Type 3310/AT and Type 3310/3278 Pneumatic Control Valve
Type 3310 Segmented Ball Valve
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
1 General safety instructions..........................5
2 Design and principle of operation..................6
2.1 Fail-safe position.....................................6
2.1.1 Type SRP (single-acting version).............6
2.1.2 Type DAP (double-acting version)............8
3 Mounting................................................8
3.1 Assembling valve and actuator..................8
3.1.1 Type 3310-SRP....................................8
3.1.2 Type 3310/3278...................................9
3.2 Mounting position..................................11
3.3 Signal pressure connection.....................11
4 Operation..............................................12
4.1 Changing the fail-safe action...................12
5 Servicing...............................................12
5.1 Removing the actuator from the valve.........12
5.2 Replace the packing................................12
5.3 Replacing the seat ring seal....................13
5.4 Assembly.............................................13
5.5 Replacing the segmented ball, shafts and bearings..........................15
5.5.1 Disassembly......................................15
5.5.2 Assembly..........................................15
6 Changing the characteristic......................17
7 Tools and tightening torques....................18
7.1 Special tools........................................18
7.2 Tightening torques.................................19
7.2.1 Tightening torques for flange bolts..........19
8 Nameplate.............................................21
9 Accessories..........................................22
10 Technical data........................................23
11 Customer inquiries...................................23
1 General safety instructions

- The control valve must be mounted, started up or serviced by fully trained and qualified personnel only; the accepted industry codes and practices are to be observed. Make sure employees or third persons are not exposed to any danger.

- All safety instructions and warnings given in these mounting and operating instructions, particularly those concerning installation, start-up and maintenance, must be strictly observed.

- 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. The declaration of conformity can be viewed and downloaded at http://www.samson.de.

- To ensure appropriate use, only use the valve in applications where the operating pressure and temperatures do not exceed the specifications used for sizing the valve at the ordering stage. The manufacturer does not assume any responsibility for damage caused by external forces or any other external factors.

- Any hazards that could be caused in the valve by the process medium, the operating pressure, the signal pressure or by moving parts are to be prevented by taking appropriate precautions.

- Proper shipping and storage are assumed.

- For installation and maintenance, make sure the relevant section of the pipeline is depressurized and, depending on the process medium, drained as well. Depending on the field of application, allow the valve to cool down or heat up to reach ambient temperature before starting any work on it.

- When working on the valve, make sure that the pneumatic air supply as well as the control signal are disconnected to prevent any hazards caused by moving parts.
2 **Design and principle of operation**

The pneumatic control valve consists of the Type 3310 Segmented Ball Valve and either the SAMSON PFEIFFER Type AT or the SAMSON Type 3278 Pneumatic Rotary Actuator.

The control valve is designed for both throttling and on/off service in process engineering and plants with industrial requirements. The control valve is suitable for liquids, vapors and gases at temperatures from –29 to +220 °C and pressure rating of Class 150 and 300.

The segmented ball valve in valve sizes NPS 1 to 12 is available with a soft-seated or metal-seated ball. The version used is marked on the nameplate of the valve body (see section 8).

The process medium flows through the valve. The signal pressure applied to the rotary actuator determines the position (opening angle) of the segmented ball (8) and thus the cross-sectional area of flow between the ball and body (1). The actuator motion is transmitted to the segmented ball valve by a shaft with square or key drive. The valve shaft (4) is sealed by a self-adjusting PTFE V-ring packing (2.3).

### 2.1 Fail-safe position

#### 2.1.1 Type SRP (single-acting version)

The fail-safe position of the control valve upon supply air (signal pressure) failure is determined in Type 3310/AT (Type SRP single-acting version) by the version used and in Type 3310/3278 by how the rotary actuator is mounted to the valve.
Design and principle of operation

Fig. 1: Sectional drawing of Type 3310 Valve

Note

Detail A (seal) is shown in Fig. 3.
Mounting

Fail-close
When the pressure is relieved from the rotary actuator or the supply air fails, the actuator springs close the valve. The valve opens opposing the force of the actuator springs when the signal pressure increases.

Fail-open
When the pressure is relieved from the rotary actuator or the supply air fails, the actuator springs open the valve. The valve closes opposing the force of the actuator springs when the signal pressure increases.

2.1.2 Type DAP (double-acting version)
The Type DAP Rotary Actuator (double-acting) has no springs. A defined final position is not reached when the supply air fails.

3 Mounting

3.1 Assembling valve and actuator

3.1.1 Type 3310-SRP
Proceed as follows if the valve and actuator have not been assembled by SAMSON:

Note
In the standard actuator version (SRP = single-acting with spring return mechanism), the spring return mechanism is designed to close clockwise when there is no signal pressure.

If you require a different direction of rotation or a double-acting actuator (DAP = double-acting without spring return mechanism), this specification must be submitted on ordering the actuator.

Table 1: Type 3310-SRP

<table>
<thead>
<tr>
<th>Fail-safe position</th>
<th>Springs</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail-close</td>
<td>Clockwise</td>
<td>Equal percentage</td>
</tr>
<tr>
<td>Fail-close</td>
<td>Counterclockwise</td>
<td>Linear</td>
</tr>
<tr>
<td>Fail-open</td>
<td>Clockwise</td>
<td>Linear</td>
</tr>
<tr>
<td>Fail-open</td>
<td>Counterclockwise</td>
<td>Equal percentage</td>
</tr>
</tbody>
</table>

The square drive allows the actuator to be mounted on the segmented ball valve offset at angles of 90° in such a way that it is either in the upright or horizontal position to meet the installation requirements.
Mounting

Fail-close

1. Place the segmented ball (8) of the valve in the CLOSED position (0° angle of rotation).
2. Fasten the yoke (3) to the flange of the valve shaft using two or four screws (depending on the valve size).
3. If necessary, place the shaft adapter on the valve shaft. Slide the actuator over the adapter or valve shaft (4) and fasten it onto the yoke (3) with four screws (3.1).
4. Adjust the stop bolt (12.1 or 12.2 depending on the direction of rotation) to the point where the valve is completely closed and align the markings on the shaft and packing gland.
5. Lock the position of the stop bolt with the lock nut.
6. Apply a signal pressure to the signal pressure connection which corresponds to the number of actuator springs (see actuator nameplate).
7. Turn the other stop bolt until the segmented ball stops at an opening angle of 90°.
8. Lock the position of the stop bolt with the lock nut.

Fail-open

1. Place the segmented ball (8) of the valve in the OPEN position (90° angle of rotation).
2. Fasten the yoke (3) to the flange of the valve shaft using two or four screws (depending on the valve size).
3. If necessary, place the shaft adapter on the valve shaft. Slide the actuator over the adapter or valve shaft (4) and fasten it onto the yoke (3) with four screws.
4. Adjust the stop bolt (12.1 or 12.2 depending on the direction of rotation) to the point where the valve is completely open at 90° and align the markings on the shaft and packing gland.
5. Lock the position of the stop bolt with the lock nut.
6. Apply a signal pressure to the signal pressure connection which corresponds to the number of actuator springs (see actuator nameplate).
7. Turn the other stop bolt until the segmented ball is completely closed and align the markings on the shaft and packing gland.
8. Lock the position of the stop bolt with the lock nut.

3.1.2 Type 3310/3278

If the valve and actuator have not been assembled by SAMSON, mount the actuator onto the body flange 1 or 2 depending on the characteristic and fail-safe position. '1' or '2' is cast on the corresponding side of the body.

Table 2: Type 3310/3278

<table>
<thead>
<tr>
<th>Fail-safe position</th>
<th>Characteristic</th>
<th>Body Flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail-close</td>
<td>Equal percentage</td>
<td>2</td>
</tr>
<tr>
<td>Fail-close</td>
<td>Linear</td>
<td>1</td>
</tr>
<tr>
<td>Fail-open</td>
<td>Equal percentage</td>
<td>1</td>
</tr>
<tr>
<td>Fail-open</td>
<td>Linear</td>
<td>2</td>
</tr>
</tbody>
</table>
Mounting

The four feather key notches on the actuator shaft arranged every 90° allow the rotary actuator to be mounted on the segmented ball valve offset at angles of 90° in such a way that it is either in the upright or horizontal position to meet the installation requirements.

Fail-close

1. Completely undo both stop bolts (13.1 and 13.2) on the rotary actuator. Turn the stop bolt (13.2) clockwise until the grooves of the actuator shaft are aligned with the actuator axis horizontally or vertically.
2. Place the segmented ball (8) of the valve in the CLOSED position (0° angle of rotation).
3. Fasten the yoke (3) to the flange of the valve shaft using two or four screws (depending on the valve size).
4. Slide the actuator over the valve shaft (4) and fasten it onto the yoke (3) with four screws.
5. Undo the stop bolt (13.2) again.
6. Adjust the stop bolt (13.2) to the point where the valve is completely closed and align the markings on the shaft and packing gland.
7. Apply a supply pressure required for the spring range (see actuator nameplate) to the loading pressure connection to open the valve.
8. Turn the stop bolt (13.1) clockwise until the segmented ball (8) of the valve is in the OPEN position (90° angle of rotation).

Fail-open

9. Lock the position of both stop bolts with the lock nuts.

1. Completely undo both stop bolts (13.1 and 13.2) on the rotary actuator. Turn the stop bolt (13.1) clockwise until the grooves of the actuator shaft are aligned with the actuator axis horizontally or vertically.
2. Place the segmented ball (8) of the valve in the OPEN position (90° angle of rotation).
3. Fasten the yoke (3) to the flange of the valve shaft using two or four screws (depending on the valve size).
4. Slide the actuator over the valve shaft (4) and fasten it onto the yoke (3) with four screws.
5. Undo the stop bolt (13.1) again.
6. Apply a supply pressure required for the spring range (see actuator nameplate) to the loading pressure connection to close the valve.
7. Adjust the stop bolt (13.1) to the point where the segmented ball is completely closed and align the markings on the shaft and packing gland.
8. Disconnect the supply air from loading pressure connection.
9. Turn the stop bolt (13.2) clockwise until the segmented ball (8) of the valve is in the OPEN position (90° angle of rotation).
10. Lock the position of both stop bolts with the lock nuts.
3.2 Mounting position

**Note**

Prior to installing the valve into the pipeline, place it in the CLOSED position to allow the seat to be centered properly with the segmented ball.

The control valve can be installed into a pipeline either in the upright or horizontal position. However, the following points regarding the direction of flow must be observed:

- Install the valve into the pipeline in such a way that the bottom half of the segmented ball opens in the direction of the flow. This helps to prevent dirt deposits from accumulating and blocking the valve when it opens. The direction of medium flow into the ball also prevents the medium from collecting unnecessarily in the shaft bearings.

- The standard direction of flow (onto the segmented ball) is indicated by SAMSON by an arrow on the valve body.

- If the direction of flow is be reversed, e.g. required for abrasive media, indicate the reversed direction by using the arrow plate and the two slotted pins included in the scope of delivery. This direction of flow causes the pressure of the process medium to constantly act on the packing. On tightening the flange bolts, make sure that an even pressure is exerted on the gaskets.

3.3 Signal pressure connection

The signal pressure connection of the rotary actuator is designed as a borehole with a G ⅛ female thread for small actuators and with G ¼ female thread for large actuators. The connection allows in compliance with VDE/VDE 3845 guidelines the connection of a solenoid valve, e.g. Type 3963, or a limit switch with or without a solenoid valve (Type 3776/3777).

The corresponding accessories are available to mount SAMSON positioners.
4 Operation

4.1 Changing the fail-safe action

The fail-safe action of Type 3278 Actuator can be changed from fail-close to fail-open or vice versa after the valve has been installed. In this case, the side where the rotary actuator is mounted must be changed (see Table 2).

The pistons of the Type SRP Actuator must be reversed to change the fail-safe action.

If you intend to remove parts to clean them, first mark the position of the seat ring (11.8) in the body for a valve with soft-seated ball. This will help you to replace the seat ring in its correct position on reassembling the valve.

To replace the seat ring (11.6 or 11.8), proceed as described in section 5.3.

Before starting any work on the valve body, first remove the actuator (see section 5.1).

WG WARNING

Remove the valve from the pipeline before removing any parts from the valve. Before proceeding, depressurize the relevant plant section.
Wait until the medium cools down if hot media are used.

5 Servicing

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

External leakage can indicate that the packing is defective.

If the valve does not close tightly, tight shut-off may be impaired by dirt stuck between the seat ring and segmented ball or by damaged facings.

5.1 Removing the actuator from the valve

Unscrew the two or four screws on the flange of the valve shaft and pull off the actuator together with the yoke (3) from the valve.

5.2 Replace the packing

The valves in NPS 1 to 12 are fitted with a V-ring packing.

1. Undo the screws (2.2). Lift off the packing gland (2) with the bearing bushing (2.1).
2. Pull all the packing parts out of the packing chamber using a suitable tool. Clean the packing chamber thoroughly.

3. Renew the packing (2.3). Slide the packing parts over the shaft (4) into the packing chamber.

4. Push the packing gland (2) together with bearing bushing (2.1) onto the shaft (4). Tighten the packing gland using the screws (2.2).

5. Assemble as described in section 5.4.

### 5.3 Replacing the seat ring seal

1. Remove both anchoring screws (11.1) with washers (11.2).

2. Take out the retainer (11) together with the gasket (11.3).
   If you are unable to remove the retainer, use the special tool listed in Table 3.

3. **Soft-seated version**: remove the support ring (11.7) and seat ring (11.8).
   **Metal-seated version**: remove in sequence any washer(s) (11.4), metal tubular seal (11.5) and seat ring (11.6).

4. Assemble as described in section 5.4.

### 5.4 Assembly

Assemble in the reverse order. Special tools are not necessary.

---

**Tip**

The retainer (11) can be pressed into the body using, for example, a blank flange, by tightening the flange bolts accordingly. In this case, first place the valve in the CLOSED position to center the seat ring and segmented ball.
Servicing

Checking the friction torque

Check the friction torque (breakaway torque) needed to open the valve according to Table 4.

If the friction torque is different from the torque specified in the table, proceed as follows:

- **Soft-seated version**: turn the segmented ball clockwise by 360° in the valve body two or three times to let the seal adapt itself.
- **Metal-seated version**: change the number of washers (11.4) used. If necessary, omit the bottom washer on the valve body side.

---

Fig. 3: Seat ring seal
5.5 Replacing the segmented ball, shafts and bearings

**NOTICE**
Risk of valve damage.
No clearance may exist between the segmented ball and shafts. Therefore, the shafts need to be replaced as well when the segmented ball is replaced with a new one. Furthermore, renew the bearing bushings and seat rings as well as the ring and gasket on the bottom flange as well.

5.5.1 Disassembly

1. Unscrew both bolts (10.3) and lift off bottom flange (10) together with the ring (10.2). Remove the flange gasket (10.1).
2. Unscrew the threaded pin (5.2) out of the shaft and remove the clamping bolt (5.3). Make sure that the locking pins (5.4) do not get lost.
3. Press out the support shaft.
4. Pull the bearing bushing (5.1) out of the body.
5. Undo the screws (2.2) and lift off the packing gland (2) with the bearing bushing (2.1).
6. Use snap ring pliers to pull the snap ring (4.3) off the shaft and pull the shaft out of the body using disassembling tool.
7. Pull all the packing parts out of the packing chamber using a suitable tool. Clean the packing chamber thoroughly.
8. Remove the lower bearing bushing (4.1).
9. Take the segmented ball out of the body.

**Note**
The segmented ball of valves in NPS 1, 1 ½ and 2 must be removed from the retainer side. Proceed as described in section 5.3, dismantling first the retainer and then the seat ring parts.

5.5.2 Assembly

**Tip**
We recommend ordering the assembly tools listed in Table 3 for reassembling the valve.

Assemble in the reverse order. Observe the tightening torques specified in section 7.

On inserting the shaft (4) into the body and segmented ball, make sure that the shaft is aligned correctly with the segmented ball (the red marking on the shaft must be positioned at a right angle to the pipeline when the valve is closed).

1. Insert the segmented ball (8) into the valve body.
2. Push the bearing bushing (4.1) into the body, then align the shaft (4) and use an
assembling tool to press the bearing bushing into the segmented ball.

3. Use the part of the tool that is in the bearing of the support shaft to slide the segmented ball (8) onto the shaft (4) and attach the snap ring (4.3).

4. Insert the locking pins (5.4) into the holes of the support shaft (5), then position the complete support shaft (5, 5.2, 5.3 and 5.4) on the bearing bushing (5.1) and use the packing gland (2) to press them in.

5. Align the segmented ball (8) centrally.

6. Screw the threaded pin (5.2) against the clamping bolt (5.3) to obtain a force-locking connection between the support flange and segmented ball.
7. Mount the packing with spacer (2.7), washer (1.6), spring (2.5), thrust washer (2.4), packing (2.3) and packing gland (2).

**Checking the friction torque**

Check the friction torque (breakaway torque) needed to open the valve according to Table 4.

If the friction torque deviates from the specified torque, proceed as described in section 5.4 on Checking the friction torque.

---

### 6 Changing the characteristic

Changing the characteristic from equal percentage to linear and vice versa can be performed by changing the actuator’s direction of rotation (see Table 1 and Table 2).
7 Tools and tightening torques

7.1 Special tools

Table 3: Special tools

<table>
<thead>
<tr>
<th>NPS</th>
<th>Extracting tool for retainer (11)</th>
<th>Crossbeam</th>
<th>Extracting tool for support shaft (5)</th>
<th>Flange</th>
<th>Tool to mount and remove the shaft</th>
<th>Press tool for support shaft</th>
<th>Press tool for actuator shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1281-0011</td>
<td></td>
<td>1281-0009</td>
<td></td>
<td>1281-0019</td>
<td></td>
<td>1281-0023</td>
</tr>
<tr>
<td>1½</td>
<td>1281-0012</td>
<td></td>
<td>1281-0013</td>
<td>1281-0008</td>
<td>1281-0026</td>
<td></td>
<td>1281-0020</td>
</tr>
<tr>
<td>2</td>
<td>1281-0013</td>
<td></td>
<td>1281-0014</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1281-0015</td>
<td></td>
<td>1281-0016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1281-0017</td>
<td></td>
<td>1281-0018</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1281-0019</td>
<td></td>
<td>1281-0020</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1281-0021</td>
<td></td>
<td>1281-0022</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NPS</th>
<th>Adapter for torque wrench</th>
<th>Shaft with square drive</th>
<th>Shaft with key drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 1½, 2, 3</td>
<td>1281-0029</td>
<td>1281-0032</td>
<td></td>
</tr>
<tr>
<td>4, 6</td>
<td>1281-0030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8, 10</td>
<td>1281-0031</td>
<td>1281-0033</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 7.2 Tightening torques

**Table 4: Tightening and friction torques**

<table>
<thead>
<tr>
<th>Valve size</th>
<th>NPS</th>
<th>1</th>
<th>1½</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><strong>Tightening torques in Nm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screws (2.2) on packing gland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bolts (10.3) on bottom flange</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>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td><strong>Friction torque to open the valve in Nm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metal seal</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>19</td>
<td>40</td>
<td>70</td>
<td>100</td>
<td>155</td>
<td>155</td>
<td>155</td>
</tr>
<tr>
<td>Soft seal</td>
<td>9</td>
<td>12</td>
<td>14</td>
<td>24</td>
<td>50</td>
<td>100</td>
<td>170</td>
<td>260</td>
<td>260</td>
<td>260</td>
</tr>
</tbody>
</table>

#### 7.2.1 Tightening torques for flange bolts

**Table 5: ANSI version**

<table>
<thead>
<tr>
<th>NPS</th>
<th>Class</th>
<th>Flange bolts (quality 8.8)</th>
<th>Min. tightening torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>150</td>
<td>4 x ½”</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>4 x ⅜”</td>
<td>45</td>
</tr>
<tr>
<td>1½</td>
<td>150</td>
<td>4 x ½”</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>4 x ⅜”</td>
<td>65</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
<td>4 x ⅜”</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>8 x ⅜”</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>150</td>
<td>4 x ⅜”</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>8 x ⅜”</td>
<td>65</td>
</tr>
<tr>
<td>4</td>
<td>150</td>
<td>8 x ⅜”</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>8 x ¾”</td>
<td>80</td>
</tr>
<tr>
<td>6</td>
<td>150</td>
<td>8 x ¾”</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>12 x ¾”</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td>150</td>
<td>8 x ¾”</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>12 x ¾”</td>
<td>125</td>
</tr>
<tr>
<td>10</td>
<td>150</td>
<td>12 x ¾”</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>16 x 1”</td>
<td>135</td>
</tr>
<tr>
<td>12</td>
<td>150</td>
<td>12 x ¾”</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>300</td>
<td>16 x ½”</td>
<td>125</td>
</tr>
</tbody>
</table>
## Tools and tightening torques

### Table 6: DIN version

<table>
<thead>
<tr>
<th>DN</th>
<th>PN</th>
<th>Flange bolts (quality 8.8)</th>
<th>Min. tightening torque in Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>10/40</td>
<td>4 x M12</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>10/40</td>
<td>4 x M16</td>
<td>55</td>
</tr>
<tr>
<td>50</td>
<td>10/40</td>
<td>4 x M16</td>
<td>75</td>
</tr>
<tr>
<td>80</td>
<td>10/16</td>
<td>8 x M16</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>25/40</td>
<td>8 x M16</td>
<td>55</td>
</tr>
<tr>
<td>100</td>
<td>10/16</td>
<td>8 x M16</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>25/40</td>
<td>8 x M20</td>
<td>85</td>
</tr>
<tr>
<td>150</td>
<td>10/16</td>
<td>8 x M20</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>25/40</td>
<td>8 x M24</td>
<td>150</td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>8 x M20</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>12 x M20</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>12 x M24</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>12 x M27</td>
<td>150</td>
</tr>
<tr>
<td>250</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>12 x M20</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>12 x M24</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>12 x M27</td>
<td>185</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>12 x M30</td>
<td>205</td>
</tr>
<tr>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>12 x M20</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>12 x M24</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>16 x M27</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>16 x M30</td>
<td>165</td>
</tr>
</tbody>
</table>
8 Nameplate

The nameplate includes all details required to identify the valve.

Fig. 5: Nameplate

1. Type number
2. Serial number
3. Valve size DN .../NPS ...
4. Plug seal:
   - ME Metal seal
   - PT PTFE
   - PK PEEK 450G Victrex®
   - PK1 PEEK 450FC30 Victrex®
5. Body material
6. Pressure rating PN .../Class ...
7. Flow coefficient $K_v$../$C_v$...
   - Characteristic:
     % Equal percentage
     LIN Linear
8. PED text
9. Notified body
10. Year of manufacture
11. Direction of flow and maximum opening angle
## 9 Accessories

### Table 7: Accessories

<table>
<thead>
<tr>
<th>NPS</th>
<th>Type SRP/DAP Actuator (AT)</th>
<th>Connecting flange DIN 3337</th>
<th>Mounting kit order no.</th>
<th>Actuator area in cm² (Type 3278)</th>
<th>Mounting kit order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30 60</td>
<td>F05</td>
<td>1400-7316</td>
<td></td>
<td>1400-7251</td>
</tr>
<tr>
<td></td>
<td>1½</td>
<td></td>
<td></td>
<td>1400-7316 1400-7317</td>
<td>160 (F07)</td>
</tr>
<tr>
<td>2</td>
<td>60 100</td>
<td>F05  F07</td>
<td>1400-7348 1400-7239</td>
<td>1400-7239</td>
<td>1400-7252</td>
</tr>
<tr>
<td>3</td>
<td>100 150 220</td>
<td>F07  F07  F10</td>
<td>1400-7239 1400-7239</td>
<td>1400-7732</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>220 300 450</td>
<td>F10  F10  F12</td>
<td>1400-7240 1400-7240</td>
<td>1400-7241</td>
<td>320 (F12) 1400-7255</td>
</tr>
<tr>
<td>6</td>
<td>300 450 600</td>
<td>F10  F12  F12</td>
<td>1400-7240 1400-7241</td>
<td>1400-7241</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>600 900 1200</td>
<td>F12  F14  F14</td>
<td>1400-7755 1400-7243</td>
<td>1400-7243</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>900 1200</td>
<td>F14  F14</td>
<td>1400-7243</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>900 1200</td>
<td>F14  F14</td>
<td>1400-7243</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10 Technical data

The technical data as well as the dimensions and weights for the DIN and ANSI versions of the Type 3310 Segmented Ball Valve are listed in the corresponding Data Sheet T 8222.

11 Customer inquiries

Please submit the following details:

- Order number (specifications on the nameplate)
- Type, model number, nominal size and valve version
- Pressure and temperature of the process medium
- Flow rate in m³/h
- Signal pressure range (bench range)
- Installation drawing