Operating Instructions

ROCO Wave Butterfly Valve
DN 150 – 1600
without actuator

Use this operating instruction always in connection with BA01E001!

1. Product and Functional description

1.1. Product description

**ROCO wave Butterfly Valve** according to DIN EN 593
With flanges, Double eccentric shaft bearings, soft sealing, tight shutoff, made of ductile cast iron, with modular graphite.
Actuations with SKG-slider crank mechanism by means of Hand wheel, Stem extension, Underground installation, Electrical Actuator.
1.2. Functional description

(see image 2)
In the body (1) a rotating mounted valve disc (2) guided by the external actuator shaft (11) is moved by means of a side mounted gear box. The pipeline is blocked when the disc (2) is perpendicular to the flow direction. By means of a sealing element (3 or 23) mounted to the disc (2) a tight shut off is achieved at the seat located in the valve body (1). The travel between the "OPEN" - and the "CLOSED" position (90 ° tilting motion) is limited by the end stop nuts on the actuator spindle of the attached gear system. Normally the valve closes in clockwise direction (right turn).
2. Design features

Image 2: Exploded view of ROCO wave with Profile gasket (I) and with clamp ring combination (II)

Table 1: Parts list for Exploded view (image 2)
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• (I) Main sealing (DN150 - DN600, PN10-16): Fully steel-reinforced rubberized profiled gaskets (23)
• (II) Main sealing (DN150 - DN600, PN25-40, DN700 - DN1600, PN10 - 40): Profiled gasket (3) combined with the clamping ring (10)
• Body seat: enameled or welded with special alloys
• Shaft bearings: maintenance-free, low-friction sliding bushes according to ISO 3547 - P1; fully sealed and without medium contact.
• Connecting shaft / disc: Polygon connection with closed disc hub.
• Shaft seal: fully chambered in stainless O-rings.
• The shafts (11) and the shaft sealing (13/14/15) are secured against blow-out when the gear box is dismantled.
• Gear box connection: according to EN ISO 5211, round pin with parallel key.
• Wetted parts by default are free from non-ferrous metals and are approved for drinking water applications.

3. Installation in pipeline

Remove all packing materials from valve. Check pipeline on pollutions and foreign parts prior to installation and clean if necessary.

It is important to ensure that the valve is completely accessible from all sides for operation and maintenance. If installed outdoors, the valve should be protected on site against direct weather influences.

During installation, the distance between the pipe flanges should be at least 20 mm larger than the face to face dimensions of the valve, so that the faces will not be damaged and the gaskets can be inserted. For flanges steel reinforced rubber gaskets are recommended. For slip-on flange it is mandatory (Medium and temperature compatibility must be observed).

The counter flanges must be parallel and concentric.

The connecting bolts must be tightened equally in crosswise (tension free). The pipeline must not be pulled up to the valve.

ROCO wave butterfly valves can be installed in all positions.

In fully open position the valve disc projects over the face to face length of the valve. So the relevant distance must be observed for installations.
4. Initial Startup

After installation in the pipe line, the valve must be checked for ease operation by actuating the valve through the entire (open - closed) operating range.

5. Operation and Application

5.1. Permissible mode of Operation

The valve disc can be streamed along from both the direct side (A preferred flow direction) and from the indirect side (B). The valve is actuated by means of hand wheel or with the control key according to DIN 3223. In this case, no excessive forces are to be applied.

Maximum permissible flow velocities:

- PN10: 3 m/s
- PN16: 4 m/s
- PN25: 5 m/s
- PN40: 6 m/s

5.2. Non permissible modes of operation

Mounting after manifolds or similar disruptive installation parts must be avoided. Continuous operation in throttle positions leads to increased wear for the materials. Make sure that the materials are suitable for the operating conditions. Do not exceed the maximum operating pressure temperature limits. Closed valve must only be loaded up to nominal pressure. For EPDM profile gaskets and O-rings: No contact of the rubber parts with mineral oils or greases are allowed as EPDM swells.
6. Maintenance

6.1. Maintenance and inspection

ROCO wave butterfly valves have maintenance-free bushings. Gear spindle and gearbox bearings are provided with long-term lubrication. Functionality and tightness according to DVGW W392 should be monitored on rotational basis at an interval of ≤ 4 years.

The revision valve must be closed and the pipe line section must be made free from pressure before commencing the maintenance works.

External condition of the valve, including gearbox must be checked. If necessary, clean and repair the coatings. Leakage at the flanges and the free movement of the valve and gearbox must be checked. The valve should be operated manually over the complete stroke.
By moving to the closed position the leakage at closed position can be checked.
The pressure drops before and after the valve must be checked.

6.2. Repair

6.2.1. Adjustment of the Profiled Sealing (Gasket)

(see image 5)
ROCO wave butterfly valves are equipped with adjustable sealing system. The profiled sealing ring (23) and the clamping ring (4) can be adjusted in the closed position of the valve disc. For this, the threaded pins (25/7) are to be loosened and the counter-screws (24/6) are to be retightened evenly and crosswise. Since the sealing system reacts when tightening very quickly, it is recommended to proceed slowly (half a turn of the screw). Finally, tighten the threaded pins (25/7) clockwise and thereby tying the profile seal ring and the clamping ring.

The operating torque of the valve may increase if the counter screws are over tightened.
6.2.2. Replacement of Profiled Sealing (Gaskets)

(see image 5)

- Move the valve disc (2) around 20° to 30° from the seat from the closed position.
- Loosen and remove the sunk bolts (24) and hexagonal bolts (6)
- Carefully remove the profile sealing (23) and the clamping ring (4)
- The profiled slots on the disc (2) must be cleaned and check and repair the corrosion protection if required.
- Insert the new profile sealing (23) and clamp (4) / profile ring (3) by slightly turning the disc. It should be noted that the profiled sealing ring (23) or clamping ring (4) are positioned correctly in the valve disc and make sure it will not stuck in the body seat. Proper installation can be checked by the free movement of profile sealing (23) and clamping ring (4) in the valve plate (2).

**Note:** It will be easy to insert the sealing (23) and the profiled gasket (3) if they are moistened with any lubricant before assembling (use only lubricants approved for using in drinking water applications)

*Profiled gaskets made of EPDM may not come in contact with mineralized lubricants!*
- The sunk bolts (24) and hexagonal bolts (6) should be tightened crosswise with the torques listed in Table 1.
- Finally tighten the threaded pins (7, 25).

**Note**: It is recommended to use standard lock washers and sealing agents when mounting the counter sunk bolts and screws. That provides a better corrosion protection and increased safety against loosening.

The following torque values are only approximate values and may vary in practice. Therefore a final leakage test is mandatory.

<table>
<thead>
<tr>
<th></th>
<th>Tightening torque for the profile seal ring / clamping ring</th>
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<tbody>
<tr>
<td></td>
<td>[Nm]</td>
</tr>
<tr>
<td></td>
<td>10 bar 16 bar 25 bar 40 bar</td>
</tr>
<tr>
<td>DN150</td>
<td>5 5 5 5</td>
</tr>
<tr>
<td>DN200</td>
<td>4 5 5 7</td>
</tr>
<tr>
<td>DN250</td>
<td>8 9 12 15</td>
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<tr>
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<td>15 15 25 25</td>
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<td>DN1600</td>
<td>45 50 50 55</td>
</tr>
</tbody>
</table>

Typical values for Enamel seat design are approximately 20% higher

Table 2: Approximated tightening torques for the profile seal ring / clamping ring
6.2.3. Replacement of shaft sealing

Required spare parts: shaft sealing set consisting of:

(see image 6)
- Cage (13) 1 Piece
- Outer O-Ring (19) 1 Piece
- Inner O-Ring (20) 1 Piece
- O-Ring for bearing cover (18) 1 Piece

![Image 6: Shaft sealing system for ROCO wave butterfly valve.](image)

- Actuator side:
  - Remove gears /tilting actuator from the flap
  - Remove parallel key (15)
  - Remove the retaining ring (14).
  - Knockout the actuator shaft by means of slide hammer for about 20 mm. The cage will be pressed out somewhat in this way.

![Image 7: Valve connection with slide hammer](image)
• Place two medium sized flat-bladed screwdriver opposite to each other on the cage (13) and lever cage out (the outer O rings will be destroyed).
• If no slide hammer is available the cage can also be drilled out.
• Clean the installation part.
• Insert the O-rings (19, 20) into the new cage with light lubrication.
• Push the O-rings completely into the body.
• Insert new retaining ring and check for firm positioning.
• Transmission / swivel drive to grow.

Bearing side

• Dismantle the bearing cover (21) by losing the hexagonal bolt (23).
• Remove old O ring (18) from the groove in the bearing cover.
• Clean O ring groove.
• Insert new O ring (18) and remount bearing cover (21).

7. Actuator design

7.1. Operation and application

Slew transmissions or actuators, respectively, are normally used for actuation of valves with a tilting angle of up to 90°.

• Manual actuation with hand wheel, chain wheel, underground valve, actuating spanner.
• Motor actuation via electro drive and controller systems.
• Pneumatic or hydraulic actuation with piston actuators.
• For designing the actuator the connection size of the valve and the torque requirement must be considered.

7.2. Attachment

Attention:
Make sure both parts are in the same end stop position OPEN or CLOSED prior to attaching the SKG gears to the valve.

• push actuator shaft (12) on the valve shaft up to the flange (see image 8) and secure with worm-screw (13).
• screw in pointer (16) in the centering of the valve shaft and align parallel to the valve disc.
• lubricate the indented joint of the valve shaft (12).
• put on gears and tighten the fixing bolts according to table 3 crosswise.
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Image 8: Attaching the actuation shaft

<table>
<thead>
<tr>
<th>Flange type</th>
<th>Bolt size</th>
<th>Nm bolts 8.8</th>
<th>Nm bolts A2-70</th>
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<tbody>
<tr>
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<td>M8</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
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<td>M10</td>
<td>50</td>
<td>36</td>
</tr>
<tr>
<td>F12</td>
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<td>M20</td>
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<td>290</td>
</tr>
<tr>
<td>F25</td>
<td>M16</td>
<td>210</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 3: Torque values for fixing bolts for the gears

7.3. Adjustment of the end stop position and function test

Adjustment of the end positions should be performed according to instructions of the valve manufacturer.
After actuator installation a function test and leakage test must be performed.