



# Installation, Operation and Maintenance Manual

## RR & RC Flap Gates

<b>INSTALLATION, OPERATION AND MAINTENANCE MANUAL</b>		06-2010 Edition Rev. A - 02/23/11
<b>MODEL</b>	<b>RR &amp; RC FLAP GATES</b>	 <b>ORBINOX</b> <small>VALVE SOLUTIONS IN MORE THAN 70 COUNTRIES</small>

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## INTRODUCTION

This manual describes the recommended procedures for installation, operation, maintenance and safety precautions for Orbinox RR and RC model flap gates. Please read thoroughly all the instructions in the manual prior to installation, and contact an Orbinox representative in case of any questions. The manual makes reference to the "General Arrangement Drawing" (GAD). The GAD is the drawing that is sent to and approved by the customer prior to the production of the gate. **Orbinox assumes no responsibility or liability if the RR or RC Flap Gate is not installed, operated and maintained in strict accordance to the procedures described in this manual.**

## HANDLING AND STORAGE

Standard safety procedures should be followed to prevent personal injury or equipment damage. Additionally, the following instructions shall be followed during handling and storage to prevent any damage to the product:

- Special care shall be taken on any machined surface when lifting the gate.
- Equipment shall be stored in a dry, clean and even area on a raised even wood surface to prevent distortion of the frame. Do not stack gates.

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## INSTALLATION: WALL MOUNTED

### Required Materials:

RR and RC flap gates are installed by means of mechanical anchor bolts (Hilti Kwilt 3 or equivalent) and construction sealant (Sikabond or equivalent). Note that as standard, anchor bolts and construction sealant are not supplied with the flap gate.

For detailed information about the type, size and quantity of the required anchor bolts, or any other specific installation notes or materials, please refer to the notes on the "General Arrangement Drawing".

### INSTALLATION PROCEDURE

#### Step 1: Concrete construction inspection

- The concrete construction shall be flat, level and plumb, and shall be in accordance to ACI 117-06 standard. If necessary, use non-shrink grout in order to meet the specified standard. The minimum concrete strength shall be 3,000 PSI (20.7 MPa).
- The wall surface shall be dry.

#### Step 2: Pre-installation of the flap gate

- Position the flap gate against the wall and line up with the opening.
- Drill and install an anchor bolt on each side of the flap gate. After installing the first anchor bolt, and prior to drilling the hole on the other side, make sure the frame is perfectly leveled (see Figure 1).

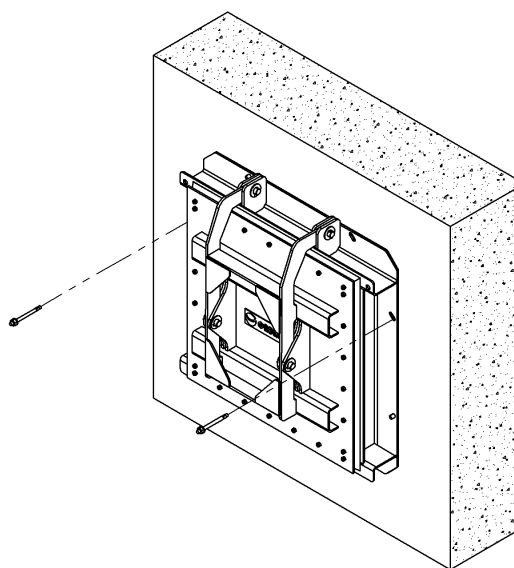


Figure 1

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**INSTALLATION: WALL MOUNTED**

continued

**Step 3: Construction sealant application (Sikabond or equivalent)**

In order to avoid leakage between the frame and the wall, construction sealant shall be applied on the back side of the frame:

- Remove the flap gate from the wall (first remove the nuts of the anchor bolts).
- Apply construction sealant all around the perimeter of the frame, where it will be in contact with the wall. Sikabond (206 oz/ft = 200 ml/m) or equivalent construction sealant shall be used (See Figure 2 and 3). Be sure not to get sealant on the gate's seals or guides as this may cause leakage or damage.

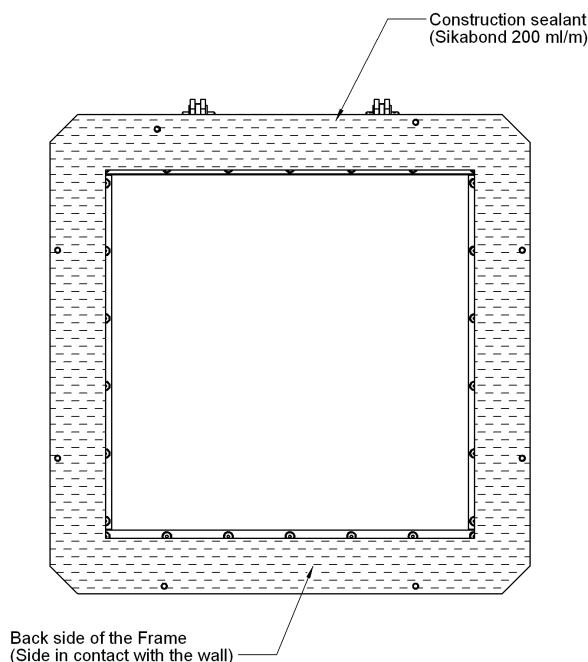


Figure 2



Figure 3

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**INSTALLATION: WALL MOUNTED**

continued

**Step 4: Final installation**

- Drill and install the rest of the anchor bolts (see Figure 4).

**CAUTION!:** If the flap gate is not completely in contact with the wall, do not over-tighten the anchor bolts. Over tightening may bend or distort the frame. If the wall flatness and levelness is according to the specified standards, the construction sealant will fill in the remaining void (see Figure 5).

- Apply construction sealant around the frame in order to fill in any existing gap between the wall and the frame (this step is only for esthetics). Wipe away the excess sealant to leave a smooth finish.

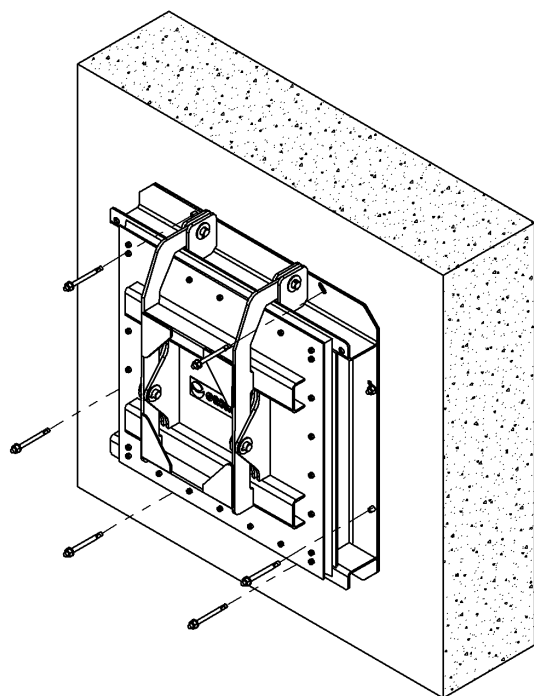


Figure 4

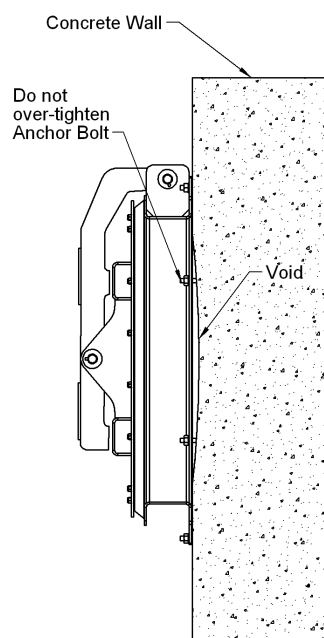


Figure 5

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## INSTALLATION: STANDARD FLANGE MOUNTED

### Required Materials:

Orbinox Standard Flange Mounted RR Flap Gates are installed by means of Hex Bolts and a flange gasket. For detailed information about the size and quantity of the required bolts, or any other specific installation notes or materials, please refer to the notes on the 'General Arrangement Drawing'.

### Installation:

- Partially tighten the four corner bolts, and check that the flap gate is perfectly lined up with the flange.
- Install the rest of the bolts, and evenly tighten all of them.

## INSTALLATION: WALL THIMBLE MOUNTED

### Required Materials:

Orbinox Wall Thimble Mounted RR and RC Flap Gates are installed by means of Hex Bolts. In order to avoid leakage between the wall thimble and the frame, construction sealant shall be used. (Sikabond Construction Sealant or equivalent, 206oz/ft or 200ml/m of opening perimeter). For detailed information about the size and quantity of the required bolts, or any other specific installation notes or materials, please refer to the notes on the 'General Arrangement Drawing'. Note that as standard, bolts and construction sealant are not supplied with the slide gate.

### Installation:

- The concrete construction shall be flat, level and plumb, and shall be in accordance to ACI 117-06 standard. If necessary, use non-shrink grout in order to meet the specified standard.
- Apply construction sealant all around the perimeter of the frame. Sikabond (200 ml/m) or equivalent construction sealant shall be used.
- Partially tighten the four corner bolts, and check that the flap gate is perfectly lined up with the wall thimble opening.
- Install the rest of the bolts, and evenly tighten all of them.

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## OPERATION

### Initial Operation:

Before operating the flap gate, make sure there are no foreign deposits or materials on the seals, guides or sealing area. Gate seals could be damaged if the area is not cleaned and coated with a light grease. Please refer to section "Materials needed for maintenance and seal replacement" on page 9 for detailed information about the required grease type.

### Operation:

The RR and RC Flap Gate is operated (opened) automatically, when the seating water head is higher than the unseating water head.

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## MAINTENANCE: CLEANING AND LUBRICATION

Orbinox model RR and RC Flap Gates need practically no maintenance. In order to assure maximum performance of the flap gate, the following maintenance inspections shall be carried out periodically every 6 months:

- Clean the gate with clear water and remove any deposits, especially on the seals.
- Check the seals and make sure they are not damaged. Seals shall be replaced if damaged. See section "Maintenance: Seal Replacement" for detailed procedures about seal replacement.
- **Seals shall be wet.** If the flap gate has not been used for a long period of time under dry conditions, the seals shall be wetted with clear water.

### Spare parts:

Orbinox does not recommend stocking any spare parts by the owner of the equipment as the flap gates are designed for a very long life cycle. If a repair part is required, please contact an Orbinox representative and provide the following information:

- Orbinox S/O number.
- "Orbinox General Arrangement Drawing" number.
- Project name (if applicable).
- Vendor's company name.

### Materials needed for maintenance and seal replacement:

Material	Type	Recommended or equivalent
Grease	Silica-Gel Silicone Grease	Verkosil G-2
Glue	Instant adhesive	Loctite 495

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## MAINTENANCE: RR SEAL REPLACEMENT

The following procedure describes how to replace the RC Flap Gate's seal. The flap shall be secured by lifting it to the open position with a crane. In case it cannot be secured in the open position, the flap should be first removed prior to the seal replacement.

### Un-install flap (figure 6)

- **Step 1:** Remove spring pins, washers and hinge pins (items 1, 2 and 3) with caution, as the flap (item 4) is no longer secured.

### Seal replacement (figure 7)

- **Step 1:** Remove bolts and nuts (items 2 and 3) and remove the lateral and horizontal retainers (item 4 and 5).
- **Step 2:** Remove seal (item 6) and replace it with the new seal.

### Reassembly:

- Follow Steps 2 to 1.

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### MAINTENANCE: RR SEAL REPLACEMENT

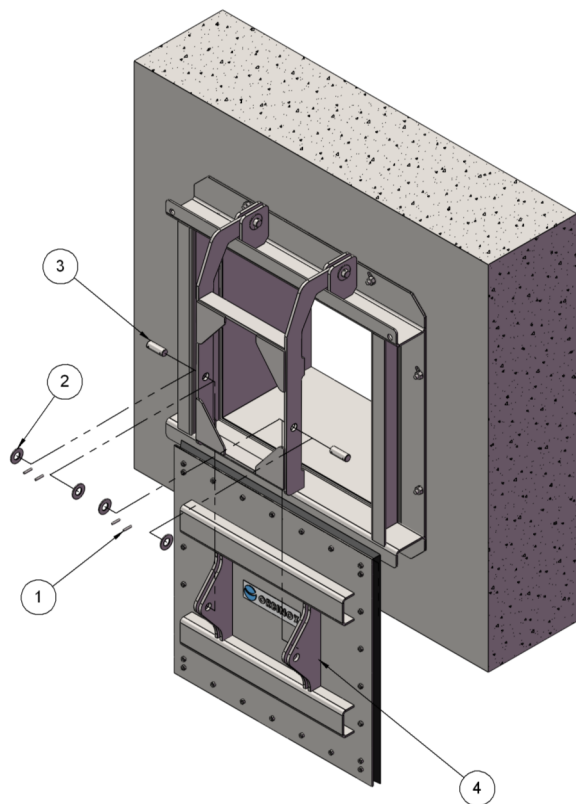


Figure 6

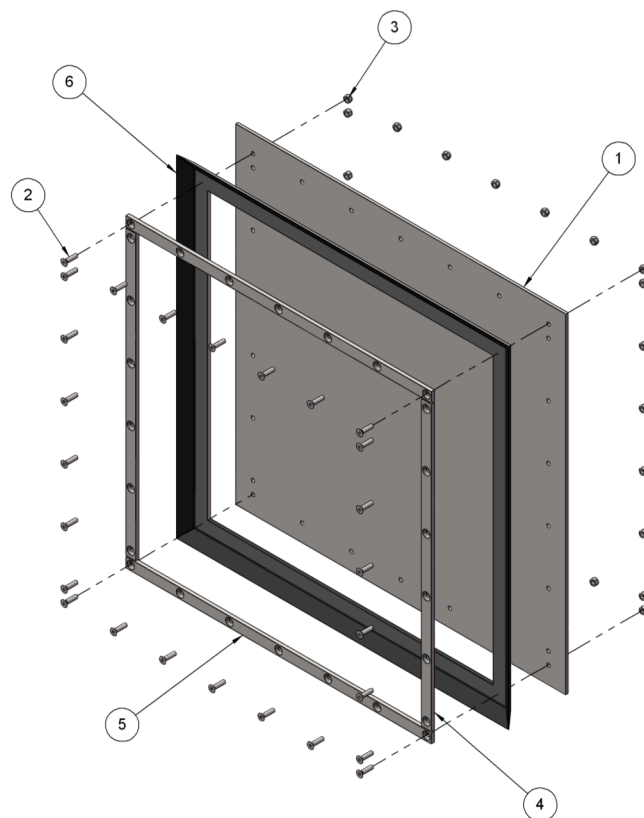


Figure 7

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## MAINTENANCE: RC SEAL REPLACEMENT

The following procedure describes how to replace the RR Flap Gate's seal. The flap shall be secured by lifting it to the open position with a crane. In case it cannot be secured in the open position, the flap should be first removed prior to the seal replacement.

### Un-install flap

- **Step 1:** Remove spring pins, washers and hinge pins (items 1, 2 and 3) with caution, as the flap (item 4) is no longer secured.

### Seal replacement

- **Step 1:** Remove bolts and nuts (items 5 and 8) and remove the retainers (items 6).
- **Step 2:** Remove seal (item 7) and replace it with the new seal.

### Reassembly:

- Follow Steps 2 to 1.

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**MAINTENANCE: RC SEAL REPLACEMENT**

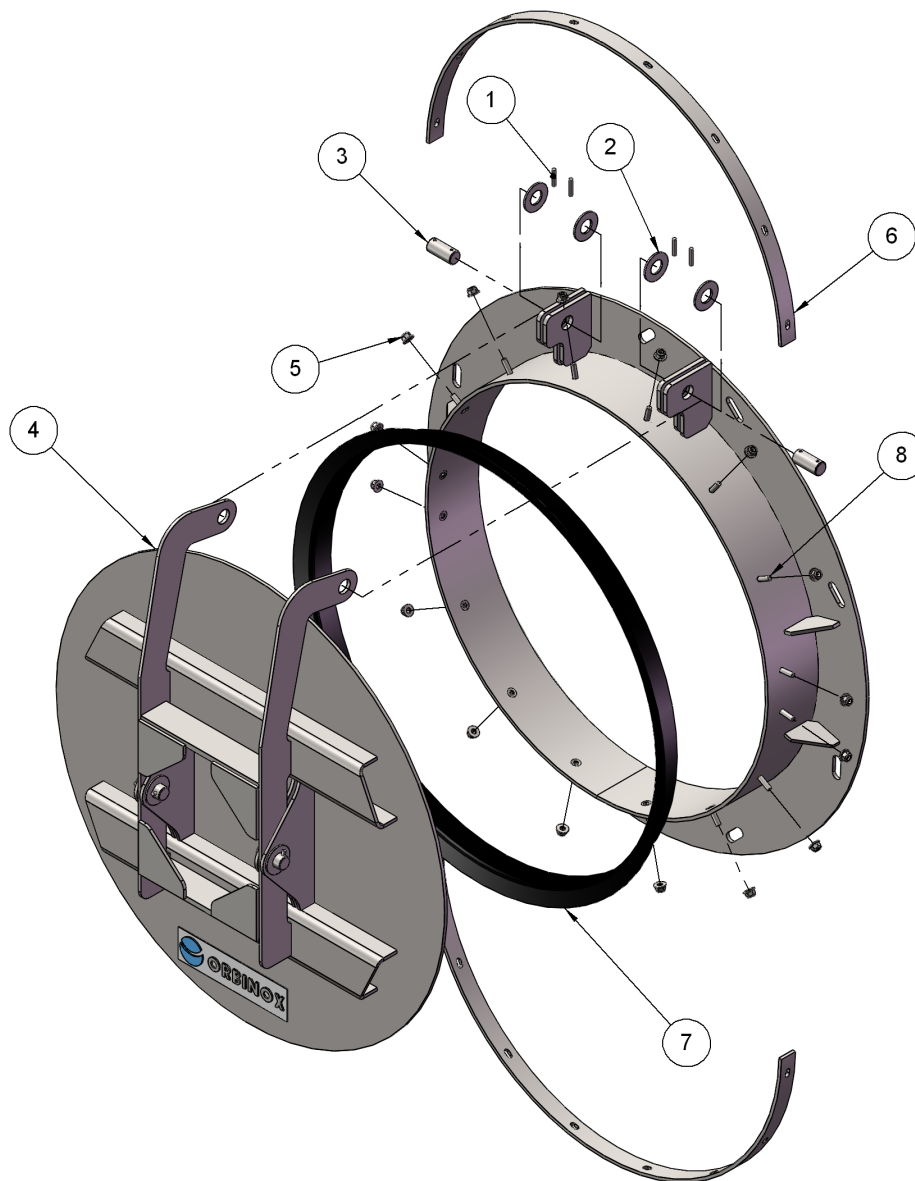


Figure 8

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## TROUBLE SHOOTING

SYMPTOM	CAUSE	SOLUTION
<ul style="list-style-type: none"> <li>Leakage between flap gate and concrete wall</li> </ul>	<ul style="list-style-type: none"> <li>Concrete wall does not meet the required std.</li> </ul>	<ul style="list-style-type: none"> <li>Un-install the slide gate and fix the wall.</li> </ul>
	<ul style="list-style-type: none"> <li>Not enough construction sealant.</li> </ul>	<ul style="list-style-type: none"> <li>Un-install the slide gate, clean the wall and apply a new layer of construction sealant.</li> </ul>
	<ul style="list-style-type: none"> <li>Loose anchor bolts.</li> </ul>	<ul style="list-style-type: none"> <li>Tighten anchor bolts.</li> </ul>
	<ul style="list-style-type: none"> <li>Incorrect anchor bolts.</li> </ul>	<ul style="list-style-type: none"> <li>Check the "General Arrangement Drawing" and make sure the right anchor bolts have been installed.</li> </ul>
<ul style="list-style-type: none"> <li>Leakage through the seal</li> </ul>	<ul style="list-style-type: none"> <li>Foreign material trapped between flap and frame</li> </ul>	<ul style="list-style-type: none"> <li>Remove the foreign material. Check if there is any damage to the seal.</li> </ul>
	<ul style="list-style-type: none"> <li>Damaged seal.</li> </ul>	<ul style="list-style-type: none"> <li>Replace seal.</li> </ul>

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