



XL4 penstock

(Seal on the plate)

made of stainless steel

WITH RECTANGULAR OPENING, 4-SIDED SEALING

Opening size and pressure stage

Opening size 150 x 150 mm to 4000 x 4000 mm

Selectable pressure level on both sides: 2-15 mwc

Frame and plate

- Supplied as pre-assembled penstock which does not require assembly, setting and adjusting works up to 1200 mm
- Design as self-supporting frame construction made of stainless steel with integrated spindle bearing
- Welded frame and penstock plate made of stainless steel, optimised for maximum safety and durability by means of FEM certification
- Bridge screwed on, thereby all wear parts (spindle, spindle nut, spindle bearing and seal) can be exchanged in the installed condition without dismantling the penstock from the structure
- Up to opening size 1200 mm:
Integrated closing wedges in the frame made of stainless steel, in the penstock plate made of polyethylene (PE-UHMW)
- From opening size 1300 mm:
Integrated closing wedges in the frame made of seawater- and wastewater-resistant bronze, in the penstock plate made from stainless steel
- Penstock for embedding in concrete: Equipped with setting sleeve for aligning the penstock in the channel recess
- No offset in rear to front invert level on the embedded penstock
- Welding certificate in accordance with DIN EN 1090-2 EXC2

Material

- Stainless steel 1.4301 (304) / 1.4404 (316L) / 1.4410 (507) / 1.4462 (318LN) / 1.4539 (904L) / A36-hot-dip galvanized

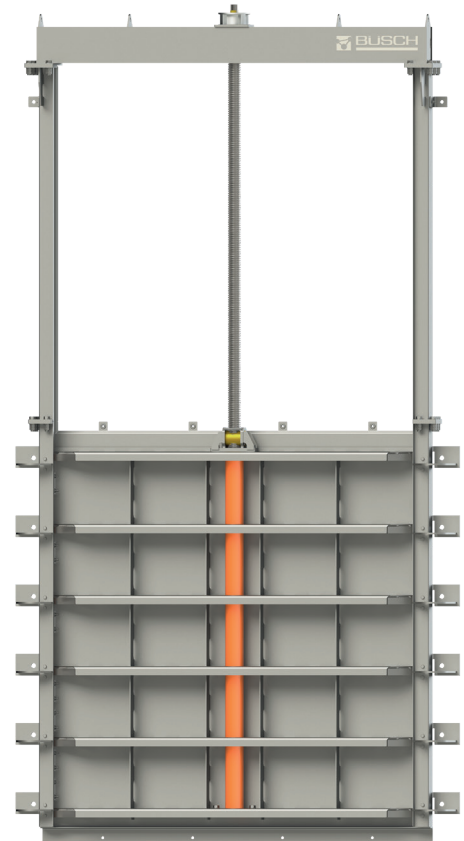
Spindle

- Polyethylene spindle protection
- Spindle with rolled trapezoidal thread made of stainless steel from opening dimensions 150-1600 mm
- Spindle with whirled trapezoidal thread made of stainless steel from opening dimensions 1700-4000 mm
- Single spindle design or twin spindle design
- Spindle nut made of seawater- and wastewater-resistant bronze
Optional: Spindle outside the medium rising or non-rising

Seal

- Assembled on the sliding plate, note profile seal with hot vulcanised (minimum temperature 180°C) BÜSCH UNO corner connections made of wastewater and UV resistant EPDM or oil-resistant NBR
- As standard, the seal can be easily replaced during operation, as the penstock plate can be pulled out upwards
- Optional seal replacement during operation without removing the penstock plate due to possible maintenance position using a raised frame
- Factory pre-assembled seal against the wall made of solid, wastewater-resistant cellular rubber on the seal support with maximum pressure stage 6 mwc on both sides, from 6 mwc (at higher water pressures) a 1-component sealant (SIKAFLEX®) is required with appropriate pre-treatment of the penstock and the structure using a primer
- Seal line 50 mm larger than the masonry opening to prevent leaks on masonry openings

*(multiple frame as of 1300 mm)



XL4 penstock 2000 x 2000 mm

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YOUR ADVANTAGES

- **READY FOR IMMEDIATE USE**
Penstock is delivered ready for assembly*
- **SEAL ON PENSTOCK PLATE**
Can be replaced during operation by pulling out the entire penstock plate
- **VARIANT SEAL IN FRAME**
Due to the maintenance position, the seal in the frame can be replaced during operation using a raised frame
- **FOREVER DURABLE SEAL**
Through vulcanized BÜSCH UNO angle and butt joints
- **PERFECT CORROSION PROTECTION**
All welded stainless steel parts from our own pickling plant
- **OPTIONAL EX-PROTECTION**
On request, the penstock can be proven to comply with the ATEX Directive 2014/34/EU

Leak tightness class

- Leak rate better than DIN EN 19569; Part 4 Table 1:
 - Pressure on front side: max. 1% of $0,021 \cdot s^{-1} \cdot m^{-1}$ (Leak tightness class 5)
 - Pressure on rear side: max. 5% of: $0,02$ to $0,051 \cdot s^{-1} \cdot m^{-1}$ (Leak tightness class 4)
- Alternative:
 - Leak rate on both sides according to DIN EN 12266-2, Part 2, Table A.5: Leak rate C.

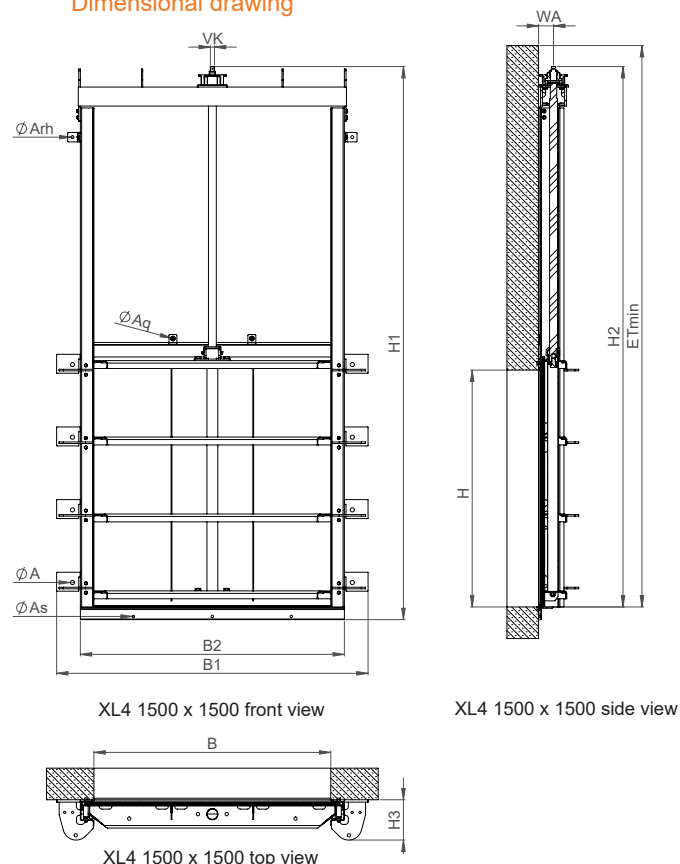
Mounting

- Concreted into recess
- Dowelling to the wall in front of the opening
- Dowelling laterally on the wall
- Dowelling onto the base

Actuation of the penstock

- Stainless steel handwheel on transverse yoke
- Lateral actuation with BÜSCH stainless steel gearbox with stainless steel handwheel or stainless steel crank handle
- BÜSCH All-in-one control key via square cap
- BÜSCH MOBITORQ electric or accu mobile actuators via square stem cap
- BEA® servo stainless steel electric actuator assembled on transverse yoke
Optional: with BÜSCH weather protection roof
- Pneumatic actuation assembled on transverse yoke
- Hydraulic actuation assembled on transverse yoke
- E-Actuator

Dimensional drawing



Dimensions in mm

B x H	150 x 150	200 x 200	250 x 250	300 x 300	400 x 400	500 x 500	600 x 600	700 x 700	800 x 800	900 x 900	1000 x 1000	1200 x 1200
B1	350	400	450	500	600	740	840	1058	1158	1258	1358	1672
B2	210	260	310	360	460	600	700	820	920	1020	1120	1372
H1	493	593	743	793	1008	1240	1140	1745	1945	2145	2345	2902
H2	448	548	698	748	948	1195	1395	1685	1885	2085	2285	2822
H3	ca. 90	ca. 90	ca. 90	ca. 90	ca. 90	ca. 130	ca. 130	ca. 192	ca. 192	ca. 192	ca. 192	ca. 192
ET min.	508	608	758	808	1008	1255	1455	1745	1945	2145	2345	2882
WA	47	50	50	50	50	50	50	67	67	67	67	67
Rev./stroke	31	41	51	61	81	101	121	141	161	181	201	172
VK	□16	□16	□16	□16	□16	□16	□16	□26	□26	□26	□26	□26
A	"2x Ø13 M10x130"			"4x Ø13 M10x130"			"4x Ø19 M16x190"			"6x Ø19 M16x190"		
As	-	-	-	-	-	-	-	-	-	"1x Ø13 M10x130"		
Aq	-	-	-	-	-	-	-	-	-	"2x Ø10 M8x90"		
Arh	-	-	-	-	-	-	"2x Ø10 M8x90"					

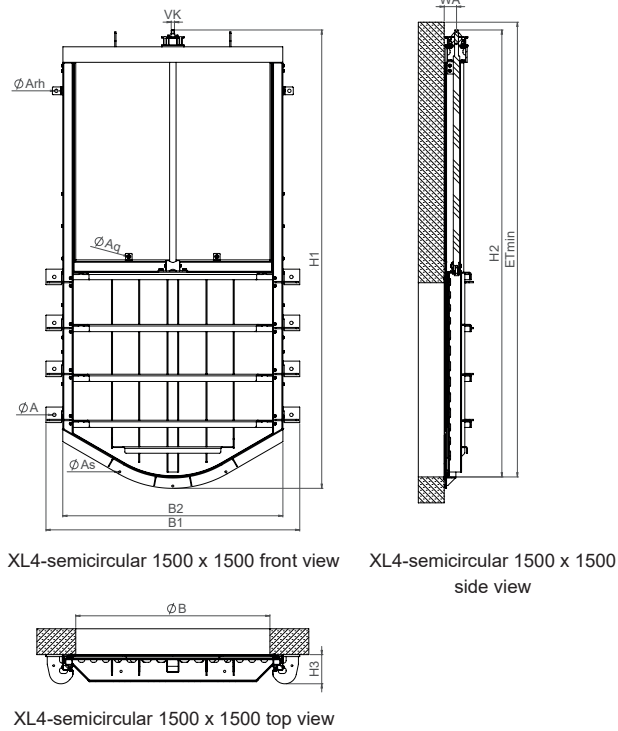
B x H	1300 x 1300	1400 x 1400	1600 x 1600	1800 x 1800	2000 x 2000	2200 x 2200	2400 x 2400	2600 x 2600	2800 x 2800	3000 x 3000
B1	1772	1872	2072	2272	2472	2672	2872	3072	3272	3472
B2	1472	1572	1772	1972	2172	2372	2572	2772	2972	3172
H1	3102	3302	3702	4102	4502	4902	5302	5702	6102	6502
H2	3022	3222	3622	4022	4422	4822	5222	5622	6022	6422
H3	ca. 245	ca. 245	ca. 245	ca. 265	ca. 265	ca. 265	ca. 265	ca. 265	ca. 265	ca. 265
ET min.	3082	3282	3682	4082	4482	4882	5282	5682	6082	6482
WA	95	95	95	95	95	130	130	130	130	130
Rev./stroke	163	176	201	201	223	221	241	261	281	281
VK	□26	□26	□26	□30	□30	□30	□35	□35	□60	□60
A	"8x Ø26 M20x260"			"10x Ø26 M20x260"			On demand			
As	"3x Ø15 M12x160"				"4x Ø15 M12x160"					
Aq	"2x Ø10 M8x90"		"4x Ø10 M8x90"							
Arh	"2x Ø13 M10x130"		"2x Ø26 M20x260"							

Dimensions for other nominal sizes on request.

XL4-semicircular VARIANT* FROM XL4

WITH SEMICIRCULAR OPENING, 4-SIDED SEALING

Dimensional drawing



SPECIAL FEATURES

• ROUND BOTTOM

For easy concreting into the channel, water flow at the same level

*STANDARD DATA: please refer XL4 penstock



XL4-semicircular 2100 x 2100

Dimensions in mm

DN	150	200	250	300	350	400	500	600
B1	350	400	450	500	550	600	740	840
B2	210	260	310	360	410	460	600	700
H1	497	602	696	794	896	1000	1235	1435
H2	407	512	606	704	806	910	1135	1335
H3	ca. 90	ca. 90	ca. 90	ca. 90	ca. 90	ca. 90	ca. 130	ca. 130
ET min.	467	572	666	764	866	970	1195	1395
WA	50	50	50	50	50	50	50	50
Rev./stroke	31	41	51	61	71	81	101	121
VK	□16	□16	□16	□16	□16	□16	□16	□16
A	"2x Ø13 M10x130"			"4x Ø13 M10x130"				

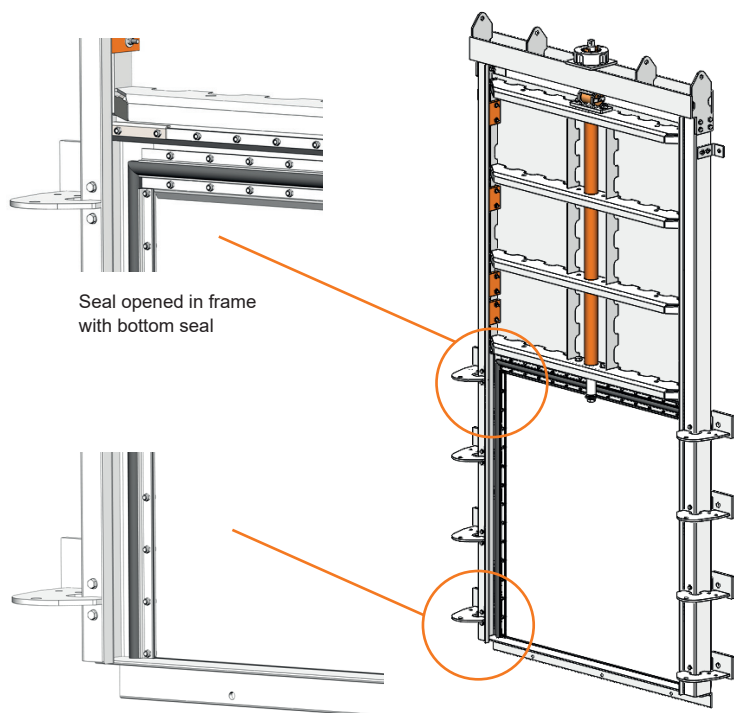
DN	700	800	900	1000	1200
B1	1058	1158	1258	1358	1558
B2	820	920	1020	1120	1320
H1	1750	1950	2151	2353	2749
H2	1606	1806	2007	2210	2605
H3	ca. 192	ca. 192	ca. 192	ca. 192	ca. 192
ET min.	1666	1866	2067	2270	2665
WA	65	65	65	65	65
Rev./stroke	141	161	181	201	241
VK	□26	□26	□26	□26	□26
A	"4x Ø19 M16x190"		"6x Ø19 M16x190"		
As			"3x Ø13 M10x130"		
Aq			"2x Ø10 M8x90"		
Arh			"2x Ø13 M10x130"		

Dimensions for other nominal sizes on request.

XL4 Penstock with wedges

VARIANT* FROM XL4 - SEAL IN FRAME

Dimensional drawing & Sealing principle



Seal in frame

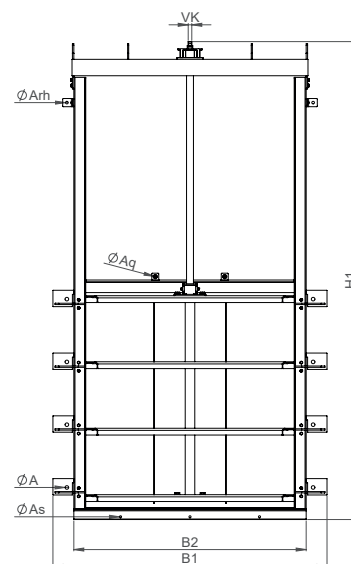
XL4 Penstock with wedges in maintenance position

SPECIAL FEATURES

• SEAL IN FRAME

Seal replacement during operation without penstock plate removal - a raised frame allows the slide plate to be moved into maintenance position

*STANDARD DATA: please refer XL4 penstock



XL4 with seal in frame 1500 x 1500 front view

Dimensions in mm

B x H	150 x 150	200 x 200	250 x 250	300 x 300	400 x 400	500 x 500	600 x 600	700 x 700	800 x 800	900 x 900	1000 x 1000	1200 x 1200
B1	350	400	450	500	600	740	840	1058	1158	1258	1358	1672
B2	210	260	310	360	460	600	700	820	920	1020	1120	1372
H1	583	683	833	883	1098	1330	1230	1835	2035	2235	2435	2992
H2	448	548	698	748	948	1195	1395	1685	1885	2085	2285	2822
H3	ca. 90	ca. 90	ca. 90	ca. 90	ca. 90	ca. 130	ca. 130	ca. 192	ca. 192	ca. 192	ca. 192	ca. 192
ET min.	508	608	758	808	1008	1255	1455	1745	1945	2145	2345	2882
WA	47	50	50	50	50	50	50	67	67	67	67	67
Rev./Stroke	31	41	51	61	81	101	121	141	161	181	201	172
VK	□16	□16	□16	□16	□16	□16	□16	□26	□26	□26	□26	□26
A	"2x Ø13 M10x130"				"4x Ø13 M10x130"			"4x Ø19 M16x190"		"6x Ø19 M16x190"		
As	-	-	-	-	-	-	-	-	-	"1x Ø13 M10x130"		
Aq	-	-	-	-	-	-	-	-	-	"2x Ø10 M8x90"		
Arh	-	-	-	-	-	-	"2x Ø10 M8x90"					

B x H	1400 x 1400	1600 x 1600	1800 x 1800	2000 x 2000	2200 x 2200	2400 x 2400	2600 x 2600	2800 x 2800	3000 x 3000
B1	1872	2072	2272	2472	2672	2872	3072	3272	3472
B2	1572	1772	1972	2172	2372	2572	2772	2972	3172
H1	3406	3806	4206	4606	5006	5406	5806	6206	6606
H2	3222	3622	4022	4422	4822	5222	5622	6022	6422
H3	ca. 245	ca. 245	ca. 265	ca. 265	ca. 265	ca. 265	ca. 265	ca. 265	ca. 265
ET min.	3282	3682	4082	4482	4882	5282	5682	6082	6482
WA	95	95	95	95	130	130	130	130	130
Rev./Stroke	176	201	201	223	221	241	261	281	281
VK	□26	□26	□30	□30	□30	□35	□35	□60	□60
A	"8x Ø26 M20x260"		"10x Ø26 M20x260"			On demand			
As	"3x Ø15 M12x160"			"4x Ø15 M12x160"					
Aq	"2x Ø10 M8x90"	"4x Ø10 M8x90"							
Arh	"2x Ø13 M10x130"	"2x Ø26 M20x260"							

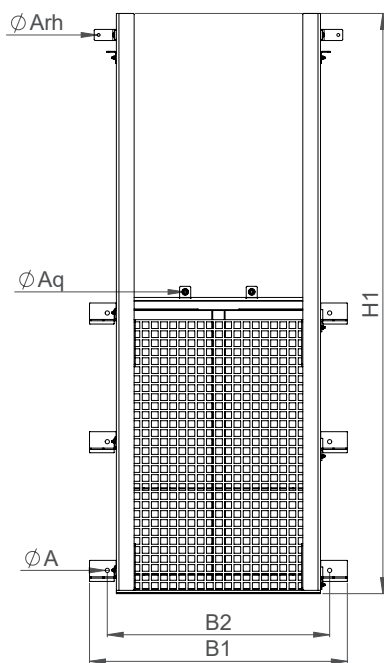
Dimensions for other sizes on request.

XL4 with GRP-Bar screen VARIANT* OF XL4

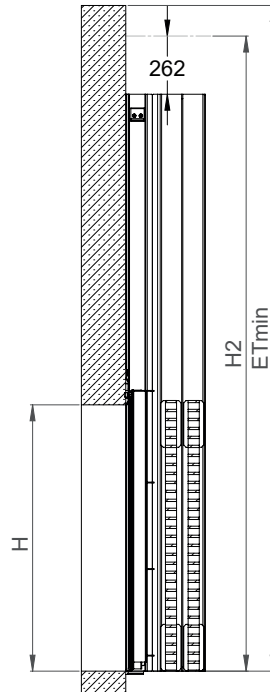
WITH RECTANGULAR OPENING, 4-SIDED SEALING

Dimensional drawing

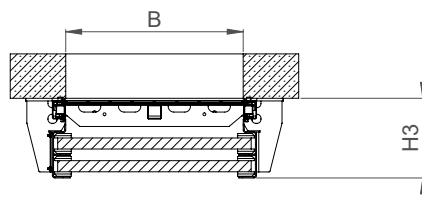
Doweled directly onto the building base



XL4 with GRP-Double bar screen 800 x 1200 front view



XL4 with GRP-Double bar screen 800 x 1200 side view



XL4 with GRP-Double bar screen 800 x 1200 top view

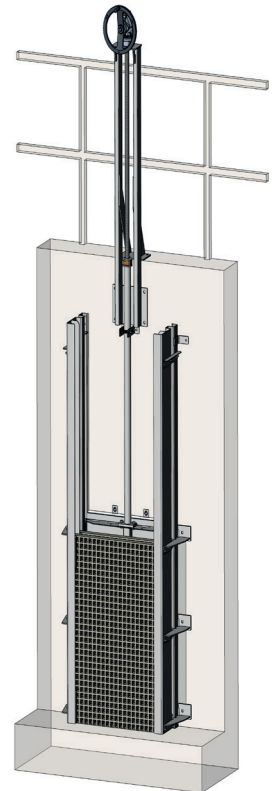
All dimensions in mm.

Dimension "H3" depends on the size of the bar screen

SPECIAL FEATURES

- XL4 penstock with integrated GRP bar screen in single or double bar screen version (GRP = glass fiber reinforced plastic bar screen)

*STANDARD DATA: please refer XL4 penstock



View XL4 with integrated GRP-Double bar screen 800 x 1200

Dimensions

For dimensions see table XL4 Standard. All dimensions in mm. Shown with the DR sole assembly type.

Mounting types

All mounting types of the XL4 Standard are possible with the version with GRP (glass fiber reinforced plastic) bar screen.



XL4 weir type penstock (Seal in frame)

made of stainless steel

WITH RECTANGULAR OPENING, 4-SIDED SEALING

Opening dimensions und pressure level

Opening dimensions 200 x 200 mm to 4000 x 2500 mm

Selectable pressure levels on both sides: 2-6 mWS

Frame and panel

- Supplied as pre-assembled penstock which does not require assembly, setting and adjusting works up to 1200 mm *(multiple frame as of 1300 mm)
- In the opening sizes 200 x 200 mm to 600 x 600 mm, the penstock is manufactured without a base plate
- Design as self-supporting frame construction made of stainless steel with integrated spindle bearing
- Welded frame and slide panel made of stainless steel, optimised for maximum safety and durability by means of FEM certification
- Bridge screwed on, thereby all wear parts (spindle, spindle nut, spindle bearing and seal) can be exchanged in the installed condition without dismantling the penstock from the structure
- Integrated sliding wedge made from Polyethylen (PE-UHMW)
- Penstock for embedding in concrete: Equipped with setting sleeve for aligning the penstock in the channel recess
- No offset in rear to front invert level on the embedded penstock
- Welding certificate in accordance with DIN EN 1090-2 EXC2

Material

- 1.4301 (304) / 1.4404 (316L) / 1.4410 (507) / 1.4462 (318LN) / 1.4539 (904L) / A36-hot-dip galvanized

Spindle

- Polyethylene spindle protection
- Spindle with rolled trapezoidal thread made of stainless steel from opening dimensions 200-1600 mm
- Spindle with whirled trapezoidal thread made of stainless steel from opening dimensions 1700-4000 mm
- Single spindle design or twin spindle design
- Spindle nut made of sea and wastewater-resistant bronze
- Optional: Spindle outside the medium rising or non-rising (easier to lubricate)

Seal

- Twin-lipped seal assembled in the frame with hot vulcanised (minimum temperature 180°C) BÜSCH UNO corner connections made from wastewater and UV resistant EPDM or oil-resistant NBR
- Easy replacement of the seal possible during operation, as the slide plate can be pulled upwards
- Factory pre-assembled seal against the wall made of solid, wastewater-resistant cellular rubber on the seal support with maximum pressure stage 6 mWC on both sides
- Seal line 50 mm larger than the masonry opening to prevent leaks on masonry spalling



XL4 lowering type penstock 1200 x 600 mm



YOUR ADVANTAGES

- **READY FOR IMMEDIATE USE**
Penstock is delivered ready for assembly*
- **SEAL IN FRAME**
Clear control options, seal is on both sides completely in place even in the intermediate position
- **PERFECT CORROSION PROTECTION**
All welded stainless steel parts from our own pickling plant
- **OPTIONAL EX-PROTECTION**
On request, the penstock can be proven to comply with the ATEX Directive 2014/34/EU

Leak tightness class

- Leak rate better than DIN EN 19569; Part 4 Table 1:
 - Pressure on front side: max. 1% of $0.02 \text{ l} \cdot \text{s}^{-1} \cdot \text{m}^{-1}$ bis $0.05 \text{ l} \cdot \text{s}^{-1} \cdot \text{m}^{-1}$ (Leak tightness class 4)
 - Pressure on rear side: max. 5% von: 0.02 of $0.1 \text{ l} \cdot \text{s}^{-1} \cdot \text{m}^{-1}$ (Leak tightness class 3)

Actuation of the penstock

- Stainless steel handwheel on transverse yoke
- Lateral actuation with gearbox with BÜSCH stainless steel
- gearbox with stainless steel handwheel or stainless steel crank handle
- BÜSCH All-in-one control key via square cap
- BÜSCH MOBITORQ electric or accu mobile actuators via square stem cap
- BEA®servo stainless steel electric actuator assembled on transverse yoke
- Optional: with BÜSCH weather protection roof
- Pneumatic actuation assembled on transverse yoke
- Hydraulic actuation assembled on transverse yoke



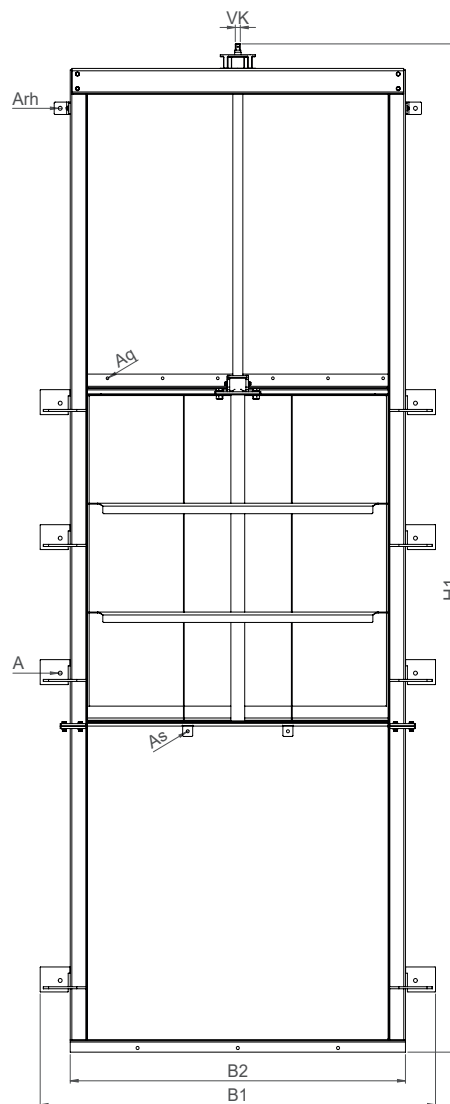
XL4 lowering type penstock 1200 x 600 mm

B	Please specify when ordering
H	
B1	Size dependent
B2	
H1	Size dependent
H2	
H3	
H4 min.	= H + 150 mm
ET min.	Please specify when ordering
WA	Size dependent
Rev./Stroke	
VK	
A	
As	
Aq	
Arh	

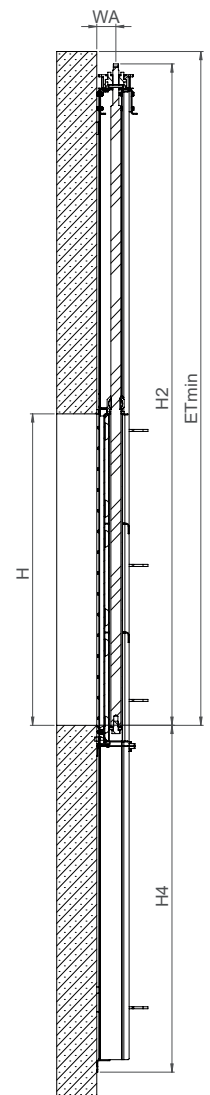
Mounting

- Concreted into recess
- Dowelling to the wall in front of the opening
- Dowelling laterally on the wall
- Dowelling onto the base

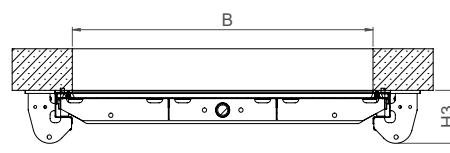
Dimensional drawing



XL4 lowering type penstock 1500 x 1500
front view



XL4 lowering type penstock 1500 x 1500
side view



XL4 lowering type penstock 1500 x 1500 top view



Lubrication

centralized and decentralized

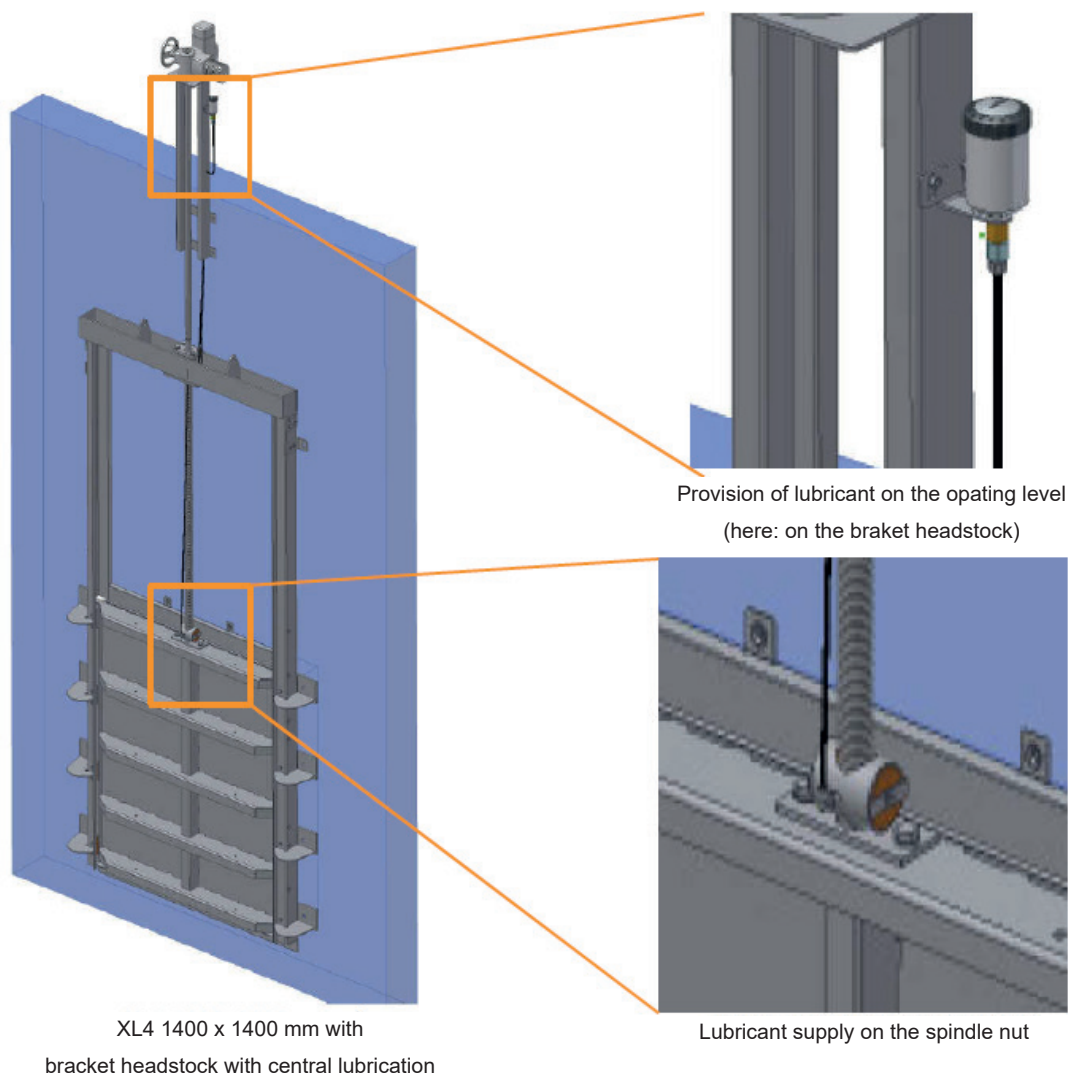
The service life of bearings and threads can be significantly extended by regular lubrication. Furthermore, regular lubrication reduces friction and therefore the necessary drive torques. Easier operation and possibly smaller actuators are the positive effects.

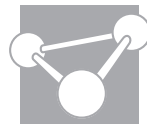
BÜSCH Technology offers two different lubrication systems for the spindle slides: centralized and decentralized lubrication.

With centralized lubrication, the lubricant is supplied centrally at an easily accessible location near the operating level and fed to the points to be lubricated via hoses. The advantage of centralized lubrication is the central and easy-to-use lubricant supply, which makes refilling the grease uncomplicated.

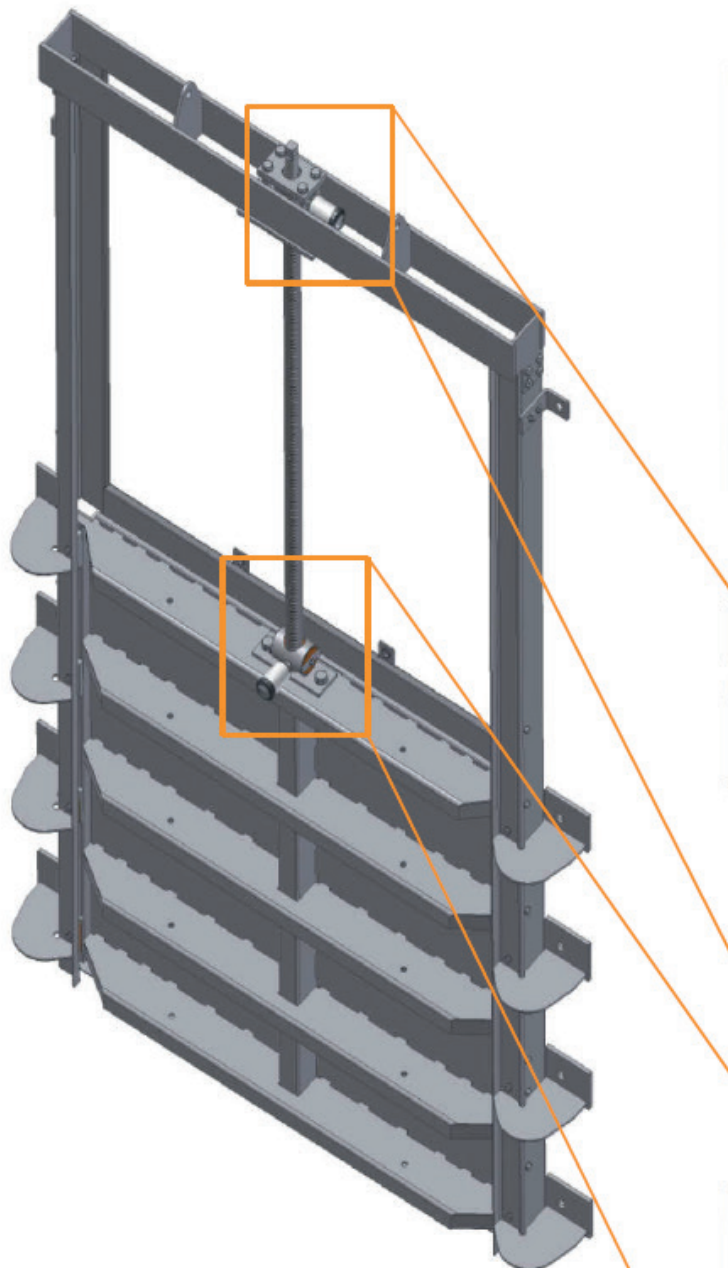
In decentralized lubrication, the parts to be lubricated are provided directly with the lubricant cartridges. This means that grease cartridges are fitted directly to the bearings, spindle nuts and other parts to be lubricated. The advantage of decentralized lubrication lies in the possibility of supplying different parts with different greases (e.g. if the spindle nut is permanently in the medium).

Examples of centralized lubrication





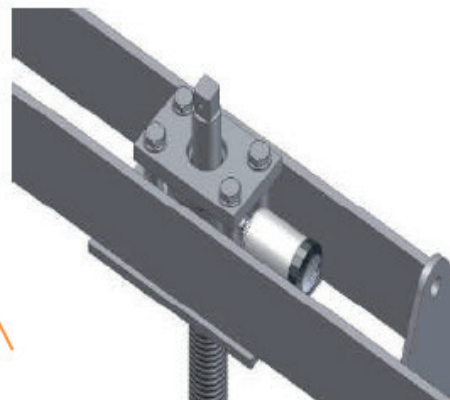
Examples of decentralized lubrication



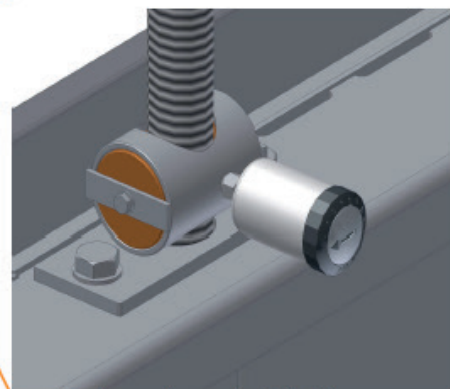
XL4 1600 x 1600 with decentralized lubrication of spindle bearing and spindle nut



Grease cartridge on the spindle bearing when using a penstock with rising spindle



Grease cartridge on the spindle bearing



Grease cartridge on the spindle nut