while being lift-
ed. Before lifting the control valve, tighten the sling.

**Version with flanges**

1. Attach one sling to each flange of the body and to the rigging equipment (e.g. hook) of the crane or forklift (see Fig. 4).
2. **NPS 6 and larger:** Attach another sling to the lifting eyelet on the actuator and to the rigging equipment.
3. Carefully lift the control valve. Check whether the lifting equipment and accessories can bear the weight.
4. Move the control valve at an even pace to the site of installation.
5. Install the valve into the pipeline (see section 5.2).
6. After installation in the pipeline, check whether the flanges are bolted tight and the valve in the pipeline holds.
7. Remove slings.

**Tip**

We recommend using a hook with safety latch (see Fig. 4). The safety latch prevents the slings from slipping during lifting and transporting.
4.3 Storage

⚠️ NOTICE
Risk of valve damage due to improper storage.
- Observe storage instructions.
- Avoid long storage times.
- Contact SAMSON in case of different storage conditions or long storage periods.

ℹ️ Note
We recommend regularly checking the control valve and the prevailing storage conditions during long storage periods.

Storage instructions
- Protect the control valve against external influences (e.g. impact).
- Do not damage the corrosion protection (paint, surface coatings). Repair any damage immediately.
- Protect the control valve against moisture and dirt. Store it at a relative humidity of less than 75%. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure that the ambient air is free of acids or other corrosive media.
- The permissible storage temperature of standard control valves is –20 to +65 °C (–4 to +149 °F).

ℹ️ Note
Contact SAMSON’s After-sales Service department for the storage temperatures of other valve versions.
- Do not place any objects on the control valve.

Special storage instructions for elastomers
Elastomer, e.g. actuator diaphragm
- To keep elastomers in shape and to prevent cracking, do not bend them or hang them up.
- We recommend a storage temperature of 15 °C (59 °F) for elastomers.
- Store elastomers away from lubricants, chemicals, solutions, and fuels.

🌞 Tip
SAMSON’s After-sales Service department can provide more detailed storage instructions on request.
Measures for preparation

4.4 Preparation for installation

Proceed as follows:

➤ Flush the pipelines.

**Note**

The plant operator is responsible for cleaning the pipelines in the plant.

➤ Check the valve to make sure it is clean.
➤ Check the valve for damage.
➤ Check to make sure that the type designation, valve size, material, pressure rating, and temperature range of the valve match the plant conditions (size and pressure rating of the pipeline, medium temperature etc.).
➤ For steam applications, make sure that the pipelines are dry. Moisture will damage the inside of the valve.
➤ Check any mounted pressure gauges to make sure they function.
➤ When the valve and actuator are already assembled, check the tightening torques of the bolted joints (AB 0100). Components may loosen during transport.
5 Mounting and start-up

SAMSON valves are delivered ready for use. In special cases, the valve and actuator are delivered separately and must be assembled on site. The procedure to mount and start up the valve are described in the following.

**NOTICE**

Risk of valve damage due to excessively high or low tightening torques.
Observe the specified torques on tightening control valve components. Excessively tightened torques lead to parts wearing out quicker. Parts that are too loose may cause leakage.
Observe the specified tightening torques (► AB 0100).

5.1 Mounting the actuator onto the valve

Proceed as described in the actuator documentation if the valve and actuator have not been assembled by SAMSON.

**Tip**

Usually, this is the largest V-shaped port.

1. Before mounting the actuator, determine which V-shaped port is uncovered first when the plug is lifted out of the seat.

2. On mounting the actuator, make sure that the V-shaped port uncovered first faces toward the valve outlet.

**NOTICE**

Medium flow obstructed due to incorrect installation of the V-port plug.
To achieve the best flow conditions inside the valve, the V-port plug must always be installed with the largest port facing toward the valve outlet.
Make sure the V-port plug is installed correctly.

**Note**

- Remove the mounted actuator before mounting the other actuator (see associated actuator documentation).
Mounting and start-up

− Preloading the actuator springs increases the thrust of a pneumatic actuator and reduces the travel range of the actuator (see associated actuator documentation).

5.2 Installing the valve into the pipeline

5.2.1 Checking the installation conditions

Pipeline routing
The inlet and outlet lengths vary depending on the process medium. To ensure the control valve functions properly, follow the installation instructions given below:

➔ Observe the inlet and outlet lengths (see Table 4). Contact SAMSON if the valve conditions or states of the medium process deviate.

➔ Install the valve free of stress and with the least amount of vibrations as possible. If necessary, attach supports to the valve.

➔ Install the valve allowing sufficient space to remove the actuator and valve or to perform service and repair work on them.

Mounting position
Generally, we recommend installing the valve with the actuator upright and on top of the valve.

In the following versions, the valve must be installed with the actuator on top:

− Valves in NPS 4 and larger

➔ Valves with insulating section for low temperatures below –10 °C (14 °F)

➔ Contact SAMSON if the mounting position is not as specified above.

Support or suspension
Depending on the valve version and mounting position, the control valve and pipeline must be supported or suspended. The plant engineering company is responsible in this case.

**NOTICE**
Premature wear and leakage due to insufficient support or suspension.

In the following versions, the control valve must be supported or suspended:

− Valves that are not installed with the actuator in the upright position on top of the valve.

Attach a suitable support or suspension to the valve.

Vent plug
Vent plugs are screwed into the exhaust air ports of pneumatic and electropneumatic devices. They ensure that any exhaust air that forms can be vented to the atmosphere (to avoid excess pressure in the device). Furthermore, the vent plugs allow air intake to prevent a vacuum from forming in the device.

➔ Locate the vent plug on the opposite side to the workplace of operating personnel.

➔ On mounting valve accessories, make sure that they can be operated from the workplace of the operating personnel.
### Table 4: Inlet and outlet lengths

<table>
<thead>
<tr>
<th>State of process medium</th>
<th>Valve conditions</th>
<th>Inlet length a</th>
<th>Outlet length b</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inlet</strong></td>
<td><strong>Outlet</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td>Ma ≤ 0.3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>0.3 ≤ Ma ≤ 0.7</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Vapor</td>
<td>Ma ≤ 0.3 (^1)</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>0.3 ≤ Ma ≤ 0.7 (^1)</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Saturated steam (percentage of condensate &gt; 5 %)</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Liquid</td>
<td>Free of cavitation/w &lt; 10 m/s</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Cavitation producing noise/w ≤ 3 m/s</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Cavitation producing noise/3 &lt; w &lt; 5 m/s</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Critical cavitation/w ≤ 3 m/s</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Critical cavitation/3 &lt; w &lt; 5 m/s</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Liquid, with flashing</td>
<td>-</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Multi-phase</td>
<td>-</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

\(^1\) No saturated steam
Mounting and start-up

5.2.2 Additional fittings

Strainers
We recommend installing a SAMSON strainer upstream of the valve. It prevents solid particles in the process medium from damaging the valve.

Bypass and shut-off valves
We recommend installing a shut-off valve both upstream of the strainer and downstream of the valve and setting up a bypass line. The bypass ensures that the plant does not need to be shut down for service and repair work on the valve.

Insulation
Only insulate control valves with insulating section or bellows seal up to the bonnet flange of the valve body for medium temperatures below 0 °C (32 °F) and above 220 °C (428 °F).

Do not insulate valves mounted to comply with NACE MR 0175 requirements.

Test connection
Versions with bellows seal fitted with a test connection (G 1/8") at the top flange allow the sealing ability of the bellows to be monitored.

Particularly for liquids and vapors, we recommend installing a suitable leakage indicator (e.g. a contact pressure gauge, an outlet to an open vessel or an inspection glass).

### WARNING
Risk of personal injury due to pressurized components and process medium escaping under pressure.
Do not loosen the screw of the test connection while the valve is in operation.

Safety guard
To reduce the crush hazard arising from moving parts (actuator and plug stem), a safety guard can be installed.

5.2.3 Installing the control valve

Version with flanges
1. Close the shut-off valve in the pipeline while the valve is being installed.
2. Remove the protective caps from the valve ports before installing the valve.
3. Lift the valve using suitable lifting equipment to the site of installation (see section 4.2.2). Observe the flow direction through the valve. The arrow on the valve indicates the direction of flow.
4. Make sure that the correct flange gaskets are used.
5. Bolt the pipe to the valve free of stress.
6. Depending on the field of application, allow the valve to cool down or heat up
to reach ambient temperature before start up.

7. Slowly open the shut-off valve in the pipeline after the valve has been installed.

8. Check the valve to ensure it functions properly.

**Version with welding ends**

1. Proceed as described for Version with flanges (steps 1 to 3).

Completely retract the actuator stem to protect the plug from sparks during welding.

For the version with “stem extends” fail-safe action, apply the signal pressure to the actuator. For the version with “stem retracts” fail-safe action, the valve is open without any signal pressure applied to the actuator.

2. Weld the valve free of stress into the pipeline.

3. Proceed as described for Version with flanges (steps 6 to 8).

### 5.3 Quick check

SAMSON valves are delivered ready for use. To test the valve’s ability to function, the following quick checks can be performed:

**Tight shut-off**

1. Close the valve.
2. Slowly open the shut-off valve in the pipeline.

**NOTICE**

Risk of valve damage due to a sudden pressure increase and resulting high flow velocities.

Slowly open the shut-off valve in the pipeline during start-up.

3. Check the valve for leakage (visual inspection).

**Travel motion**

The movement of the actuator stem must be linear and smooth.

- Open and close the valve, observing the movement of the actuator stem.
- Apply the maximum and minimum control signals to check the end positions of the valve.
- Check the travel reading at the travel indicator scale.
Mounting and start-up

Fail-safe position

- Shut off the signal pressure line.
- Check whether the valve moves to the fail-safe position.

Adjustable packing

**Tip**
A label on the bonnet (2) indicates whether an adjustable packing is installed.

1. Tighten the threaded bushing gradually (by turning it clockwise) until the packing seals the valve.

**NOTICE**
Risk of valve damage due to the threaded bushing tightened too far. Make sure that the plug stem can still move smoothly after the threaded bushing has been tightened.

2. Open and close the valve several times.
3. Check the valve for leakage (visual inspection).
4. Repeat steps 1 and 2 until the packing completely seals the valve.

**Note**
If the adjustable packing does not seal properly, contact SAMSON’s After-sales Service department.

Pressure test

During the pressure test, make sure the following conditions are met:
- Retract the plug stem to open the valve.
- Observe the maximum permissible pressure for valve and plant.

**Note**
The plant operator is responsible for performing the pressure test. SAMSON’s After-sales Service department can support you to plan and perform a pressure test for your plant.
6 Operation

Immediately after completing mounting and start-up (see section 5), the valve is ready for use.

**WARNING**
Crush hazard arising from moving parts (actuator and plug stem).
Do not insert hands or fingers into the yoke while the valve is in operation.

**WARNING**
Risk of personal injury when the actuator vents.
Wear eye protection when working in close proximity to the control valve.

**WARNING**
Risk of burn injuries due to hot or cold components and pipelines.
Depending on the process medium, valve components, and pipelines may get very hot or cold and cause burn injuries.
Wear protective clothing and safety gloves.

**NOTICE**
Operation disturbed by a blocked actuator or plug stem.
Do not impede the movement of the actuator or plug stem by inserting objects into their path.

6.1 Working in manual mode

Valves fitted with actuators with a handwheel can be manually closed or opened in case of supply air failure.

⇒ For normal closed-loop operation, move the handwheel to the neutral position.
7 Servicing

The control valve is subject to normal wear, especially at the seat, plug, and packing. Depending on the operating conditions, check the valve at regular intervals to prevent possible failure before it can occur.

**Tip**

SAMSON's After-sales Service department can support you to draw up an inspection plan for your plant.

We recommend removing the valve from the pipeline for service or repair work (see section 9.2).

**DANGER**

Risk of bursting in pressure equipment. Control valves and pipelines are pressure equipment. Improper opening can lead to bursting of the valve.

− Before starting any work on the control valve, depressurize all plant sections concerned as well as the valve.
− Drain the process medium from all the plant sections concerned as well as the valve.
− Wear personal protective equipment.

**WARNING**

Risk of personal injury due to residual process medium in the valve.
While working on the valve, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns. Wear protective clothing, safety gloves, and eyewear.

**WARNING**

Risk of burn injuries due to hot or cold components and pipeline. Valve components and the pipeline may become very hot or cold. Risk of burn injuries.
− Allow components and pipelines to cool down or heat up.
− Wear protective clothing and safety gloves.

**NOTICE**

Risk of valve damage due to incorrect servicing or repair. Service and repair work must only be performed by trained staff.

**NOTICE**

Risk of valve damage due to excessively high or low tightening torques. Observe the specified torques on tightening control valve components. Excessively tightened torques lead to parts wearing out quicker. Parts that are too loose may cause leakage.
Observe the specified tightening torques (\( \text{AB 0100} \)).
Servicing

**NOTICE**
Risk of valve damage due to the use of unsuitable tools.
Only use tools approved by SAMSON (► AB 0100).

**NOTICE**
Risk of valve damage due to the use of unsuitable lubricants.
Only use lubricants approved by SAMSON (► AB 0100).

**Note**
The control valve was checked by SAMSON before it left the factory.
- Certain test results (seat leakage and leak test) certified by SAMSON lose their validity when the valve body or actuator housing is opened.
- The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON’s After-sales Service department.
- Only use original spare parts by SAMSON, which comply with the original specifications.

7.1 Replacing the gasket

**NOTICE**
Risk of control valve damage due to incorrect service or repair.
The gasket can only be replaced when all the following conditions are met:
- The valve size is ≤NPS 4.
- The valve does not have a balanced plug.
- The valve does not have a flow divider.
To replace the gasket in other valve versions, contact SAMSON’s After-sales Service department.

7.1.1 Standard version

1. Remove the actuator from the valve. See associated actuator documentation.
2. Undo the body nuts (14) gradually in a crisscross pattern.
3. Lift the bonnet (2) and plug with plug stem (5) off the body (1).
4. Remove the gasket (17). Carefully clean the sealing faces in the valve body (1) and on the bonnet (2).
5. Insert a new gasket (17) into the body.
6. Place the bonnet (2) onto the body. **Version with V-port plug:** place the bonnet (2) onto the valve body, making sure that the largest V-shaped port of the V-port plug faces toward the valve outlet. See section 5.1.
7. Firmly press the plug (5) into the seat (4). Fasten down the bonnet (2) with the body nuts (14). Tighten the nuts gradual-
Legend for Fig. 5 and Fig. 6

1   Body
2   Bonnet
3   Yoke
4   Seat
5   Plug (with plug stem)
8   Threaded bushing (packing nut)
9   Stem connector nut
10  Lock nut
14  Body nut
15  Packing
17  Body gasket
21  Insulating section
84  Travel indicator scale
92  Castellated nut

A4  Diaphragm
A7  Actuator stem
A8  Ring nut
A10 Spring
A16 Vent plug
A26/27 Stem connector clamps
S   Signal pressure connection

Fig. 5: Standard version of Type 3256 Valve with Type 3271 Actuator
Servicing

ly in a crisscross pattern. Observe tightening torques.


9. Adjust lower or upper signal bench range. See associated actuator documentation.

7.1.2 Version with insulating section or bellows seal

1. Remove the actuator from the valve. See associated actuator documentation.

2. Undo the body nuts (14) gradually in a crisscross pattern.

3. Lift the insulating section (21) or bellows seal (22) and plug with plug stem (5) off the body (1).

4. Remove the gasket (17). Carefully clean the sealing faces in the valve body (1) and on the insulating section (21) or bellows seal (22).

5. Insert a new gasket (17) into the body.

6. Place the insulating section (21) or bellows seal (22) onto the body.

**Version with V-port plug:** place the insulating section (21) or bellows seal (22) onto the valve body, making sure that the largest V-shaped port of the V-port plug faces toward the valve outlet. See section 5.1.

7. Firmly press the plug (5) into the seat (4). Fasten down the insulating section (21) or bellows seal (22) with the body nuts (14). Tighten the nuts gradually in a crisscross pattern.

**Fig. 6:** Type 3256 with insulating section
crisscross pattern. Observe tightening torques.


9. Adjust lower or upper signal bench range. See associated actuator documentation.

7.2 Replacing the packing

**NOTICE**

Risk of control valve damage due to incorrect service or repair.
The packing can only be replaced when all the following conditions are met:
- The valve size is ≤ NPS 4.
- The valve does not have a balanced plug.
- The valve does not have a bellows seal.
- The standard or ADSEAL packing is installed in the valve.

To replace the packing in other valve versions, contact SAMSON's After-sales Service department.

7.2.1 Standard version

Standard packing (PTFE)

1. Remove the actuator from the valve. See associated actuator documentation.
2. Unscrew the castellated nut (92) and lift the yoke (3) off the bonnet (2).
3. Undo the body nuts (14) gradually in a crisscross pattern.
4. Lift the bonnet (2) and plug with plug stem (5) off the body (1).
5. Unthread the stem connector nut (9) and lock nut (10) from the plug stem.
6. Unscrew the threaded bushing (8).
7. Pull the plug with plug stem (5) out of the bonnet (2).
8. Pull all the packing parts out of the packing chamber using a suitable tool.
9. Renew damaged parts. Clean the packing chamber thoroughly.
10. Apply a suitable lubricant to all the packing parts and to the plug stem (5).
11. Slide the plug with plug stem (5) into the bonnet (2).
12. Place the bonnet (2) together with the plug stem and plug (5) onto the body.
   **Version with V-port plug:** place the bonnet (2) onto the valve body, making sure that the largest V-shaped port of the V-port plug faces toward the valve outlet. See section 5.1.
13. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see Fig. 7).
14. Firmly press the plug (5) into the seat (4). Fasten down the bonnet (2) with the body nuts (14). Tighten the nuts gradually in a crisscross pattern. Observe tightening torques.
15. Screw in the threaded bushing (8) and tighten it. Observe tightening torques.
16. Place yoke (3) on the bonnet (2) and fasten tight using the castellated nut (92).
17. Loosely screw the lock nut (10) and stem connector nut (9) onto the plug stem.

19. Adjust lower or upper signal bench range. See associated actuator documentation.

**ADSEAL packing**

1. Proceed as described in Standard packing (PTFE), steps 1 to 12.

2. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see Fig. 8).

3. Slide the seals (15.2) over the plug stem.

4. Insert the wire of the red spacer ring (15.1) into the groove of the retaining ring.

5. Slide the retaining ring over the plug stem.

4. Insert the red spacer ring (15.1) between the threaded bushing (8) and retaining ring. See Fig. 8.

5. Proceed as described in Standard packing (PTFE), steps 14 to 19.

---

**Fig. 7:** Standard packing: NPS ½ to 1½ (left) and NPS 2 to 4 (right)

- 8 Threaded bushing
- 11 Spring
- 12 Washer
- 16 Packing ring
- 19 Spacer
7.2.2 Version with insulating section

Standard packing (PTFE)

1. Remove the actuator from the valve. See associated actuator documentation.
2. Unscrew the castellated nut (92) and lift the yoke (3) off the insulating section (21).
3. Undo the body nuts (14) gradually in a crisscross pattern.
4. Lift the insulating section (21) and plug with plug stem (5) off the body (1).
5. Unthread the stem connector nut (9) and lock nut (10) from the plug stem.
6. Unscrew the threaded bushing (8).
7. Pull the plug with plug stem (5) out of the insulating section (21).
8. Pull all the packing parts out of the packing chamber using a suitable tool.
9. Renew the damaged parts and carefully clean the packing chamber.
10. Apply a suitable lubricant to all the packing parts and to the plug stem (5).
11. Slide the plug with plug stem (5) into the insulating section (21).
12. Place the insulating section (21) together with the plug stem and plug (5) onto the body.

**Version with V-port plug:** place the insulating section (21) onto the valve body, making sure that the largest V-shaped port of the V-port plug faces toward the valve outlet. See section 5.1.

13. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see Fig. 7).
14. Firmly press the plug (5) into the seat (4). Fasten down the insulating section (21) with the body nuts (14). Tighten the nuts gradually in a crisscross pattern. Observe tightening torques.
15. Screw in the threaded bushing (8) and tighten it. Observe tightening torques.
16. Place yoke (3) on the insulating section (21) and fasten tight using the castellated nut (92).
17. Loosely screw the lock nut (10) and stem connector nut (9) onto the plug stem.
19. Adjust lower or upper signal bench range. See associated actuator documentation.

**ADSEAL packing**
1. Proceed as described in Standard packing (PTFE), steps 1 to 12.
2. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see Fig. 8).
3. Slide the seals (15.2) over the plug stem. Insert the wire of the red spacer ring (15.1) into the groove of the retaining ring. Slide the retaining ring over the plug stem.
4. Insert the red spacer ring (15.1) between the threaded bushing (8) and retaining ring. See Fig. 8.
5. Proceed as described in Standard packing (PTFE), steps 14 to 19.

### 7.3 Replacing the seat and plug

**NOTICE**

*Risk of control valve damage due to incorrect service or repair.*

Seat and plug can only be replaced when all the following conditions are met:
- The valve size is ≤NPS 4.
- The valve does not have a balanced plug.
- The valve does not have a bellows seal.
Servicing

− The valve does not have a flow divider.
− The valve does not have a AC trim.
− The standard or ADSEAL packing is installed in the valve.

To replace seat and plug in other valve versions, contact SAMSON's After-sales Service department.

---

⚠️ NOTICE

Risk of damage to the facing of the seat and plug due to incorrect service or repair. Always replace both the seat and plug.

---

💡 Tip

When replacing the seat and plug, we also recommend replacing the packing. See section 7.2.

---

7.3.1 Standard version

1. Remove the actuator from the valve. See associated actuator documentation.
2. Unscrew the castellated nut (92) and lift the yoke (3) off the bonnet (2).
3. Undo the body nuts (14) gradually in a crisscross pattern.
4. Lift the bonnet (2) and plug with plug stem (5) off the body (1).
5. Replace the gasket as described in section 7.1.1.
6. Unthread the stem connector nut (9) and lock nut (10) from the plug stem.
7. Unscrew the threaded bushing (8).
8. Pull the plug with plug stem (5) out of the bonnet (2).
9. Pull all the packing parts out of the packing chamber using a suitable tool.
10. Make sure that the guide bushing (7) is not damaged. If necessary, replace the guide bushing using a suitable tool.
11. Unscrew the seat (4) using a suitable tool.
12. Apply a suitable lubricant to the thread and the sealing cone of the new seat.
14. Apply a suitable lubricant to all the packing parts and to the new plug stem (5). We recommend replacing the packing as well. See section 7.2.1.
15. Slide the new plug with plug stem (5) into the bonnet (2).
16. Place the bonnet (2) together with the plug stem and plug (5) onto the body (1).
17. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see Fig. 7).
18. Firmly press the plug (5) into the seat (4). Fasten down the bonnet (2) with the body nuts (14). Tighten the nuts gradual-
Servicing

ly in a crisscross pattern. Observe tightening torques.

19. Screw in the threaded bushing (8) and tighten it. Observe tightening torques.

20. Place yoke (3) on the bonnet (2) and fasten tight using the castellated nut (92).

21. Loosely screw the lock nut (10) and stem connector nut (9) onto the plug stem.


23. Adjust lower or upper signal bench range. See associated actuator documentation.

7.3.2 Version with insulating section

1. Remove the actuator from the valve. See associated actuator documentation.

2. Unscrew the castellated nut (92) and lift the yoke (3) off the insulating section (21).

3. Undo the body nuts (14) gradually in a crisscross pattern.

4. Lift the insulating section (21) together with the plug stem and plug (5) off the body (1).

5. Replace the gasket as described in section 7.1.2.

6. Unthread the stem connector nut (9) and lock nut (10) from the plug stem (5).

7. Unscrew the threaded bushing (8).

8. Pull the plug with plug stem (5) out of the insulating section (21).

9. Pull all the packing parts out of the packing chamber using a suitable tool.

10. Make sure that the guide bushing (7) is not damaged. If necessary, replace the guide bushing using a suitable tool.

11. Unscrew the seat (4) using a suitable tool.

12. Apply a suitable lubricant to the thread and the sealing cone of the new seat.


14. Apply a suitable lubricant to all the packing parts and to the new plug stem (5). We recommend replacing the packing as well. See section 7.2.2.

15. Slide the new plug with plug stem (5) into the insulating section (21).

16. Place the insulating section (21) together with the plug stem and plug (5) onto the body (1).

**Version with V-port plug:** place the insulating section (21) onto the valve body, making sure that the largest V-shaped port of the V-port plug faces toward the valve outlet. See section 5.1.

17. Carefully slide the packing parts over the plug stem extension into the packing chamber using a suitable tool. Observe the proper sequence (see Fig. 7).

18. Firmly press the plug (5) into the seat (4). Fasten down the insulating section (21) with the body nuts (14). Tighten the nuts gradually in a crisscross pattern. Observe tightening torques.
19. Screw in the threaded bushing (8) and tighten it. Observe tightening torques.
20. Place yoke (3) on the insulating section (21) and fasten tight using the castellated nut (92).
21. Loosely screw the lock nut (10) and stem connector nut (9) onto the plug stem.
23. Adjust lower or upper signal bench range. See associated actuator documentation.

7.4 Preparation for return shipment

Defective valves can be returned to SAMSON for repair.
Proceed as follows to return valves to SAMSON:

1. Put the control valve out of operation (see section 9).
2. Decontaminate the valve. Remove any residual process medium.
3. Fill in the Declaration on Contamination, which can be downloaded from our website at www.samson.de > Services > Check lists for after sales service > Declaration on Contamination.
4. Send the valve together with the filled-in form to your nearest SAMSON subsidiary. SAMSON subsidiaries are listed on our website at www.samson.de > Contact.

7.5 Ordering spare parts and operating supplies

Contact your nearest SAMSON subsidiary or the SAMSON After-sales Service department for information on spare parts, lubricants, and tools.

Spare parts
See section 10.3 for details on spare parts.

Lubricant
Details on suitable lubricants can be found in the document ▶ AB 0100.

Tools
Details on suitable tools can be found in the document ▶ AB 0100.
8 Malfunctions

Depending on the operating conditions, check the valve at certain intervals to prevent possible failure before it can occur. Operators are responsible for drawing up an inspection plan.

Tip

SAMSON’s After-sales Service department can support you to draw up an inspection plan for your plant.

8.1 Troubleshooting

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible reasons</th>
<th>Recommended action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator or plug stem does not move on demand.</td>
<td>Actuator is blocked.</td>
<td>Check attachment. Unblock the actuator.</td>
</tr>
<tr>
<td></td>
<td>Signal pressure too low</td>
<td>Check the signal pressure. Check the signal pressure line for leakage.</td>
</tr>
<tr>
<td>Actuator or plug stem does not move through the range.</td>
<td>Signal pressure too low</td>
<td>Check the signal pressure. Check the signal pressure line for leakage.</td>
</tr>
<tr>
<td>The valve leaks to the atmosphere (fugitive emissions).</td>
<td>The packing is defective.</td>
<td>Replace packing (see section 7.2) or contact SAMSON’s After-sales Service department.</td>
</tr>
<tr>
<td>Version with adjustable packing 1): packing not tightened correctly.</td>
<td></td>
<td>See section 5.3, Adjustable packing. Contact SAMSON's After-sales Service department when it continues to leak.</td>
</tr>
<tr>
<td>Version with bellows seal: the metal bellows seal is defective.</td>
<td></td>
<td>Contact SAMSON’s After-sales Service department.</td>
</tr>
<tr>
<td>Flange joint loose or gasket worn out.</td>
<td></td>
<td>Check the flange joint. Replace gasket at the flanged joint (see section 7.1 or contact SAMSON’s After-sales Service department).</td>
</tr>
</tbody>
</table>
Malfunctions

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible reasons</th>
<th>Recommended action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased flow through closed valve (seat leakage)</td>
<td>Dirt or other foreign particles deposited between the seat and plug.</td>
<td>Shut off the section of the pipeline and flush the valve.</td>
</tr>
<tr>
<td></td>
<td>Valve trim, particularly with soft seat, is worn.</td>
<td>Replace seat and plug (see section 7.3 or contact SAMSON's After-sales Service department).</td>
</tr>
</tbody>
</table>

1) A label on the bonnet (2) indicates whether an adjustable packing is installed.

**Note**

Contact SAMSON's After-sales Service department for malfunctions not listed in the table.

### 8.2 Emergency action

Upon supply air or control signal failure, the valve moves to its fail-safe position (see section 3.1).

The plant operator is responsible for emergency action to be taken in the plant.

In the event of a valve malfunction:

1. Close the shut-off valves upstream and downstream of the control valve to stop the process medium from flowing through the valve.
2. Check the valve for damage. If necessary, contact SAMSON's After-sales Service department.

Putting the valve back into operation after a malfunction

> Slowly open the shut-off valves. Allow the process medium to slowly flow into the valve.
9 Decommissioning and disassembly

⚠️ DANGER
Risk of bursting in pressure equipment. Control valves and pipelines are pressure equipment. Improper opening can lead to bursting of the valve.
- Before starting any work on the control valve, depressurize all plant sections concerned as well as the valve.
- Drain the process medium from all the plant sections concerned as well as the valve.
- Wear personal protective equipment.

⚠️ WARNING
Risk of personal injury due to residual process medium in the valve. While working on the valve, residual process medium can escape and, depending on its properties, may lead to personal injury, e.g. (chemical) burns. Wear protective clothing, safety gloves, and eyewear.

⚠️ WARNING
Risk of burn injuries due to hot or cold components and pipeline. Valve components and the pipeline may become very hot or cold. Risk of burn injuries.
- Allow components and pipelines to cool down or heat up.
- Wear protective clothing and safety gloves.

9.1 Decommissioning
To decommission the control valve for service and repair work or disassembly, proceed as follows:
1. Close the shut-off valves upstream and downstream of the control valve to stop the process medium from flowing through the valve.
2. Completely drain the pipelines and valve.
3. Disconnect and lock the pneumatic air supply to depressurize the actuator.
4. If necessary, allow the pipeline and valve components to cool down or heat up.

9.2 Removing the valve from the pipeline
1. Put the control valve out of operation (see section 9.1).
2. Unbolt the flange joint.
3. Remove the valve from the pipeline (see section 4.2).

9.3 Removing the actuator from the valve
See associated actuator documentation.

9.4 Disposal
→ Observe local, national, and international refuse regulations.
→ Do not dispose of components, lubricants, and hazardous substances together with your other household waste.
10 Annex

10.1 After-sales service

Contact SAMSON's After-sales Service department for support concerning service or repair work or when malfunctions or defects arise.

E-mail

You can reach the After-sales Service Department at aftersalesservice@samson.de.

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives, and service facilities worldwide can be found on the SAMSON website, in all SAMSON product catalogs or on the back of these Mounting and Operating Instructions.

Required specifications

Please submit the following details:

- Order number and position number in the order
- Type, model number, nominal size, and valve version
- Pressure and temperature of the process medium
- Flow rate in cu.ft/min or m³/h
- Bench range of the actuator (e.g. 0.2 to 1 bar)
- Is a strainer installed?
- Installation drawing

10.2 Certificates

The declaration of conformity is provided on the next page.
SAMSON erklärt in alleiniger Verantwortung für folgende Produkte:

<table>
<thead>
<tr>
<th>Geräte/Devices</th>
<th>Bauart/Series</th>
<th>Typ/Type</th>
<th>Ausführung/Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durchgangsventil/Globe Valve</td>
<td>240</td>
<td>3241</td>
<td>DIN, Gehäuse GG ab DN150, Fluide Fluids G2, L1, L2</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way Valve</td>
<td>240</td>
<td>3244</td>
<td>DIN, Gehäuse GG ab DN150, Fluide Fluids G2, L1, L2</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way Valve</td>
<td>250</td>
<td>3253</td>
<td>DIN/ANSI, Gehäuse Stahl u.a. Body Steel etc., alle Fluids/all Fluids</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way Valve</td>
<td>250</td>
<td>3254</td>
<td>DIN/ANSI, Gehäuse Stahl u.a. Body Steel etc., alle Fluids/all Fluids</td>
</tr>
<tr>
<td>Split-Body-Ventil/Split-Body-Valve</td>
<td>250</td>
<td>3255</td>
<td>DIN/ANSI, Gehäuse Stahl u.a. Body Steel etc., alle Fluids/all Fluids</td>
</tr>
<tr>
<td>Dampfumformventil/Steam-converting Valve</td>
<td>280</td>
<td>3281</td>
<td>DIN/ANSI, alle Fluids/all Fluids</td>
</tr>
<tr>
<td>Dampfumformventil/ Steam-converting Valve</td>
<td>280</td>
<td>3284</td>
<td>DIN/ANSI, alle Fluids/all Fluids</td>
</tr>
<tr>
<td>Dampfumformventil/ Steam-converting Valve</td>
<td>280</td>
<td>3288</td>
<td>DIN, alle Fluids/all Fluids</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way Valve</td>
<td>V2001</td>
<td>3321</td>
<td>DIN, Gehäuse Stahl u.a. Body Steel etc., alle Fluids/all Fluids</td>
</tr>
<tr>
<td>Dreieckventil/Angle Valve</td>
<td>V2001</td>
<td>3323</td>
<td>DIN, Gehäuse Stahl u.a. Body Steel etc., alle Fluids/all Fluids</td>
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<tr>
<td>Schrägsitzventil/Bevel-Valve</td>
<td>—</td>
<td>3353</td>
<td>DIN, Gehäuse Body Steel, alle Fluids/all Fluids</td>
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<tr>
<td>Drossel- und Druckläufer/Silencer</td>
<td>3381</td>
<td>3381-1</td>
<td>DIN/ANSI, alle Fluids/all Fluids, Einzeldrosselscheibe mit Anschweißende/Single attenuation plate with welding end</td>
</tr>
<tr>
<td>Drossel- und Druckläufer/Silencer</td>
<td>3381</td>
<td>3381-3</td>
<td>DIN/ANSI, alle Fluids/all Fluids</td>
</tr>
<tr>
<td>Drossel- und Druckläufer/Silencer</td>
<td>3381</td>
<td>3381-4</td>
<td>DIN/ANSI, alle Fluids/all Fluids, Einzeldrosselscheibe mit Anschweißende/Single attenuation plate multi-stage with welding end</td>
</tr>
<tr>
<td>Durchgangsventil/Globe Valve</td>
<td>240</td>
<td>3241</td>
<td>ANSI/ASME B16.34; DIN/ANSI, Gehäuse GG Cl125 ab 5&quot;, Fluide Fluids G2, L1, L2</td>
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<tr>
<td>Dreiwegeventil/Three-way Valve</td>
<td>250</td>
<td>3253</td>
<td>ANSI, Gehäuse GG ab DN200 PN16, Fluide Fluids G2, L1, L2</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way Valve</td>
<td>250</td>
<td>3254</td>
<td>ANSI, alle Fluids/all Fluids</td>
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<td>Dreiwegeventil/Three-way Valve</td>
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<td>3259</td>
<td>ANSI, alle Fluids/all Fluids</td>
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<td>3291</td>
<td>ANSI, alle Fluids/all Fluids</td>
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<tr>
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<td>590</td>
<td>3991</td>
<td>ANSI, alle Fluids/all Fluids</td>
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<tr>
<td>Dreieckventil/Angle Valve</td>
<td>590</td>
<td>3996</td>
<td>ANSI, alle Fluids/all Fluids</td>
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<tr>
<td>Regelventil/Control valve</td>
<td>—</td>
<td>3995</td>
<td>ANSI, NPS 4 Cl 900 und NPS 12 Cl 600, alle Fluids/all Fluids</td>
</tr>
</tbody>
</table>

Die Konformität mit folgenden Anforderungen wird durch die nachfolgende Stelle überwacht:

Bureau Veritas S. A. Nr./No. 0062 67/71, Boulevard du Château, 92200 Neuilly-sur-Seine, France

Angewandte technische Spezifikation/Technical Standards applied:
- DIN EN12516-2
- DIN EN12516-3
- ASME B16.34

Das Qualitätsicherungssystem des Herstellers wird von folgender benannten Stelle überwacht:

Bureau Veritas S. A. Nr./No. 0062 67/71, Boulevard du Château, 92200 Neuilly-sur-Seine, France

Angewandtes Konformitätsbewertungsverfahren für Fluide nach Art. 4 Abs. 1/ Applied Conformity Assessment Procedure for fluids according to Article 4(1)
- Modul H/Module H

Das Qualitätssicherungssystem des Herstellers wurde von folgender benannten Stelle überwacht:

Bureau Veritas S. A. Nr./No. 0062 67/71, Boulevard du Château, 92200 Neuilly-sur-Seine, France

Angewandtes Konformitätsbewertungsverfahren für Fluide nach Art. 4 Abs. 1/ Applied Conformity Assessment Procedure for fluids according to Article 4(1)
- Modul H/Module H

Das Qualitätssicherungssystem des Herstellers wurde von folgender benannten Stelle überwacht:

Bureau Veritas S. A. Nr./No. 0062 67/71, Boulevard du Château, 92200 Neuilly-sur-Seine, France
## 10.3 Spare parts

<table>
<thead>
<tr>
<th>Number</th>
<th>Part</th>
<th>Number</th>
<th>Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>45</td>
<td>Packing ring ¹)</td>
</tr>
<tr>
<td>2</td>
<td>Bonnet</td>
<td>46</td>
<td>Gasket ¹)</td>
</tr>
<tr>
<td>3</td>
<td>Yoke</td>
<td>47</td>
<td>Support ¹)</td>
</tr>
<tr>
<td>4</td>
<td>Seat</td>
<td>48</td>
<td>Hexagon screw ¹)</td>
</tr>
<tr>
<td>5</td>
<td>Plug</td>
<td>49</td>
<td>Hexagon screw ¹)</td>
</tr>
<tr>
<td>6</td>
<td>Bellows nut</td>
<td>50</td>
<td>Lock ¹)</td>
</tr>
<tr>
<td>7</td>
<td>Guide bushing</td>
<td>51</td>
<td>Guide ¹) (several guides only for version with graphite seal)</td>
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<tr>
<td>8</td>
<td>Threaded bushing (packing nut)</td>
<td>52</td>
<td>Ring ¹) (only for version with graphite seal)</td>
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<td>9</td>
<td>Stem connector nut</td>
<td>53</td>
<td>Snap ring ¹)</td>
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<tr>
<td>10</td>
<td>Lock nut</td>
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<tr>
<td>11</td>
<td>Spring</td>
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<td>12</td>
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<td>13</td>
<td>Stud bolt</td>
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<td>14</td>
<td>Body nut</td>
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<td>15</td>
<td>Packing</td>
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<td>16</td>
<td>V-ring packing</td>
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<td>17</td>
<td>Body gasket</td>
<td>61</td>
<td>Flow divider ST 2 ²)</td>
</tr>
<tr>
<td>19</td>
<td>Bushing</td>
<td>62</td>
<td>Flow divider ST 1 or ST 3 ²)</td>
</tr>
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<td>21</td>
<td>Insulating section</td>
<td>63</td>
<td>Ring ²)</td>
</tr>
<tr>
<td>22</td>
<td>Bellows seal</td>
<td>64</td>
<td>Gasket ²)</td>
</tr>
<tr>
<td>24</td>
<td>Guide bushing</td>
<td>65</td>
<td>Gasket ²)</td>
</tr>
<tr>
<td>26</td>
<td>Label (bellows seal or insulating section)</td>
<td>80</td>
<td>Nameplate</td>
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<tr>
<td>27</td>
<td>Flange</td>
<td>81</td>
<td>Grooved pin</td>
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<td>28</td>
<td>Clamping ring</td>
<td>82</td>
<td>Screw</td>
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<tr>
<td>29</td>
<td>Plug for version with bellows seal</td>
<td>83</td>
<td>Hanger</td>
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<td>30</td>
<td>Retaining washers</td>
<td>84</td>
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<td>Nut</td>
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<td>Plug stem with metal bellows</td>
<td>93</td>
<td>Expansion sleeve</td>
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<td>Gasket</td>
<td>94</td>
<td>Expansion sleeve ³)</td>
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<td>Screw plug</td>
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<td>Bellows bonnet</td>
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<td>Gasket</td>
<td>102</td>
<td>Screw with snap ring ¹)</td>
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<td>44</td>
<td>Ring/ring nut ¹)</td>
<td>¹)</td>
<td>Version with balanced valve plug</td>
</tr>
<tr>
<td>¹)</td>
<td></td>
<td>²)</td>
<td>Version with flow divider</td>
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<td>³)</td>
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<td>For NPS ½ to 6 only</td>
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