

**MODEL**

**MU**

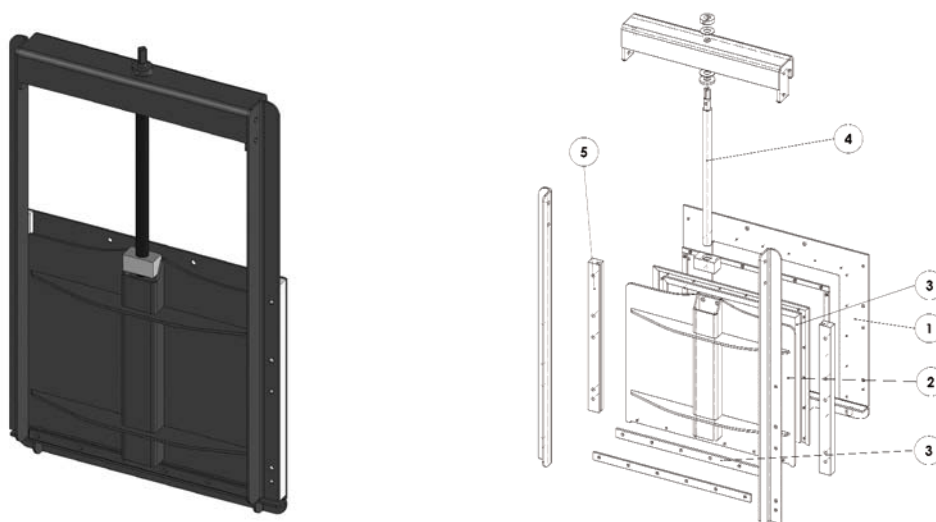
## SLIDE GATE

The MU model is a rectangular penstock suitable for wall and thimble mounting, with a resilient sealing member applied to all 4 sides. There are two different designs, which are size dependent,  $\leq 1000 \times 1000$  or  $\geq 1100 \times 1100$ .

The MU series is used mainly in water treatment, irrigation, hydraulic works and hydro-electric power plants.

This product is manufactured in accordance with the following standards: AWWA 513-05, DIN 19569 and BS 7775.

SIZES: From 200x200 to 2000x2000 (as standard). Alternative sizes available on request.



## CONSTRUCTION MATERIALS

Standard materials of construction:

1.- Frame:	Stainless Steel AISI 304, AISI 316, AISI 316 Ti or Carbon Steel
2.- Gate:	Stainless Steel AISI 304, AISI 316, AISI 316 Ti or Carbon Steel
3.- Seals:	EPDM
4.- Stem:	Stainless steel AISI 303 as standard. AISI 304/AISI 316 on request
5.- Sliders:	UHMWPE

## SERVICE CONDITIONS

Size	On-seating design head	Off-seating design head
200x200 – 1000x1000	10 m.w.c.	10 m.w.c.
1100x1100 – 2000x2000	10 m.w.c.	2 m.w.c.

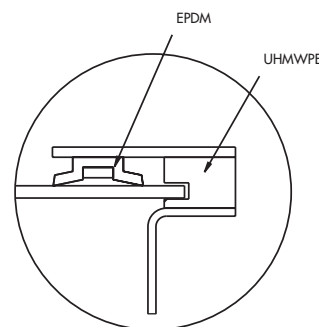
Alternative alloy materials, like AISI 904L or DUPLEX stainless steel, are available if required.

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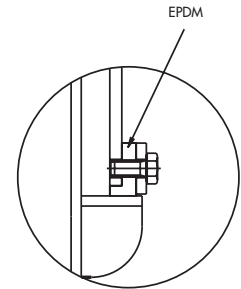
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## DESIGN FEATURES

- MU slide gates can be fabricated with square or rectangular openings. A circular orifice version, the MC series, is available from Ø200 to Ø600 mm.
- MU penstocks are bi-directional as standard, for sizes ≤1000x1000. On request, we have the capability to provide a custom design service for both off-seating heads and bi-directional applications, in any size.
- Modular design allows both open frame and self-contained configurations.
- Option of rising or non-rising stem actuation.
- Suitable for linear actuation with either pneumatic or hydraulic cylinders.
- Suitable for wall thimble mounting.
- Frame design allows easy mounting, at medium height or floor level.
- UHMWPE sliders for on-seating and off-seating heads, reduce the friction coefficient during operation, minimising actuation thrust and extending the seal life.
- Stems in AISI 303 stainless steel, threaded in accordance with DIN 103 standard.



SIDE SEALING



INVERT SEALING

## ACTUATORS

MU series modular design ensures they are easily adaptable to non-rising stem (self-contained frame), rising stem (open frame) and linear actuation applications.

### Manual operators:

- Handwheel with rising spindle
- Handwheel with non-rising spindle
- Gear box with rising spindle
- Gear box with non rising spindle
- Others (cap top,...)

### Actuators:

- Electric actuator
- Pneumatic cylinder
- Hydraulic cylinder

Slide gates with a self-contained frame design accommodate a direct interface with various actuators. However, when using extensions, the actuator must be mounted securely onto a dedicated floor pillar or appropriate wall bracket supports.

### Accessories:

There are various accessories available for the manual operators or actuators: mechanical stops, actuator manual overrides, locking devices, solenoid valves, positioners, limit switches, proximity switches or sensors, etc.

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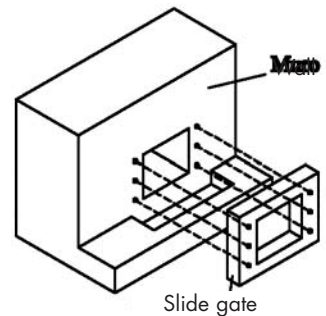
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## INSTALLATION INSTRUCTIONS

### 1. Wall mounting

#### 1.1. Slide gates $\leq$ 2000

- Open the gate.
- Place the frame against the wall making sure the orifices on both the wall and the frame are perfectly aligned.
- Drill the concrete using the holes on the frame as a guide.
- Introduce the anchor bolts with a hammer.
- In order to avoid leakage between frame and the wall, separate the frame from the wall and fill the space between them with SIKAFLEX 11 FC or similar. As an alternative, soft adhesive rubber tape can be used (20mm wide by 10mm deep), placed on the back of the frame around the orifice.
- Place the frame back on the wall and tighten the fasteners of the anchor bolts. Be very careful not bending the frame.

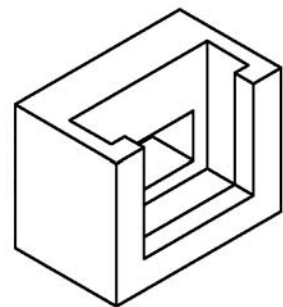


#### **▲ WARNING!!**

If the wall is not level, tightening the fasteners fully may bend the frame. Use of a spirit level or flat ruler is recommended, whilst installing, to control the level of the frame. If you notice the frame is beginning to bend, stop tightening. Fill the void between the wall and metal frame with expansive mortar, allow necessary time to dry. Once satisfied, resume retighten all fasteners. Malfunctioning of a penstock due to incorrect installation is not the responsibility of ORBINOX.

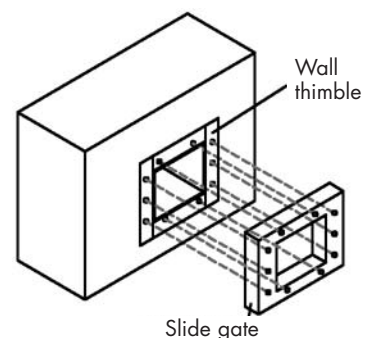
#### 1.2. Slide gates $>$ 2000

- Slide gates on these sizes can not be held on the wall by only anchor bolts. They have to be held into concrete. The wall must have a shape similar to the one shown in the figure. Dimensions are shown in drawings.
- Place the frame against the wall with the seal side downstream.
- Center the slide gate horizontally and vertically making sure the orifices of both the frame and the wall are perfectly aligned.
- Hold the slide gate in place in such position. The slide gates are delivered with special bolts, nuts and counter nuts to adjust the frame and fix it in position.
- Fill the void with expansive mortar type SIKAGROUT or similar.



### 2. Wall thimble mounting

- MU slide gates can be mounted on a wall thimble. The thimble has threaded holes, to be aligned with the fixing holes on the frame of the slide gate.
- Tighten the frame against the wall thimble placing a seal between them.



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## MAINTENANCE INSTRUCTIONS

### 1. Stem lubrication

Keep the stem well greased to avoid premature wear of the bronze nut.

### 2. Seal replacement

The seals are retained with stainless steel plates and fasteners. After replacing the seals, the fixing components can be reused.

## OPERATING INSTRUCTIONS

### 1. Opening and closing

A clockwise rotation closes the gate. Once the closed position is reached, apply additional 1/4 turn. This will ensure that the bottom seal is properly pressed.

#### **WARNING!!**

Forcing the spindle unnecessarily does not improve the sealing performance and may cause irreparable damage on stems, nuts, gates and frames.

A counter clockwise rotation opens the gate. The gate will stop against the upper beam once the slide gate is fully open.

The slide gate operating system is self-locking by design, thus the gate will remain in the last operated position: open, closed or intermediate.

### 2. Electric actuators

Electric actuators for ORBINOX slide gates should have the following adjustments:

#### **Opening:**

Position indicator and motor cut-off by limit switch.

Adjust the torque switch setting at the values specified by ORBINOX.

#### **Closing:**

Position indicator and motor cut-off by limit switch or torque switch.

Adjust the torque switch setting at the values specified by ORBINOX.

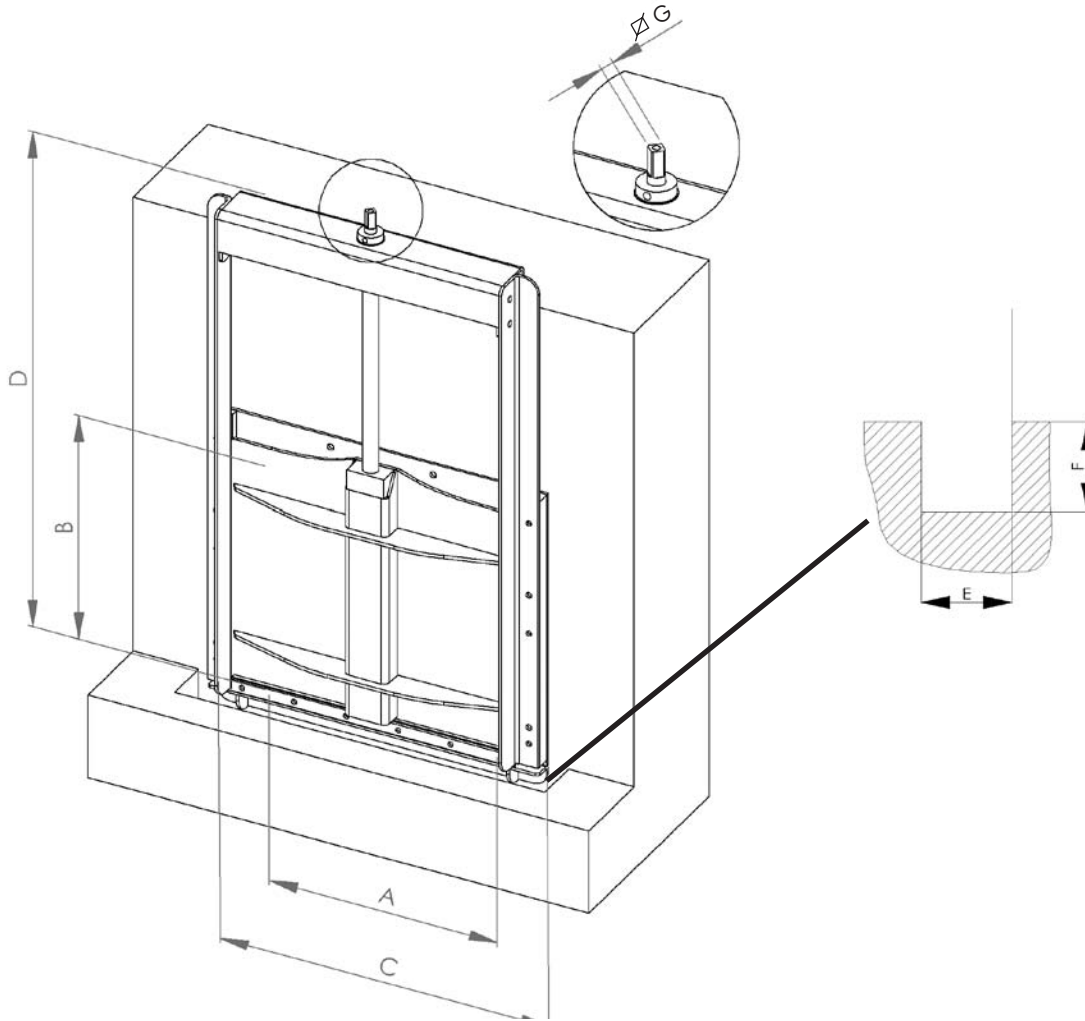
#### **WARNING!!**

- Electric motors without limit and torque switches are not applicable to ORBINOX slide gates
- Electric motors have internal anti-condensation electric heaters. Avoid mounting the actuators outside if they are not connected to the electric supply. Internal humidity could damage the electric/electronic components.
- For motor maintenance, refer to the dedicated manufacturers IOM manual.

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**MU NON RISING STEM ≤ 1000X1000**

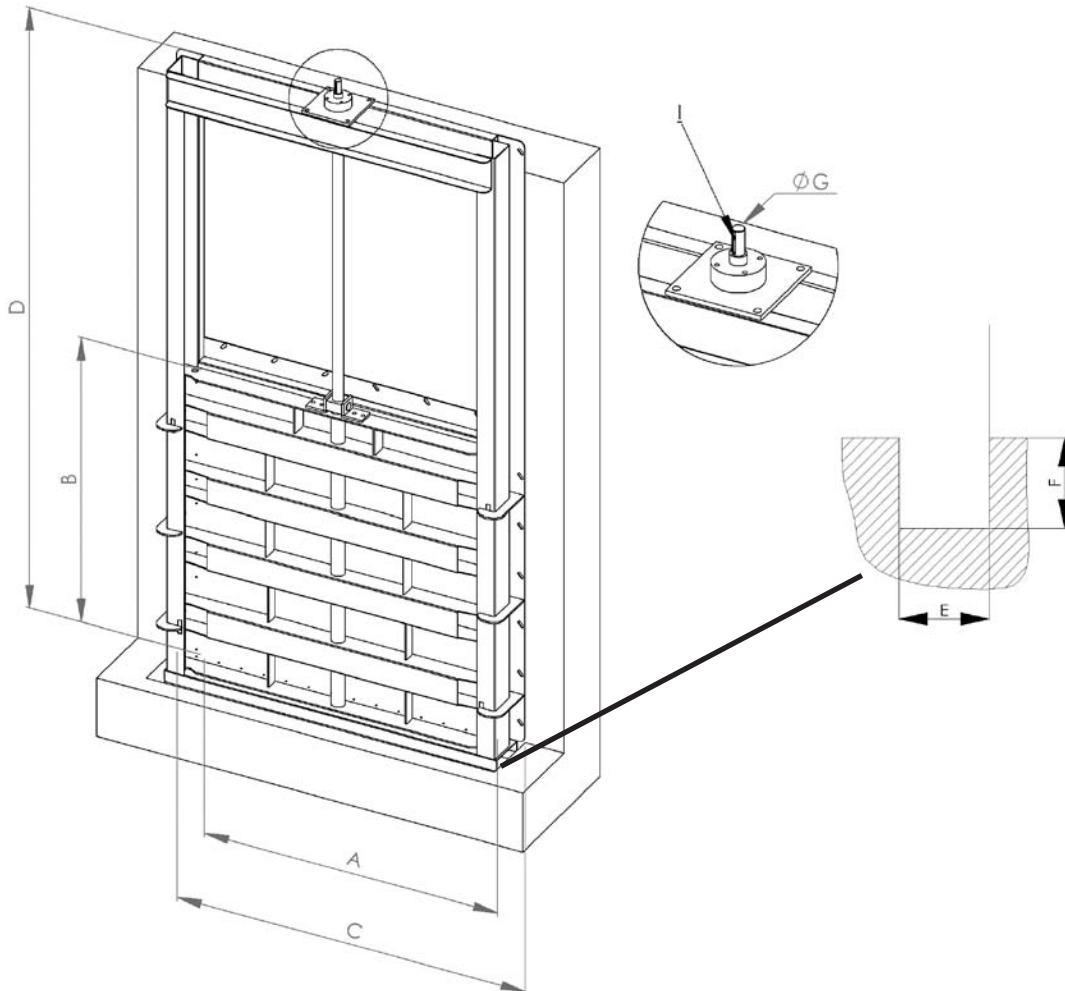


A	B	C	D	∅ G	E X F
200	200	380	492	∅12x12	70x75
300	300	480	692	∅12x12	70x75
400	400	580	893	∅14x14	70x75
500	500	680	1093	∅14x14	70x75
600	600	780	1294	∅14x14	70x75
700	700	880	1496	∅14x14	70x75
800	800	980	1696	∅14x14	70x75
900	900	1100	1976	∅20x20	70x85
1000	1000	1200	2176	∅20x20	70x85

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**MU NON RISING STEM 1100X1100 - 2000X2000**



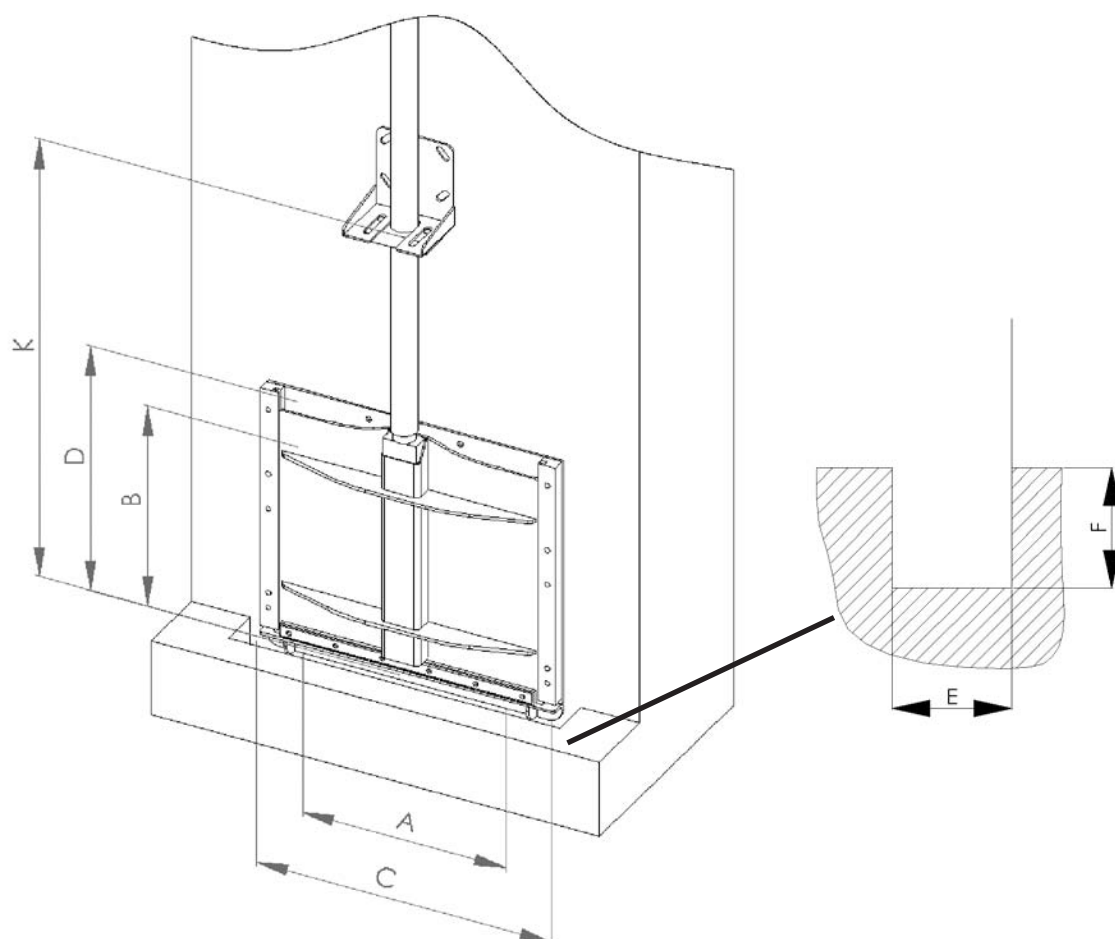
A	B	C	D	Ø G	I	E X F
1100	1100	1380	2370	Ø 30	8x7x60	300x110
1200	1200	1430	2570	Ø 30	8x7x60	300x110
1300	1300	1580	2770	Ø 30	8x7x60	300x110
1400	1400	1680	2970	Ø 30	8x7x60	300x110
1500	1500	1780	3170	Ø 30	8x7x60	300x110
1600	1600	1880	3370	Ø 35	10x8x70	400x140
1700	1700	1780	3570	Ø 35	10x8x70	400x140
1800	1800	2080	3770	Ø 35	10x8x70	400x140
1900	1900	2180	3970	Ø 35	10x8x70	400x140
2000	2000	2280	4170	Ø 35	10x8x70	400x140

\* For alternative sizes check with ORBINOX technical department.

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**MU RISING STEM  $\leq$  1000X1000**



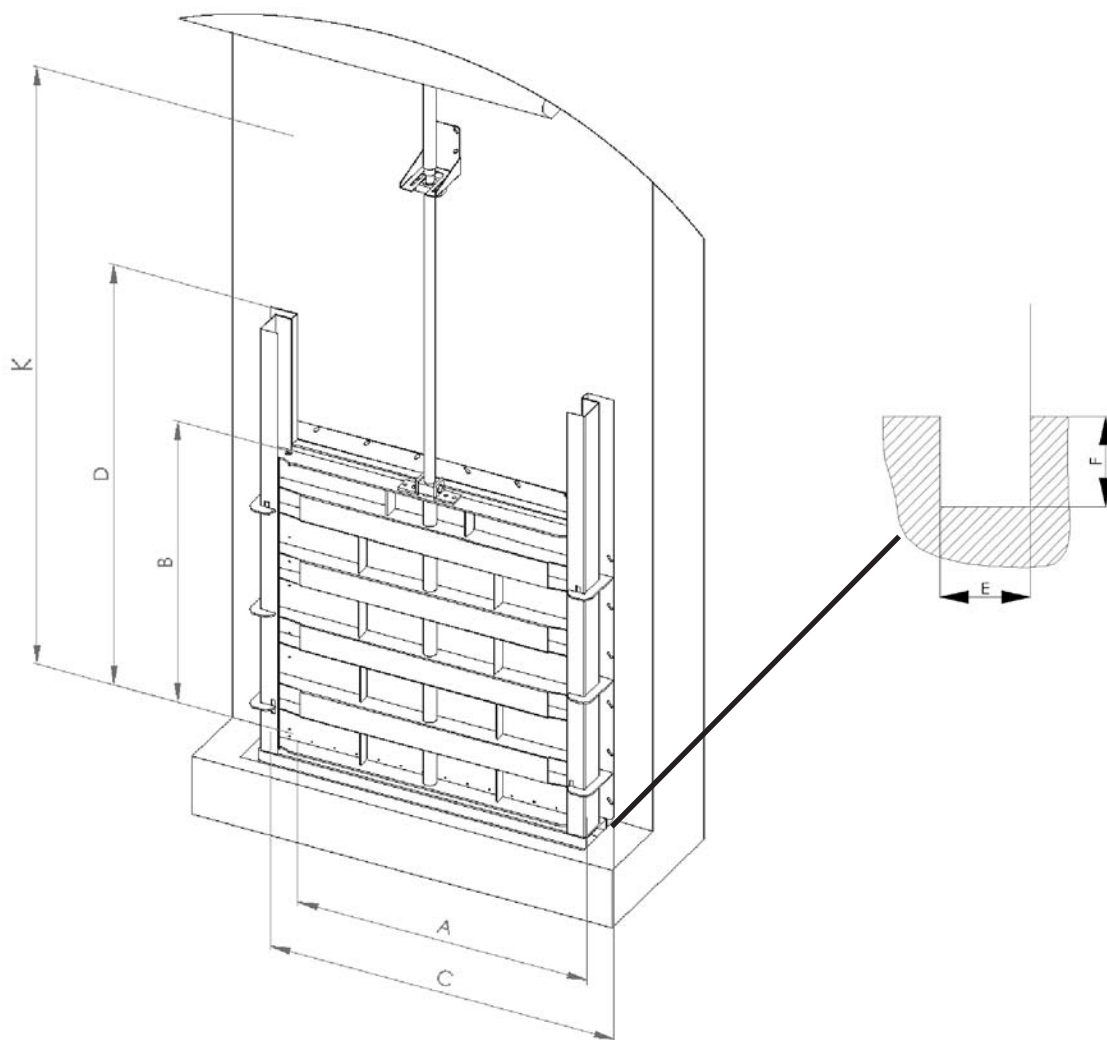
A	B	C	D	K	E X F
200	200	380	290	475	70x75
300	300	480	390	675	70x75
400	400	580	490	900	70x75
500	500	680	590	1100	70x75
600	600	780	690	1300	70x75
700	700	880	790	1500	70x75
800	800	980	890	1700	70x75
900	900	1100	1000	1904	70x85
1000	1000	1200	1100	2104	70x85



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**MU RISING STEM 1100X1100 - 2000X2000**



A	B	C	D	K	E X F
1100	1100	1380	1850	2260	300x110
1200	1200	1430	2000	2460	300x110
1300	1300	1580	2150	2660	300x110
1400	1400	1680	2300	2860	300x110
1500	1500	1780	2450	3060	300x110
1600	1600	1880	2600	3260	400x140
1700	1700	1980	2750	3460	400x140
1800	1800	2080	2900	3660	400x140
1900	1900	2180	3050	3860	400x140
2000	2000	2280	3200	4060	400x140

\* For alternative sizes check with ORBINOX technical department.



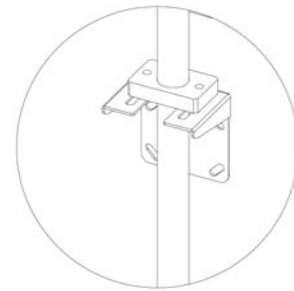
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## EXTENSIONS

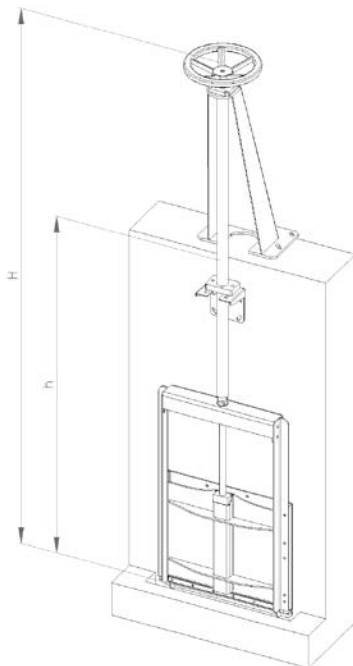
Tube extensions are used to allow operation of the gate remotely. Connections to the slide gate are by means of square nuts or fixed couplings.

Should the length of the extension exceed 2-3 meters, dedicated polyethylene guides will be provided and must be utilised with the appropriate wall brackets and fixings, as illustrated.



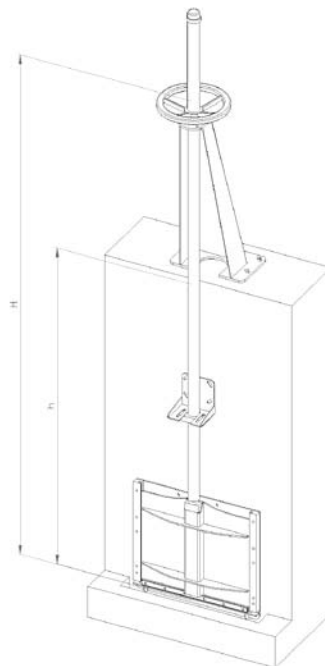
### Non-rising stem

Slide gate with a self-contained frame. The extension does not support axial load, thus less wall supports are required. As a general rule, one support every 3-4 meters of extension should be used.



### Rising stem

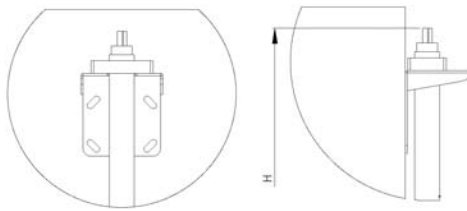
Slide gate with open frame. The extension supports the axial load, thus wall supports must be considered to avoid buckling. One support every 2 meters of extension is necessary.



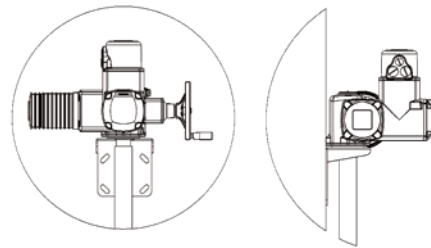
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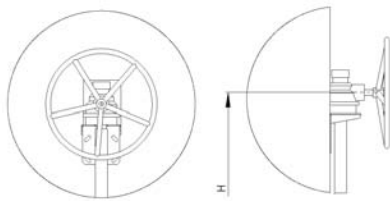
WALL SUPPORT AND SQUARE NUT



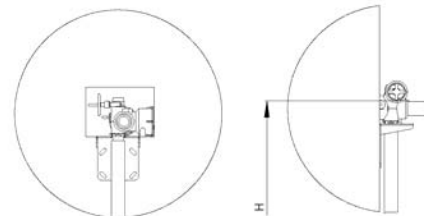
WALL SUPPORT AND HANDWHEEL



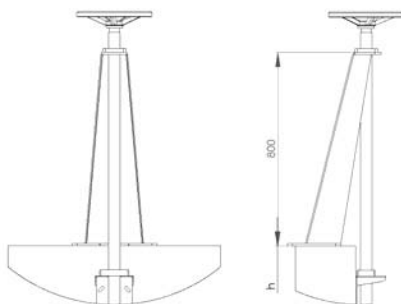
BEVEL GEAR ON WALL SUPPORT



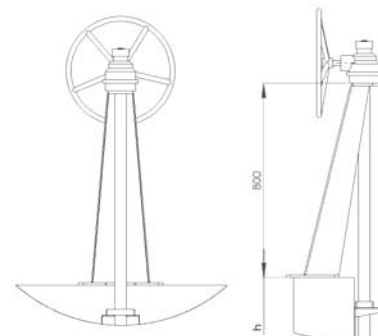
ACTUATOR ON WALL SUPPORT



HANDWHEEL ON INCLINED PEDESTAL



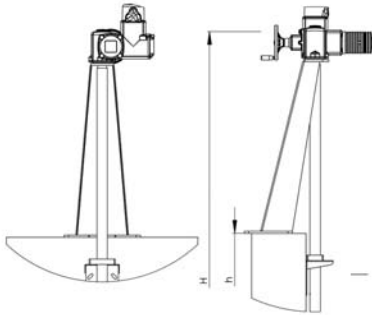
BEVEL GEAR ON INCLINED PEDESTAL



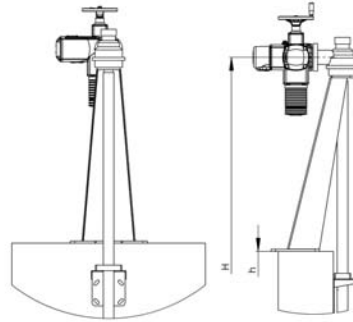
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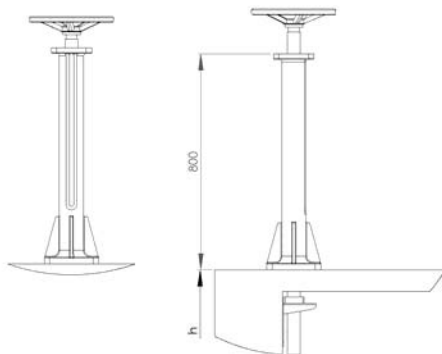
ACTUATOR ON INCLINED PEDESTAL



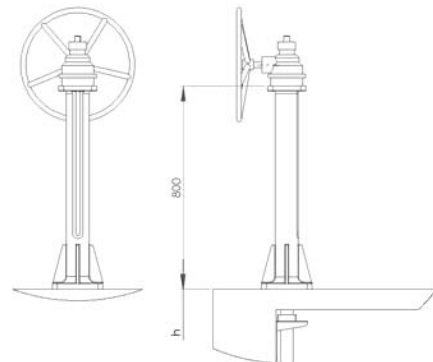
BEVEL GEAR WITH ACTUATOR ON INCLINED PEDESTAL



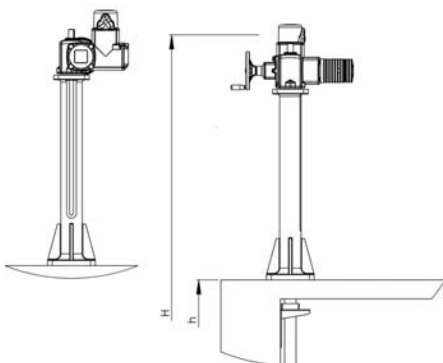
HANDWHEEL ON STRAIGHT PEDESTAL



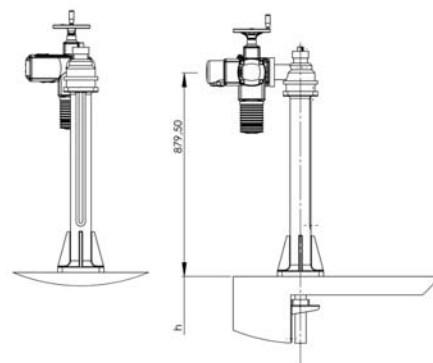
BEVEL GEAR ON STRAIGHT PEDESTAL



MOTOR ON STRAIGHT PEDESTAL



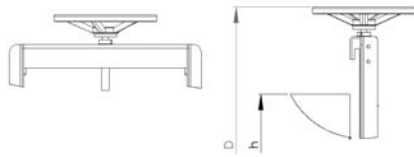
BEVEL GEAR AND MOTOR ON STRAIGHT PEDESTAL



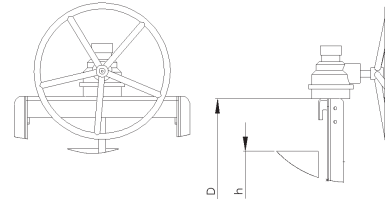
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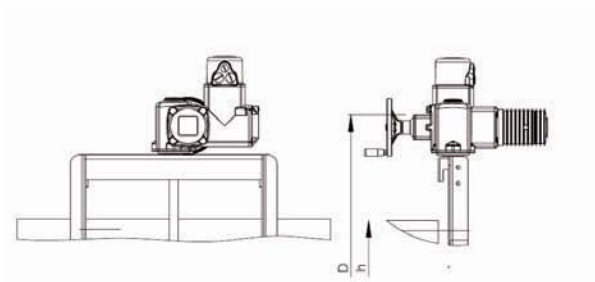
**HANDWHEEL ON FRAME**



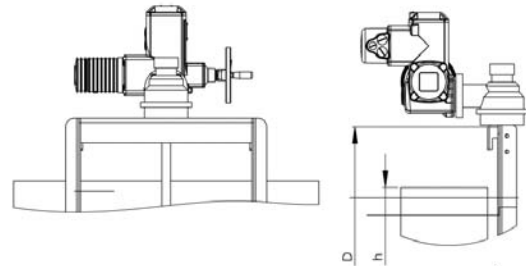
**BEVEL GEAR ON FRAME**



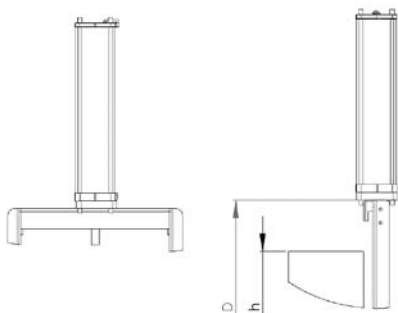
**ACTUATOR ON FRAME**



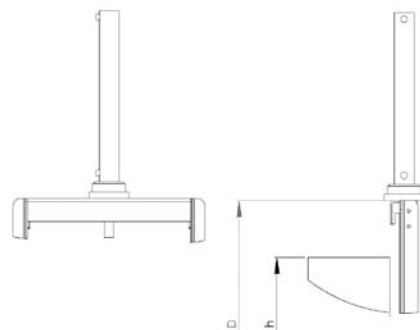
**BEVEL GEAR AND ACTUATOR ON FRAME**



**PNEUMATIC CYLINDER ON FRAME**



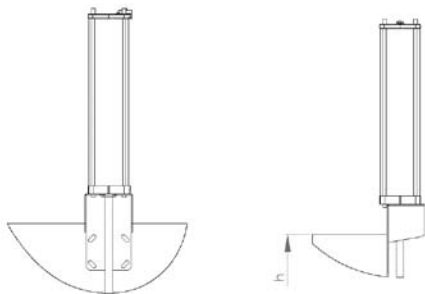
**HYDRAULIC CYLINDER ON FRAME**



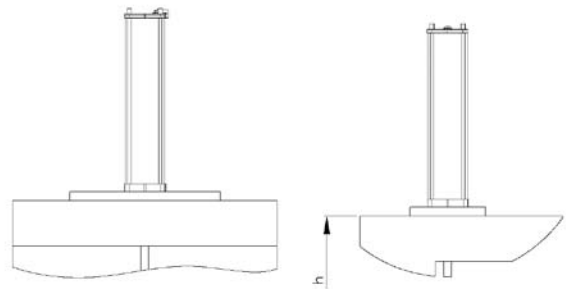
MODEL

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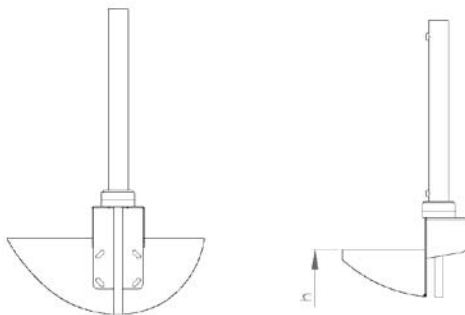
PNEUMATIC CYLINDER ON WALL SUPPORT



PNEUMATIC CYLINDER ON FLOOR SUPPORT



HYDRAULIC CYLINDER ON WALL SUPPORT



HYDRAULIC CYLINDER ON FLOOR SUPPORT

