Aseptic Double-Seat Valve
Type N35

Operating Manual and Spare Parts List
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1. Safety

1.1. General

This operating manual states basic instructions to be followed in regard to installation, operation and maintenance. For engineers, mechanics and other qualified personnel working with this valve it is necessary to read and study this manual carefully before installation and set into operation. A copy of the manual has to be available at the operation site of the valve at all times.

1.2. Warning Signs

General Warning !
This sign shows special procedures that are to be followed in order to prevent personal injury.

Caution !
This sign shows special procedures that are to be followed in order to prevent damage to the valve.

Notice !
This sign shows important information to simplify and clarify procedures.

1.3. Safety Notes

Pay special attention to the safety warnings in this chapter and the warning signs within the following chapters.

Failure to comply with the stated warning signs can lead to severe personal injury and/or damage to the valve, the environment and the production plant. Failure to comply with the stated warning signs may also lead to the loss of complete damage claims.

Existing national laws and regulations to prevent injuries as well as internal installation, operation and safety regulations are to be followed.

1.4. Personnel Qualification

Installation, operation and maintenance personnel has to be qualified for these tasks and need to read and study this manual carefully. Responsibilities and monitoring of such personnel has to be well defined by management.

1.5. Inadmissible Usage

Operation safety of the valve can only be guaranteed when it is used appropriately and according to the technical data of chapter 5 of this operating manual. The stated threshold values are not to be over passed under any circumstance.

1.6. Unauthorized Alterations and Spare Parts Use

Reconstructions and alterations of the valve are only permissible in agreement with the manufacturer. Original spare parts and parts authorized by the manufacturer serves the purpose of safety. Use of other parts may lead to the loss of possible damage claims.
2. Installation

2.1. Unpacking/Delivery

1. Check the delivery for complete valve, including one steam and one condensate connection pipe with two welding ends and O-Ring.
2. Check delivery note.
3. This operating manual is part of the delivery.

Caution! We cannot be held responsible for incorrect unpacking.


Accessories for indication unit (optional).

Indication units! The bracket (51) can be equipped with 1 to 5 sensors (55). Each sensor needs one cable (54).

Position indicator! According to the position of the sensor there is one or two position indicators (53) and (56) mounted.

3. Accessories for control top (optional).

Control top! Consists of two screws (49) and upper piston rod (48). There is a separate operating manual for the control top.

4. Remove possible packing materials from the pipe connections.
2. Check valve for visible transport damage.

Connections! Avoid damaging the air, thread and pipe connections.
2. Installation

2.2. General Installation

1. Installation position and pipe connections.

- **Liability**! We cannot be held responsible for incorrect installation.
- **Installation position**! Always install the valve vertically.
- **Steam connection**! Connect steam always to the lower steam connection (left side)
- **Condensate connection**! Always use upper condensate connection (right side) as condensate outlet.

- **Product connections**! The valve is assembled from the factory as shown above. The position of the product outlets can be changed during installation.

2. Peripheral components.

- **Components**! The following components are necessary for a safe function of the valve and are not part of the delivery:
  - 1 hand-operated shut-off valve DN15
  - 1 pneumatic shut-off valve DN15
  - 1 temperature sensor e.g. PT-100
  - 1 steam trap min. 10 kg/h

3. Tension in the pipeline.

- **Risk of damage**! To avoid stressing the valve pay special attention during installation to:
  - vibrations
  - thermal expansion of the tubes
  - excessive welding
  - overload of pipelines

4. Air connections.

- **Control**! The valve has four air connections. Without air pressure the valve is in closed position (AC0).
  - AC1 upper valve seat cleaning
  - AC2 intermediate (short stop) position
  - AC2 and AC3 open valve
  - AC4 lower valve seat cleaning
2. Installation

2.3. Welding

1. Installation of tubing system.

Steam supply lines! The steam supply line should be sloped and drainable. Always place the steam supply line above the valve as shown on the sketch above. This minimizes the risk of pressure shocks in the steam and condensate circuit.

Product lines! Product lines should always be sloped and self-drained. This minimizes the risk of steam and condensate shocks during sterilization, because condensate can drain faster. This is also favorable to the life time of the stainless steel bellow.

Condensate reservoir! If product with particles or high solid content is processed, it might be considered to increase the dimension of the steam supply line, to increase the condensate volume (reservoir) that is used for valve seat cleaning.

2. Connect compressed air to AC3.

Moving parts! Never stick your fingers through the valve ports or touch the marked areas if the actuator is supplied with compressed air.

3. Dismantle the valve housing according to instructions in chapter 4.5. step 1 and 2.

4. Keep the actuator in a safe place.

Minimum clearance to remove actuator.

Control top! If valve is mounted with a control top, then measurement B = B + 172.

<table>
<thead>
<tr>
<th>DN</th>
<th>2&quot;</th>
<th>50</th>
<th>2½&quot;</th>
<th>65</th>
<th>3&quot;</th>
<th>80</th>
<th>4&quot;</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>60</td>
<td>60</td>
<td>66</td>
<td>69</td>
<td>77</td>
<td>81</td>
<td>89</td>
<td>91</td>
</tr>
<tr>
<td>B</td>
<td>560</td>
<td>560</td>
<td>600</td>
<td>600</td>
<td>730</td>
<td>730</td>
<td>750</td>
<td>750</td>
</tr>
</tbody>
</table>
2. Installation

2.3. Welding

Recommended clearance when welding a T-piece.

![Diagram of weld housing into tubing system](image)

<table>
<thead>
<tr>
<th>DN</th>
<th>2&quot;</th>
<th>2 1/2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>35</td>
<td>36</td>
<td>44</td>
<td>48</td>
</tr>
</tbody>
</table>

**CIP Cleaning**  The mentioned clearances ensure a good CIP cleaning of the pipe connection up to the lower valve seat.

**Position of steam and condensate connections.**

1. Weld housing into tubing system according to existing standards and instructions.
2. Let valve housing cool down.
3. Reassemble the valve according to instructions in chapter 4.6. step 5 to 9.

**Damaging of valve seats!** Remove metal cuttings and other foreign matters from the valve housing and the tubing system before mounting the actuator.

2.4. Fitting of indication unit (optional)

1. When mounting the top unit please follow the operating manual delivered with the top unit.

2. When fitting the indication unit, loosen screw (37) placed on the left side of the bonnet (32).

3. Slide bracket (51) with sensor (55) into the groove in the bonnet.

4. Tighten screw (37).
2. Installation

2.5. Before Operation

1. Supply compressed air to AC1, AC2, AC3 and AC4 one by one and operate the valve several times to ensure that it operates smoothly.

Moving parts! Never touch the marked areas if the actuator is supplied with compressed air.

Function test! When operating the valve pay special attention to the following:
- Smooth operation
- No pressure loss while valve is actuated
- Sensor position

Sensor position (optional)! If indication unit is fitted, check and if necessary adjust the sensor position to proper indication. (on=yellow LED, off=green LED).

2. Close condensate valve.
3. Open steam valve slowly.
4. Check if product pipe is pressureless and if steam is exiting at wrong places.
5. Supply AC1 with compressed air for 5 seconds (upper seat cleaning).
6. Supply AC4 with compressed air for 5 seconds (lower seat cleaning).

Hot! Never touch the valve, pipelines, steam or condensate connection pipe after opening the steam valve.
Pressure! After opening the steam valve there will be steam pressure in the steam and condensate hoses and the barrier chamber.

CIP / SIP! Always clean and sterilize the valve before operation.
3. Operation

3.1. Operation

1. **Hot !** Never touch the valve or the pipelines when processing hot liquids or when sterilizing.

2. **Pressure !** When the steam valve is open, there will be steam pressure in the steam and condensate hoses and the barrier chamber.

3. **Product mix !** Always keep steam valve open during operation in order to ensure separation of the two product lines.

4. **Moving parts !** Never touch the moving parts as shown in the marked areas, if the actuator is supplied with compressed air.

5. **Compressed air !** Always release compressed air after use.

6. **Control !** Never pressurize the following air connections simultaneously:
   - AC2 and AC1 or AC2 and AC4
   - AC3 and AC1 or AC3 and AC4

7. **Liability !** We cannot be held responsible for incorrect operation of the valve.

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3.2. Fault Finding and Repair

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause and Effect</th>
<th>Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condensate connection pipe is always hot</td>
<td>Condensate valve is leaking</td>
<td>Replace the lip seal</td>
</tr>
<tr>
<td>Steam connection pipe is always hot</td>
<td>- Particles between valve seats and valve plugs&lt;br&gt;- Upper plug seal (26) or lower plug seal (25) worn</td>
<td>- Remove the particles, carry out a number of seat cleanings&lt;br&gt;- Replace the O-rings</td>
</tr>
<tr>
<td>Leakage at external bellow vent hole (on bonnet)</td>
<td>External bellow (21) is damaged</td>
<td>Replace external bellow (21)</td>
</tr>
<tr>
<td>Leakage at internal bellow vent hole (at condensate connection)</td>
<td>Internal bellow (20) is damaged</td>
<td>Replace internal bellow (20)</td>
</tr>
<tr>
<td>Leakage at clamp</td>
<td>Loose clamp (31), worn O-Ring (18)</td>
<td>Tighten clamp (31), replace O-ring (18)</td>
</tr>
<tr>
<td>Leakage of compressed air</td>
<td>Worn O-rings in actuator</td>
<td>Replace actuator O-ring(s)</td>
</tr>
</tbody>
</table>
3. Operation

3.3. Cleaning and Production

1. CIP Cleaning (Clean In Place)
Choosing the ideal cleaning procedure depends also on other components used in the system.

Caustic danger! Always handle lye and acid with great care and according to safety regulations. Always use rubber gloves and protective goggles!

Water quality! Use clean water, free from chlorides.

Steam quality! For sterilization and barrier chamber use saturated and filtered (5 μm) steam.

Cleaning agents! Cleaning agents depend on the type of pollution, the type of water quality and the type of material to be cleaned. Please consult a CIP specialist.

Pump capacity! Volumetric speed at the product connections should be 1.5 bis 2 m/s. Product and cleaning pressure should be smaller than the steam pressure in the barrier chamber.

2. CIP/SIP (Sterilize In Place) phase
The sequence of the phases in this example, as well as parameters, such as temperature and time, depend on the application and have to be adjusted accordingly.

- Rinsing with water
  Duration: 10 minutes

- Emptying the rinsing water

- Cleaning with lye solution 70°C
  Duration: 30 minutes

- Emptying the lye solution

- Rinsing with water
  Duration: 10 minutes

- Emptying the rinsing water

- Cleaning with acid solution 70°C
  Duration: 5 minutes

- Emptying the acid solution

- Rinsing with water
  Duration: 10 minutes

- Emptying the rinsing water

- Heating with saturated steam 130°C
  Duration: until temperature is reached

- Sterilization with saturated steam 130°C
  Duration: 20 minutes

3. Valve positions during CIP/SIP phases
See drawings in the following chapter "Valve Positions"

- Rinsing with water
  Valve closed (drawing 1). Condensate will build up in the barrier chamber.

- Emptying
  Valve closed. At the end of the emptying phase, perform seat cleaning for 5 seconds (drawing 2 or 3).

- Cleaning with cleaning agent
  Valve closed. Sterilize the barrier chamber every 15 minutes for 10 seconds (drawing 4).

- Heating with saturated steam
  Valve closed. Sterilize the barrier chamber every 15 minutes for 10 seconds (drawing 5).

- Sterilization with saturated steam
  Valve closed. Sterilize the barrier chamber every 15 minutes for 10 seconds (drawing 6).

4. Valve positions during production
The valve should be cleaned and sterilized before production.

- Opening procedure
  Either activate AC2 to go into intermediate/short stop position (drawing 1) and there after activate AC3 to go into open position (drawing 2). Or activate simultaneously AC2 and AC3 to go into open position directly.

- Short Stop/Intermediate Position
  For short production stops the short stop position can be used (drawing 3). Thereby barrier chamber sterilization can be avoided. The initial position is open valve. For short stop position pressure is released from AC3 while AC2 is still activated. To open the valve after a short stop, reactivate AC3.

- Closing Procedure
  After production release AC3 and AC2 to move into closed position (drawing 1). Immediately after the barrier chamber has to be sterilized for 10 seconds (drawing 2).
3. Operation

3.4. Valve Positions

1. **Closed valve** (no compressed air)
   A condensate buffer will build up in the barrier chamber to ensure sterile separation of the two product lines. The condensate valve is close.

2. **Upper seat cleaning** (AC1).
   Condensate and steam from the sterile barrier flush and clean the upper seal and valve seat surfaces, always into the pressureless, empty piping system.

3. **Lower seat cleaning** (AC4).
   Condensate and steam from the sterile barrier flush and clean the lower seal and valve seat surfaces, always into the pressureless, empty piping system.

4. **Barrier chamber sterilization** (closed valve).
   The condensate valve is open and the barrier chamber is sterilised by the steam flow.

5. **Valve in intermediate position** (AC2).
   It is recommended as first step in the opening procedure and can also be used for short production stops. The valve acts as single seat valve. The condensate valve is closed.

6. **Open valve** (AC2 and AC3).
   Product can flow through the open double-seat valve.
4. Maintenance

4.1. General Maintenance

The following table shows the recommended maintenance intervals and the corresponding spare parts. They may vary according operating conditions.

<table>
<thead>
<tr>
<th>Maintenance</th>
<th>Product Seals</th>
<th>Internal Bellow</th>
<th>External Bellow</th>
<th>Actuator Seals</th>
</tr>
</thead>
<tbody>
<tr>
<td>After one week</td>
<td>Visual inspection</td>
<td>Visual inspection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly</td>
<td>Please comply with fault finding and repair in chapter 3.2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every 6 months or after 4000 lifts</td>
<td>Replace</td>
<td>Visual inspection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every 3 Years or after 200'000 lifts</td>
<td>Replace</td>
<td>Replace</td>
<td>Replace</td>
<td></td>
</tr>
</tbody>
</table>

Lubrication:
Only with USDA H1 approved grease. Do not use mineral oil or grease!

**After fitting** apply a thin layer of Klüber Paralig GTE 703 or similar grease only to the seals **pos. 18 and 33.**

**Before fitting**, lubricate with Klüber Paralig GTE 703 or similar grease suitable for EPDM!

4.2. Tools List

For maintenance of the valve (product part)
- 1 Spanner 19 mm
- 1 Spanner 17 mm
- 1 Hook spanner 45 mm
- 1 Tool set for valve plug maintenance
  **Art. No. 0912.22995**
  (incl. 5001.22998 and 5001.22999)

For maintenance of the actuator
- 1 Spanner 17 mm
- 1 Spanner 10 mm
- 1 Allen Key 5 mm
- 1 Socket spanner 24 mm

4.3. Torques

All threads are right-hand ISO threads. Please follow the table below for the correct torques appropriate for the screws and threads.

<table>
<thead>
<tr>
<th>Item (Pos.)</th>
<th>Counter Part (Pos.)</th>
<th>Thread Size</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower plug, external (24)</td>
<td>Stem (19)</td>
<td>M16</td>
<td>40 Nm</td>
</tr>
<tr>
<td>Upper plug (30)</td>
<td>Main piston (39)</td>
<td>M42 x 1.5</td>
<td>15 Nm</td>
</tr>
<tr>
<td>Bellow, external (21)</td>
<td>Upper plug (30)</td>
<td>M48 x 1.5</td>
<td>15 Nm</td>
</tr>
<tr>
<td>Stem (19)</td>
<td>Piston rod (7)</td>
<td>M12</td>
<td>80 Nm</td>
</tr>
<tr>
<td>Upper piston rod (48)</td>
<td>Piston rod (7)</td>
<td>M6</td>
<td>10 Nm</td>
</tr>
<tr>
<td>Nut (3)</td>
<td>Piston rod (7)</td>
<td>M16</td>
<td>140 Nm</td>
</tr>
<tr>
<td>Screws (14, 36, 37, 42, 49)</td>
<td>Various threads</td>
<td>M6</td>
<td>15 Nm</td>
</tr>
</tbody>
</table>
4. Maintenance

4.4. Preparation

1. Prepare operating manual.
2. Prepare recommended spare parts according to spare parts list 6.1.
3. Prepare recommended tools according to 4.2.

2. End the production process.
   2. Await the CIP cleaning to finish

3. Hot! Perform maintenance only on cooled down valve.

4. Never touch the moving parts if the actuator is supplied with compressed air.

5. Pressure! Perform maintenance only when product lines are empty and pressureless and when steam and condensate hose are not under pressure. Never service the valve when actuator is under pressure.

   2. Open condensate valve.

5. Release compressed air from AC1, AC2 and AC4 and disconnect tubes.
   2. Loosen and disconnect steam hose (46).
   3. Loosen and disconnect condensate hose (46).
   4. Disconnect cable (54) and remove control top (47) (optional).
4. Maintenance

4.5. Dismantling of Valve

1. Supply compressed air to AC3.
2. Loosen and remove clamp (31).
3. Release compressed air from AC3 and disconnect tube.

Spring under pressure! Never loosen the clamp without compressed air on AC3 since spring of the actuator is under pressure.

Twist the actuator slightly and carefully remove it from the valve body (23).

Compressed air! Do not supply compressed air to AC2 when it is removed.

Work bench! Use a stable base for the following tasks:

3. Mount the "counterhold" rod on steam or condensate connection pipes. Loosen lower external plug (24) and remove it from inner stem (19).
4. Pull out lower external plug (24) from lower internal plug (28).
5. Remove O-Ring (25) and guide (22).

Unscrew and remove upper plug (30) together with external bellow.

1. Remove internal bellow (20) together with O-ring (16) from upper plug (30).
2. Remove O-rings (18, 29, 33).

Valve plug! Be careful not to damage the sealing surfaces and bellows during maintenance.
4. Maintenance

4.5. Dismantling of Valve

1. Mount the upper plug on the bracket for easy maintenance. Loosen upper plug (30) and remove from external bellow (21).
2. Remove O-rings (26, 27).

Clean all removed parts and O-rings or replace them if damaged.

Dispose all used or replaced parts according to local regulations.

Visual inspection of stainless steel bellow.

Bellows! Sharp peaks indicate the presence of excessive pressure or pressure shocks in the process. Sharp valleys indicate the presence of vacuum or cavitation in the process. Adjust process conditions and replace bellows if necessary.

4.6. Reassembly of Valve

1. Fit O-ring (27) in the front end of the external bellow (21).
2. Fit O-ring (26) in the front end of the upper plug (30).
3. Gently lubricate both threads in the upper plug (30).
4. Fit upper plug (30) into external bellow (21) and tighten with the recommended torque. Make sure there is metallic contact between the parts.

Fit O-ring (29) in the front end of the internal bellow (20).
2. Fit O-ring (33) in the back end of the internal bellow (20).
3. Fit O-ring (18) in the front end of the external bellow.
4. Slide internal bellow (20) into upper plug (30).
5. Fit O-ring (16) in the back end of the upper plug (30).

Torque! Table 4.3. Tighten only slightly. Thread is designed not to loosen.
4. Maintenance

4.6. Reassembly of Valve

3. Fit upper plug unit (30+21) into bonnet (32) and tighten with the recommended torque. Make sure there is metallic contact between the parts.

O-Ring (17)! Before fitting the bellow check position of O-Ring (17).

Torque! Table 4.3. Tighten only slightly. Thread is designed not to loosen.

4. 1. Fit guide (22) into lower internal plug (28).
   2. Fit O-ring (25) into lower external plug (24)
   3. Slide lower internal plug (28) into lower external plug (24) and tighten to stem (19) with the recommended torque. Make sure there is metallic contact between the parts.

O-Ring (29)! Before fitting the lower plug unit, check position of O-ring (29).

Torque! Table 4.3.

5. Lift the actuator and the internal valve parts carefully into the valve body (23).

Valve plug! Be careful not to damage the sealing surfaces and bellows.

6. 1. Supply compressed air to AC3.
   2. Fit clamp (31).
   3. Release compressed air.

Spring under pressure! If valve is mounted to the housing without compressed air on AC3 the spring of the actuator is under pressure.
4. Maintenance

4.6. Reassembly of Valve

1. Reconnect air hose AC1, AC2 and AC4.
2. Reconnect steam hose (46).
3. Reconnect condensate hose (46).

O-Ring (34)! Check position of O-rings (34) on steam and condensate hose before reconnecting.

4.7. Dismantling of actuator

1. Loosen and remove screw (36).
2. Pull out condensate connection (35).
3. Loosen and remove screw (14).
4. Pull out steam connection (15).
5. Remove O-rings (34).

Side indication unit! (optional) If valve is equipped with a side indication unit, dismantle indication bracket (51) according to 2.4. If screws (14, 36) are removed, position indicators (53, 56) can be removed.

1. Loosen and remove screw (37).
2. Pull back loose bonnet ring.
3. Push bonnet (32) into actuator until retaining ring (12) is free.
4. Release and remove retaining ring (12) by pushing through the small bore in the cylinder face.
5. Remove bonnet (32) from the actuator.

1. Remove O-rings (11, 13, 17) from the bonnet (32).
4. Maintenance

4.7. Dismantling of Actuator

1. Pull out main piston (39) together with lower piston (38).
2. Slide lower piston (38) out of main piston (39).
3. Remove O-rings (4, 5, 10).

1. Loosen and remove screw (37).
2. Remove top plate (1).
3. Push cylinder lid (2) into actuator until retaining ring (12) is free.
4. Release and remove retaining ring (12) by pushing through the small bore in the cylinder face.
5. Pull out cylinder lid (2) by using two M6 screws.
6. Push out plug (44) from the back side of the lid (2).
7. Remove O-rings (12, 34).

1. Loosen and remove screw (37).
2. Remove top plate (1).
3. Push cylinder lid (2) into actuator until retaining ring (12) is free.
4. Release and remove retaining ring (12) by pushing through the small bore in the cylinder face.
5. Pull out cylinder lid (2) by using two M6 screws.
6. Push out plug (44) from the back side of the lid (2).
7. Remove O-rings (12, 34).

Control Top! If valve is equipped with a control top there is a piston rod (48), O-ring (50) and screw (49) mounted instead of the plug (44), the O-ring (34) and the screw (37).

1. Loosen stem (19) and counterhold on nut (3).
2. Pull out piston (8).
3. Remove O-rings (5, 9).

1. Remove piston rod (7) by pushing from below.
2. Unscrew and remove nut (3) from piston rod (7).
3. Remove upper piston (43) from piston rod (7).
4. Remove O-rings (4, 5).

1. Loosen and remove screws (42).
2. Pull out pins (41).
3. Remove O-Ring (34).

Remove O-rings (5) from both ends of the actuator.

Springs under tension! The actuator must not be any further dismantled beyond this point! Any attempt to do so is extremely dangerous and may cause serious injuries as it releases the main actuator spring.

Clean all removed parts and O-rings or replace them if damaged.

Waste! Dispose all used or replaced parts according to local regulations.
4. Maintenance

4.8. Reassembly of actuator

1. Lubricate and fit O-rings (5) from both ends of the actuator.

2. Lubricate and fit O-rings (34) on the three pins (41).
   1. Mount pins (41) from top of actuator.
   2. Insert screws (42) and tighten with recommended torque.

3. Lubricate and fit O-rings (4, 5) in upper piston (43).
   1. Fit piston (43) groove ahead onto piston rod (7).
   2. Fit nut (3) and tighten with recommended torque.
   3. Push upper piston unit (43+7) into the actuator until it hits the pins (41).

4. Lubricate and fit O-rings (5, 9) onto piston (8).
   1. Install piston (8) groove ahead onto the piston rod (7) (inside the actuator).
   2. Be careful not to damage O-ring (5).
   3. Insert stem (19) into piston rod (7) and tighten with the recommended torque.

5. Lubricate and fit O-ring (34) onto plug (44).
   1. Fit O-ring (34) onto plug (44).
   2. Lubricate and fit O-ring (11) onto lid (2).
   3. Push plug (44) into lid (2).
   4. Push cylinder lid (2) into actuator until groove for retaining ring (12) is free.
   5. Fit retaining ring (12) into groove.
   6. Put top plate (1) onto lid (2).
   7. Insert screws (37) into lid (2) and tighten with recommended torque.

Control Top! If valve is equipped with a control top there is a piston rod (48), O-ring (50) and screw (49) mounted instead of the plug (44), the O-ring (34) and the screw (37). Secure screws (49) with a small amount of LOCTITE 243 or similar threadlocking agent before mounting.

Torque ! Table 4.3. Tighten well.

Control Top !
4.8. Reassembly of Actuator

2. Slide main piston (39) on stem (19) from the front side into the actuator and over piston (8).
3. Lubricate and fit O-rings (4, 10) on lower piston (38).
4. Slide lower piston (38) over main piston (39) into the actuator..

7. Lubricate and fit O-rings (11, 13) into bonnet (32).
2. Lubricate and fit O-ring (17) into bonnet (32).

8. Push the bonnet (32) over the main piston (39) into the actuator until groove for retaining ring (12) is free. Hold back the loose bonnet ring.
2. Insert the retaining ring (12) into the groove of the actuator.
3. Fit the loose bonnet ring up to the retaining ring (12).
4. Insert screws (37) but do not tighten.

9. Turn the bonnet (32) so that the mounting surface in main piston (39) for the steam connection pipe (15) is positioned between the two columns on the left side of the groove for the external indication unit.
2. Insert steam connection pipe (15).
3. Insert and tighten screw (14).
4. Turn bonnet (32) with main piston (39) until groove and air connections are aligned.
5. Tighten screw (37).
6. Turn stem (19) until the groove for the condensate connection (35) lies between the two columns of the bonnet until the groove can be seen.
7. Insert and tighten screw (36).

5. Technical Data
### 5.1. Pressure and Temperature

<table>
<thead>
<tr>
<th>Parameter</th>
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<tr>
<td>Max. product pressure</td>
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<tr>
<td>Min. product pressure</td>
<td>Vakuum</td>
</tr>
<tr>
<td>Max. steam pressure in barrier chamber</td>
<td>4 bar (400 kPa)</td>
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<tr>
<td>Temperature range product area</td>
<td>up to 150°C</td>
</tr>
<tr>
<td>Min. air pressure for actuator</td>
<td>6 bar (600 kPa)</td>
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<tr>
<td>Max. air pressure for actuator</td>
<td>7 bar (700 kPa)</td>
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<tr>
<td>Temperature range for actuator</td>
<td>up to 100°C</td>
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Steam pressure in barrier chamber! Steam pressure in the barrier chamber always has to be higher than product or CIP pressure in the product pipes.

### 5.2. Energy Consumption

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<tr>
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<th>Compressed air consumption per operation (actuator ø190)</th>
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<td>1.04 NL x air pressure in bar</td>
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Steam consumption:
- Seat cleaning: 35 - 40 kg/h
- Barrier chamber sterilization: 4 - 8 kg/h

### 5.3. Werkstoffe

- **Product wetted parts**: stainless steel parts 1.4404 / 1.4435 / 1.4571 (AISI 316L / 316Ti)
- **Surface finish**: 0.8 μ
- **Other parts**
  - **Seals**: PEEK
  - **EPDM FDA**
- **Steam hose**: inside PTFE, cover 1.4301 (AISI 304)
- **Actuator**: stainless steel parts 1.4301 / 1.4305 (AISI 304)
  - **Slide bearing**: sintered bronze
  - **Seals**: EPDM

### 5.4. Side Indication Unit

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6. Spare Parts

6.1. Spare Parts List

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Service Kit Actuator: 0912.22979
Service Kit Valve: 0912.22980
6. Spare Parts

6.2. Spare Parts Drawing Valve and Actuator
6. Spare Parts

6.3. Spare Parts Drawing Control Top Adaptor

6.4. Spare Parts Drawing Side Indication Unit
Appendix A

Double Seat Tank Bottom Valve

The hanging installed Tank Bottom Valve needs to have **steam** and **condensate** attached as shown on the sketch beside.

There must be also a **reservoir** with a content of at least one litre in the steam supply line used for building up condensate. This reservoir should stand on a higher level than the valve seat or the tank bottom.

**To consider while installation:**

For changing the seal (18) the valve body must be removable from the piping. Therefore the lateral connecting pieces at the valve body should be equipped with unions.

Y = 55 mm is to consider with tanks having cooling jacket or isolation.

---

**Spare Parts**

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Qty</th>
<th>Description</th>
<th>DN 50</th>
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Operating Manual N35

Rev. 4.5

29.01.2010/BOS
Appendix B

Bellow Monitoring BOF

Principle

In the two-layer metal bellow, the rise in air pressure in the hermetically sealed space between the inner and outer bellow layer is monitored at the start of the SIP steam sterilisation procedure. Due to its dimensions, the inner bellow layer forms a breach location; this will be the first to rupture under conditions of heavy fatigue, therefore preventing a rise in pressure. The external layer, in contact with the product, won’t be damaged. An electronic switch monitors the pressure between the bellow layers. When exposed to heat for long periods, a vacuum breaker compensates, when cooled again, for any air diffusion losses that have developed.

Operation

We recommend doing a first sterilization without the manometric (65) switch and the vacuum breaker (61). Possibly remaining humidity in the monitoring area can escape in such a way through the unions. Wait until the valve cools down to ambient temperature and install then the manometric switch (65) and the vacuum breaker (61). At ambient temperature the indication should always stand on 0.00 bar. At the beginning of the sterilization the pressure rises rapidly to 0.10 bar and after approximately 5 min., dependent on the temperature, up to over 0.30 bar. After reaching the sterilization temperature the manometric switch can be queried by the CPU control. The active switching exit shows that the bellow is integer. A light diode at the cable box signals additionally the active switching exit. If the temperature rise is too slow, less than 2°C/sec, the pressure cannot rise because of air diffusion losses. In such a case please set in contact with MTS. There are other detecting methods available.

Maintenance

For maintenance and inspection work, please use the testing device (68).

Installation

1. The complete monitoring unit is examined at MTS and will be delivered separately. Before you put the valve into the housing, make sure whether the two O-rings (17) are assigned and the area between the bellow and the bonnet are drying and free of dust. Set then the valve into the housing as described under 4.6.

2. Install the monitoring unit at the appropriate connection and attach the cable with the cable box (64) at the plug. The circuit diagram is shown on the identification plate of the manometric switch (65).
Appendix B

Maintenance

With normal operating conditions the product wetend outside bellow layer survives the inside layer by three times. So a current process can be continued and finished even if the inside layer is broken. If the pressure in the monitoring area drops at the beginning of the sterilization under 0.10 bar or if it does not rise at all, check the unit at ambient temperature according to the following pattern.

Replace in addition the vacuum breaker (61) by the testing cylinder and screws the pressure up to 0.50 bar. If the indication on the manometric switch (65) drops continuously, replace the bellow at next possible opportunity.

If the indication keeps over 0.40 bar, check the vacuum breaker (61) in the same way according to the following pattern.

If the pressure drops continuously, replace the vacuum breaker (61).

Spare Parts

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<th>Pos.</th>
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