Translation of original instructions

Type 3253 Valve · DIN 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 3253 Three-way Valve in combination with an actuator, e.g. Type 3271 or Type 3277 Pneumatic Actuator, is designed as a mixing or diverting valve for use in process engineering applications with high industrial requirements. 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 operating conditions 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 device 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 by 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 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 of 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 specified hazard statements, warnings and caution notes. 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 an EU declaration of conformity, which includes information about the applied conformity assessment procedure. This EU 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 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.
Valves and pipelines are pressure equipment. Improper opening can lead to valve components bursting.

- Before starting any work on the 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.
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).
2 Markings on the device

2.1 Valve nameplate

Fig. 1: Valve nameplate

1…5 PED (Pressure Equipment Directive), "Art. 4, Abs. 3"
   ID of the notified body, fluid group and category
   6 Type designation
   8 Material
   9 Year of manufacture
   10 Valve size:
      DIN: DN · ANSI: NPS · JIS: DN … A/B
   11 Pressure rating:
      DIN: PN · ANSI: CL · JIS: K
   12 Order no. with modification index
      For after-sales service orders: AA prefix
   13 Position in order
      For after-sales service orders: configuration ID
   14 Flow coefficient:
      DIN: $K_v$ · ANSI: $C_v$ · JIS: $C_v$
   15 Characteristic:
      Lin: linear
   16 Seat-plug seal:
      ME: metal (see section 3.3)
      HA: carbide metal
      ST: Stellite® facing
   17 Seat code (trim material) · On request
   18 Version:
      Mixing valve: M · Diverting valve: V
   20 Country of origin
Markings on the device

The valve nameplate (80) is affixed to the bonnet (see Fig. 2).

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 3253 is a three-way valve which can be used either as a mixing or diverting valve. The design of the mixing and diverting valves in sizes DN 15 to 25 is identical. The Type 3253 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 two seats (4), plug (5) and plug stem (36) are installed in the body (1). The plug stem is connected to the actuator stem (A7) by the stem connector clamps (A26/27) and is sealed by a 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 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 seats changes and determines the flow rate through the valve.

In mixing valves, the process media to be mixed enter at valve ports A and B. The combined flow exits the valve at port AB (see Fig. 3).

In diverting valves, the process medium enters at the valve port AB and the partial flows exit at ports A and B (see Fig. 4).

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. In mixing valves, port B

---

**Legend for Fig. 3 and Fig. 4**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th></th>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>15</td>
<td>Packing</td>
<td>A8</td>
</tr>
<tr>
<td>2</td>
<td>Bonnet</td>
<td>17</td>
<td>Body gasket</td>
<td>A10</td>
</tr>
<tr>
<td>4</td>
<td>Seat</td>
<td>20</td>
<td>Seat body</td>
<td>A26/27</td>
</tr>
<tr>
<td>5</td>
<td>Plug</td>
<td>36</td>
<td>Plug stem</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Threaded bushing (packing nut)</td>
<td>60</td>
<td>Yoke assembly</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Lock nut</td>
<td>92</td>
<td>Castellated nut</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Nuts</td>
<td>225</td>
<td>Nut</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A4</td>
<td>Diaphragm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A7</td>
<td>Actuator stem</td>
<td></td>
</tr>
</tbody>
</table>
Fig. 3: Type 3253 Valve (as mixing valve) with Type 3271 Pneumatic Actuator

Fig. 4: Type 3253 Valve (as diverting valve)
Design and principle of operation

is closed. In diverting valves, port A is closed. The valve ports B or A respectively are opened against the force of the compression springs when the signal pressure increases.

**Actuator stem retracts (FE)**

When the signal pressure is reduced or the air supply fails, the springs move the actuator stem upward. In mixing valves, port B is opened. In diverting valves, port A is opened. The valve ports B or A respectively are closed against the force of the compression springs when the signal pressure increases.

> 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.

**Anti-rotation fixture**

An optional anti-rotation fixture is available. It is mounted to the actuator/plug stem to protect the plug against damage caused by rotation.

### 3.3 Technical data

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

**Note**

More information is available in Data Sheet T 8055.

**Noise emission**

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

⚠️ WARNING

Risk of hearing loss or deafness due to loud noise.
Wear hearing protection when working near the valve.

Table 1: Technical data

<table>
<thead>
<tr>
<th>Material</th>
<th>Cast iron EN-GJL-250</th>
<th>Cast steel 1.0619</th>
<th>Cast steel 1.7357</th>
<th>Cast stainless steel 1.4408</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve size ¹)</td>
<td>DN 150 to 200</td>
<td>15 to 100</td>
<td>15 to 300</td>
<td>15 to 100</td>
</tr>
<tr>
<td>Nominal pressure ¹)</td>
<td>PN 16</td>
<td>16 to 160</td>
<td>16 to 160</td>
<td>16 to 160</td>
</tr>
<tr>
<td>Type of connection</td>
<td>Flanges</td>
<td>All DIN EN versions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seat-plug seal</td>
<td></td>
<td>Metal seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td></td>
<td>Linear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rangeability</td>
<td></td>
<td>50 : 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature ranges in °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body without insulating section</td>
<td>-10 to +220 °C</td>
<td>Up to +350 °C with high-temperature packing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body with insulating section or bellows seal</td>
<td>-10 to +300</td>
<td>-10 to +400</td>
<td>-10 to +500</td>
<td>-196 to +550</td>
</tr>
<tr>
<td>Valve plug</td>
<td></td>
<td>Metal seal</td>
<td></td>
<td>-196 to +550</td>
</tr>
<tr>
<td>Leakage class according to IEC 60534-4</td>
<td></td>
<td></td>
<td></td>
<td>≤ 0.05 % of Kᵥ₅ coefficient</td>
</tr>
<tr>
<td>Compliance</td>
<td></td>
<td>CE · EAC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹) Up to PN 400 on request · DN 400: PN 16 to 40 · DN 500: PN 16 to 40
Design and principle of operation

Dimensions and weights

Table 2 to Table 4 provide a summary of the dimensions and weights of the standard version of Type 3253 Valve. The lengths and heights in the dimensional drawings are shown on p. 19.

Dimensions in mm · Weights in kg

Table 2: Dimensions of Type 3253 Three-way Valve · DN 15 to 150

<table>
<thead>
<tr>
<th>Valve</th>
<th>DN</th>
<th>15</th>
<th>25</th>
<th>40</th>
<th>50</th>
<th>80</th>
<th>100</th>
<th>150</th>
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</thead>
<tbody>
<tr>
<td>Length L</td>
<td>PN 10 to 40</td>
<td>130</td>
<td>160</td>
<td>200</td>
<td>230</td>
<td>310</td>
<td>350</td>
<td>480</td>
</tr>
<tr>
<td></td>
<td>PN 63 to 160</td>
<td>210</td>
<td>230</td>
<td>260</td>
<td>300</td>
<td>380</td>
<td>430</td>
<td>550</td>
</tr>
<tr>
<td>Height H4</td>
<td>PN 10 to 40</td>
<td>152</td>
<td>152</td>
<td>164</td>
<td>217</td>
<td>222</td>
<td>242</td>
<td>315</td>
</tr>
<tr>
<td></td>
<td>PN 63 to 160</td>
<td>186</td>
<td>186</td>
<td>195</td>
<td>251</td>
<td>288</td>
<td>348</td>
<td>445</td>
</tr>
<tr>
<td></td>
<td>PN 250 to 400</td>
<td>350 cm²</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td></td>
<td>700 cm²</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1400-60 cm²</td>
<td>295</td>
<td>295</td>
<td>295</td>
<td>418</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>1400-120 cm²</td>
<td>480</td>
<td>480</td>
<td>480</td>
<td>503</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2800 cm²</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H8 for actuator</td>
<td>PN 10 to 40</td>
<td>115</td>
<td>115</td>
<td>130</td>
<td>230</td>
<td>275</td>
<td>305</td>
<td>480</td>
</tr>
<tr>
<td></td>
<td>PN 63 to 160</td>
<td>115</td>
<td>115</td>
<td>130</td>
<td>275</td>
<td>310</td>
<td>370</td>
<td>535</td>
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<tr>
<td></td>
<td>PN 250 to 320</td>
<td>140</td>
<td>On request</td>
<td>587</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>PN 400</td>
<td>On request</td>
<td>457</td>
<td>626</td>
<td></td>
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</table>

Table 3: Dimensions of Type 3253 Three-way Valve · DN 200 to 500

<table>
<thead>
<tr>
<th>Valve</th>
<th>DN</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>400</th>
<th>500</th>
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<tbody>
<tr>
<td>Length L</td>
<td>PN 10 to 40</td>
<td>600</td>
<td>730</td>
<td>850</td>
<td>1100</td>
<td>1250</td>
</tr>
<tr>
<td></td>
<td>PN 63 to 160</td>
<td>650</td>
<td>775</td>
<td>900</td>
<td>1150 1)</td>
<td>1400 2)</td>
</tr>
<tr>
<td>Height H4</td>
<td>PN 10 to 40</td>
<td>389</td>
<td>441</td>
<td>637</td>
<td>637</td>
<td>735</td>
</tr>
<tr>
<td></td>
<td>PN 63 to 160</td>
<td>518</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>PN 250 to 400</td>
<td>544</td>
<td>699</td>
<td>811</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
### Design and principle of operation

<table>
<thead>
<tr>
<th>Valve</th>
<th>DN</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>400</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8 for actuator</td>
<td>350 cm²</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>700 cm²</td>
<td>418</td>
<td>418</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1400-60 cm²</td>
<td>418</td>
<td>418</td>
<td>503</td>
<td>503</td>
<td>503</td>
</tr>
<tr>
<td></td>
<td>1400-120 cm²</td>
<td>503</td>
<td>503</td>
<td>650</td>
<td>650</td>
<td>650</td>
</tr>
<tr>
<td></td>
<td>2800 cm²</td>
<td>503</td>
<td>3)</td>
<td>650</td>
<td>650</td>
<td>650</td>
</tr>
<tr>
<td>H2 (approx.)</td>
<td>PN 10 to 40</td>
<td>520</td>
<td>595</td>
<td>740</td>
<td>830</td>
<td>982</td>
</tr>
<tr>
<td></td>
<td>PN 63 to 160</td>
<td>590</td>
<td>730</td>
<td>790</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PN 250 to 320</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>PN 400</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
</tr>
</tbody>
</table>

1) DN 400, up to PN 63
2) DN 500, up to PN 40
3) H8 = 650 mm with 250 mm seat bore

### Table 4: Weights for Type 3253 Three-way Valve

<table>
<thead>
<tr>
<th>Valve</th>
<th>DN</th>
<th>15</th>
<th>25</th>
<th>40</th>
<th>50</th>
<th>80</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>400</th>
<th>500</th>
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</thead>
<tbody>
<tr>
<td>Valve without actuator</td>
<td>PN 10 to 40</td>
<td>-</td>
<td>-</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>PN 63 to 160</td>
<td>32</td>
<td>37</td>
<td>50</td>
<td>93</td>
<td>129</td>
<td>165</td>
<td>365</td>
<td>On request</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PN 250 to 400</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Dimensional drawing

- **H8**
- **H4**

**Standard version of Type 3253**

### Note

For more dimensions and weights refer to the Data Sheet T 8055.

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 with 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

**Note**

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.

**Notice**

Risk of valve damage due to foreign particles entering the valve.
The protective caps fitted on the valve’s inlet and outlet prevent foreign particles from entering the valve and damaging it. Do not remove the protective caps until immediately before installing the valve into the pipeline.

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 8055 for weights.

**Warning**

Risk of personal injury due to the control valve tipping.
- Observe the valve’s center of gravity.
- Secure the valve against tipping over or turning.

**Notice**

Risk of valve damage due to incorrectly attached slings.
The eyebolt on the actuator is only intended for mounting and removing the actuator as well as lifting the actuator without valve. Do not use this eyebolt to lift the entire control valve assembly.
Measures for preparation

− 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).

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

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).
− Protect the control valve against moisture and dirt.
− The permissible transportation temperature of standard control valves is –20 to +65 °C.

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 eyebolt and rigging equipment (hook, shackle etc.) does not bear any load when lifting valves larger than DN 150. The sling only protects the control valve from tilting while being lifted. Before lifting the control valve, tighten the sling.

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

Lifting the control valve

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. 5).
2. If necessary, attach another sling to the eyebolt 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 5.2.3).
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. 5). 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.

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).
Measures for preparation

− 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.

4.4 Preparation for installation

Proceed as follows:

⇒ Flush the pipelines.

**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 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.

⇒ 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. Proceed as follows to mount and start up the valve.

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.

Versions with V-port plug

Each V-port plug has three V-shaped ports. Depending on the valve size, the size of the symmetrically arranged V-shaped ports varies. The process medium in the valve flows through the V-shaped ports as soon as the plugs are lifted out of the seat (i.e. the valve opens).

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

Tip

Usually, this is the largest V-shaped port.

2. On mounting the actuator, make sure that the V-shaped port of both the top and bottom plug uncovered first is correctly aligned.

Mixing valve: the corresponding V-shaped ports face toward the side valve outlet AB (see Fig. 6).

Diverting valve: the corresponding V-shaped ports face toward the side valve outlet A (see Fig. 6).

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.
Mounting and start-up

− Remove the mounted actuator before mounting the other actuator (see associated actuator documentation).
− 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:

➤ 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.

➤ In heating or cooling applications, the valve can be installed in the flow pipe or return flow pipe (see Fig. 7).

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:

Fig. 6: Alignment of the V-port plug in mixing valves (left) and diverting valves (right)
Mounting and start-up

- Valves in DN 100 and larger
- Valves with insulating section for low temperatures below –10 °C

⇒ 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.

5.2.2 Additional fittings

Strainers

We recommend installing a SAMSON strainer upstream of the valve. We recommend installing a strainer upstream of both valve inlet ports in mixing valves. It prevents solid particles in the process medium from damaging the valve.

Shut-off valves

We recommend installing a shut-off valve both upstream of the strainer and downstream of 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 or above 220 °C.

Do not insulate valves mounted to comply with NACE MR0175 requirements and which have nuts and bolts that are not suitable for sour gas environments.

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.
Mounting and start-up

**Mixing service**
Temperature control \( Q = \text{constant} \)

Fail-safe action: FA = "Actuator stem extends", FE = "Actuator stem retracts"
In heating applications with FA, the heating medium (flow) is shut off in the fail-safe position, in cooling applications with FE, cooling is maintained in the fail-safe position.

**Diverting service**
Flow control \( Q = 0 \text{ to } 100\% \)

Heating with mixing valve (FA) or cooling with mixing valve (FE)
Installation in flow pipe

![Diagram of mixing service installation in flow pipe]

Installation in return flow pipe

![Diagram of mixing service installation in return flow pipe]

Heating with diverting valve (FA) or cooling with diverting valve (FE)
Installation in return flow pipe

![Diagram of diverting service installation in return flow pipe]

Installation in flow pipe

![Diagram of diverting service installation in flow pipe]

Fig. 7: Typical installations
Mounting and start-up

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

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.

**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.

8. Check the valve to ensure it functions properly.

### 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:

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

- Apply the maximum and minimum control signals to check the end positions of the valve while observing the movement of the actuator stem.
- Check the travel reading at the travel indicator scale.

**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:

- Move the plug to the mid-position to open the valve.
- Observe the maximum permissible pressure for valve and plant.
6 Operation

The valve is ready for use when mounting and start-up (see section 5) have been completed.

⚠️ 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 seats, 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 in drawing up an inspection and test plan for your plant.

Danger

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

- Before starting any work on the 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 control valve damage due to incorrect service or repair.
The parts subject to wear can only be replaced when all the following conditions are met:
- Nominal size of the valve is ≤DN 100.
- The valve does not have a balanced plug.
- The valve does not have a flow divider.
- The valve does not have a bellows seal.
- The standard or ADSEAL packing is installed in the valve.
To replace parts subject to wear in other valve versions, contact SAMSON’s After-sales Service department.
Servicing

⚠️ 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.
- We recommend replacing all the parts subject to wear (gasket, packing, seat and plug) at the same time.

⚠️ 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).

⚠️ 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.

Preparing the valve for servicing
- Put the control valve out of operation (see section 9.1).
- Remove the valve from the pipeline (see section 9.2).
7.1 Standard version

7.1.1 Single-piece body
1. Remove the actuator from the valve. See associated actuator documentation.
2. Unscrew the nut (40) from the bottom end of the plug stem while holding the stem connector nut (9) stationary.
3. Remove the bottom plug (5) and sleeves (75) from the plug stem.
4. Unscrew the castellated nut (92) and take the yoke (60) off the bonnet (2).
5. Undo the body nuts (14) gradually in a crisscross pattern.
6. Remove the bonnet (2) and plug stem (36) together with the top plug (5) from the body (1).
7. Remove the gasket (17). Carefully clean the sealing faces in the valve body (1) and on the bonnet (2).
8. Unthread the stem connector nut (9) and lock nut (10) from the plug stem.
9. Unscrew the threaded bushing (8).
10. Pull the plug stem (36) together with the top plug (5) out of the bonnet (2).
11. Pull all the packing parts out of the packing chamber using a suitable tool.
12. Make sure that the guide bushing (7) is not damaged. If necessary, replace the guide bushing using a suitable tool.
13. Unscrew the top plug (5) from the plug stem (36).
14. Unscrew the bottom seat (141) and top seat (4) using a suitable tool.
15. Apply a suitable lubricant to the thread and the sealing cone of the new seats.
16. Screw in the top seat (4) and bottom seat (141). Observe tightening torques.
17. Insert a new gasket (17) into the body.
18. Apply a suitable lubricant to the plug stem (36).

Fig. 8: Single-piece body
Fig. 9: Multi-piece body · Mixing valve with standard bonnet and Type 3271 Pneumatic Actuator
19. Screw the new top plug (5) onto the plug stem (36).
20. Slide the plug stem (36) together with the top plug (5) into the bonnet (2).
21. Place the bonnet (2) and plug stem (36) together with the top plug (5) onto the body (1).
22. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see section 7.3).
23. Firmly press the top plug (5) into the top seat (4) and fasten down the bonnet (2) with the top body nuts (14). Tighten the nuts gradually in a crisscross pattern. Observe tightening torques.
24. Screw in the threaded bushing (8) and tighten it.
25. Loosely screw the lock nut (10) and stem connector nut (9) onto the plug stem.
26. Place the yoke (60) on the bonnet (2) and fasten tight using the castellated nut (92).
27. Place the sleeve (75) and bottom plug (5) onto the plug stem.
28. Tighten the nut (40) at the bottom end of the plug stem while holding the stem connector nut (9) stationary.
29. Mount actuator. See associated actuator documentation.
30. Adjust lower or upper signal bench range. See associated actuator documentation.

7.1.2 Multiple-piece body · Mixing valve

1. Remove the actuator from the valve. See associated actuator documentation.
2. DN 15 to 50: unscrew the nut (225) from the bottom end of the plug stem while holding the stem connector nut (9) stationary.
   DN 65 to 100: unscrew the nut (225) from the bottom end of the plug stem while holding the stem connector nut (9) stationary. Remove the tab washer (224) and ring (230) from end of the plug stem.
3. Remove the sleeve (76) from the plug stem.
4. Undo the bottom body nuts (14) gradually in a crisscross pattern.
5. Remove the seat body (20) from the body (1).
6. Remove the bottom gasket (17). Carefully clean the sealing faces in the valve body (1) and on the seat body (20).
7. Remove the new bottom plug (5), sleeve (75), top plug (5) and sleeve (76) from the plug stem.
8. Unscrew the castellated nut (92) and take the yoke (60) off the bonnet (2).
9. Undo the top body nuts (14) gradually in a crisscross pattern.
10. Remove the bonnet (2) and plug stem (36) from the body (1).
11. Remove the top gasket (17). Carefully clean the sealing faces in the valve body (1) and on the bonnet (2).

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

13. Unscrew the threaded bushing (8).

14. Pull the plug stem (36) out of the bonnet (2).

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

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

17. Unscrew the bottom and top seat (4) using a suitable tool.

18. Apply a suitable lubricant to the thread and the sealing cone of the new seats.

19. Screw in the top and bottom seat (4). Observe tightening torques.

20. Insert a new top gasket (17) into the body.

21. Apply a suitable lubricant to the plug stem (36).

22. Slide the plug stem (36) into the bonnet (2).

23. Place the bonnet (2) and plug stem (36) onto the body (1).

24. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see section 7.3).

---

Fig. 10: Arrangement for valves in DN 65 to 100

- 224 Tab washer
- 225 Nut
- 230 Ring (internal anti-rotation fixture)
25. Fasten down the bonnet (2) with the top body nuts (14). Tighten the nuts gradually in a crisscross pattern. Observe tightening torques.

26. Screw in the threaded bushing (8) and tighten it.

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

28. Place the yoke (60) on the bonnet (2) and fasten tight using the castellated nut (92).

29. Place the sleeve (76), new top plug (5), sleeve (75) and the new bottom plug (5) onto the plug stem. The sleeves of valves in DN 65 and larger are constructed to act as an internal anti-rotation fixture. Make sure during assembly that the sleeves engage in each other.

30. Insert a new bottom gasket (17) into the body.

31. Place the seat body (20) onto the body (1) and fasten down it with the bottom body nuts (14). Tighten the nuts gradually in a crisscross pattern. Observe tightening torques.

32. Place the sleeve (76) on the plug stem.

33. **DN 15 to 50**: tighten the nut (225) on the end of the plug stem while holding the stem connector nut (9) stationary. **DN 65 to 100**: Place the ring (230) and tab washer (224) on the end of the plug stem. Tighten the nut (225) at the bottom end of the plug stem while holding the stem connector nut (9) stationary.

34. Mount actuator. See associated actuator documentation.

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

### 7.1.3 Multi-piece body · Diverting valve

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

2. **DN 15 to 50**: unscrew the nut (225) from the bottom end of the plug stem while holding the stem connector nut (9) stationary. **DN 65 to 100**: unscrew the nut (225) from the bottom end of the plug stem while holding the stem connector nut (9) stationary. Remove the tab washer (224) and ring (230) from end of the plug stem.

3. Remove the bottom plug (5) and sleeves (75 and 75) from the plug stem.

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

5. Remove the seat body (20) from the body (1).

6. Remove the bottom gasket (17). Carefully clean the sealing faces in the valve body (1) and on the seat body (20).

7. Unscrew the castellated nut (92) and take the yoke (60) off the bonnet (2).
8. Undo the top body nuts (14) gradually in a crisscross pattern.

9. Remove the bonnet (2) and plug stem (36) together with the top plug (5) from the body (1).

10. Remove the top gasket (17). Carefully clean the sealing faces in the valve body (1) and on the bonnet (2).

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

12. Unscrew the threaded bushing (8).

13. Pull the plug stem (36) together with the top plug (5) out of the bonnet (2).

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

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

16. Unscrew the top plug (5) from the plug stem (36).

17. Unscrew the bottom and top seat (4) using a suitable tool.

18. Apply a suitable lubricant to the thread and the sealing cone of the new seats.

19. Screw in the top and bottom seat (4). Observe tightening torques.

20. Insert a new top gasket (17) into the body.

21. Apply a suitable lubricant to the plug stem (36).

22. Screw the new top plug (5) onto the plug stem (36).

23. Slide the plug stem (36) into the bonnet (2).

24. Place the bonnet (2) and plug stem (36) together with the top plug (5) onto the body (1).

25. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see section 7.3).

26. Firmly press the top plug (5) into the seat (4) and fasten down the bonnet (2) with the top body nuts (14). Tighten the nuts gradually in a crisscross pattern. Observe tightening torques.

27. Screw in the threaded bushing (8) and tighten it.

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

29. Place the yoke (60) on the bonnet (2) and fasten tight using the castellated nut (92).

30. Insert a new bottom gasket (17) into the body.

31. Place the seat body (20) onto the body (1) and fasten down it with the bottom body nuts (14). Tighten the nuts gradually in a crisscross pattern. Observe tightening torques.

32. Place the sleeves (75 and 76) and the new bottom plug (5) onto the plug stem.

**Note**
The sleeves of valves in DN 65 and larger are constructed to act as an internal anti-rotation fixture. Make sure during assembly that the sleeves engage in each other.
33. **DN 15 to 50**: tighten the nut (225) on the end of the plug stem while holding the stem connector nut (9) stationary.

**DN 65 to 100**: Place the ring (230) and tab washer (224) on the end of the plug stem. Tighten the nut (225) at the bottom end of the plug stem while holding the stem connector nut (9) stationary.

34. Mount actuator. See associated actuator documentation.

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

### 7.2 Version with insulating section

The parts subject to wear in versions with insulating section are replaced according to the same principle as for the standard version.

→ Proceed as described in section 7.1. The insulating section (21) is installed instead of the bonnet (2). See Fig. 11.
7.3 Sequence of packing parts

Standard packing (PTFE)

1. Pull all the packing parts out of the packing chamber using a suitable tool.
2. Renew damaged parts. Clean the packing chamber thoroughly.
3. Apply a suitable lubricant to all the packing parts and to the plug stem (36).
4. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see Fig. 12).
5. See section 7.1 or section 7.2 concerning further assembly.

Fig. 12: Standard packing
Fig. 13: ADSEAL packing
ADSEAL packing

1. Carefully slide the packing parts over the plug stem into the packing chamber using a suitable tool. Observe the proper sequence (see Fig. 13).

2. 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.

3. Insert the red spacer ring (15.1) between the threaded bushing (8) and retaining ring. See Fig. 13.

4. See section 7.1 or section 7.2 concerning further assembly.

7.4 Preparation for return shipment

Defective valves can be returned to SAMSON for repair.

Proceed as follows to return devices 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 > SERVICE & SUPPORT > 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 > About SAMSON.

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.

Lubricants

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 and test plan.

**Tip**

SAMSON’s After-sales Service department can support you in drawing up an inspection and test 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 whole 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) 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 or contact SAMSON’s After-sales Service department).</td>
</tr>
<tr>
<td>Malfunction</td>
<td>Possible reasons</td>
<td>Recommended action</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<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 is worn.</td>
<td>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. Valves and pipelines are pressure equipment. Improper opening can lead to bursting of the valve.
- Before starting any work on the 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 household waste.
10 Appendix

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 (www.samson.de) or in all SAMSON product catalogs.

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 m³/h
- Bench range of the actuator (e.g. 0.2 to 1 bar)
- Is a strainer installed?
- Installation drawing

10.2 Certificates

The EU declarations of conformity are included on the next pages.
SAMSON erklärt in alleiniger Verantwortung für folgende Produkte:

### Geräte / Devices

<table>
<thead>
<tr>
<th>Gerät / Device</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, DN 65-125, Gehäuse GG/GG, DN 50-80, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Durchgangsventil / Globe valve</td>
<td>240</td>
<td>3241</td>
<td>DIN, Gehäuse Stahl u.a., DN 40-100, Fluids G2, L2&lt;sup&gt;2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Durchgangsventil / Globe valve</td>
<td>240</td>
<td>3241</td>
<td>ANSI, Gehäuse GG, Class 250, NPS 1 ½ bis NPS 2, Class 125, NPS 2 ½ bis NPS 4, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Durchgangsventil / Globe valve</td>
<td>240</td>
<td>3241</td>
<td>ANSI, body of cast iron, Class 250, NPS 1 ½ to NPS 2, Class 125, NPS 2 ½ to NPS 4, fluids G2, L1, L2&lt;sup&gt;2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dreiwegeventil / Three-way valve</td>
<td>240</td>
<td>3244</td>
<td>DIN, Gehäuse GG, DN 65-125, Gehäuse GG/GG, DN 50-80, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dreiwegeventil / Three-way valve</td>
<td>240</td>
<td>3244</td>
<td>DIN, Gehäuse Stahl u.a., DN 40-100, Fluids G2, L2&lt;sup&gt;2)&lt;/sup&gt;</td>
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<tr>
<td>Schrägsitzventil / Angle seat valve</td>
<td>---</td>
<td>3353</td>
<td>DIN, Rotgüsegehäuse, all Fluids</td>
</tr>
<tr>
<td>Schrägsitzventil / Angle seat valve</td>
<td>---</td>
<td>3353</td>
<td>DIN, Gehäuse Stahl, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Durchgangsventil / Globe valve</td>
<td>V2001</td>
<td>3321</td>
<td>DIN, Gehäuse GG, DN 65-100, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Durchgangsventil / Globe valve</td>
<td>V2001</td>
<td>3321</td>
<td>ANSI, Gehäuse GG, NPS 2 ½ bis NPS 4, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
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<tr>
<td>Dreiwegeventil / Three-way valve</td>
<td>V2001</td>
<td>3323</td>
<td>DIN, Gehäuse GG, DN 65-100, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dreiwegeventil / Three-way valve</td>
<td>V2001</td>
<td>3323</td>
<td>ANSI, Gehäuse GG, NPS 2 ½ bis NPS 4, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
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<tr>
<td>Schrägsitzventil / Angle seat valve</td>
<td>V2001</td>
<td>3323</td>
<td>ANSI, Gehäuse GG, NPS 2 ½ bis NPS 4, Fluids G2, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Schrägsitzventil / Angle seat valve</td>
<td>V2001</td>
<td>3323</td>
<td>ANSI, body of cast iron, NPS 2 ½ to NPS 4, fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dreiwegeventil / Three-way valve</td>
<td>250</td>
<td>3253</td>
<td>DIN, Gehäuse GG, DN 200 PN 10, Fluids G2, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dreiwegeventil / Three-way valve</td>
<td>250</td>
<td>3253</td>
<td>DIN, body of cast iron, DN 200 PN 10, Fluids G2, L1, L2&lt;sup&gt;1)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1)</sup> Gase nach Art. 4 Abs.1 Pkt. c.i zweiter Gedankenstrich // Gases according to Article 4(1)(c.i), second indent
<sup>2)</sup> Flüssigkeiten nach Art. 4 Abs.1 Pkt. c.ii // Liquids according to Article 4(1)(c.ii)

die Konformität mit nachfolgender Anforderung/that the products mentioned above comply with the requirements of the following standards:


Angewandtes Konformitätsbewertungsverfahren für Fluide nach Art. 4 Abs. 1 / Applied conformity assessment procedure for fluids according to Article 4(1)

|-------------------|-----------------------------------------------|

Angewandte technische Spezifikation / Technical standards applied: DIN EN 12516-2, DIN EN 12516-3, ASME B16.34

**Hersteller / Manufacturer:**

SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany

Frankfurt am Main, 23. Februar 2017/23 February 2017

Klaus Hörschken  
Zentralabteilungsleiter / Head of Central Department  
Entwicklung Ventile und Antriebe / R&D, Valves and Actuators

Dr. Michael Heß  
Zentralabteilungsleiter / Head of Central Department  
Product Management & Technical Sales
SAMSON erklärt in alleiniger Verantwortung für folgende Produkte: For the following products, SAMSON hereby declares under its sole responsibility:

<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 G25 ab DN 100, Gehäuse G50 ab DN 150, Fluide G2, L1, L2/1</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way valve</td>
<td>240</td>
<td>3244</td>
<td>DIN, Gehäuse G25 ab DN 100, Gehäuse G50 ab DN 150, Fluide G2, L1, L2/1</td>
</tr>
<tr>
<td>Tieftemperaturventil/Cryogenic valve</td>
<td>240</td>
<td>3248</td>
<td>DIN/ANSI, alle Fluide / DIN/ANSI, all fluids</td>
</tr>
<tr>
<td>Durchgangsventil/Globe valve</td>
<td>250</td>
<td>3251</td>
<td>DIN/ANSI, alle Fluide / DIN/ANSI, all fluids</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way valve</td>
<td>250</td>
<td>3253</td>
<td>DIN/ANSI, Gehäuse Stahl u.a., alle Fluide / DIN/ANSI, body of steel, etc., all fluids</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way valve</td>
<td>250</td>
<td>3254</td>
<td>DIN/ANSI, Gehäuse Stahl u.a., alle Fluide / DIN/ANSI, all fluids</td>
</tr>
<tr>
<td>Eckventil/Angle valve</td>
<td>250</td>
<td>3256</td>
<td>DIN/ANSI, alle Fluide / DIN/ANSI, all fluids</td>
</tr>
<tr>
<td>Split-Body-Ventil/Bolt-body valve</td>
<td>250</td>
<td>3258</td>
<td>DIN, alle Fluide / DIN, all fluids</td>
</tr>
<tr>
<td>el-Eckventil/Angle valve (IS standards)</td>
<td>250</td>
<td>3259</td>
<td>DIN/ANSI, alle Fluide / DIN/ANSI, all fluids</td>
</tr>
<tr>
<td>Dampfunformventil/Steam-converting valve</td>
<td>280</td>
<td>3287</td>
<td>DIN/ANSI, alle Fluide / DIN/ANSI, all fluids</td>
</tr>
<tr>
<td>Durchgangsventil/Globe valve</td>
<td>V2001</td>
<td>3321</td>
<td>DIN, Gehäuse Stahl u.a., alle Fluide / DIN, body of steel, etc., all fluids</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way valve</td>
<td>V2001</td>
<td>3323</td>
<td>DIN, Gehäuse Stahl u.a., alle Fluide / DIN, body of steel, etc., all fluids</td>
</tr>
<tr>
<td>Schrägstellsitzventil/Angle seat valve</td>
<td>---</td>
<td>3381</td>
<td>DIN/ANSI, Einzeldrosselscheibe mit Anschweißende, alle Fluide / DIN/ANSI, single attenuation plate with welding ends, all fluids</td>
</tr>
<tr>
<td>Drosselschalthämmer/Silencer</td>
<td>3381-1</td>
<td>3381-1</td>
<td>DIN/ANSI, Einzeldrosselscheibe mehrstufig mit Anschweißende, alle Fluide / DIN/ANSI, single attenuation plate multi-stage with welding ends, all fluids</td>
</tr>
<tr>
<td>Durchgangsventil/Globe valve</td>
<td>240</td>
<td>3241</td>
<td>ANSI, Gehäuse G25, Class 125, ab NPS 5, Fluide G2, L1, L2/1</td>
</tr>
<tr>
<td>Dreiwegeventil/Three-way valve</td>
<td>240</td>
<td>3246</td>
<td>ANSI, Gehäuse G25, Class 125, ab NPS 5, Fluide G2, L1, L2/1</td>
</tr>
<tr>
<td>Tieftemperaturventil/Cryogenic valve</td>
<td>250</td>
<td>3253</td>
<td>ANSI, Gehäuse G25 ab DN200 PN16, Fluide G2, L1, L2/1</td>
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<tr>
<td>Durchgangsventil/Globe valve</td>
<td>250</td>
<td>3291</td>
<td>ANSI, Gehäuse G25 ab DN200 PN16, Fluide G2, L1, L2/1</td>
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<tr>
<td>Eckventil/Angle valve</td>
<td>250</td>
<td>3296</td>
<td>ANSI, alle Fluide / ANSI, all fluids</td>
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<tr>
<td>Durchgangsventil/Globe valve</td>
<td>500</td>
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</tr>
<tr>
<td>Eckventil/Angle valve</td>
<td>500</td>
<td>3596</td>
<td>ANSI, alle Fluide / ANSI, all fluids</td>
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<tr>
<td>Navigationsventil/Control valve</td>
<td>3595</td>
<td>3595</td>
<td>ANSI, alle Fluide / ANSI, all fluids</td>
</tr>
</tbody>
</table>

*Gase nach Art. 4 Abs.1 Pkt. c) zweiter Gedankenstrich/Gases according to Article 4(1)(c), second indent Flüssigkeiten nach Art. 4 Abs.1 Pkt. c.ii/Liquids according to Article 4(1)(c.ii)

Die Konformität mit nachfolgender Anforderung/that the products mentioned above comply with the requirements of the following standards:

Angewandtes Konformitätsbewertungsverfahren für Fluide nach Art. 4 Abs. 1/ Applied conformity assessment procedure for fluids according to Article 4(1)

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Modul H/ Module H</td>
<td>durch/bv Bureau Veritas 0062</td>
</tr>
</tbody>
</table>

Das Qualitätssicherungssystem des Herstellers wird von folgender benannter Stelle überwacht/The manufacturer’s quality management system is monitored by the following notified body:

Bureau Veritas S. A. N°. 0062, Newtime, 52 Boulevard du Parc, Ile de la Jatte, 92200 Neuilly sur Seine, France

Angewandte technische Spezifikation/Technical standards applied: DIN EN 12516-2, DIN EN 12516-3, ASME B16.34

Hersteller/Manufacturer: SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany

Frankfurt am Main, 08. Februar 2017/February 2017

Klaus Hörschken
Zentralabteilungsleiter/Head of Central Department
Entwicklung Ventile und Antriebe/R&D, Valves and Actuators

Dr. Michael Heß
Zentralabteilungsleiter/Head of Central Department
Product Management & Technical Sales
10.3 Spare parts

1 Body
2 Bonnet
3 Yoke
4 Seat
5 Plug
6 Guide bushing
7 Threaded bushing (packing nut)
8 Stem connector nut
9 Lock nut
10 Washer
11 Spring
12 Stud bolt
13 Body nut
14 Packing
15 V-ring packing
16 Body gasket
17 Bushing
18 Seat body
19 Insulating section
20 Bellows seal
21 Bolt
22 Nut
23 Plug stem
24 Plug stem with metal bellows
25 Gasket
26 Nut
27 Screw plug (test connection)
28 Seal
29 Yoke assembly with anti-rotation fixture
30 Anti-rotation fixture
31 Holder
32 Bushing
33 Bushing
34 Bushing
35 Hexagon screw
36 Hexagon screw

60.14 Washer
60.15 Threaded pin
60.16 Balls functioning as anti-rotation fixture
60.17 Washer
73 Stud bolt
75 Sleeve
76 Sleeve
80 Nameplate
81 Grooved pin
82 Screw
83 Hanger
84 Travel indicator scale
85 Screw
91 Protective cap
92 Castellated nut
93 Expansion sleeve
94 Expansion sleeve
101 Bellows cover
117 Expansion sleeve
224 Snap ring
225 Nut
230 Ring (anti-rotation fixture)
231 Seat holder
Type 3253 (up to DN 40)
Mixing/diverting service
Single-piece body
Type 3253 (DN 150)
Mixing service
Multi-piece body
Insulating section
Type 3253 (DN 150)
Diverting service
Multi-piece body
Bellows seal