

AQUJIKO

Operation & Maintenance Manual

PENSTOCK



Trading as Aquatic Control Engineering Ltd

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Introduction and Purpose

The AQUIKO APS-PE Penstock is designed for multiple uses, in a wide range of water environments including fresh, surface, waste, certain chemicals and saltwater.

The APS-PE is fitted as standard with a non-rising spindle, with a Polyacetal nut block, meaning that it does not need greasing- even after a long period of no use, the penstock can be relied upon- this is particularly useful in secondary protection, emergency shut off and maintenance isolation applications. The material remains suitable however for regular use, so it can be used in many other more arduous conditions.

The APS-PE Penstock is a device which lifts vertically (sometimes described as a sluice or knife valve) to regulate flow, or to isolate pipework. It is most commonly driven by a non-rising threaded spindle, however variants of this, and other options, are available on request.

Technical and Material specifications (summary)

The APS-PE is manufactured using a combination of High Density Poly Ethylene (HDPE) and Stainless Steel 316, making the equipment:

- Very robust, yet much lighter than comparable strength materials
- Low friction (coupled with lighter weight) allows much lower force required to operate
- Suitable for harsh environments, including Sewage and Seawater
- UV Stable, recyclable and low - carbon - long lasting
- Virtually Maintenance Free- Only requires occasional visual inspection
- Available with a range of operation options and drive variants

Safety Considerations

- Prevention of unauthorised access and vandalism/theft
- Prevention of trapping during hoisting/maintenance
- General construction installation hazards
- If actuated- guards, emergency stops and isolation should all be installed as appropriate.



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If in doubt, please contact ACE for copies of the design-risk assessment (DRA-APS-PE) for advice on suitable control measures.

NOTE: In some cases, particularly where actuated, the installer may be responsible for UK-CA certification of the incorporated system. Please contact ACE if you require advice on this.

Storage

Prior to installation, the APS-PE should be stored on a suitably sized pallet, supported flat on a horizontal surface, and away from sources of damage, contamination and tampering.

Fixings that are supplied may also be provided in perishable containers (e.g., boxes)- these should be stored in dry conditions, away from contamination, particularly from other metals.

Installation

Clean and check the mounting surface:

- a. For sealing, this should be within a 2-3mm tolerance per metre, and any pockets or lumps needs to be resolved before fitting.
- b. The surface should be vertical.
- c. Clean and, where possible, dry the surface to remove dirt and grease.
- d. Check all dimensions to ensure fit.

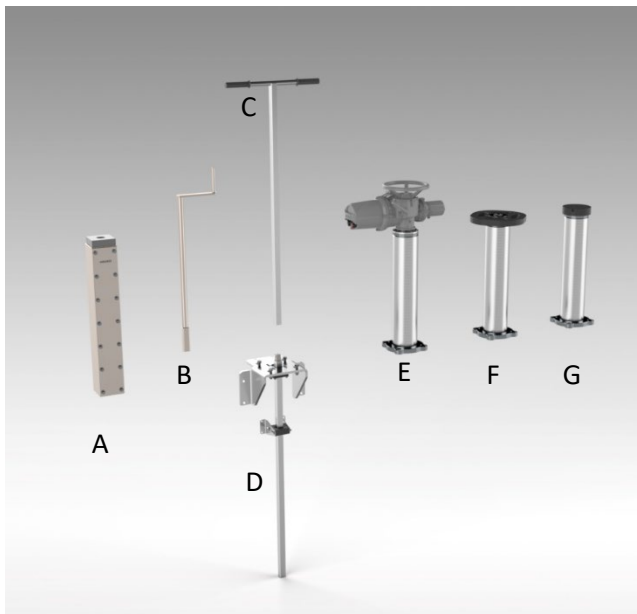
Prepare the APS-PE:

- a. Position the APS-PE in place over the outfall, with the inverts of the outfall and APS-PE backplate aligned.
- b. Ensure the APS-PE is level and vertical and secure to prevent movement.
- c. Mark the mounting holes on the wall.
Note: We would recommend starting with the top corner fixings, and installing these bolts- this prevents movement of the APS-PE when marking the other holes.
- d. Clean the surface of the APS-PE back plate to remove dirt, grease and water.
- e. Apply sealant in a continuous 5mm bead around the opening and around the fixing holes (take care not to smear this when moving the APS-PE into position).
- f. Re-position the APS-PE as before, and install the top corner anchors as per the resin manufacturer's instruction (enclosed with fixing kit).

- g. Continue to install the remaining side frame anchors in the wall.
- h. To ensure a good seal, check that no resin has exited the fixing hole- remove any resin that would prevent the frame sitting flat to the wall.
- i. Once cured, secure the APS-PE to the wall using a washer, spring washer and nut on each bolt.
- j. Tighten all fixings evenly, to the recommended torque. *Note: On larger flaps, the fixings may require multiple tightening as the seal is compressed.*
- k. Place the plugs in the holes of the invert and soffit beams, and secure using the screw-anchors.

Accessories/Operation Options:

There are various options that are available for use with the APS-PE Penstock- these are often also used in combination with each other- if in doubt, please contact us.



A- Budget column (suitable for up to 600mm penstock, non-rising spindles)

B- S Key

C- T Key

D- Spindle extension (various lengths)

Pipe pedestal options (for larger sizes)

E- Electric Actuator (on Pipe column)

F- Handwheel (lockable on request)

G- Lockable cap- for use with battery driver or removable handwheel.

Manual Key operation (B and C)

The S key and T Key options can be used either on the penstock itself or on a spindle extension. The items are placed onto the operation point and turned manually as required. These are only suitable up to a 600mm diameter due to water pressure and operation force required, but are ideal for infrequent use or remote sites.

Spindle extensions (D)

These are commonly used to place the operation point of the penstock at a comfortable level for operation.

To confirm the length of the spindle extension required, measure between the top of the penstock and the point you wish to operate the penstock at:

- For T and S Key operations, this is at floor level
- For actuated or handwheel operations (any with a pedestal) this is at the top of the pedestal.

Installation

- Measure the extension stem length and cut to size (NOTE: If using a pedestal, ensure sufficient stem is present for the pedestal and engagement into the drive).
- Position the spindle extension onto the operation point of the penstock and align vertically in both planes.
- Place the locking ring assembly onto the stem loosely, just under the position for the top bracket.
- Position the brackets so that the top bracket is around 50mm from the top of the mounting surface/extension stem, and any further brackets below at no more than 1.5m centres.
- Mark and drill the mounting holes for the brackets onto the wall, and fix using resin anchors (follow resin manufacturer's instructions, delivered with the fixing kit).
- Position and secure the locking ring just under the top bracket- this stops the extension stem from being removed.
- Adjust the position of the mounting bracket to ensure the extension stem is vertical and runs smoothly.

Pedestal Options

Pedestals place the operation point around waist height, to make it comfortable and safe for operation at ground level.

All pedestal options are available for floor mounting or wall mounting, in the following variants:

- Budget column- this is a lightweight option for manual penstocks, with non-rising spindles up to 600mm diameter.



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- Pipe column- this is heavier duty, allowing for actuation, larger sizes of penstock, rising spindles (due to thrust loading) and the use of the AQUIKO torque booster.

Installation

- a) Position the pedestal over the spindle extension stem and ensure there remains sufficient length to engage with the drive option chosen.
- b) Align with the centre of the drive stem, and check for vertical/level.
- c) Mark and drill the mounting holes, and fix with resin according to the manufacturer's instructions (with the fixing kit). These will also be on the wall face if using a wall mounting option.
- d) Once cured, tighten all fixings evenly to recommended torque.

Operation options

Pedestal variants can be used with fixed and removable handwheels as well as battery drivers in some cases, and all are available with locking systems on request. The pipe pedestal can also be used with Actuators to automate the penstocks.

For installation/configuration advice regarding the operation options, please contact us.

Cleaning and Maintenance

NOTE: The APS-PE is designed to require minimal maintenance, so NO GREASING is required- grease can attract dirt and reduce the lifespan of the equipment.

The APS-PE requires occasional visual inspection only, to check for damage, obstruction etc. In certain environments, it may also require cleaning to prevent build up that could cause obstruction; however, this is uncommon.

To clean the equipment, use clean water and a stiff brush.

Disposal

1. Remove the equipment and sort materials into groups.
2. Dispose of all metallic items via registered scrap dealers.
3. Dispose of all recyclable materials via registered carriers/local recycling. (HDPE can be recycled into reusable material, however used in it's pure form in this construction for strength).